

Design Management as a Driver for Innovation in SMEs

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Abstract

Innovation is the key-driving factor for economic growth and social wealth. Innovative products and services emerge more often as a result of cross-sectorial combination of technologies, design and business models. The European Union approved in summer 2011 the South Baltic project 'Design EntrepreneurSHIP' in order to develop and foster design management approaches and instruments for the SME sector. The project work was followed by an evolutionary approach supported by semi-structured interviews, qualitative and quantitative surveys and expert assessments. The paper presents accumulated results by highlighting expectations and needs of entrepreneurs concerning a SME-suitable design management model and a skilled design management, forging innovation and sustainable entrepreneurial growth.

Keywords: *design management, innovation, entrepreneurship, small and medium-sized enterprises, competitiveness, technology-driven SMEs.*

INTRODUCTION

In recent times, design gained growing attention in the context of entrepreneurship and innovation as a powerful tool for company development and business performance (Kotler & Rath, 1984). An empiric research study of the German Design Council (GDC, 2010) proved the influence of design on cost saving, business processes' improvements and sustainability but it also revealed that this role is broadly underestimated among companies, especially among SMEs. Indeed, traditionally design has been affiliated with products and their uses, their shapes, colours, etc. or just been treated as a matter of mere styling. Today, however, design has been 'repositioned' and new possibilities were opened up for design to play: within manufactur-

ing, business development, industrial and social innovation and, recently, digital economy domains (Inglewood & Youngs, 2014; Hack *et al.*, 2013). Design is used not just for manufacturing anymore, but also for daily life, becoming a driving force on the entire manufacturing process and the entire lifecycle (Elsy, 2015). Design affects the entire ecosystem and leaves positive ecological, environmental and sustainable imprints, e.g. in the manufacturing sector, enables to generate technological innovations or achieve social inclusion through being heart within social innovation development process (Brown & Wyatt, 2010). Indeed, as the scholarly discourses showcase, design has become an important tool related to the business development, innovation and entrepreneurship (Borja de Mozota, 1998, 2003a, 2003b, 2006; Raulik *et al.*,

2008; Cooper & Press, 1995; Dumas & Mintzberg, 1989; Walsh *et al.*, 1992; Turner, 2013). Design as an approach and tool is notably multi-faceted and opens up new perspectives in all challenged societal and economic arrays, for instance, through inclusive design by integrating customers, end-users and information needs (Coleman *et al.*, 2007; Bound & Coleman, 2005). Other concepts refer to design as design for all, social design or eco-design (Ljunberg, 2007) as well as design for social responsibility (Persson *et al.*, 2015; Bochinska, 2011), collaborative design (Sebastian, 2004), green design (Adhikary, 2008) and sustainable design (Heylighen, 2008; Novak, 2014; Nielsen *et al.*, 2009; Fargnoli *et al.*, 2014; Laszlo & Cooperrider, 2007). As a result, different manifestations to design confirm the movement of design within the management practice from the form of design just being the heart of the operational and tactical practices to that of changing organisations and organisational culture. Although the role of design attitudes, skills, methods and techniques needed for product and service development, improvement of operational practices in organisation and issues related to strategic vision and positioning are still on the agenda, the focus shifts towards design aiming at cultural reform, and its best, seeking to bring innovations to organisations that have to adopt to new circumstances of economic competition, social expectation and cultural understanding (Buchanan, 2015, p. 5; Deserti & Rizzo, 2014, p. 36; Lockwood, 2004, p. 37).

Paradoxically, although effectiveness and efficiency of design as a tool, process, style, way of thinking and acting had been acknowledged already by scholars from different disciplines, design integration within practice-oriented small business interactions, particularly within the SMEs context has been largely marginalised (Moultrie *et al.*, 2007, p. 335) or failed successful utilisation when compared to other type of organisations or other business settings (Bruce *et al.*, 1999; Dickson *et al.*, 1995; Walsh & Roy, 1985; Cawood, 1997; Ward *et al.*, 2009; Yström & Karlsson, 2010; Matthews & Bucolo, 2011; Bucolo & Matthews, 2011; Fernandez-Mesa *et al.*, 2013; Barison, 2015). It is a paradox of missing competences, lack of practice-oriented concept of dealing with design in small businesses or lack of design integration within small business

support programmes (Raulik *et al.*, 2008; Moultrie & Livesey, 2009; World Design Survey Report, 2010). Too less attention has been paid to reveal the pattern-related design impact, i.e. how does design process take place, what processes, frameworks, tools can be adopted by enterprises to assist them in using design and becoming more design-oriented by means of policy support and design intervention programmes (Bucolo & Matthews, 2011, pp. 4–5; Ward *et al.*, 2009, p. 78) as well as what challenges, opportunities and implications are related to design process within smaller enterprises (Gemser & Lenders, 2001; Hertenstein *et al.*, 2005; Moultrie *et al.*, 2007; Fernández-Mesa *et al.*, 2013; Erichsen, 2014; Kortesoja, 2013; Maroni *et al.*, 2015). Potential reasons related to missing or failed design integration in management practice, i.e. design management can be traced back also to the missing ability of design management to adopt to management function (Sun *et al.*, 2011); unawareness of design as strategic resource, limitations of human and financial resources related to design capacity building (Gorb & Dumas, 1987; Moultrie *et al.*, 2007) as well as non-existent and less formal product development and innovation process (Fueglistaller, 2004; Boulton, 2006, etc.).

As a result, there is a missing practical answer to enterprises of how is then efficient and effective design process organised that leads to innovations, organisational culture reform, how it is implemented in the practice of management, i.e. how does design management take place. The missing answers to these raised questions serve as a scientific impetus for the researchers and thus constitute the research question. What implications for small business might be gained from the implemented design integration and its effective and efficient management frame the research gap formulated by the researchers. Similar concerns have been recently raised by contemporary scholars (Bucolo & Matthews, 2011; Yström & Karlsson, 2010; Barison, 2015). Therefore, the objective of this research is to provide practitioners (small enterprises) with specific design management framework, which can be used within entrepreneurial practices of technology-driven micro and small enterprises and clearly shows what and how processes, tools, methods, resources and techniques can be efficiently

interlinked.

Bearing this problematic nature and research gap in mind, the European Commission acknowledged the importance of the SME sector as the backbone of the EU economy and launched in 2012 the 'Entrepreneurship 2020 Action Plan – Reigniting the Entrepreneurial Spirit in Europe' stressing that future growth and competitiveness needs to be smart, sustainable and inclusive addressing their principal societal challenges (EC, 2012, p. 3). By following Candi (2005), the European Commission perceives design as part of the innovation process, which encompasses activities enhancing the value inherent in products and services by combining design with technology and commercialising the result, both functionality and aesthetics of the final result can be achieved. Similarly, in the Oslo Manual (OECD/EC, 2005) dedicated to the innovation policy and its measurement, design is seen as part of innovation, i.e. integral part of the development and implementation of product innovations. In this manual, design is linked to innovations through three dimensions: R&D, products / services and marketing. As a result, design is inherent throughout the entire development and innovation process, having its roots in the first ideation and understanding phase. It is not just a form, appearance of a product, service or marketing. It is a function, value and strategic resource along the entire value development chain.

In the frame of the EU-funded project 'Design EntrepreneurSHIP' a group of German, Polish and Swedish partners from the South Baltic Sea Region (SBSR) aimed at providing the regional SMEs with specific SME-oriented concepts and frameworks on how to integrate creativity and design into entrepreneurial practices and product development and to spur innovation and growth. The present paper builds therefore on key tenets relating to SMEs strategic orientation, innovation, competitiveness and growth in connection to design management and presents the design-driven approach, practice-oriented approach for SMEs based on the empirical inquiry – design management model. The authors argue that design integration within business interactions may lead towards business success expressed through variables such as increased innovation capacity, better competitiveness

or growth potential.

THEORETICAL FRAMEWORK

Being important vehicle of regional and national economy, SMEs have become a major player in the economic world. According to the EU Policy Paper 'Regional Policy for Smart Growth of SMEs', the key aim is to increase the strategic focus of SMEs making them more innovative, thus contributing to competitiveness and growth, as innovation is the key to both (p. 1). To envisage such a business success from the entrepreneurial and managerial point of view, design integration within the business array is perceived through merging design perspective with theoretical approaches from organisation and innovation management literature. Empirical cases demonstrate the special role of an integral innovation approach merging design, business and technology and becoming a key driving force for innovation performance, economic growth and competitive advantage for SMEs (Prause *et al.*, 2012). One important argument for combining design, technology and business activities in product, service or organisational development arises from the fact that clients perceive products as a bundle of properties, where design emotionally attracts and influences clients, whereas technology generates satisfaction during the later usage of the product. This consideration underpins the advantage of an integral concept for design, technology and management in order to meet the customer expectations. A design-caused quick emotional effect of a product will be successful on the market if and only the technology is able to affirm rationally the emotional expectations by positive experiences during the product life time (Wood *et al.*, 2011).

Consequently, design integration becomes viable matching diverse approaches based on their common conceptual meanings or shared values and propositions and building upon complex and mixed conceptual framework. There is needed a better partnership between design and management (Johansson & Woodilla, 2008, p. 1). This viewpoint clearly underpins the research objectives and the identified research gap – to merge design, technology and business within enterprise development to achieve a better organisational performance

leading to innovation, growth and competitiveness. In fact, is an important to link all the actors in the innovation process, both inside and outside of the firm and to establish and maintain the role of designer as a 'gatekeeper' facilitating such linkages (Walsh, 2000, p. 88).

Against this background, design domain integrates principles of value creation and exploitation – design for innovation, competitiveness and growth, while business domain embraces value creation and its capturing residing in strategy, competition and innovation. As a result, taking into account the common conceptual thread of the affiliated approaches, design and management may result in design management perspective, a concept, which is still being highly debatable, depending on the scholarly or research array the angle therefore is placed on design. There are myriad of definitions proposed by scholars and practitioners on design management (Best, 2015). Already in 1998, the Design Management Journal counted more than 18 different views on the definition of design management (p. 14). Over the last 50 years, new areas of application entered the scientific and practice-oriented discourses, and new definitions were formulated. However, taking into account the research objectives, the best suitable definition of design management to be applied in the present research environment is that one that links the peculiarities of design process, design being an act and outcome with positive impact on entrepreneurial competitiveness, innovation and smart growth, i.e. an interdisciplinary, process-based approach (Hack *et al.*, 2012; Prause *et al.*, 2012; Er, 1997; Martin, 2009; Brown, 2008; Brown & Wyatt 2010; Best, 2011, 2015; Kaivo-oja, 2012; Whyte *et al.*, 2015, etc.).

The 'universality' of design management application has been already evident decades ago. Although further attempts towards strengthening role of design and acknowledgment of design as management function were made globally and in Europe, it is stressed that the vestiges of design management are rather of the European nature, associated with such scholars as Farr, 1965 and Gorb, 1976 (Chung, 1998, p. 66; Acklin & Fust, 2014, p. 2; Erichsen & Christensen, 2013, p. 107). Scientific literature on design management has been increasingly filled from the 2000s onwards

with understanding, analysing and evaluating new constructs in the context of emerging and strengthening complexity in the social and economic settings. New business models have started to evolve that integrated design tools – design management and design thinking concepts and approaches were under scrutiny of scholars from both design and management fields (Osterwalder & Pigneur, 2011; Osterwalder *et al.*, 2014; Brown, 2008, etc.). Managerial approach implies using design as a reaction, whereas design-driven approach capitalises on design within organisational practices (proactive). Regarding the first, it was attempted to enhance design impact in organisations by accommodating management concepts and to improve design with management knowledge. In contrast, design approach involved examining design as a new paradigm and improving management with design knowledge (Borja de Mozota, 2011, p. 19). Design thinking has been also perceived as a business model for creative organisation implying processes, in which management tools and organisational capabilities are applied (Borja de Mozota & Kim, 2009, p. 68). However, key objectives of design management are still not achieved – establishing design as a practice, process and as an attitude in organisations. The rationale behind this is that the focus has been laid on focusing on management side of things rather than on design and designing. Indeed, too often the focus has been placed on design from a management view rather on managing from a design perspective (Cooper & Junginger, 2011, p. 539). However, again, this research presents the one-sided and mainstreamed design management perspective, i.e. managing design activities within an enterprise. As a result, there is a need to clearly reveal the potential of design integration in the management of operational and strategic processes of SMEs.

Today it is widely acknowledged that design management gains an increasing importance in providing companies with transformation value, i.e. where design is particularly employed not to manage projects but rather utilised as a core strategic resource and organisational capability, activity, process or phenomenon presenting the creative industry (Borja de Mozota & Kim 2009, p. 69). Indeed, based on the results from design-related

research studies, the scholars do confirm the emerging interlinkage between design and innovation. Specifically, sharing the same conceptual grounds, design management approach can be also perceived as twin-concept of innovation (Calgren, 2013, p. 56).

As a result, design, the same applies for innovation, can be used as a noun or verb and both. Design as well as innovation gain in the contemporary discussions an increasing attention on integration of external and open sources, i.e. open innovation and open design (Chesbrough, 2003; Prause & Thurner, 2013). The focus, however, is on question how the design process can be organised and managed towards product and service innovations on corporate and community (users) levels, thus creating a value (Whyte *et al.*, 2015, p. 2) and enabling organisations to differentiate and position on the market (Porter 1985, p. 35; 1991, p. 103; 1996, p. 70). Although design is not only about invention, i.e. creating something totally new, it is a way of making (in)tangible impact through the implementation of ideas, i.e. design of products, services and experiences that touch, change and improve people's daily lives. In product or process innovation, design is important in activities related to functional or user characteristics, whereas in marketing activities design is significant in terms of styling, forming, as it yields product form and its appearance (OECD/ EC, 2005, pp. 48–49). In this understanding, design and the same applies for innovation, introduces a new meaning and value for its consumers, i.e. a new or significantly improved good or service, process or new marketing method, new organisational methods in business practice, workplace organisation or external relations (OECD/ EC, 2005, p. 46; Trott, 2012, pp. 12–15).

Using design to lower costs, achieve greater resource efficiency and quality on products and services compared to competitors and to gain stronger value and recognition by customers and users may lead to competitive advantage. Integrating design into specific organisational activities, which enable to create value – logistics (suppliers), development, operations (manufacturing), marketing and sales and after sale services – design becomes a part of the value chain. Thus, strategic design value can be generated not only at the top level of the value

chain, e.g. strategic management level, but also at operational level. For this, design can create customer value at primary operational activities through differentiation/positioning gained on the market, at functional level through integrating design at organisational support activities and using design to improve and better coordinate functions, e.g. product or service design process. On top level, design adds strategic value through anticipation of changes in organisational internal and external environment (Borja de Mozota, 1998, p. 28).

Acknowledging design's value for organisations, its power to differentiate, position on the market and improve functionality of internal processes and external appearance of organisations (products, services), design can be viewed as a strategic resource by integrating the Resource-Based-View (RBV). Following the RBV, resources are all tangible and intangible assets, capabilities, organisational processes, attributes, information, knowledge, etc., i.e. all potential, which, in turn, when controlled by the enterprise, allows it to recognise and implement strategies bringing organisational efficiency and efficacy (Barney, 1991, p. 101; Boxall, 1996, p. 65; Crook *et al.*, 2008, pp. 1150–1152). Design is a resource, because it is a process and can be employed within development projects. It is a resource, since design may bring value through being hardly duplicable, imperfectly imitable and non-substitutable. Design can influence products through giving them sense. Being design as a source of making sense of things, design implies messages to users, within the styling (e.g. form), functionality of a product, service or process (technology, cost), emotional and symbolic value, i.e. meaning. Meaning proposes to users a system of values by using a specific language, e.g. signs, symbols and icons that deliver the message (Verganti, 2008, p. 440). Thus, it is hardly to duplicate and imitate design, when a specific sense is given through design to a certain product, service or a process. Design is also knowledge, as it is used to generate new meanings or forms (Jonas, 2011, p. 1). Design may be perceived as capability too, capacity to deploy design resources by building on capability concept as developed by Amit & Schoemaker, 1993, pp. 35–37) and dynamic capability in today's world, as introduced by Teece *et al.*, (1997, p. 516). Researchers already confirmed de-

sign being an asset, capability, resource, differentiator, integrator, transformer (Bruce & Jevnaker 1998; Gorb, 1990; Borja de Mozota, 2006; Kotler & Rath, 1984; Bruce *et al.*, 1999; Chiva & Alegre, 2009; Dumas & Whitfield, 1990; Perks *et al.*, 2005; Acklin, 2010, etc.). As a result, design can be used as an organisational asset as well as information for competitive advantage. Through combination of new information flows, organisation gets ability to exploit new linkages between its activities internally and externally (Porter & Millar, 1985, p. 152). Design becomes a valuable resource, as it enables to differentiate, integrate, transform and be a good business practice (Borja de Mozota, 2006, p. 45). Further, understanding design as a resource may create and offer a value proposition, reach markets, maintain relationships with customer segments and earn revenues (Osterwalder *et al.*, 2014, p. 152).

METHODOLOGY

The present research applied a hybrid research approach (Fereday & Muir-Cochrane, 2006, p. 80) combining inductive and deductive perspectives, analysing and identifying to capture the key phenomenon – design integration and its value for SMEs by design management model. The paper has pursued a manifold research path, whereby diverse research methods have been combined with the respective research approach and research tool. Five techniques were employed in exploring the objectives of the present paper:

- Research type: analytical, qualitative, practice-based and exploratory.
- Research approach: qualitative.
- Research method: qualitative – case studies, semi-structured interviews, expert assessments, trainings presentations, observations, field notes and memos.
- Research tool: design management concept.
- Research scope: 2011–2015.

The paper applies a qualitative research approach and discusses the value of design management for SMEs, which participated within the project ‘Design EntrepreneurSHIP’ in the time frame 2011–2015. Qualitative approach has been frequently utilised for the research purposes within

academic design management research and related discourses, mainly driven by case study method (e.g. Borja de Mozota, 2006, 2013; Millward *et al.*, 2006; Acklin, 2011, 2013, etc.) and a series of studies conducted by the Design Management Institute (DMI), USA. Similarly, in case of studies on innovation related practices, scholars tend using qualitative case analysis also in developing a conceptual model. As a result, conceptual model can be derived from SMEs practices (cases) overt a longitudinal period (Shaw, 1999, p. 62ff).

SMEs, who took part in the project, are referred here to as individual cases comprising the macro case study (project). In total, eight SMEs were subject to the scrutiny and evaluation. Research on design management within innovation and growth, i.e. product, service or organisational development processes, i.e. creative processes, is more likely to deploy case studies accompanied by semi-structured interviews (e.g. Roy & Reidel, 1997; Bruce *et al.*, 1999). Already Svengren (1993, p. 444) recognised the importance of case study in dealing with design management as opposed to action research. As a result, a cross-case or multiple case (also collective) analysis (Eisenhardt, 1989; Miles & Huberman, 1994, p. 101; Stake, 1995, pp. 4–6; Yin, 2009, 2012), thematic/content analysis, template (concept) based approach to analysis to explore the data gathered at a predefined scheme identified prior the analysis as well as generated inductively from the data (Crabtree & Miller, 1992, pp. 93–109) were employed. The analysis of results of design application and exploitation are presented in a narrative way. Indeed, integration, analysis and evaluation of case studies, i.e. decomposition of company’s performance (Borja de Mozota, 2013, p. 305) and presentation of results enables to showcase the partnership between design and management and to reveal the complexity of the phenomenon. Particularly, the project is viewed as a collective case, whereas SMEs as individual cases. These build a basis for cross-sectorial and cross-case analysis and justification of the design management phenomenon and its impact within different operational and environment setting. Here, the results and validation are grounded on the insights from the individual SMEs and their specific cases solved (SMEs cases). Each SME has a different case port-

Table 1. Longitudinal cross-border and research project scope consisting of the eight participating SMEs

Collective case	No.	Training case	SME scope
Training cycle I	1	Wismar 2012	SME 1
		Gdynia 2012	SME 2
		Stockholm 2012	Not direct SME case
Training cycle II	2	Rostock 2013	SME 3
		Gdynia 2013	SME 4
		Malmö 2014	Not direct SME case
Training cycle III	3	Gdynia 2013	SME 5
		Wismar 2014	Not direct SME case
		Kronovall/Malmö 2014	SME 6
Grand Showcase Training Session	G	Gdynia 2014	SME 7
			SME 8

(source: compiled by the authors)

folio available for the project, depending on enterprise's operational or environmental scope, problem or challenge complexity. The real-life cases (scenarios) of the investigated SMEs refer to the challenges that concern the technological array of SMEs, e. g. complicated fuel cell based system that gives heat, air conditioning and electricity through reduced Oxygen generation, thus providing an ecological fire protection system; heating and ventilation units' producer and distributor; bath and leisure furniture producer, miniature electronic systems producer, producer of ecological food products (based on regional apples as basic product), robotic systems and interior decoration producers. All considered SMEs were chosen for the project purposes (cross-border project) as well as subject to this research because all of them act as developers of new products or services pointing to high-tech areas or driven by high technologies. The formulated problems by the participating SMEs address product, service, organisational or marketing related problem. It is not necessary the design that needs to be changed. It is, however, argued by the researchers, taking into account the positive scientific results of other scholars, that design can act here as well as process facilitator, integrator, functional coordinator, and most important, value creator, thus leading to improvement (innovation) on product, service, organisational or marketing (positioning scale) in incremental or radical terms.

These SMEs cases were solved during the project life and bear real-life scenarios that imply a problem, a challenge or a particular search for a business opportunity. In brief, the project was designed in a manner that during interdisciplinary, international and cross-sectorial training sessions with a number of three per project year, real-life problems or challenges provided by SMEs, i.e. specific cases from Germany, Poland and Sweden were dealt with by intercultural, interdisciplinary and international project teams consisting of students, graduates and experts from these three countries and renown experts worldwide. Thus, a number of SMEs participated during a project year with eight SMEs in total and ten training sessions conducted.

A consolidating grand showcase training session with two additional SMEs rounds off the trainings and cases. In sum, three project years stand for three project milestones or three training cycles with three enterprise cases solved per year and two additional. This research considers only (beyond the project scope) eight SMEs in three training cycles, as the remaining three enterprises or organisations are not directly referred to as SMEs, and are therefore out of this research scope. Added to this are two additional SMEs from the Grand Showcase training session, with a total eight SMEs cases. The project gathered more than 120 design management practitioners, absorbers, developers and experts.

Case narration is held short, as cases are comprehensive. This, however, does not affect the reliability and validity of the research results. The key objective is to showcase the diversity of possible design management application and justify positive impact for entrepreneurial innovation and growth. Indeed, despite the different nature of SMEs, nearly all cases subject to scrutiny yield similar design management patterns, problems faced and observations made. In the proceeding, the results and implications for entrepreneurs are presented and discussed in order to meet their needs in the future based on summary reports from the SMEs cases.

RESULTS FROM CROSS-CASE ANALYSIS

By taking a look at all the SMEs under scrutiny as well as design management approaches applied within other company-related trainings, it is confirmed that design is likely to be the driving force on operational, strategic and socio-environmental level of the enterprise (its external performance on the market and linkage with customers). It implies a common thread embedded in all enterprise interactions, from the manufactured goods, over service proposition and customer management related to produced goods or services, towards self-supporting value networks. Indeed, design has been observed as a powerful source, resource, networking, organisational, coordination, integration and value sharing capability. It is indispensable knowledge and information, which can lead to product, service or process innovation, strengthened competitiveness and stronger performance internally and externally on the market as well as provide with better opportunities for business growth of SMEs.

These results are in line with observations from Chiva & Alegre (2009), who investigated Spanish and Italian home equipment companies and who were able to show that a strong integration of dedicated design activities into the R&D process shows a significant positive impact on the business success. Furthermore, Chiva and Alegre unveiled that higher R&D expenses alone are not sufficient for business success; even more important are design management skills, open innovation concepts and integration of design and R&D processes.

In the following, the SME cases are broken down

in specific aggregated themes with regard to their contents, necessary to reveal the contribution of design to innovation on operation and strategic level in the economic and social context. As a result, the landscape of cases is presented only to what is necessary from the research objective point of view. The results gathered from the empirical inquiry are displayed in such a way that they reveal potential of innovations for SMEs (1), competitiveness (2) and growth path (3).

As the theoretical treatises of scholars suggest, innovation is key to both – competitiveness and growth. Indeed, the empirical evidence from all eight SMEs individual cases and SMEs cases dealt with support this contention. Enterprise, driven by design as an incremental process, is capable to generate and exploit innovation capacity for developing, producing and capitalising products, services or process within organisation itself. Design becomes a driver. Initially, innovation has been highly affiliated with the field of R&D (OECD/EC, 2005) and could hardly be allocated to the primary activities of the supply chain of an organisation needed for operational practices (Porter, 1985). Indeed, it was believed that innovation is not a crucial precondition for products or services to be delivered along the supply and value chains.

Yet, the SMEs cases reveal that innovation does not evolve just in the R&D line of the supply chain, i.e. is pulled by technologies, but is rather result of smart combinations of resources, activities and capabilities residing in technological, business and design domain. In fact, design when combined to technology and managerial perspective may lead towards new meanings and value creation for its customers, i.e. new or significantly improved good or service, process, new marketing or organisational method in business practice or external relations. This is also true for innovations, which enable solving a problem, developing a new idea, manufacturing and marketing a new construct, would it be product, service or process itself. Innovation is a process turning opportunity into new idea and ensuring its practical application in reality (Tidd & Bessant, 2013, pp. 18–22) as well as bringing value through its availability and access to it for its users via the market and/or other channels or distributed peer-to-peer and/or by the market (Gault, 2012, p.

Table 2. Results of design integration for innovation potential for all eight participating technology-led SMEs

SME	SME Case Scope	Challenge by SME	Organisational and operational field addressed by means of design integration	Result of Design Management Consultation	Innovation Form (4 Ps)
SME 1	Fuel cell based system for ventilation, air conditioning	MANAGEMENT-DRIVEN Attracting customers, Engaging in new markets Simplifying project message Improving project marketing	Strategic level Marketing & branding Improvement of organisational culture	Marketing Corporate identity strategy Branding Business strategy Customer management New Business Planning	Product Service Organisation process Positioning
SME 2	Heating and ventilation producer	DESIGN-DRIVEN Entry of new products on markets Developing new product appearance Improving product functionality	Operational level Strategic level	New forms of product Service, Increased technological product efficiency Improved functionality Marketing method Communication strategy & new business planning	Product Service Positioning
SME 3	Civil engineering enterprise	DESIGN-DRIVEN Developing of new building architecture Improving performance of architectural buildings	Strategic level Product value creation Marketing & communication	Solutions for customer experience Product delivery channels Products combined with socio-economic environment – Customer & end-user orientation	Product Service Process Positioning
SME 4	Producer of bathroom & leisure furniture made of Corian	DESIGN-DRIVEN Extending product line Improving branding Increasing value creation	Strategic level Product value creation Operational level Improving product appearance	Product modular systems Product applications Customers groups Market entry proposals	Product Service Positioning
SME 5	Producer of miniature electronic systems	MANAGEMENT-DRIVEN Creating new business strategy	Strategic level Business strategy Customer management Value Creation	Product applications Business strategy Customer groups	Product Service Positioning
SME 6	Producer of food consumer goods based on regional apple	MANAGEMENT-DRIVEN Consumer involvement Change of consumer's behaviour Change of the product	Strategic level Developing consumer experience Consumer engagement	End-users engagement and loyalty building, extended product portfolio	Product Service Positioning
SME 7	Producer of robots & robotic systems	TECHNOLOGY-DRIVEN Increase or change functionality of robot shielding enclosure	Operational level Strategic level Customer management Corporate identity and vision Selling & marketing strategy	Marketing Communication strategy Corporate identity Branding	Product Service Process Positioning
SME 8	Producer of moulding & constructing models as well as interior decoration & polymer processing	MANAGEMENT-DRIVEN Customer retention for new vessel design with distinct functionality User scenarios and marketing of meander structure	Strategic level Communication strategy Selling & Marketing	Storytelling Visualisation of the function Product applications	Product Service Process Positioning

(source: compiled by the authors)

9). Design is a tangible outcome, i.e. end product of the process or intangible, e.g. service or process, solution, etc. (von Stamm, 2004, p.11).

Innovations are driven by design and emerge as a result of smart design integration and are aggregation with technological and business readiness. Due to the limited scope, the table above canvases the key innovation results gathered from the interdisciplinary and intercultural trainings aimed to propose solutions for the SMEs. Mainly, these innovations are referred to as 'the 4Ps of innovation space' (process, paradigm [organisational], product and position [context or market]), as introduced by Tidd & Bessant (2013, pp. 24–29) and OECD/ EC (2005, p. 47). It is here to mention that also innovation is regarded as innovation when realised and exploited on the market, thus distinguishing it from invention, which implies just discovery of new product, service or process, the researchers acknowledge the proposed solutions for SMEs as innovative design-driven solutions or potential innovations (Keller, 2004, p. 243; Fagerberg *et al.*, 2006, p. 5ff). It is notably believed that such innovative smart solutions will be realised as real-life innovations in the next future, since the time beyond the project is still too short to successfully commercialise the developed solutions on the market by the pilot SMEs.

As the project results' canvas in Table 2 demonstrates, innovation can be notably traced within product, service, organisational improvement or position domain. Indeed, integration of design within business and technological organisational dimensions can streamline operational efficiency, enhance strategic enterprise orientation or improve perception within external setting – socio-cultural environment or on the market. Design is treated as a domain of innovation, thus enabling innovation generation driven by design or design-driven innovation.

The empirical results reinforce the already mentioned view that design can be considered as a source of innovation within SMEs. It is evident from the research that before the application of the design management concept and conducted consultations, SMEs alone were not able to solve the problems or challenges recognised. Yet, the integration of external design knowledge, i.e. design con-

sultants and design agencies in most of the SME cases previously, did not yield any substantial improvement to solve the problems or challenges. By contrast, what is evident here, is that only the combination of all three arrays – design, business and technology and integration of the perception of all these arrays when developing a solution can be potentially feasible, credible and reliable for the concerned SME. This solution already shows innovation potential, not necessarily a radical one, but incremental. Indeed, it confirms the scholarly argumentation that design cannot be detached from business and technology. Design serves as integrator, facilitator and innovation driver, in particular combining all the necessary features and processes that are essential in delivering solid, appealing, functional, technology and market feasible elaborated solution – product, service, organisational process optimisation or organisational positioning option.

It also implies important development process within enterprise, improves production or service provision development and processes. Design improves products, services and processes in SMEs in their aesthetics, form and functionality. It enables achievement of desired or demanded by costumers' quality, efficiency, usability, durability, reliability, etc. The research also brings to light that design supports the development of new technologies, new technological combinations and aggregations, methods and tools.

From the empirical inquiry, it becomes evident that design integration may lead to different constellations or aggregations of innovation, diverse innovation space and different level of innovativeness. As the empirical data suggest, design integration supports in all the eight pilot SMEs generation of innovation potential by providing innovative solutions, even if they are not commercialised on the market yet. However, these solutions are reliable and feasible propositions for SMEs, which, it is argued and believed, will be exploited on the market in the next future, thus enabling to trace design value. Mainly, design integration leads towards improved product or service portfolio, better understanding of enterprise itself as well as external perception on the market. Employing design as a resource facilitates enterprise positioning and en-

ables the enterprise to sustain its positioning with the improved product or service quality, durable and reliable products, which better meet the needs of customers and end-users. With this being results, enterprises are able to streamline their competitive edge. Furthermore, improved product, service or internal process innovative solutions provide SMEs with clear opportunities for growth, e.g. through identification of new markets, new customers and end-users groups, new applications of products or services in different socio-economic or socio-cultural environment, etc.

In fact, it can be argued that innovation and design being driving part of innovation itself or design linked with innovation through creative process and creativity embeddedness (von Stamm, 2004, p. 11) is key towards enterprise competitiveness and growth, as hypothesised in the research question. Particularly, design enables to 'design', i.e. develop innovative solutions matching the needs and requirements of both – entrepreneurs and the society – customers and end-users. In this, it is valuable internally within enterprise and externally on the market. The developed solutions suggest clear linkage of functional, aesthetical, meaning and visual match expressed through a form (product) or solution (service or process). Indeed, the implemented solutions notably reinforce the functional dimension. Moreover, design integration allows product development from the idea towards the maturity phase. Specifically, different number of developed solutions provides SMEs with key strategic strengths – capability to diversify and differentiate from the other. Diversification is possible through application of solutions to a range of options, modifications and new combinations, thus enabling quantification of design-driven innovative solutions. This, again, might lead to business growth, entry of new markets or engagement of new customers and end-user groups. Therefore, design being key innovation source and designer as key enabler to innovate allows developing smart and sustainable solutions.

Design being as a driving force for the development process, i.e. innovation development, can aggregate all the necessary components and activities to deliver product, service or process. Much more important, design can make the product and ser-

vice more visible and tangible through form and shape optimisation, and valuable for customers and end-users through specific meanings and values generated and associated with this specific product, service or process. Without design being as a point of departure for any development process, no efficient and effective form, functionality and meaning of a product, service or process can be achieved. As a result, when combined with technological and managerial resources, capabilities, knowledge and information, design may create a specific value for the enterprise through its different manifestation, e.g. being a source, resource, knowledge, information, organisational capability or asset. Design is an innovation enabler. It is a core activity within entrepreneurial ecosystem, operational and strategic setting and sound business opportunity leading towards desired intention of SMEs – capability to become competitive and to grow.

DISCUSSION

The results of our research underpin that design can be considered as a powerful tool, which enables to innovate, improve competitive strength and to increase business growth prospects and opportunities. Indeed, this potential of design can be aggregated under the term value creation, value proposition and value capturing for SMEs. Understanding design as a resource, knowledge, asset, information and capability allows tracing its value within product, service or process development as well as its effective and efficient commercialisation potential. Launch of innovations also require specific capabilities, knowledge, skills, facilities, resources, market knowledge, financial resources and certain level of infrastructure. It is, in other words, knowledge and entrepreneurial know-how that makes innovations successful on the market (Fagerberg *et al.*, 2006, p. 5ff).

Yet, the results of the conducted research, especially in the context of SMEs, can be benchmarked with results from the well-known and very successful group of SMEs, so-called 'hidden champions' (Simon, 2009). The researchers do recognise clear parallels between both studies. Hidden champion represents a SME, which is a world leader in a niche market. Hidden champions are rather German

phenomena, since they constitute a part of German 'Mittelstand' (SME sector), and about two thirds of all global hidden champions (ca. 2.000 worldwide) are located in Germany. The research object 'hidden champion' leads to a deeper understanding of SME management and allows a better comprehension of characteristics of those SMEs, which can globally compete with global counterparts. Important characteristic of hidden champions is resilience against economic crises, their large annual growth rates of about 25% and the creation of large numbers of new jobs. Some currently large companies like SAP, Fresenius or Würth have started as a hidden champion but grew out of this group to well known brands.

However, the most important characteristic for a hidden champion strategy is his special contribution to innovation. Specifically, hidden champions enjoy average annual R&D rate of about 6% representing twice the R&D rate of normal SMEs together with high patenting activities, i.e. the number of patents is five times higher than in normal SMEs (30 vs. 6 patents per 1,000 employees) (Simon, 2009). Consequently, hidden champion possesses an average innovation advantage of up to five or more years. Unfortunately, until now no results are known for hidden champions about design rates, the role of design in innovation and integrative design approaches.

The analysis of our empirical data suggests that design alone does not bear such innovation potential for products, services, organisational processes or improvement of enterprise's positioning. By contrast, the results show that design together with other innovation activities lead in the frame of an integrated approach to enhanced product development and improved competitiveness. A more detailed view of the SMEs' cases displays that those SMEs, which aimed at focusing only on solely classical design (physical appearance) (e.g. changing form or shape) solutions (e.g. SME 4 or SME 8) were proposed with solutions, which tackle, challenge or target their external performance on the market, internal organisation processes or are directly linked to technological and functional dimension of their products, services produced and delivered. This, indeed, leads towards proposition that effective design integration and design man-

agement in an enterprise needs to link up creative, managerial and technological capacities and capabilities. Concentration solely on design and its isolation from the fields of business and technology might negatively affect business practices or even miss to supply them with any feasible solutions.

Consequently, the implementation of a successful design management (consultation) is related to the specific enterprise development task – improving and adapting the organisation and the internal processes as well as enhancing the skill level of design management, open innovation concepts as well as integration of design and R&D processes (Chiva & Alegre, 2009). This enterprise development task is something, which is also well known from hidden champions, which are famous for their long-term thinking, especially in case of qualification and development of their employees professional knowledge and solid learning and development capabilities (Simon, 2009). Under these circumstances, successful and integrative design management constructs are able to evolve.

In sum, the research pointed out that the designer, economist or manager and engineer should cooperate to achieve complex structures and ensure combination of form, shape with functionality and customer needs. Respectively, business activities of a particular enterprise should not be restricted to management, design or technology. In fact, just by combining these three arrays, the enterprise can transfer to successful business entity. Similarly, all three fields need to be involved within design management process. As a result, the research results suggest that design being a heart of innovation or driver for innovation itself is able to provide with the value combining operational and strategic dimension of the enterprise (Fig. 1).

Value is expression of competitive strength. It manifests through first, innovative product, service or processes solutions, second, competitiveness, business modelling and strategy, and third, the ultimate achievement of competitiveness, the brand. The interplay of all three arrays reflects the cooperation patterns within a given SME, since there exists a mutual interdependence between these particular fields. Besides, an important implication of close dovetailing of the creative, business and technological realm appears to be efficient and effective inter-

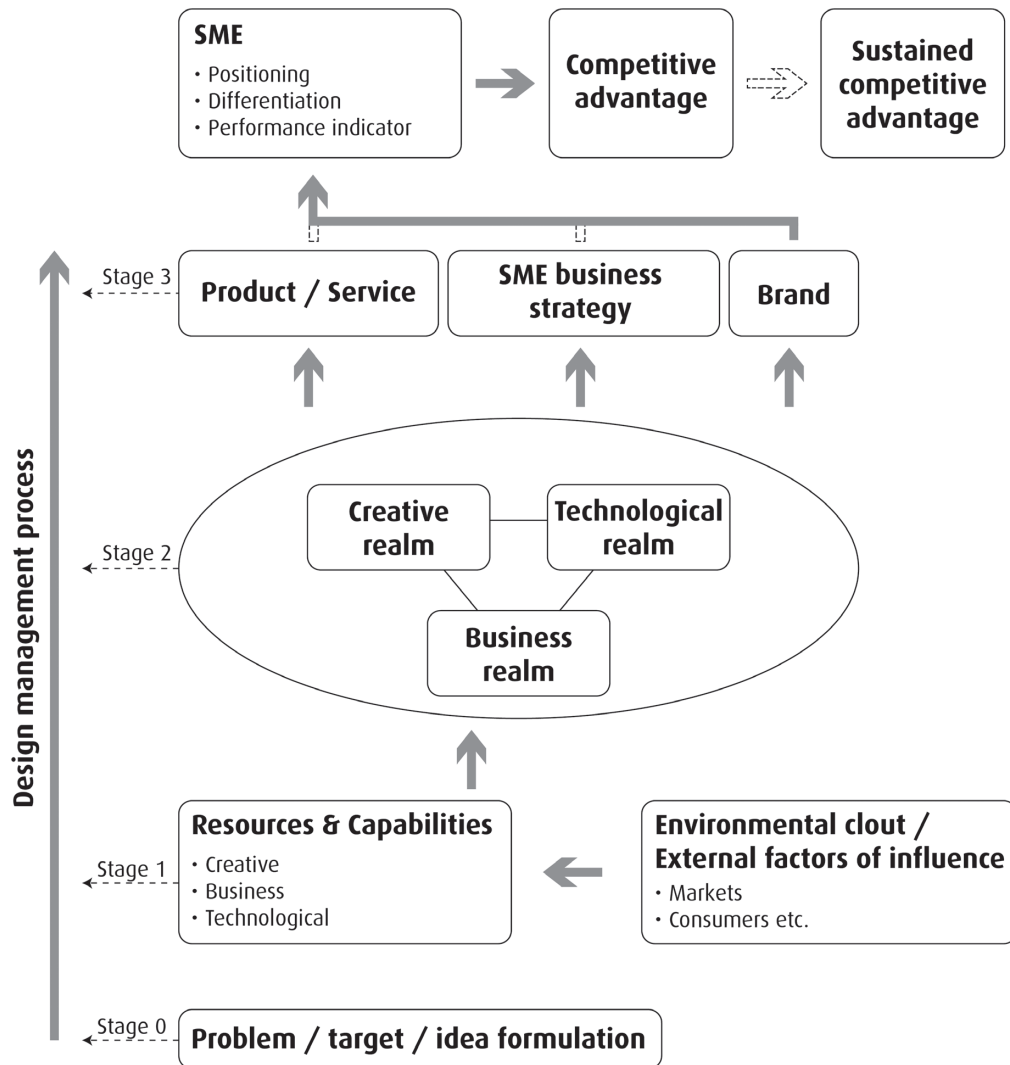


Figure 1: Process-based design management for SMEs

(source: compiled by the authors)

nal and external communication within the SME. Due to the common communication, there might result an effective cooperation of all three terrains.

CONCLUDING OBSERVATIONS AND IMPLICATIONS

From the strategic intent, it might be argued then that design can be strategically deployed and exploited for innovations. Strategic acting of design within the business frame can be delineated as a critical dynamic collaboration across operational

and management practices of organisations or companies successfully utilising design capabilities. For this, design integration for innovations resulting in value proposition on corporate level have positive implications for operational and strategic indications and provides with new opportunities. By echoing the empiric study of the German Design Council (GDC, 2010), on operational level, design integration has the potential to lead towards increased operational and economic efficiency, environmental efficiency (e.g. lower carbon footprint, less energy consumption) and social efficiency (e.g.

individual customisation, user engagement and acceptance, customer loyalty). Beside that, strategically, design positively affects enterprise, since it enables diversification of activities, products and services. Design streamlines differentiation and positioning, supports strategic flexibility, resource efficiency, customers and end-user satisfaction. It creates value, provides with competitive advantage and enables better predictability in terms of competition, innovation potential, market penetration and similar. Indeed, design is valuable resource, an innovation within the enterprise operational and strategic interactions.

The observed design management practices and validation of design impact for innovation, competitiveness and growth is not free from limitations. The main limitation remains, however, sectorial concentration when dealing with SMEs, since the research focused on design practices within high technology driven or manufacturing SMEs. For this, it is necessary to continue the research in this field, by, for instance, undertaking sectorial comparative studies how design is being integrated and exploited within different sector SMEs.

The research pointed out, as addressed in the reference study of hidden champions, that becoming smart players as 'hidden champions', offers an opportunity to better understand the role of design in innovation processes due to the high importance of innovation activities as well as due to strong focus on employee qualification and enterprise development, thus paving the ground for successful implementation of integrative design management concepts. Until now, the characteristics of hidden champions are well studied, but unfortunately, the role of design within the innovation process has been marginalised. Case studies revealed already that it might be fruitful to continue further research in this area.

Forthcoming future research should support design management model application by measuring design value and employing a higher number of SMEs cases in order to enable quantified validation and to develop key performance indicators (KPIs) for design management models. Further, comparative analyses and impact analyses should be done showcasing after the certain time lapse how the provided innovative solutions for pilot eight SMEs

turned into real innovations, commercialised on the market or exploited in another way. Nevertheless, the managerial positive implications for SMEs already proved to be a success, as the empirical data yield. Providing a practice-oriented incremental design management model bears also the chance to support design-driven innovation application and innovation capacity building for whole SME sector by extending the already known success factors from hidden champions.

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