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THESIS FOR THE DEGREE OF
PhD by Published Work

Entrepreneurial Leadership by Design

- The Role of Design in Socio-Economic Innovation

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Abstract

The case for this PhD by published work is based on reflection on eight years' reflective practice research into the role of design in entrepreneurial leadership. Specifically, it explores a strategic design approach to socio – economic innovation. It is the culmination of a thirty-year longitudinal study at the interface of leadership, enterprise, innovation and development within the particular challenging environment of the Northern Ireland conflict. One important lesson from the author's experience of societal crisis has been the pivotal role of innovation in socio - economic regeneration.

External environmental pressures are forcing organisations to develop new approaches to cope with uncertainty. These circumstances call for leaders who can innovate whilst navigating complexity. Against this context the research considers entrepreneurial leadership and understands this to be more than the sum of entrepreneurship and leadership but a new phenomenon leveraged in response to the current climate. The focus is on entrepreneurial leadership, strategic design and open innovation as transformational drivers for socio-economic value creation.

The study involves a design-led approach that maps transformational drivers against triple helix challenges, to provide a new perspective on the generative role of design. It synthesises organising frameworks that further highlight how entrepreneurial leaders build relationships for developmental innovation. These model the interplay between transfiguring and threshold concepts to yield guiding principles for entrepreneurial leadership practice. They represent antecedent factors for a prospective theory of Design Dynamics.

The distinct contribution is an original contextual framework that provides insight into how entrepreneurial leaders employ design to realise innovation. Further, this builds on the extant body of knowledge through the hypothesis of a potential Design Dynamics theory as a support structure to explain and guide entrepreneurial leadership within complex environments. Future research will explore the nature of this structure so that it is applicable to new entrepreneurial contexts.

Contents	Page
1. Introduction	1.
2. Challenges and Transformational Drivers	4.
3. Literature Review	7.
4. Methodology	12.
5. Reflection on Reflective Practice	15.
6. Design Dynamics	22.
7. Conclusion and Further Investigation	24.
Appendices	
1. List of Published Output	26.
2. Evolution of Entrepreneurial Leadership	28.
3. Nature of the Inquiry	31.
4. Published Output & Support Material by: - Type, Focus, Abstract & Impact	33.
5. Publication Differentiation by: - Theme, Key Words, Research Methods & Key Influences	45.
References	47.
Declarations of Co-Authorship of Published Work	60.
Declaration	67.
Tables	
1. Design Dynamics Research Model Canvas	13.
2. Framework of Transformational Drivers for Triple Helix Challenges	16.
3. Map of Differentiated Issues from Published Output	17.
4. Design Dynamics Organising Framework	21.
5. Design Dynamics Values Matrix	22.
6. Design Dynamics Principles, Concepts and Values	23.
Figure	
1. Research through Design	3.

1. Introduction

Rational

Given the changing nature of the economy, the political landscape, and the speed of these changes in society, many believe that traditional business models are failing in the face of global complexity and competition. In these circumstances of unpredictability, current strategy formation techniques are often only based on inaccurate assumptions (Schlesinger and Keifer 2010).

Faced with intractable difficulties, a different logic that seeks to support the common good is needed for business decision making. Consequently, there is an imperative to develop the capacity to identify and solve complex, multi-faceted problems and to demonstrate entrepreneurial attributes. Such capabilities are equally in demand from global corporations, charitable foundations, and governments (Kuratko 2007). In the future, we will need leaders who can shape and make opportunity amidst social and economic unpredictability. This will require entrepreneurial leaders, who are knowledge-innovators (OECD 2010), to develop creative strategies for socio-economic value creation (Hamel 2007, Martin 2009).

Current circumstances have led to many calling for reform in management education practices (Moss Kanter 1997, Khurana 2007, Mintzberg 2004; Moldoveanu and Martin 2008). Developing future leaders with the necessary competencies is important because those with entrepreneurial capabilities will become drivers of economic and social change and innovation. Such new entrepreneurial leaders, who can employ strategic design, have the potential to create new forms of socio-economic value by determining the future of work and how organizations are configured, thereby redefining the relationship between industry, governments and academia.

Research Context

The research motivation was forged in the context of the 1970's conflict in Northern Ireland. This challenging background necessitated different tactics not only within the economy but also in terms of community building and the political arena. In the belief that complex situations come to be better understood in an attempt to change them, the research has built knowledge over time in an episodic yet cumulative manner. This required a systemic approach to social impact that concentrated on the relationships between organisations for progress toward shared objectives. It also necessitated the creation of a new set of entrepreneurial leadership skills to coordinate the specific elements necessary for conflict resolution and societal rebuilding (Ensley et al. 2006, Kania and Kramer 2011).

One of the important lessons of those three decades of conflict was the pivotal role of innovation in economic development and with this came the realisation that economic development and social value creation were inextricably linked (Stacey 1999, 2001). Consequently, in the post conflict environment of a society in transition, the build-up of innovation capacities played a central role in the growth dynamics across government, industry, community and education. In many ways post conflict socio-economic regeneration had parallels with innovation strategies that cover developing and emerging economies (OECD 2012). Both are concerned with ongoing work on innovation for development, focusing on among other things: -

- The contribution of innovation to economic growth and well-being
- Inclusive innovation
- Institutional frameworks for innovation policy

These uncertain circumstances (Wilson and Eisenman 2010, Reeves and Deimler 2011) have prefigured the current zeitgeist where organisations are finding it more difficult to deal with unprecedented environmental and organisational pressures leading to a quest to adopt more innovative approaches. Such circumstances call for entrepreneurial leaders who can navigate complexity by adopting a strategic design approach.

This body of work is a longitudinal study, resulting from thirty years of professional practice and academic study, at the interface between leadership, enterprise, innovation and development within the particular challenging environment of a society in crisis. It has taken the form of participatory action in episodic developmental initiatives where the catalyst was entrepreneurial leadership through design led innovation.

The work represents a learning journey of reflection – in – action, where a design thinking approach has been central to entrepreneurial leadership in practice. The choice of successive activities has been purposeful in order to triangulate, sense check and test an evolving understanding of the role of creativity expressed as design and innovation expressed as entrepreneurship in socio-economic value creation. It was conducted in the varied yet connected contexts of business start – up, government and academia. It was concerned with achieving a common purpose to envisage an alternative future. This: -

- employed creativity that fluently oscillated between divergent and convergent modes of thinking
- necessitated a design approach of naming, framing and sense-making
- entailed developing different research methodologies based on design practices that are simultaneously exploratory, generative and evaluative
- required a multidisciplinary methodology, working at the confluence of higher education, enterprise development and policy formation.

These tactics, born out of necessity in the intractable circumstances of civil conflict, prefigure new pioneering approaches needed for tackling the complexity that has become the norm in the 21st Century (Kuratko 2007).

This inquiry has culminated in an 8-year period of concerted reflection on reflection – in – action (Schon 1983); in itself a design process. The body of work comprises 14 representing outputs (10 published and 4 supporting documents). The collection includes six book chapters/sections, two international journal articles and two reports for external bodies; supported by four conference papers. These publications are detailed in Appendix 1.

Purpose and Research Questions

The research considers the notion of entrepreneurial leadership and takes up the term to be more than the sum of entrepreneurship and leadership but a new phenomenon leveraged in response to the current climate. Here entrepreneurial leadership is understood as the leadership role in entrepreneurial ventures (Leitch et al. 2013); be they within civic, corporate, start – up and or the academic domain. The focus is how entrepreneurial leaders build relationships between organizations and engage in developmental innovation (Christensen 2015) in different settings (Renko et al. 2015).

The aim of the research is to explore how entrepreneurial leaders employ design in their practice across a range of policy, education and economic contexts. Thus it seeks to identify: -

- How do entrepreneurial leaders enact developmental innovation?
- What are the critical factors that facilitate entrepreneurial leadership in this practice?

The methodology employed has been research through design as illustrated in Figure 1. It is concerned with past, present and future. This has involved reflection-in action with respect to developmental innovation, namely; enterprise development, education development and policy development, which have been practiced across the three elements of the Triple Helix. Leadership has required reflection on reflection in action while engaging in strategic entrepreneurial leadership in government, academic enterprise and pedagogy innovation in industry and academia. The resulting analysis has been threefold; this is explorative, generative and hypothetical. Evaluation and impact assessment has been a process of and reflection on trial in practice.

RESEARCH THROUGH DESIGN

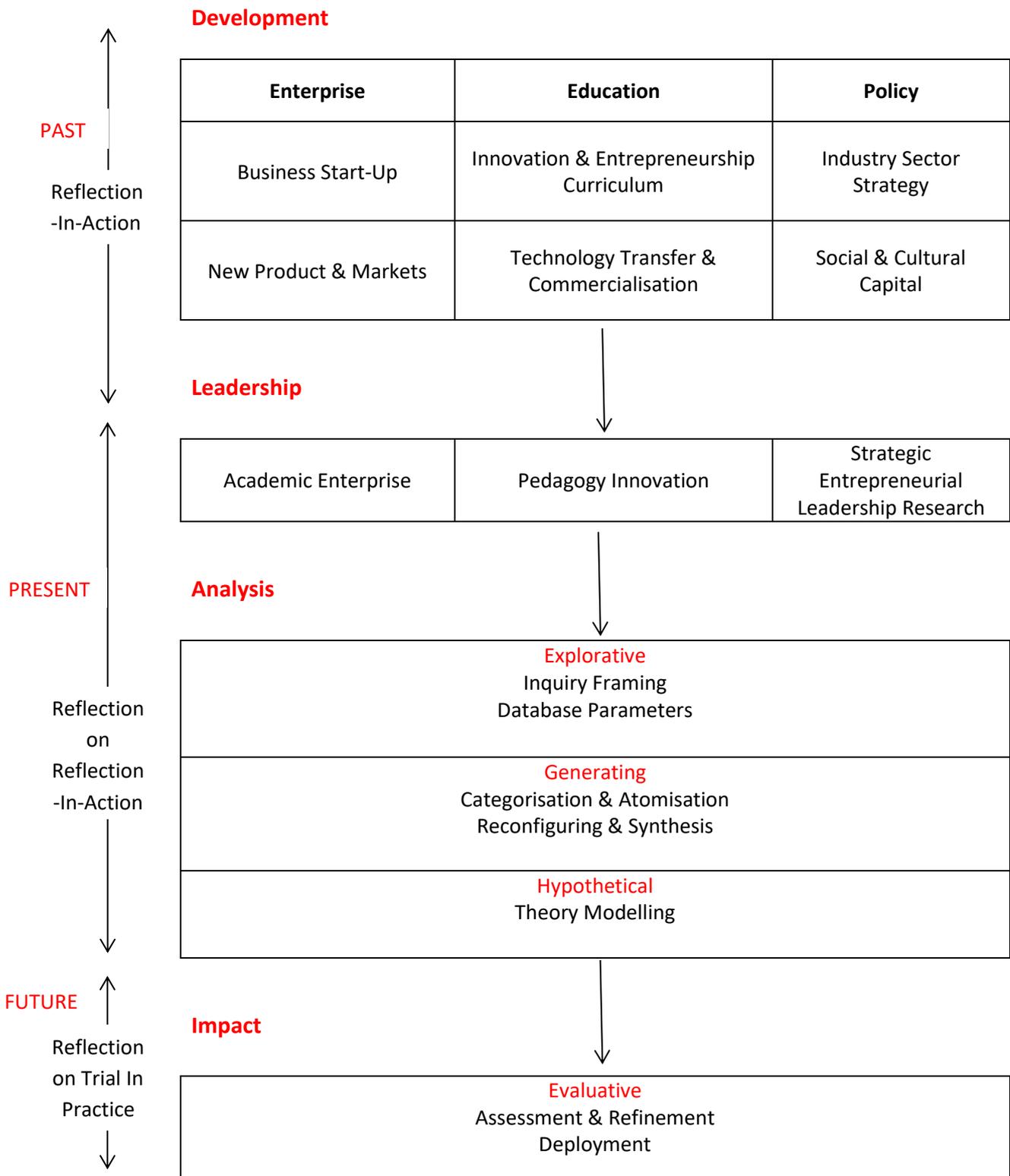


Figure 1 Research through Design

The thesis proceeds as follows. In chapter 2 a fundamental challenge in each of the dimensions of the triple helix, namely government, academia and industry, will be articulated together with three transformational

drivers to address these. In chapter 3, a literature review of the scholarly fields and sub-fields will be described and related to the purpose explored here. Entrepreneurial leadership, design and innovation constitute the three main scholarly fields of this thesis, with socio - economic value creation as a cross cutting theme being situated within innovation. Chapter 4 describes the methodology leading up to describing new concepts and principles of entrepreneurial leadership practice. In chapter 5 the body of work is reflected upon and appraised in relation to the aim of this thesis. Chapter 6 contains an attempt to articulate the appraisal as the foundation for a new entrepreneurial leadership framework coined Design Dynamics. Conclusions together with recommendations for possible application and further avenues of research are outlined in chapter 7.

2. Challenges and Transformational Drivers

Introduction

We have to acknowledge that traditional business models are failing in the face of global complexity and competition (Reeves and Deimler 2011). The major challenges for society today is dealing with intractable problems fuelled by our ever increasing complexity and speed (OECD 2012, 2013).

The existing body of literature highlights the main concern for leaders as the difficulty of addressing multifaceted issues with outmoded tools and fragmented rigid systems of thinking. Consequently, fundamental challenges have been conceptualised as the following systemic issues; Socio- Economic Value Creation (Porter, Kramer 2011, OECD 2011); Global Venturing (Carpenter, Dunung 2011); and Academic Renaissance (Daniel 1996, Hilton, DeVaney 2017). Collectively these issues represent multifaceted challenges that are central to stimulating collaborative action for sustainable development across a diverse range of contexts.

However, a key concern is to provide the impetus to stimulate ecosystems necessary to raise entrepreneurial ambitions (Morgan 2007). Invariably, challenging systemic issues are typically deeply imbedded within the Triple Helix (Etzkowitz 2012), that is, at the interface between government, industry, and academia. In order to imaginatively address these challenges new methodologies that continuously spark, lead and realise innovation need to be articulated (Rodrik 2008). The motivation for exploring these fundamental Triple Helix challenges is to articulate new transformational drivers to meet these challenges.

Socio- Economic Value Creation

Today economic and social wellbeing are inextricably entwined (Isenberg et al. 2011, 2013). This calls for more innovative approaches to articulating and coping with multi-faceted problems (Cox and Rigby 2013). Consequently, new forms of leadership in whatever guise, whether manifest in individuals or as entrepreneurial organisations, have become the driver of economic and social change and innovation, altering future work patterns, the way organisations are designed, and redefining the dynamics of whole industries (Greenberg et al 2011). Future, regional, national and international development will depend on environments conducive to innovative socio-economic value creation, so called entrepreneurial ecosystems (Roper and Hart 2013, Kuratko and Menter 2017). To develop these, we will require leaders who can shape and make opportunity amidst social and economic unpredictability (Anyadike-Danes et al 2009, 2013). The challenge here is ensuring sustained and equitable development by building relationships between organisations to create new economy clusters, smart specification platforms and entrepreneurial ecosystems (Mc Gowan 2013).

Academic Renaissance

Education is the route to self- actualisation and key to individuals' quest for meaning. By extension it is, or should be, a guiding force for society's moral compass. Not only does higher education carry the responsibility of adding to the body of knowledge, the academy has an obligation to collaborate with other pillars of society

to unlock creativity so that we can strive to be more than who we are (Rosted 2012, Lackeus 2015). Cognisant of changing socio- economic realities, universities are switching to more integrated and issue facing research approaches to underpin education. Such research informed curriculum development provides better methodologies to enable future entrepreneurial leaders tackle hitherto unforeseen scenarios (Vyakarnam 2009).

Universities have long been under pressure to contribute to economic and social development and to explore opportunities for wealth generation (Gibb and Hannon 2006, NESTA 2007). The expectation for them to become enablers of economic growth has given rise to the concept of the Entrepreneurial University (Etzkowitz 2004). Such universities collaborate with government and industry in support of local and regional development by creating value through stakeholder connections (Mason and Brown 2014, Guerrero, Cunningham and Urban 2015). By showing dynamic entrepreneurial leadership universities can bring a unique perspective to identifying and solving problems; spanning boundaries over a broad spectrum of disciplines; uniting values with innovative practice; and integrating corporate social responsibility with business tradition; resulting in an expansion of entrepreneurial collaborative forms that bring forth different contingency thinking and behaviours.

Global Venturing

The new economy has had its genesis in the convergence of globalization, technological innovations, knowledge-based systems and significantly altered demographic trends (Schlaepfer et al 2015). These circumstances mean that planning how we do business even in the near future becomes increasingly difficult. It is not THAT we are connected but HOW we connect and for WHAT purpose, that is important (Seita 1997, Mulgan 1997). These new freedoms have given rise to endless options but with freedom comes responsibility, for new forms of interaction also require new rules of engagement otherwise how will ethical and moral obligations be met and who will be the custodians of fairness and sustainability in the long run (UK Government Office of Science 2014)

Transformational Drivers to Meet the Challenges

When envisaging the future, entrepreneurship research can be means of transformation (Mueller et al. 2011). Three transformational drivers have been identified as Entrepreneurial Leadership (Harrison et al, 2004), Strategic Design (Steinberg, 2010) and Open Innovation (Chesbrough and Vanhaverbeke 2014). These meet the Triple Helix challenges by: -

- higher education realignment
- balancing of both social and economic value creation through government policy formation
- enabling industry to capitalise on unprecedented levels of connectivity through strategies for venturing on a global scale

These drivers have been identified as seminal agents for enabling change given that: -

- Narrowing the gap between aspirations and innovation is not about organisational structures and processes but rather more concerned with people and cultures (Barsh et al. 2008)
- Designing the future is a creative act employing strategic tools and methods to help organizations take advantage of untapped opportunities that impact on individuals, society and the economy (Deloitte 2017)
- Connections and networks generate a cycle of innovation, enabling cross-fertilisation of ideas, knowledge and problem solving techniques as well as the ability to capture more value from existing resources. (Fleming and Marx 2006)

Entrepreneurial Leadership

The nature of entrepreneurship is complex, creative and transformative (Nielsen et al. 2012). Entrepreneurship can be regarded as being more than just starting an independent organisation, but a multifaceted phenomenon that occurs in many different contexts, varying in terms of scope, process and output (Harrison et al 2004, Fayolle 2007, Storey and Greene 2010). In order to find meaningful direction through current levels of complexity every leader, in whatever sphere, has no choice but to be creative and innovative (Jensen and Luthans 2006, Feldman and Zoller 2012). This is manifest not only in the domain of business and the economy, but right across the social spectrum (Florida 2002).

Traditionally the role of the entrepreneur was to engage primarily in economic innovation by founding and growing new businesses. However, in today's reality we have to acknowledge leaders must be entrepreneurial (Yukl 2012) and that entrepreneurship has been expanded to include social innovation and the building of social capital (Santos 2009, OECD 2010). Consequently, new more flexible, adaptive and creative leadership approaches are emerging in the interconnected worlds of social enterprise, new economy venturing, responsible corporate leadership and civic governance. Where once entrepreneurs were commonly perceived as engaging in innovation to establish and build new ventures, with entrepreneurial leadership the operative word is leadership. As such, entrepreneurial leaders inspire others to engage in innovative activity. They do this by working with and through others in common purpose. The term entrepreneurial leaders specifically refers to those who are entrepreneurs and can motivate others to join in comprehensive change (Isenberg 2011). Entrepreneurial leaders are often the inspiration for the formation of entire new ecosystems; the catalysts for raising aspirations in a diverse range of circumstances; be it within universities, government departments, large corporations or even in civil society (Levie et al 2013).

Strategic Design

Increasingly it is at the intersection of different areas of knowledge where solutions are to be found in a multidisciplinary mix. Strategic Design describes the role of design in generating alternatives and providing integrated solutions (Steinberg, 2010). In the context of new venturing, strategic design can be understood as innovative intent; that which brings about tangible solutions by enacting improvement, change and transformation. Strategic design is a mechanism for knowledge-innovation through the development of creative strategies that add value (Cross 2006, 2007, Liedtka 2006). This design imperative helps frame problems properly from the start, acting as a multiplier within decision making (Varganti 2009). In essence it is the key discipline that makes creative thoughts tangible in the form of new innovations; be they, new systems, infrastructures or ventures. These transformational mechanisms are vital to enable entrepreneurial leaders to create socio-economic value. Thus strategic design offers a perspective to help us understand how these leaders apply, measure, refine and adapt their new venturing tactics in the process of learning by doing. As such, strategic design implies a greater degree of considered and intentional orchestration on the part of entrepreneurial leaders.

Open Innovation

Companies have to innovate to stay competitive, and they have to collaborate with other organizations to innovate effectively (Chesbrough and Vanhaverbeke 2014). Sustainable innovation requires a more systemic approach that employs new provisional, situational and contingency methods (Norton 2001, Uyarra 2010). The central idea behind open innovation is that in a world of widely distributed knowledge, companies cannot afford to rely entirely on their own research, but should exchange knowledge with other organisations. Open innovation accelerates internal innovation, and expands the markets for external use of innovation (Chesbrough et al 2006). Networks, and how we develop, utilise and consolidate them, are at the core of open innovation. Today networks are global in nature, in this context insightful leaders bring the right people together, provide an infrastructure in which global communities can thrive, and measure the networks' value in non-traditional ways (Barsh et al 2010).

3. Literature Review

Introduction

Scholars are calling for new perspectives on entrepreneurial leadership to be investigated (Calás et al. 2009, Collinson 2011, Leitch et al. 2013, Harrison et al. 2015, Lewis 2015, Dean and Ford 2017). They are doing so in recognition that traditional methods of organising and planning are no longer fit for purpose; because in today's climate it becomes increasingly important to consider interactive, evolving processes that emerge as a consequence of the fluid and often temporary nature of any given context. In consequence attention now focuses on integrated forms of entrepreneurship, leadership and strategy formation. This has meant the expansion of traditional philosophies of economic value creation and corporate responsibility to include broader notions of human wellbeing, ecological sustainability and collective action. Accordingly, there is a new imperative for developmental innovation that involves team and inter-organisational collaborative behaviours and necessitates dynamic interrelationships among many actors (Leitch and Volery 2017). This literature review focused on three distinct fields of scholarly interest, namely; Entrepreneurial Leadership, Design and Innovation.

Entrepreneurial Leadership

Harrison (2015) considers entrepreneurship to be an essential element of leadership; that an entrepreneurial mind-set and entrepreneurial behaviours are essential for effective leadership in a volatile, uncertain and ambiguous world. Others call for a leader who can raise collective entrepreneurial ambition; 'to create visionary scenarios that are necessary for selecting and mobilising a supporting cast of interdependent members who commit to and enact the vision to achieve strategic value creation'(Chen 2007).

Defining Entrepreneurial Leadership

Definitions of entrepreneurial leadership have been evolving since the late 90's. Early attempts focused on the ability to create opportunities (Cunningham and Lischeron 1991) as well as the capability to influence (Ireland, Hitt and Sirmon, 2003). Others highlighted a talent to inspire, by imagining alternative futures (Gupta, MacMillan and Surie 2004) through passion, vision and focus (Thornberry 2006). However, contemporary scholars maintain that the field is still emerging, lacks definitional clarity and has not yet developed appropriate tools to assess its characteristics and behaviours (Harrison et al. 2015, Leitch et al. 2013). Hannah Dean and Jackie Ford, (2017) point out that there are now a plethora of new meanings associated with the notion of entrepreneurial leadership that suggest the fluidity of the very concept. Yet at the same time it must be recognised that entrepreneurship and the leadership thereof is an integrated concept that permeates our society and is necessary for developmental innovation (Kuratko 2007).

The focus of entrepreneurial leadership scholars and the perspective from which they view the discipline has shifted over time. In the past 15 years the debate has progressed from the commonalities within each separate domain of entrepreneurship and leadership (Vecchio 2003) to an acknowledgement that modern entrepreneurial leadership is a synthesis, more than the sum of its parts (Kuratko 2007, Roomi and Harrison 2011, Leitch et al. 2009, 2013). Scholars have progressively recognised entrepreneurial leadership as the capacity for flexibility and adaptation in the face of volatility and complexity (Surie and Ashley 2008). They see it as a new phenomenon (Dean and Ford 2017) concerned with generative innovation in multifaceted and dynamic circumstances (Hazy and Uhl-Bien 2015). Currently more attention is being paid to the creative and collaborative nature of entrepreneurial leadership. How it leverages social capital by engaging in open systems networks, its role in stimulating communities that engage in co-creation and embrace collaborative competition (Renko et al. 2015, Sklaveniti 2017, Romano et al. 2017). This trajectory is outlined in Appendix 2 - Evolution of Entrepreneurial Leadership.

Entrepreneurial Leadership Approaches

In the process of working in collaboration with others, entrepreneurial leaders often reframe their view of systems. This observation has led to a number of studies that focus on the different cognitive approaches of entrepreneurs as they seek to understand their practice. Key creative and generative attitudes include abductive reasoning and the employment of alternative frames, and then most recently effectuation, creative logic and collaborative co-creation. Being more akin to design, these approaches have been specifically selected as the antithesis to planning and causal logic. They represent better alignment to the creative process because of their imaginative, improvisational and inventive qualities.

Abductive Reasoning: Practitioners in many contexts often make decisions based on incomplete information. To do this they employ abductive reasoning to arrive at the best prospect (Peirce 1931-1935, Buchanan 1992, Martin 2009, Reichertz 2010). This approach is generative and differs from the causal logic, where there is a predetermined goal and the process to achieve it is carefully planned in accordance to a set of given resources (Peirce 1992). Saras Sarasvathy (2001) argues that causal logic is not suited for entrepreneurship processes that are inherently characterised by uncertainties and risks. By contrast entrepreneurial leaders must exercise imagination, relying on their creativity, intuition and resourcefulness.

Alternative Frames: Entrepreneurial leaders rethink the nature of organisations through unique mental models that support them to create solutions and build better ways of being (Greenberg et al. 2011). Thus these leaders employ alternate frames that enable the redrawing of the problem space and reconstituting existing circumstances into new opportunities. Several studies (Sarasvathy 2008, Dew et al. 2009) argue that problem framing matters because the particular frames entrepreneurs use influence how they formulate problems. Kees Dorst (2015) in his work on frame innovation and creating new thinking by design, explores how design practices spread across society. Crucially he explores which of these design practices are particularly relevant to the problems of today's society.

Effectuation: Entrepreneurs have learned to create the future through a process of effectuation involving action and experimentation (Sarasvathy 2008, Read et al. 2011). They are not discouraged by current constraints, such as a lack of resources or conditions of unknowability, as they experiment with new ways of innovating. They are 'acting their way out' by behaving like start-up entrepreneurs and redefining the context (Wilson and Eisenman 2010).

Creation logic: When leaders find themselves in uncharted territory with few reference points their predictive capabilities are inevitably curtailed. In fundamentally new or difficult situations where traditional cause-and-effect relationships are unknown, it is not always possible to gather the appropriate data or use the historical trends to engage in an analytical approach. In these situations of unknowability, entrepreneurial leaders must learn to also employ a different logic that is based in action, discovery, and creation. This complementary decision methodology has been labeled creation logic (Greenberg et al. 2011).

Collaborative Co-creation: Some scholars have argued that economic growth comes through collective entrepreneurship (Reich, 1987) in which talent, energy and skills are integrated into an entrepreneurial team. Consequently, entrepreneurial leadership is seen as influencing and directing group members towards recognising and exploiting opportunities (Renko et al. 2015). Whilst they acknowledge that assembling and maintaining such a team is difficult they point out that entrepreneurial leaders have the ability to inspire others by identifying opportunities where others see chaos, contradiction, or confusion (Kuratko and Hodgetts 2006). Scholars are increasingly attending to the topic of collaborative co-creation (Bhalla 2011) in a quest to understand the seeming paradox of collaborative competition. Such entrepreneurial leaders at once unlock the entrepreneurial ambitions of groups and or enable nascent entrepreneurs to act in concert for common purpose (Ramaswamy 2009).

Conclusion: Whilst each of these approaches begins to consider some of the more creative aspects of entrepreneurial leadership practice and cognitive styles, each individually provides only a partial understanding of the dynamics of what entrepreneurial leaders actually do. The hypothesis here is that the above themes are partial expressions of a design process and that in aggregate they are facets of strategic design. By extension can it be said that entrepreneurial leaders are in fact design practitioners. If so, this calls for closer examination of the role of design in socio- economic innovation.

Design

Engaging in innovation that generates new products, processes and experiences is a matter of design. This normally involves multiple actors; technologists, policymakers, infrastructure specialists, industrialists, sociologists, psychologists, ethnographers and designers all acting in concert. However, how design enables innovation both in cognitive terms and as a generative practice is still poorly understood by business scholars.

The Nature of Design

Design is an insight-driven, prototype-powered and foresight-inspired search for new ideas that can be applied to products, services, experiences, business strategies and business models (Mootee 2011). While the popular understanding of the influence of design has grown, the specific mechanisms through which the use of design, approached as a thought process, might improve innovation have not received significant attention from business scholars. Although design thinking is generally acknowledged as an approach to innovation based on designer protocols; because by nature the field is integrative and multidisciplinary, the body of knowledge in support of design has to be regarded formally as unbounded (Cross 1999, Archer 2007).

Design Thinking: Design thinking has attracted significant attention in the business press (Johansson-Sköldberg et al 2013) and has been heralded as a novel problem-solving methodology well suited to the often-cited challenges business organisations face in remaining competitive (Hamel 2007, Brown 2008, 2009, Martin 2009). However, some scholars are in fundamental disagreement with the term (Nussbaum 2011, Kimbell 2011, 2012) wondering if design thinking is only a synonym for creativity (Lawson 2006[1980]) applied in the business context. Notwithstanding, many see design thinking as a design led approach to innovation (Cross 2011, Kolko 2015), and promote it as a value creation capability to complement existing managerial competence (Leavy 2010, Tjendra 2014). Others have identified the need to assess the utility of design thinking to improve organizational outcomes and call for recognition that design has a place in business strategy formation (Liedtka 2006). These researchers advocate a more considered research agenda focused on the potential to explain linkages between design elements, strategies and innovation related to corporate outcomes (Noble 2011) and sustainable social value creation (Kimbell 2012).

Design as a Process: Design is an ongoing process requiring a growth or generative mind-set (Liedtka 2015). Designers fluently alternate between divergent and convergent modes of creativity; design is also an approach that employs creative and analytical thinking concurrently. Designers typically identify needs, collect insights, explore context and create possibilities. But there are distinct processes involved; as a minimum, design methods can be mapped into four discrete phases, Discover, Define, Develop and Deliver (Design Council 2007).

Strategic Design: An alternative area of interest is strategic design, where design affects individual cognition and decision-making in strategy formulation. This term is applied to how those with an entrepreneurial disposition can employ design sensibilities. It aptly describes how entrepreneurial leaders allow strategic direction to evolve through experimentation and exploration before plans become more delineated, streamlined and formalised.

Finnish scholars have extended the domain of design into strategic design (Steinberg 2012), recognising that it requires multidisciplinary dialog and integrated teams. Strategic design is concerned with socio - economic innovation because contemporary macro challenges fall at the intersection of what we know (Steinberg, 2010). These multifaceted problems are no longer amenable to solutions based on deep and narrow specialisms. Rather they require an understanding of the architecture of the problem and a scaffold for solutions. Strategic design theorists argue that it is a proven and repeatable problem-solving protocol that can be employed to achieve or even exceed expected results (Verganti 2006). Consequently, strategic design has the potential to provide a shift from improving the past to designing the future; as such its practice can also help governments discover new solutions to the intractable challenges confronting society (Manzini 2007, Aftab et al. 2017).

Conclusion: There are many elements of strategic design that are akin to entrepreneurial effectuation and by extension it could be reasoned that the same design modus operandi is taken up by entrepreneurial leaders in generating new value. Both require a growth mind-set and espouse learning as a journey of discovery (Liedtka 2015). However, more sophisticated insights are needed into the modalities of 'designerly' thought and action (Cross, 2006) as it is employed in the service of entrepreneurship. In addition, we need a better understanding of the dynamics at play. Arguably, such understanding would lead to more innovative techniques that could permeate society and the economy at large (Evenson and Dubberly 2011).

Innovation

Unique models for managing innovation that are simultaneously loose and tight; precise and vague; planned and responsive; controlled and contingent are urgently needed so that entrepreneurial leaders can rethink the nature of organizations and build better ways of empowering human action (Greenberg et al. 2011). Not only is competitive advantage a reason to innovate, so too is improved wellbeing in terms of social parameters.

The Innovation Imperative: Companies have to innovate to stay competitive (Chesbrough 2010) and although many are persuaded of the necessity for innovation they often don't know how. Increasingly new ventures are faced with competitive pressure due to the highly interconnected environments in which they operate (Luo and Donaldsen 2013). The best conceived ventures make space for contingencies and place emphasis on realigning their procedures to address unforeseen eventualities (Cakir 2006). Consequently, new initiatives can be conceived of as open systems that interact with their environment (Zott and Amit 2007). This situates innovation as a core strategic capability that determines a firm's competitiveness and survival. In a world of widely distributed knowledge, interaction with others through multiple collaborations is a prerequisite for business model and services innovation. This in turn leads to entire new innovation ecosystems (West 2014).

Open Innovation: Open innovation has developed into a new dimension of competition (Henkel et al. 2014, Porter 1990). It is a form of free knowledge exchange and thus can be viewed in term of new ways of trading intellectual property, not as a barrier but as opportunity (Gassmann et al. 2010). It builds on intense co-development with users; were users are innovators, co-designers, co-producers, and entrepreneurs in regard to new value creation (Pascu and van Lieshout, 2009). The emergence of open innovation has led to the establishment of elaborate networks in which companies team up with diverse types of partners to generate new products, services, and technologies (Appleyard and Chesbrough 2016). These open-innovation networks enable collaborative actors to engage in innovation processes and practices that lead to new forms of value creation.

Joined up Approach: Developmental innovation, as practiced by entrepreneurial leaders, is essentially open innovation because it drawn on open systems networks. Living labs are one manifestation of open innovation networks. They transform conventional research and development practice by espousing an ethos of collaborative competition (Ramaswamy 2009, Leminen et al. 2012). These labs typically conduct experimentation to engage in collaboration with users, partners, and other parties (Lynch and O'Toole 2009).

They provide the necessary network of relationships to enable strategic design (Leminen et al. 2012). They offer practical methods of creating and validating original inventions and improvements in real world environments. Such situated networks represent an open or societal form of communities of practice, and although they are fundamentally informal and self-organizing, they benefit from cultivation (Wenger 2000). In recognition of the value of living labs, the European Commission has promoted a common European innovation system based on living labs (Dutilleul et al. 2011). However, such entrepreneurial platforms must encompass strategic design competences exhibited by entrepreneurial leaders.

Triple Helix: A collaborative stakeholder approach to regional development and societal regeneration is termed a 'Triple Helix': an overlapping, series of institutional arrangements among universities, industries and the government, with hybrid organisations emerging at the interfaces. The concept of Triple Helix relationships was initiated in the late 1990s (Etzkowitz and Leydesdorff 2000). The Triple Helix analogy encompasses the specific nature of innovation that arises within each of the three institutional spheres of university, industry and government, as well as the dynamics at their intersections. The concept is a model of knowledge production and exploitation as a consequence of the relationships between all three. In effect Triple Helix relationships are prerequisite for the subsequent establishment of ecosystems or platforms for socio-economic value creation.

Socio - Economic Value Creation: Socio - economic value creation is entirely concerned with developmental innovation (OECD 2010). Socio-economics, as a bridging term, describes a broader field of value creation in today's society, characterised by openness, sharing, co-creation and global networking (Lackeus 2016). While modern economic theory is appropriate for quantifying market value it is less well able to categorise socio-economic value or analyse entrepreneurial value creation, innovation, co-creation and production (Lopdrup-Hjorth 2013). What we can say is value creation is dependent on resources be they physical or human. Several studies point out, that physical, human and social capital are productive resources (Baker 1990, Burt 1992, Putnam 1993, 1995) that facilitate actions that range from a firm's business operations to collaborative action for social good (Tsai and Ghoshal 1998, Porter and Kramer 2011, Mason and Brown 2013). Social capital can thus be said to contribute not only to a firm's ability to create value but also to society's ability to innovate through new economy or civic venturing (Tsai and Ghoshal 1998, Davies and Simon 2012, Lester 2013).

Conclusion: Entrepreneurs are viewed by society in general and policy makers in particular as creating value in terms of innovation, economic growth and job creation (Perren and Jennings 2005, Lackeus 2016). However, core human values such as creativity, empathy and humanism cannot be divorced from entrepreneurial endeavour (Frankl 1985, Batson et al., 2008, Baumeister et al.2012). Scholars have highlighted common entrepreneurial motives including improving the community, experiencing a sense of meaningfulness with others, finding a higher purpose in life and changing the world for the better (Spinosa et al. 1999, Morris et al. 2012). These views position entrepreneurship as an inherently collective activity, with emphasis on teamwork and community-based action (Drakopoulou et al. 2007, Sarasvathy et al 2009). In this context, value creation requires open engagement with the surrounding environment as it relies on energetic interactions within networked communities (Bruyat 2001).

Summary

Concern for human wellbeing has given rise to sustainable development as a broad social goal and, as a vigorous force for change; entrepreneurship is increasingly expected to contribute to this goal (Parrish 2010). Thus the term entrepreneurial leadership at once conveys economic and social connotations as the term encompasses academic, civic and responsible corporate entrepreneurship as well as new economy venturing. Thus, contemporary entrepreneurial leaders are individuals who connect with others to create and manage innovative ventures. Their primary mission is economic development in tandem with social change and improvement.

The task of cultivating new innovative practice calls for the skills of orchestration and improvisation that are the province of entrepreneurial leaders who can be adaptable, flexible, collaborative and imaginative. Their task is to initiate, frame, facilitate and champion alternative strategies, generate new lines of business, solve problems and promote the spread of best practices; thereby developing professional skills, and facilitating innovative talent. It is this crossing of boundaries, multifaceted inquiry and synthesis that necessitates research and innovation by design.

The relevance of design to strategy formation was first articulated as Design Direction (Bucci 1997) and later elaborated as Strategic Design (Steinberg 2010). This coupled with transformational leadership (Bass 1995) and entrepreneurial effectuation (Read et al. 2011) offers a different view of developmental innovation. Together with an open systems network approach, these elements will be synthesised in this study to form the foundation for a Design Dynamics theory upon which to model design led socio- economic innovation as a guide to entrepreneurial leadership practice.

4. Methodology

Research Philosophy

It is perhaps a truism to say that the relevance of the discipline of design in social, cultural and economic domains has increased exponentially over recent years and with it the recognition of the quest for different academic tools that are redolent of the discipline's cognitive force and agency (Ralf 2007). Thus cognitive design theory (Schön 1983, 1987, Archer 2007, Kolko 2010) is central to the methodological approach; specifically research through design.

A 'designerly' approach (Cross 2006, Bonsiepe 2007, Jonas 2007) to research, conducted simultaneously with generative activity, affords a new perspective on entrepreneurial leadership. Seen through the lens of strategic design, similar cognitive approaches that are common to design and entrepreneurial leadership are highlighted. For the strategic design process, of working from the general to the particular and then extrapolating back to the general again, is a specific and unique design dynamic of oscillating between the divergent and convergent. Accordingly, Donald Schön's view on design as a reflective activity and the central role of frame creation (Dorst 2015) are taken up as situated action and situated cognition. In particular, the improvisational nature of reflection-in-action and subsequently reflection on reflection-in-action, are considered appropriate when investigating the complicated realm of socio- economic value creation.

In essence, the research philosophy employs a constructionist view (Krippendorff 2006, 2007), where reconciliation is enabled by collaborative action. It is strongly influenced by Wenger's (1998) work on communities of practice, as these are continually engaged in sense making (Goodman 1978, Schön 1987). Unlocking creativity (Robinson 2009) at the societal level across the triple helix (Etzkowitz 2012) underpins the philosophy as does systems thinking (Senge 1990). The research was invariably conducted in the shared setting of studio practice known as Strategic Design Labs. In these co-creation laboratories for change, inquiry was through a problem setting and solving approach enabled by the process of naming, problem framing, sense-making and boundary setting (Schön 1987).

Design as Research Methodology

Some maintain that design is resistant to rigorous empirical inquiry because of its multifaceted nature and the complication of measuring the outcomes (Liedtka 2015). However, the methodological approach is based on abduction; the core reasoning process that underlies the design practice of problem framing as the foundation for generative activity (Stappers 2007, Dorst 2015).

The research methodology employed throughout has been participatory action specifically that of the reflective design practitioner through a process of naming, framing and sense-making. In particular naming that which needs attention (problem or paradox) and framing the context for this as a problem setting activity. Frame creation is a design-based approach that is purely problem-focused. As such it is the fundamental underpinning of a repertoire of generative methods employed in Strategic Design Labs. Here entrepreneurial leaders, be they expert designers, managers and/or stakeholder, are able to platform their strategic design activity so as to co-evolve multiple solutions in a co-creation process. Table 1, below depicts the range of research methods as a holistic Design Dynamics Research Model Canvas. It illustrates the combined methodological approach; its phases, methods, activity and instruments.

Design Dynamics Research Model Canvas				
Approach	Phases	Methods	Activity	Instruments
Participatory Action Reflection in Action	Exploratory Community of Practice (Venture Platform) (1) (2) (7) (8) (9)	1. Domain Orientation (1) (9)	Exploration Definition Planning	Expert Reference (1) (2) Focus Group (1) Stakeholder Maps (9) Territory(position) Maps(9)
		2. Issue Scoping (2) (7) (8)	Scoping Design Implications	Conceptual Enquiry (2) Laddering (8) Design Ethnography (7) Image Boards (7) (8)
	Generative Design Workshop (Strategic Design Lab) (2) (4) (6) (7) (9) (10)	3. Elemental Analysis (2) (4) (7) (9)	Atomisation Juxtapositions	Mind Maps (7) Thematic Networks (2) Stakeholder Walk - Though (7) (9) Relational Schema (4)
		4.Reconfiguring (4) (10) (6)	Permutations Synthesis Iterative Generation Testing Refinement	Problem Based Thought – Experiments (4) (6) Parallel Prototyping (10) Observation (6)
Reflection on Reflection in Action	(3) (5) (6) (8) (10)	5. Deployment & Evaluation (8) (10)	Launch Monitor Feedback Review Correct	Focus Group (8) Laddering Effectuation Improvisation (8) User trials (10)
		6. Reflection (3) (5) (6)	Post Project Analysis	Literature Review (3) (5) (6) Self – Reporting (3) Data Analysis Conceptual Modelling (5) (6) Impact Assessment

Table1. Design Dynamics Research Model Canvas

Numerals in red through this submission pertain to each publication listed in Appendix 1. List of Published Output.

The research approach was characterised by a two-fold process of episodic toggling between: -

1. **Reflection in Action:** during the generative, solution making Strategic Design Labs.
2. **Reflection on Reflective Practice:** Post outcome analyses and evaluation research yielding sense-making through mapping and model making.

This resulted in a cumulative build-up of knowledge derived either by reframing in a quest for more and better solutions in the same problem space; or in a different context, application of knowledge gained in an unrelated sphere.

Three distinct phases that were in turn **Exploratory, Generative and Evaluative** made up a sequential approach:-

1. **Exploratory:** In the first phase strategic design is an exemplar of expert design practice, where designers and stakeholders engage in reasoning from desired outcomes via frames for possible design solutions (Schön and Wiggins 1992).
2. **Generative:** During the second phase, Strategic Design Labs enable a network of interested parties to come together around a problem, which they collectively view from a novel standpoint. They address the multifaceted nature of the problem by creating a new and broader context. This produces underlying themes that lead to the creation of a framework for action. The activity is recorded in template proformas, photographic and video evidence and public exhibition. In the Strategic Design Lab both the problem and the solution are developed and refined in concert in a co-evolution process (Dorst and Cross 2001) to simultaneously satisfy potentially conflicting considerations (Whitbeck 2011). Through this activity entrepreneurial leaders create new concepts for developmental innovation with respect to curriculum, enterprise, platforms and policy frameworks. In this way Strategic Design Labs initiate the practice of open innovation. Where: -
 - the investigation is initiated by problem based inquiry or thought experiment
 - stakeholders design and co-create their strategic direction
 - a primary investigator takes on the role of catalyst, and reflective practitioner.
3. **Evaluative:** The third phase constitutes analytical research and evaluation. It is a process of sense-making that articulates relationships through the use of visual diagrammatic schema. This phase takes place at the interface between Reflection – in - Action and Reflection on Reflection – in - Action. Reflection on the ensuing trail in practice informs the deliberate proactive choice of the next inquiry as the subsequent step in the learning journey.

The research employed a range of design and business instruments (Martin and Hanington 2012). These are aligned into six sequential methods. These methods have been identified during the retrospective sense-making of participatory action during the longitudinal study. Each method is employed, to a greater or lesser extent in all of the research contributions, with variations in emphasis being contingent on subject matter or context. The methods are: - **Domain Orientation, Issue Scoping, Elemental Analysis, Reconfiguring and Evaluation, Reflection:** -

1. **Domain Orientation** describes elicitation and modelling of the area, analysis from different perspectives and issue intelligence gathering. The research involved information gathering from industry sources; reference to knowledgeable expert actors through Focus Groups; as well as Stakeholder (market segmentation) and Territory (position) Maps.

2. **Issue Scoping** defines the problem architecture through identification components and their relation to core values. Typical research techniques used were: Conceptual Enquiry, Design Ethnography, Image boards, Laddering and Focus Group.
3. **Elemental Analysis** helps understanding of complex issues by atomisation into constituent parts. Mind Maps, Thematic Networks, Stakeholder walk through, as well as relational schema were employed.
4. **Reconfiguring** is concerned with the practice of strategic design for innovation through alternative permutations and syntheses generation. The primary research techniques being Problem Based Thought Experiments.
5. **Deployment and Evaluation** is by trial for verification of functional appropriateness through situational testing. Methods include: Focus Groups, User trials, Design Ethnography.
6. **Reflection** describes post project analysis that involves reviewing success factors and limitations, as well as unintended consequences, to draw inferences through new cognitive connections. Data analysis informs the development of principles and conceptual models that make new contributions to knowledge, simultaneously interpreting and anticipating patterns of unmet emerging needs to form new lines of inquiry.

5. Reflection on Reflective Practice

Introduction

The inquiry underpinning this submission centres on how entrepreneurial leadership can be harnessed for developmental innovation that contributes not only to economic but also social value creation. The nature of the inquiry is reflected upon in detail in Appendix 3. This has led to issue scoping and elemental analysis through mapping each publication onto a Framework of Transformational Drivers and Triple Helix Challenges. This has yielded threshold and transfiguring concepts. Threshold Concepts (Meyer and Land 2006, Yip, and Raelin 2012) are the ideas that need to be comprehended as keys to understanding the field. Whereas Transfiguring Concepts are generative devices, normally the province of creativity, that need to be mastered as part of a design process.

Published Output Mapping

Analysis has been conducted through identification of fundamental challenges in each domain of the Triple Helix and drivers for transformation articulated earlier in chapter 2. Each publication, numbered 1 to 14, has been mapped onto a matrix of Triple Helix Challenges along the vertical axis and Transformational Drivers along the horizontal axis. This has been used as a framework upon which to map the main focus of each output as shown in Table 2 below. In the ensuing tables and narrative each published output in the body of work is referenced by numerals in red. These then pertain to the List of Published Output Appendix 1. The dataset of published output and support material is listed in detail by type, main focus, abstract and impact in Appendix 4.

Framework of Transformational Drivers for Triple Helix Challenges			
Triple Helix Challenges	Transformational Drivers		
	Entrepreneurial Leadership	Strategic Design	Open Innovation
Socio - Economic Value Creation	<p>11. <i>The University as a Catalyst for Entrepreneurial Leadership - It's a Matter of Design.</i> 39th ISBE Conference (Conference Paper 2016)</p> <p>12. <i>Civic Leadership for Cities in Transition.</i> 8th European Conference on Management Leadership and Governance, (Conference Paper 2013)</p>	<p>4. <i>Translational Design - The evolution of Design Management for the 21st Century.</i> In <i>Designing Business and Management</i> (Book Chapter 2016)</p> <p>13. <i>New Ways of Knowing: Strategic Design for Social and Economic Innovation.</i> IED Design Business Conference (Conference Provocation Statement 2011)</p>	<p>2. <i>Using Design, Innovation and Entrepreneurship in Community Building and Regeneration.</i> <i>Design Principles and Practices</i> (Journal article 2011)</p> <p>8. <i>Design Thinking, Enterprise and Innovation: Strategies for stimulating creative hubs and making an impact on city regeneration.</i> In: <i>Design Management: Toward A New Era of Innovation.</i> (Book Section 2011)</p>
Academic Renaissance	<p>5. <i>Entrepreneurial Identity and Leadership: The research imperative</i> Proceedings 11th European Conference on Innovation and Entrepreneurship. (Book Section 2016)</p> <p>6. <i>Entrepreneurial Learning In Context - An Exploration of learning models in different domains.</i> Proceedings 10th European Conference on Innovation and Entrepreneurship. (Book Section 2015)</p>	<p>1. <i>Designing a Design Research, Enterprise and Innovation Agenda.</i> <i>Design Principles and Practices</i> (Journal article 2011)</p> <p>7. <i>Studio 21 - A New School of Management Thought.</i> The 7th Art of Management & Organization Conference Papers. (Book Section 2015)</p> <p>14. <i>Using creativity and innovation to integrate research into master's program.</i> 10th ABC Europe Convention (Conference Paper Presentation 2010)</p>	
Global Venturing	<p>3. <i>The University as a Catalyst for Nascent Technology Entrepreneurial Leadership – Towards a sustainable model in Advances in Economics of Innovation and Technology Based Nascent Entrepreneurship.</i> (Book Chapter 2017)</p>		<p>9. <i>PROPEL– Ideas into Businesses Programme;</i> Northern Ireland Science. (External Body Report 2009)</p> <p>10. <i>Enterprise Development Management Competency Framework & Change Management Standards;</i> Russian Federal Commission Presidential Programme (External Body Report 2008)</p>

Table 2 Framework of Transformational Drivers for Triple Helix Challenges

When apprising the body of work in entirety, categorisation took place on the bases of each publication’s differentiated contribution by issue, key words, research methodology and key influences, see in Appendix 5. Each publication was then attributed to one of the Triple Helix Challenges depending on its predominant focus. The publications were further segmented into three groups depending on which of the Transformational Drivers was most germane to the issue. This atomisation enabled the body of work to be disaggregated, attributed and mapped with respect to its differentiated issue within the framework as shown in table 3 below.

Map of Differentiated Issues from Published Output			
Triple Helix Challenges	Transformational Drivers		
	Entrepreneurial Leadership	Strategic Design	Open Innovation
Socio - Economic Value Creation	Leverage Social Anchors (11) Future Focus Transformation Through the Triple Helix (12)	Translational Design as a Meta Skill (4) New Ways of Knowing Provisional Forms (13)	Creating Value through International Knowledge Exchange (2) Regenerative Creative Hubs (8)
Academic Renaissance	Strategic Entrepreneurial Leadership the Academy as Community of Inquiry, Learning and Practice (5) Strategic Entrepreneurial Leadership Debate, Exchange & Learning (6)	Reframing Multi- Disciplinary inquiry (1) Method Learning for Design & Management Synthesis (7) Design Led Multicultural Research Reconfiguration (14)	Gap Analysis New Forms of Distributed Higher Education Multidisciplinary and Interdisciplinary Working in Higher Education
Global Venturing	University Led Global Enterprise Development (3)	Gap Analysis New Ecosystems & Institutional Models	Stimulation Platform for Nascent Technology Industry (9) Underpinning Standards for Global Innovation (10)

Table 3 Map of Differentiated Issues from Published Output

Systematic coupling of Transformational Drivers with Triple Helix Challenges generated themes that are elaborated below.

Entrepreneurial Leadership for: - Socio - Economic Value Creation

A predominant theme in exploring the nature of entrepreneurial leadership is the notion of the Triple Helix (Etzkowitz and Leydesdorff 2000); how universities, governments and industry collaborate to contribute to economic and social development. In particular, how they jointly exhibit responsibility for local and regional development by creating value through stakeholder connections. Such collaborations help build corporate, civic and social capital by creating initiatives that empower civic responsibility for new economy innovation. Thus civically minded entrepreneurial activity is a way to ensure future sustainability by anchoring regional socio - economic development at the local level (Vyakarnam 2009). In this context the activities of entrepreneurial universities, responsible business leaders and local government, galvanises partnerships; combining academic, economic, social, industrial and professional groups for socio- economic action.

The works pertaining to this theme comprise two refereed conference papers. The first (12) documents collaboration between the domains of business leadership and strategic design. It promoted the provision of student and tutor collaborations and participatory action learning, assessment and teaching in post conflict

communities in transition; it also advocates fostering an international learning community for city transformation. This was the foundation for the second work (11) 'The University as a Catalyst for Entrepreneurial Leadership - It's a Matter of Design', built on the author's experience of leveraging networks of influence by galvanising entrepreneurial ambitions within the entrepreneurial university. Key issues to emerge were: -

- Leverage Social Anchors (11)
- Future Focus Transformation through the Triple Helix (12)

Entrepreneurial Leadership for: - Academic Renaissance

Higher Education research strategies have become more issue focused and by necessity developed multidisciplinary platforms in their quest for relevance and impact. In turn this has prompted the recent emergence of Strategic Entrepreneurial Leadership (SEL) research communities which exhibit a momentum to make a distinct contribution in the form of new cross - disciplinary engagement, collaboration and co-creation. Published output here comprises two peer reviewed international conference proceedings book sections.

The first publication (6) 'Entrepreneurial Learning in Context - An Exploration of learning models in different domains.' points to a limited understanding of the essence of entrepreneurial leadership by comparing entrepreneurial practice in different contexts. It posits that there are situational factors that lead to altered forms of entrepreneurial leadership approaches and expression. The work sets out the need for the identification of higher order entrepreneurial leadership threshold concepts that would have significant bearing on future development of the discipline. The second publication (5) 'Entrepreneurial Identity and Leadership: The research imperative' built on the former by identifying the need to better understand novel aspects of how entrepreneurs construct identity. It highlights the need for leaders to self - identify as entrepreneurial in order to cultivate the capacity to ignite innovation by mobilizing entrepreneurial attributes in a variety of milieus. Key issues were: -

- Strategic Entrepreneurial Leadership Academy as Community of inquiry, learning and practice (5)
- Strategic Entrepreneurial Leadership Debate, Exchange & Learning (6)

Entrepreneurial Leadership for: - Global Venturing

If we recognise entrepreneurial leadership as the mobilising force that galvanises action to create new value, the real question becomes how? And by extension, for all engaged in economic development, how can we develop global entrepreneurial leadership competencies through appropriate new talent management initiatives (Rae et al. 2014, Manzini 2011). Consequently, this output illustrates how universities have a central role as catalysts for new economy global economic development (3). This publication sets out how, in practice, universities accelerate nascent technology enterprises; how entrepreneurial universities collaborate with government and industry in support of such ventures and ultimately how this joined up approach builds productive relationships with diaspora in Silicon Valley. The key issue was: -

- University Led Global Enterprise Development (3)

Strategic Design for: - Socio - Economic Value Creation

Triple helix actors collaborate to become ground social sustainability and accelerate economic development (4). The emergence of strategic design as an approach to giving form to decision - making for government policy formulation gave rise to the provocation statement entitled 'New Ways of Knowing: Strategic Design for Social and Economic Innovation' (13).

The work challenged design and business disciplines to articulate a philosophy of sustainability, fit for our time and beyond; citing strategic design as an appropriate methodology by which to tackle complex social infrastructural problems. The provocation prompted the book chapter 'Translational Design - The evolution of Design Management for the 21st Century' (4), this provides a commentary on the evolution of contemporary design management and discusses new business models for innovation. This work concluded by proffering the term 'Translational Design' to better describe the role of design for future oriented development and leadership. In so doing it advocates a new school of thought more appropriate to 21st century development. Key issues were: -

- Translational Design as a Meta Skill (4)
- New Ways of Knowing through Provisional Forms (13)

Strategic Design for: - Academic Renaissance

True learning is predicated on advances in knowledge and its transfer which relies on insightful pedagogy and curriculum development, based on the integration and convergence of the three pillars of academia namely; research, teaching and learning and enterprise. Thus educational development per se can be viewed as a whole system of knowledge creation, exchange and application.

The fundamental challenge for academia is how to equip future strategists with the abilities to create and lead change-adept organisations and systems. If academia is to remain relevant, it needs to establish flexible, issue focused and collaborative research platforms (14). A new approach to management education is empirical learning through studio practice (7). Another is reframing multi-disciplinary academic research and innovation through the lens of strategic design inspired regenerative ecosystems. Design therefore can be viewed as a key change agent; the metaskill that that enables tangible innovation (1).

These sentiments are expressed in 2 published outputs entitled 'Designing a Design Research, Enterprise and Innovation Agenda' (1) and 'Studio 21 - A New School of Management Thought'(7), as well as a collaborative conference paper with international colleagues.(14). Key issues were: -

- Disciplinary inquiry (1)
- Method Learning Design & Management Synthesis (7)
- Design Led Multicultural Research Reconfiguration (14)

Open Innovation for: - Socio - Economic Value Creation

Broad spectrum value creation is best stimulated by a holistic cross cutting approach. Here investigations into different cultural contexts are important in order to exchange expertise across domains. The published works here comprise two outputs. The first is a journal article (2) focused on how creativity, design thinking, and entrepreneurship enable the development of innovative practices of knowledge exchange in the social domain. The second is a book chapter (8) describing the role of design thinking in change management and economic development in a post conflict urban context. The study arrives at a conceptual model that describes the relationship between creativity, design and innovation, with particular reference to the role of design thinking in cultivating entrepreneurship within a social and cultural context. Key issues were: -

- Creating Value through International knowledge exchange (2)
- Regenerative Creative Hubs (8)

Open Innovation for: - Global Venturing

Not only is entrepreneurial venturing an international endeavour made possible by instantaneous global connectedness, it is also being influenced by rapid geo-political shifts. The nature of research in this context

requires underpinning by the international Enterprise Development Management Competency Frameworks & Change Management Standards (10).

For new global enterprise ecologies to emerge they need to tap into virtual networks, capitalise on global best practice and harness international expertise. Such globally active networked communities could give the impetus for a new type of Entrepreneurial Leadership Academy without frontiers (9).

The published outputs here comprise two reports for external agencies. The first (10), focusing on the former Soviet Union, was the publication for the pan Russia Presidential Programme. This bespoke research, on behalf of the Kremlin in Moscow in 2008, was designed in response to a call from the Russian State Plan for training economic development administrative personnel.

The second publication (9), focusing on Irish diaspora networks in Silicon Valley, was a strategic development initiative in support of the high growth technology enterprise sector in Northern Ireland. The publication outlined a proposal for the establishment of the PROPEL – Ideas into Business Programme, enabled by a new blend of facilities, academic preparation and real world readiness, facilitated by Silicon Valley expert entrepreneurs. Key issues were: -

- Stimulation Platform for Nascent Technology Industry (9)
- Underpinning Standards for Global innovation (10)

Gap Analysis

The mapping of the body of work has identified gaps. There are two themes that are not address and consequently represent fruitful areas for future research, namely

- **Strategic Design:** for Global venturing
- **Open Innovation:** for Academic Renaissance

Conclusion: Analysis of the contribution that the body of work has made initially in the practice arena and more recently to the theoretical underpinning of the field is both comprehensive and innovative. The key insights that have been derived point to the development of substantive underpinning of entrepreneurial leadership by design; of utility to academics, government policy makers and organisational leaders.

Synthesis of a New Organising Framework

Key issues derived from the above themes were reflected upon and synthesised to yield threshold and transfiguring concepts. Collectively these are combined into a Design Dynamics Organising Framework illustrated in Table 4 below.

In this Design Dynamics Organising Framework, the Transfiguring Concepts has been discerned through a distillation of the essence of the Transformational Drivers as follows: -

- Entrepreneurial leadership is about transformation; it is the catalytic principle that employs direction setting, chain reaction and effectuation.
- Strategic design is about reconfiguration; it is the animating principle that employs metamorphosis, aggregation and alignment.
- Open innovation is about scaling; it is the navigating principle that employs a repertoire of alternative routes, open systems networks, hub and branch dissemination as well as the ability to cope with paradox (Enkel and Gassmann, Chesbrough 2009, Bogers 2011)

Design Dynamic Transfiguring Concepts are **Transformation, Reconfiguration and Scaling**

Meeting the three Triple Helix Challenges, a synthesis of key issues across the Transformational Drivers has yielded the following threshold concepts: -

- For socio-economic value creation, it is essential to imagine alternative forms and engage in foresight. This is in essence of the threshold concept of envisioning.
- For academic renaissance an appreciation of discovery, triangulation, evaluation and insight yields the threshold concept of knowledge creation.
- For global venturing a sense of perspective that comes from exchange and comparisons through porous boundary crossing begets the threshold concept of connectivity.

Design Dynamic Threshold Concepts are **Envisioning, Knowledge Creation** and **Connectivity**

Design Dynamics Organising Framework				
Triple Helix Challenges	Transformational Drivers			
	Entrepreneurial Leadership	Strategic Design	Open Innovation	Threshold Concepts
Socio - Economic Value Creation	Leverage Social Anchors (11) Future focus Transformation Through the Triple Helix (12)	Translational Design as a Meta Skill (4) New Ways of Knowing Provisional Forms (13)	Creating Value through International knowledge exchange (2) Regenerative Creative Hubs (8)	ENVISIONING Questioning Wonder Imagination Alternative Futures To enable Foresight
Academic Renaissance	Strategic Entrepreneurial Leadership the Academy as Community of inquiry, learning and practice (5) Strategic Entrepreneurial Leadership Debate, Exchange & Learning (6)	Reframing Multi-Disciplinary inquiry (1) Method Learning for Design & Management Synthesis (7) Design Led Multicultural Research Reconfiguration (14)	Gap Analysis New Forms of Distributed Higher Education	KNOWLEDGE CREATION Inquiry Triangulation Interrogating Evaluating To achieve Insight
Global Venturing	University Led Global Enterprise Development (3)	Gap Analysis New Ecosystems & Institutional Models	Stimulation Platform for Nascent Technology Industry (9) Underpinning Standards for Global Innovation (10)	CONNECTIVITY Porous Boundaries, Exchange & Comparisons To gain Perspective
Transfiguring Concepts	TRANSFORMATION Catalyst Provide Impetus Direction Setting Chain Reaction Evolutionary track Initiate Effectuation	RECONFIGURATION Animation Paradox Metamorphosis Aggregating & Aligning	SCALING Navigation Open Systems Network Alternatives Channel Hub & Route	DESIGN DYNAMICS

Table 4 Design Dynamics Organising Framework

6. Design Dynamics

Through reflection on reflective – in - action, a new perspective on entrepreneurial leadership developmental innovation practice has been articulated. The ensuing synthesis embodies guiding principles together with transfiguring and threshold concepts. The properties of the Design Dynamics transfiguring and threshold concepts are then deduced, extrapolation and attribution as values.

The key issues emerging from the body of work (Table 3) as mapped across the Framework of Transformational Drivers for Triple Helix Challenges (Table 2) combine to enable foresight by envisioning; insight through knowledge creation; and perspective through connectivity. These have produced values emanating from threshold and transfiguring concepts that have then been retrofitted across the Design Dynamics Values Matrix, illustrated in Table 5 below. Thus the matrix yields nine sets of Design Dynamics Values.

Design Dynamics Values Matrix

	Transformational Drivers			Key Activity
Triple Helix Challenges	Entrepreneurial Leadership	Strategic Design	Open Innovation	THRESHOLD CONCEPTS
Socio - Economic Value Creation	Effectuation Questioning & Foresight	Paradox Wonder & Imagination	Chain Reaction Alternative Futures	ENVISIONING
Global Venturing	Impetus Perspective	Aggregating & Aligning Comparison & Exchange	Open Systems Network Porous Boundaries	CONNECTIVITY
Academic Renaissance	Direction Evaluation & Insight	Metamorphosis Triangulation	Alternatives Discovery	KNOWLEDGE CREATION
TRANFIGURING CONCEPTS	TRANSFORMATION	RECONFIGURATION	SCALING	
	Catalytic Principle	Animating Principle	Navigating Principle	DESIGN DYNAMICS

Table 5 Design Dynamics Values Matrix

These threshold concepts have emanated from the Triple Helix challenges, through a conflation of values attributed to the Transformational Drivers. Similarly, the transfiguring concepts are derived from the Transformational Drivers, through an amalgamation of the values ascribed to the chosen Triple Helix Challenges. These values have been arrived at during this study through a design thinking process of reflection on reflective practice, whilst the alignment of Entrepreneurial Leadership, Strategic Design, Open Innovation can be aggregated as Catalytic, Animating and Navigating Principles, to be applied in different challenging contexts. These Design Dynamics Principles together with the Transfiguring Threshold Concepts are illustrated in Table 6 below.

Design Dynamics Principles, Concepts & Values

Catalytic Principle	Animating Principle	Navigating Principle	
Transfiguring		Threshold	
Concepts	Values	Values	Concepts
TRANSFORMATION	Effectuation Impetus Direction	Questioning & Foresight Wonder & Imagination Alternative Futures	ENVISIONING
RECONFIGURATION	Paradox Aggregating & Aligning Metamorphosis	Perspective Comparison & Exchange Porous Boundaries	CONNECTIVITY
SCALING	Chain Reaction Open Systems Network Alternatives	Evaluation & Insight Triangulation Discovery	KNOWLEDGE CREATION

Table 6 Design Dynamics Principles, Concepts and Values

Thus the threshold concepts have been identified as:-

- ENVISIONING; employing questioning and foresight, wonder and imagination and alternative futures.
- CONNECTIVITY; employing perspective, comparison and exchange and porous boundaries.
- KNOWLEDGE CREATION; employing evaluation and insight, triangulation and discovery.

Whilst the transfiguring concepts are:

- TRANSFORMATION; enabled by catalytic evolutionary chain reactions, direction setting and providing the impetus for effectuation.
- RECONFIGURATION; by metamorphosis, aggregation, alignment and animation.
- SCALING; through alternative channel and navigation routes, appreciation of hub and open systems networking and the paradoxes of unintended consequences.

Conclusion

The appraisal has culminated in the hypothesis that Design Dynamics embodies the notions of permutations; aggregating, aligning to reconfigure a given set of cognitive and methodological tools for application in different contexts. The elements of Design Dynamic begin to address the core research question of how entrepreneurial leaders enact developmental innovation. Collectively this set of principles and concepts can be employed as a creative device or a zoom lens; at once horizon scanning and understanding entire landscapes to appreciate the big picture, while simultaneously engaging in fine detailed bespoke alternatives to generate multiple possibilities. Design Dynamics also connotes rapid movement. It is the speedy application of fluent oscillation between thinking styles that allows frequent adaptations and metamorphoses as a methodology for elucidating rapid iterations of novel, fit for purpose solutions; be they products, processes or experiences.

7. Conclusion and Further Investigation

The aim of this study was to identify concepts and principles with the potential to cohere into a holistic organizational framework that illustrates the role of design in entrepreneurial leadership practice. In doing so the research considered the key function of entrepreneurial leadership as that of socio-economic value creation across a range of developmental innovation contexts within the triple helix. The research deliberates on design as a pivotal, generative metaskill for adding value; specifically, as a set of cognitive and practical methodologies employed by entrepreneurial leaders to deal with instability and adapt accordingly whilst engaging in developmental innovation. This deliberation was based on a systematic reflection on reflective practices, in a variety of developmental projects and contexts over an extended period.

The body of work has had its genesis in the context of the most complex and challenging of issues – protracted civil conflict. Yet the current zeitgeist exemplifies real and present intractable difficulties on the global geopolitical stage that are not amenable to straightforward solutions. Scholarly inquiry still grapples with many of these interconnected issues and as a consequence the field of entrepreneurial leadership for socio-economic value creation is not well developed. One important lesson from the author's experience of societal crisis has been the imperative to unlocking creativity (Robinson et al. 2000) for social innovation and regeneration.

In contributing to the field, the body of work builds on the philosophies of strategic design (Bucci 1997, Verganti 2009, Steinberg 2010) and design thinking (Kimbell 2012, Liedtka 2015). It has encompassed previous theories of entrepreneurial leadership (Saravathy 2008, Read et al. 2011, Leitch et al. 2013, Harrison et al. 2015); and open innovation (Wenger and Snyder 2000, Chesbrough 2010, Appleyard and Chesbrough 2016). It arrives at a design led approach that provides a different perspective on developmental innovation in relation to addressing intractable multifaceted problems, creating value in regions where there are deficits and contributing to conflict resolution. This has been done through a synthesis of entrepreneurship, leadership, strategy, design thinking, innovation and development, and points to the potential for Design Dynamics to provide insight into what entrepreneurial leaders actually do in different contexts.

This body of work makes a distinct contribution by articulating how design principles and concepts are inherent in the work of entrepreneurial leaders. In essence this research has begun to justify the employment of design methodologies in addressing complex regional insufficiencies resulting from intractable conflict situations. Unearthing and reflecting on the process of entrepreneurial leadership has contributed to the extant body of knowledge through the construction of a Design Dynamics organising framework. Such a framework potentially provides a flexible model to help make sense of the practices of entrepreneurial leaders in response to uncertainty. Thus, whilst Design Dynamics' principal utility has been in terms of a retrospective explanation of a modus operandi of entrepreneurial leaders; it has become increasingly apparent that this could be developed into a cohesive theory for navigating new unforeseen complex circumstances.

In practice Design Dynamics could assist nascent entrepreneurial leaders engage in a range of cognitive and practical methods; helping them balance paradox and hone their modus operandi. In this way the organising framework could act as a guiding canvas to aid venture start-up, enabling sense checking along the way, thus giving shape to future courses of action. It is also a prospective guide for future multi-stakeholder engagement, decision-making and way finding. However, these insights require testing through further applied research.

Further Investigation

The potential utility of Design Dynamics needs to be ascertained. As with any new conceptual model, Design Dynamics needs to be verified and evaluated as a theoretical construct for conceptualising the developmental innovation practice of entrepreneurial leaders.

How the principles and concepts of Design Dynamics are relevant to global venturing, particularly with respect to the creation of new institutional forms needs to be investigated. How the framework could help initiate and sustain new types of socio economic value creation ecosystems also needs to be considered. Similarly, an understanding of Design Dynamics' contribution to academic renaissance and different forms of distributed higher education warrants further research.

Appendix 1

List of Published Output

List of Published Work		
Title & Date	Published in	Author
International Journal Articles		
1. Designing a Design Research, Enterprise and Innovation Agenda. 2011	Design Principles and Practices: An international Journal	Rusk, M.
2. Using Design, Innovation and Entrepreneurship in Community Building and Regeneration. 2011	Design Principles and Practices: An international Journal	Rusk, M. Poncini, G. McGowan, P.
Book Chapters		
3. The University as a Catalyst for Nascent Technology Entrepreneurial Leadership – Towards a sustainable model 2017	Advances in Economics of Innovation and Technology Based Nascent Entrepreneurship Palgrave	Rusk, M.
4. Translational Design - The evolution of Design Management for the 21st Century. 2016	Designing Business and Management Bloomsbury Academic	Rusk, M.
Book Sections		
5. Entrepreneurial Identity and Leadership: The research imperative. 2016	ECIE 2016 11 th European Conference on Innovation and Entrepreneurship. Proceedings	Rusk, M. Forbes-Simpson, K.
6. Entrepreneurial Learning In Context - An Exploration of learning models in different domains. 2015	ECIE 2015 10 th European Conference on Innovation and Entrepreneurship. Proceedings	Rusk, M. McGowan, P.
7. Studio 21 - A New School of Management Thought. 2015	7th Art of Management & Organization Conference Papers: Creativity & Design. Copenhagen Business School	Rusk, M.
8. Design Thinking, Enterprise and Innovation: Strategies for stimulating creative hubs and making an impact on city regeneration. 2011	Design Management: Toward A New Era of Innovation. Innovation and Design Management Association, Hong Kong.	Rusk, M.
Report for External Body		
9. PROPEL– Ideas into Businesses Programme. 2009	Northern Ireland Science Park for Invest NI	Rusk, M.
10. Russian Federal Enterprise Development Management Competency Framework & Change Management Standards. 2008	Russian Federal Commission Presidential Programme., Moscow, Russia.	Rusk, M.
Supporting Material		
11. The University as a Catalyst for Entrepreneurial Leadership - It's a Matter of Design. 2016	Conference Paper ISBE39th Annual Conference of the Institute for Small Business and Entrepreneurship. Paris	Rusk, M.
12. Civic Leadership for Cities in Transition. 2013	8th European Conference on Management Leadership and Governance Cyprus	Mckee, D. Sheerman, J. Rusk, M.
13. New Ways of Knowing: Strategic Design for Social and Economic Innovation. 2011	IED Design Business Conference, Models of Designing Business, Barcelona.	Rusk, M
14. Using creativity and innovation to integrate research into master's program. 2010	10th ABC Europe Convention Lessius University College Antwerp	Poncini, G. Rusk, M. Wolff, A. Stehlik, S.

Appendix 1 Continued

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Rusk, M. (2016). Translational Design - The evolution of Design Management for the 21st Century. *Designing Business and Management*. Junginger, S and Faust, J. (Eds). Publisher: Bloomsbury Academic, Publication: 14th January 2016 ISBN-10: 0857855530 ISBN-13: 978-0857855534

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Rusk, M., Mc Gowan, P. (2015). Entrepreneurial Learning In Context - An Exploration of learning models in different domains. *Proceedings of ECIE 2015 10th European Conference on Innovation and Entrepreneurship*. The University of Genoa Italy. Dameri, R.P., Garelli, R., Resta, M. (Eds). Academic Conferences and Publishing International Limited Reading, UK. Print version ISSN: 2049-1050, ISBN: 978-1-910810-49-1. E-Book ISSN: 2049-1069, ISBN: 978-1-910810-50-7 <http://academic-bookshop.com>

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Rusk, M. (2011). Design Thinking, Enterprise and Innovation: Strategies for stimulating creative hubs and making an impact on city regeneration. In: *Design Management: Toward A New Era of Innovation.*: Cai, Jun, Liu, Jikun, Tong, Gabriel Y.L. and IP, Anthony K.C.(Eds). Innovation and Design Management Association, Hong Kong, pp. 20-27. ISBN 978-988-15984-1-7

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Rusk, M. (2009). *PROPEL– Ideas into Businesses Programme*: A strategic development initiative in support of the high growth technology enterprise sector in Northern Ireland. Submitted to InvestNI by the iThree consortium; led by the Northern Ireland Science Park in partnership with University of Ulster & Queen’s University Belfast.

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Appendix 2 Evolution of Entrepreneurial Leadership

YEAR	TITLE	AUTHOR	JOURNAL/BOOK NAME
2003	Entrepreneurship and leadership: Common trends and common threads	Vecchio, R.P.	Human Resource Management Review
2004	Entrepreneurial leadership: Developing and measuring a cross cultural construct.	Gupta,V., McMillan, I., Surie, G.	Journal of Business Venturing
2007	Entrepreneurship and leadership	Antonakis, J., Autio E	The Psychology of Entrepreneurship
	Entrepreneurial leadership and new ventures: Creativity in entrepreneurial teams	Chen, M.H.	Creativity and Innovation Management
	Entrepreneurial leadership in the 21st century	Kuratko, D.F.	Journal of Leadership and Organisational Studies
2008	Practicing authentic leadership	Avolio, B.I., Wernsing, T.S.	Positive Psychology: Exploring the Best in People
2010	Learning to lead in the entrepreneurial context	Kempster, S., Cope, J.	International Journal of Entrepreneurial Behaviour & Research
2011	Exploring distributed leadership in the small business context	Cope, J., Kempster, S., Parry, K.	International Journal of Management Reviews
	Entrepreneurial leadership: What is it and how should it be taught?	Roomi, M.A., Harrison, P.	International Review of Entrepreneurship
2012	Effective leadership behaviour: What we know and what questions need more attention	Yukl, G.	Academy of Management Perspectives
	Cheerleader, Opportunity Seeker, And Master Strategist: ARL Directors As Entrepreneurial Leaders	Carpenter, M., Taesil, H.	College & Research Libraries
2013	The development of entrepreneurial leadership: The role of human, social and institutional capital.	Leitch, C.M., McMullan, C., Harrison, R.T.	British Journal of Management
2014	Entrepreneurial Leadership And Performance In Chinese New Ventures: A Moderated Mediation Model Of Exploratory Innovation, Exploitative Innovation and Environmental Dynamism	Huang, S., Ding, D., Chen, Z.	Creativity and Innovation Management
	From Hero Innovators To Distributed Heroism	Meijer, A. J.	Public Management Review
2015	Understanding and measuring entrepreneurial leadership style.	Renko M, et al	Journal of Small Business Management
	Breaking glass: Towards a gendered analysis of entrepreneurial leadership.	Harrison, R.T., Leitch, C.M., McAdam, M.	
	Towards Operationalizing Complexity Leadership: How Generative, Administrative And Community-Building Leadership Practices Enact Organizational Outcomes	Hazy, J., Uhl-Bien, M.	Leadership
2017	Discourses of entrepreneurial leadership: Exposing myths and exploring new approaches	Dean, H., Ford J.	International Small Business Journal
	Processes of entrepreneurial leadership: Co-acting creativity and direction in the emergence of new SME ventures,	Sklaveniti ,C.	
	Entrepreneurial leadership: Insights and directions	Leitch, C. M., Volery, T.	
	Nascent Entrepreneurship and Territorial Social Capital: Empirical Evidences from Italy	Romano, M., Nicoira,M., Schillaci,C	Technology – Based Nascent Entrepreneurship

Appendix 2 Continued

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Appendix 3 Nature of the Inquiry

The investigation starts by considering the role of entrepreneurship and design in addressing multifaceted complex strategic issues (1) while simultaneously comparing and contrasting different cultural approaches to knowledge exchange (2).

The research addresses the fundamental challenge of how to equip future leaders with the imagination to innovate, the professionalism to perform, and the openness to collaborate: leading to change – adept organisations and systems (Moss Kanter 1997) (7). It endeavours to position entrepreneurial leadership as a contemporary approach to social and economic sustainability and renewal (4) and in so doing explores design led developmental innovation.

In considering how the term entrepreneurial leadership has come to signify transformational value creation across the broad spectrum of societal improvement and regeneration, the work focuses on more than narrow quantifiable worth. It takes up the term to include an expanded view of value creation that is also concerned with issues such as fairness, equality, ecology and common governance. For if what is valuable can be described as what counts (Stark 2011) the work is underpinned by a quest to discover mechanisms for improvement that will contribute positively to more equitable and sustainable future scenarios.

If the essential function of entrepreneurship is to create value, by extension entrepreneurial leaders create value through and with others. Through participatory action, attention is paid to what is distinctive about entrepreneurial leaders by investigating what such individuals actually do in practice. The quest here is to identify, harness and apply newly emerging principles that stimulate entrepreneurial ambition. (6) A key driver was the search for new and better ways to support developmental innovation practice through entrepreneurial leadership competency building. This was invariably done in concert with others by brokering networks and stimulating communities of inquiry, learning and practice (5) (Wenger 2002).

The body of work is concerned with different contexts in which entrepreneurial leaders can engage in developmental innovation. These can be appropriately articulated by what Henry Etzkowitz, (2012) termed the triple helix; namely government, academia and industry. Specifically, the pivotal role of universities has been foregrounded as exemplars of entrepreneurial leadership as well as the catalysts for and supporters of entrepreneurial leadership in government and industry (3). In this broader socio- economic context entrepreneurial leaders engage in developmental innovation by raising entrepreneurial ambition, accessing means, and thus enabling transformation. They do this by design. Here design is interpreted in its broadest context as the ‘Animating principle of all creative processes’ (Vasari 1568). Design is taken up to mean intent or a strategic force that gives rise to the term strategic design.

A significant output from the body of work has been the articulation of a conceptual model (fig2.) that describes how entrepreneurial developmental activity engages strategic design as the switch that leverages creativity (the thinking) to enable concrete innovation (the doing). The model contextualises how entrepreneurs engage in development in response to the zeitgeist, within the prevailing culture and their community through open systems networks communication (8). Other impacts include schema for stimulating global open systems networks that help build design- led ecosystems for technology innovation (9) as well as the development of Enterprise Development Management Competency Frameworks and Change Management Standards (10) that inform international competency building in this arena.

Entrepreneurial Leadership

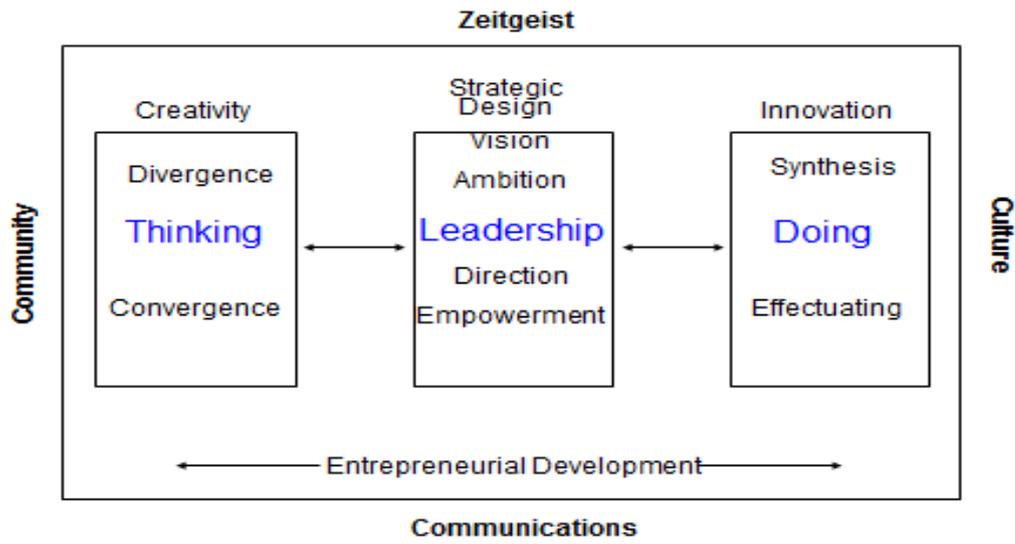


Figure2. Entrepreneurial Leadership by Strategic Design

Appendix 4

Published Output & Support Material By Type, Focus, Abstract & Impact

Published Work - International Journal Article 1. Rusk, Michele (2011) <i>Designing a Design Research, Enterprise and Innovation Agenda</i> . Design Principles and Practices: An international Journal, 5 (5). pp. 177-188., Common Ground, Illinois, USA. 2011. ISSN: 1833-1874 (Journal article)
Main Focus Strategic Design (Higher Education Innovation)
Abstract The research investigated creative entrepreneurship, through stimulating a design driven community focused on regeneration. The project linked local academic, government, industry and community actors with international design management practitioners with the aim of facilitating flows of design management knowledge and exchange of creative business expertise; to build a sustainable, regenerative ethos; and to harness the role of design as a change agent. In describing this case, design is taken up as the switch between creativity and innovation and as the key change agent in addressing complex problems. The article outlines how design is harnessed as a transformational driver and articulates a dynamic system for stimulating innovative progress. The paper draws on the author's ongoing research and experience of cultural development to explore how the notion of design as an animating principle of creativity affects socio- economic strategy formation and implementation. Thus it examines the relationship between design management, innovation and enterprises well as the changing role of design in helping navigate complexity and address the contemporary multifaceted issues.
Impact Creation of the DESIGN DIRECTION FORUM focused on Entrepreneurial Leadership by Design. From which one outcome was a DESIGN FUTURES CONFERENCE A series of government briefings and round table events, including government presentations to politicians and senior civil servants on Strategic Design at Stormont, The Northern Ireland Assembly. Round Table Symposium with 20 key stakeholders including Department of Culture Arts & Leisure Minister & 5 other Departmental Permanent Secretaries

Published Work- International Journal Article

2. Rusk, Michele, Poncini, Gina and McGowan, Pauric (2011) *Using Design, Innovation and Entrepreneurship in Community Building and Regeneration*. Design Principles and Practices: An International Journal, 5 (5). pp. 117-128. Common Ground, Illinois, USA. 2011. ISSN: 1833 187

Main Focus

Economic Development (Socio - Economic Value Creation)

Abstract

This article discusses how creativity, design thinking, and entrepreneurship enable the development of innovative practices that enhance the exchange of expertise in the social domain. It presents two specific cases, one based in the north of Ireland and one in the north of Italy, to explore the notion of community. The article first focuses on Design Direction - a University of Ulster based International Design Management Community of Inquiry, Learning & Practice. Design Direction aimed to inform Higher Education innovative practice by facilitating flows of design management knowledge and the exchange of creative business expertise.

The aim of this initiative was to enhance social capital by building a sustainable, regenerative ethos; and by harnessing design practices as a catalyst for post conflict city regeneration. The article then presents the second case, based on investigating ways to enhance knowledge creation and communication in contexts involving members of different professional communities within the viniculture ecosystem in Turin and Milan.

Impact

DESIGN RECONNAISSANCE - Fact finding study tour visits to and from Ulster by international experts on Strategic Design

1st Inward Visit Theme "From Conflict Resolution to Regeneration"

Purpose - International advice on Ulster's design development strategy Design Futures Conference and curriculum development for MBA Global Design Leadership

Experts –

- Professor Marco Steinberg, Harvard & Director of Strategic Design, Finland Innovation Fund
- Professor Kenneth Kaplan Associate Director, Collaborative Initiatives at MIT

Published Work - Book Chapter

3. Rusk, Michele. (2017). *The University as a Catalyst for Nascent Technology Entrepreneurial Leadership – Towards a sustainable model* in *Advances in Economics of Innovation and Technology Based Nascent Entrepreneurship*. Editors James A. Cunningham and Conor O’Kane, Published by Palgrave ISBN 978-1-137-59593-5

Main Focus

Entrepreneurial Leadership (International Enterprise Development)

Abstract

My chapter focuses specifically on technology based nascent entrepreneurs. Nascent entrepreneurs are important actors in the national entrepreneurial eco-systems and economies as the new to market products or services they create have positive effect on well-developed economies.

This work calls for dynamic entrepreneurial leadership to be shown by universities to enable an expansion of entrepreneurial collaborative forms that bring forth different contingency thinking and behaviours. It illustrates a strategic design approach to creating support mechanisms for nascent technology entrepreneurs, in addressing the global challenges of the 21st century.

Impact

This edited volume is to assemble the current thought of leading and emerging scholars in the field. It addresses macro, meso and micro level themes and issues in relation to technology based nascent entrepreneurs.

This line of research is extremely important not only from the academic but also public policy perspective. Consequently, this publication has potential impact on nascent entrepreneurial activity in light of current and expected future technology-based growth policies.

This contribution illustrates the case of the PROPEL strategic interventions, a Northern Ireland Science Park; InvestNI; Irish Technology Leadership Group; Queen’s University Belfast and University of Ulster joint approach to the development of an infrastructure to scaffold an innovative culture concludes by drawing lessons from the collaborative nature of the Northern Ireland case pointing to how to facilitate the establishment of a nascent technology ecology.

Published Work - Book Chapter

4. Rusk, Michele (2016). *Translational Design - The evolution of Design Management for the 21st Century*. In *Designing Business and Management*, Ed: [Junginger, S](#) and Faust, J. Publisher: Bloomsbury Academic, Publication: 14th January 2016 ISBN-10: 0857855530 ISBN-13: 978-0857855534

Main Focus

Strategic Design Management (Socio - Economic Value Creation)

Abstract

Designing Business and Management is a compilation of the views of prestigious internationally renowned thought leaders, in the field of Design Management. The forward is by the Noble Laureate Mohammed Yunus, founder of the Grameen Social Bank.

This chapter is part of Section 1 Designing Business: Concepts, Models, Processes and Challenges, It was requested by Professor Richard Buchanan (International authority on Design thinking who coined the phrase Wicked Problems) and editor of the internationally prestigious MIT Press Journal *Design Issues*

It is one of 26 commissioned chapters written by internationally esteemed expert scholars and practitioners from top Universities around the world including Case Western, Copenhagen Business School and Politecnico di Milano. The book combines practical models and grounded theories to improve organizations by design.

Impact

The book offers visual and conceptual models as well as theoretical concepts that connect the practice of designing with the activities of changing, organizing and managing. It focuses on designing businesses with a particular onus on social business and social entrepreneurship.

Designing Business and Management contributes to and enhances the discourse between leading design and management scholars; offers a first outline of issues, concepts, practices, methods and principles that currently represent the body of knowledge pertaining to designing business.

Published Work - Book Section

5. Rusk, Michele, Forbes-Simpson, Kellie (2016) *Entrepreneurial Identity and Leadership: The research imperative* Proceedings of ECIE 2016 11th European Conference on Innovation and Entrepreneurship. JAMK University of Applied Science, Jyväskylä Finland 15-16 September 2016. Edited by Dr Iiris Aaltio and Dr Minna Tunkkari Eskelinen. Published by Academic Conferences and Publishing International Limited Reading, UK Print version ISSN:2049-1050, ISBN:978-1-911218-07-4. E-Book ISSN:2049-1069, ISBN:978-1-911218-08-1 <http://academic-bookshop.com>

Main Focus

Entrepreneurial Leadership (Higher Education Innovation)

Abstract

This paper reviews the literature of entrepreneurial learning, entrepreneurial identity construction and entrepreneurial leadership. As research within entrepreneurship education has not focused on identity construction this paper will link the three areas together discussing how identity construction and entrepreneurial leadership in entrepreneurship education can be explored further in order to understand participants experience of Entrepreneurship Education.

The purpose of this paper is to support the suggestion that further research is needed to explore how participants of entrepreneurship education construct entrepreneurial identities and establish a propensity for entrepreneurial leadership.

Impact

The impact of this publication is to articulate the research priorities of the Strategic Entrepreneurial Leadership (SEL) research group. SEL is a multidisciplinary strategic priority as one of 3 Signature Research Areas at Newcastle Business School and Northumbria Design School.

This publication resulted in the establishment of a dedicated ECIE Entrepreneurial Leadership conference track. Thus internationally positioning Newcastle Business School as an exemplar of entrepreneurial university that enables the creation of new methods that remix Leadership, Strategy, Entrepreneurship, Design Thinking, Marketing and Communications to develop new economy products, processes and experiences.

Published Work - Book Section

6. Rusk Michele and Mc Gowan Pauric. (2015) *Entrepreneurial Learning In Context - An Exploration of learning models in different domains*. Proceedings of ECIE 2015 10th European Conference on Innovation and Entrepreneurship. The University of Genoa Italy 17-18 September 2015. Edited by Renata Paola Dameri, Roberto Garelli and Marina Resta. Published by Academic Conferences and Publishing International Limited Reading, UK. Print version ISSN: 2049-1050, ISBN: 978-1-910810-49-1. E-Book ISSN: 2049-1069, ISBN: 978-1-910810-50-7 <http://academic-bookshop.com>

Main Focus

Entrepreneurial Leadership (Higher Education Innovation)

Abstract

This paper investigates how innovation happens in practice. The authors argue that a one-size-fits-all approach to entrepreneurship learning is inappropriate to the development of student learning. The paper describes new routes to entrepreneurship in different communities of practice. It draws on design and innovation methodology to look at entrepreneurial activity differently, combining entrepreneurial leadership with strategic design methodologies as a catalyst for transformative change. Finally, it posits a model that contextualises entrepreneurial leadership.

Impact

This research has underpinned the initiation of the Strategic Entrepreneurial Leadership (SEL) Research Group, the major component of the Centre for Strategic Innovation and Entrepreneurial Leadership (CSIEL) one of six signature research areas of the Faculty of Business and Law's Research Strategy and a key priority of Northumbria University

This has resulted in the formation of an ISBE Entrepreneurial Leadership community of interest that expands the 'Frontiers of Entrepreneurship' through discussion and debate.

ISBE is one of the leading entrepreneurship communities. Gaining the imprimatur of ISBE for a dedicated Entrepreneurial Leadership Track at the 39th conference in Paris 2016 is a significant achievement and recognition by the key actors in the field of the important ground-breaking nature of this research.

Published Work - Book Section

7. Rusk, Michele. (2015) *Studio 21 - A New School of Management Thought*, The 7th Art of Management & Organization Conference Papers: Creativity & Design. Copenhagen Business School August 28th - 31st 2014. Editors Dr Jenna Ward & Stephen Linstead Published by University of York 2015 pp 437-446 ISBN: 978-0-901931-16-0

Main Focus

Strategic Design Management (Higher Education Innovation)

Abstract

Reinventing what management education can be involves taking a fresh approach to how leaders learn and practice management. Consequently, management pedagogy needs to engage with new organisational frameworks that rely on open source and connected collaborative processes. Design Schools represent a distinctive resource not only as generators of knowledge but also powerful players that have a direct bearing on sustainability through stimulating connections. In design the studio occupies a space of possibility where hands-on, experiential, problem-based learning is possible. Studio practice should inform new management education approaches that are based on design sensibility yet goes beyond the conventional sense of design thinking and practice; to encompass change and synthesise new knowledge from many different disciplines so as to better tackle complex socio-economic issues. This approach would enable future leaders gain sufficient insight to engage authenticity with difficult live issues; then marshal their thoughts into new ways of knowing. In this way studio practice and design methods could be the catalyst to create new dynamic strategic models for creative venturing and avenues for effectuating.

Impact

Curriculum development resulting in the validation and launching of a new, joint Ulster Business School and Design School, MSc Management in Creative Industries.

Innovative teaching methodology manifest through Strategic Design Labs.

Experiential problem based learning predicated on unlocking the entrepreneurial potential of collaborative teams through co creation techniques.

Published Work - Book Section

8. Rusk, Michele. (2011) *Design Thinking, Enterprise and Innovation: Strategies for stimulating creative hubs and making an impact on city regeneration*. In: *Design Management: Toward A New Era of Innovation*. (Eds: Cai, Jun, Liu, Jikun, Tong, Gabriel Y.L. and IP, Anthony K.C.), Innovation and Design Management Association, Hong Kong, pp. 20-27. ISBN 978-988-15984-1-7

Main Focus

Economic Development (Socio - Economic Value Creation))

Abstract

This book section concentrates specifically on the formation of a creative city hub. It employed a holistic, multidisciplinary approach to the application of design sensibilities for stimulating community innovation. It also initiated leadership that galvanised partnerships; combining academic, economic, social, and industrial and professional groups for social action.

This project involved a number of related activities, including case study analysis, pedagogical research and the piloting of strategic design tools. It was predicated on an experimental journey into ways of finding new route maps for creative venturing and as such employed an effectuating approach.

The research methodology took an ethnographic approach that employed participatory action to integrate design, planning and research as a new paradigm for effectively utilising tacit design knowledge generated by the studio practice community.

Impact

Establishment of triple helix Design Direction Forum comprising senior academics, creative industry representatives and stakeholders from Department of Culture Arts & Leisure, Arts Council, British Council, Ilex, Capital of Culture,

The Forum facilitated Entrepreneurial

Leadership through: -

DESIGN EXCHANGE – flows of knowledge and experience to enable design thinking, learning and doing to be applied to complex social and economic issues.

DESIGN ENGAGEMENT – Series of ‘Design Meets’ round tables and labs with Business, Government & Communities to identify problems and stimulate innovative strategies for new solutions. e.g.

- Design meets Regeneration
- Design meets Connectivity
- Design meets Strategic Investment
- Design meets Well Being

The project created a social innovation hub where designers and non-designers work in concert on envisioning solutions to complex problems; international research partners act as mentors and local stakeholders provide context and steer the project in an advisory capacity. The key findings of the research demonstrate design as a principle source of innovation, the basis for new approaches to socio- economic sustainability and renewal.

Published Work – Report for External Body

9. Rusk, Michele. (2009) PROPEL– Ideas into Businesses Programme; a strategic development initiative in support of the high growth technology enterprise sector in Northern Ireland. Submitted to InvestNI by the iThree consortium; led by the Northern Ireland Science Park in partnership with University of Ulster & Queen’s University Belfast.

Main Focus

Economic Development (International Enterprise Development)

Abstract

This Research was commissioned by the Northern Ireland Science Park. It culminated in a report to Invest NI that proposed the PROPEL initiative, an integrated Strategic Design approach to collaborative Entrepreneurial Leadership on the part of Queens University Belfast, The University of Ulster and The Silicon Valley based Irish Technologies Leadership Group.

The initiative was designed for rapid acceleration of thirty of Northern Ireland’s best business ideas. It was aimed at top new business talents and sought to immerse them in a new business school hot-house to be exposed to global business thinking then challenged and steered by world class Silicon Valley Business Entrepreneurs-in-Residence

The best fifteen continued on an intensive training and preparation for the world of global business with a bespoke programme of one-on-one sessions, group workshops and residential boot-camps, ultimately to prepare each for a set of opportunities that would position for them in their ideal technology target markets.

Throughout this period, they will be appointed a mentor, someone with an emotional tie to Northern Ireland and who will have performed at main board level in a multinational company in an associated market and domain. With the mentor, we shall custom tailor a program for,

Impact

The PROPEL initiative was a commercially-focused collaboration that is geared to industrialising the innovation that is generated within Northern Ireland building on indigenous ingenuity and taking entrepreneurs through a rigorous incubation process providing coaching and mentorship in investment, acquisition and IPO.

Invest Northern Ireland launched Propel Programme in September 2009 aimed at aspiring entrepreneurs keen to transform a business idea into a successful venture. The initiative is now in its 7th iteration and has supported over 200 new economy technology start up business entrepreneurs.

Propel supports potential business ideas linked to one of the following sectors: advanced materials; bioscience and healthcare; design engineering and photonics; emerging and energy technologies; and ICT.

The programme provides advice, training, mentoring, access to investors, and some financial support to develop new knowledge-based businesses that have significant international trade potential.

Published Work – Report For External Body

10. Rusk, Michele. (2008) Russian Federal Commission Presidential Programme. *Enterprise Development Management Competency Framework & Change Management Standards*. A pan Russian Federation Enterprise Development Management Initiative. For Russian Federal Commission, Moscow, Russia. (Commissioned Research & Report for External Body)

Main Focus

Economic Development (International Enterprise Development)

Abstract

Report was based on advanced principles, forms and methods of management training to increase enterprise development managers' capacity to apply independent knowledge, abilities and skills gained during training in the context of economic and enterprise development. The work articulates the type of competencies implicit in supporting entrepreneurship, including

- Cognitive Competence – the practical use of theory and concepts as well as the use of implicit knowledge gained from experience
- Functional Competence (abilities) - what exactly a person must be able to do in the workplace, in further education and in their social activities
- Personal Competence – inter personal skills which supposes behaviours in particular situations
- Ethical Competence – appropriate personal and professional values

Impact

This research was commissioned by NI-CO the Northern Ireland public body for public sector institutional capacity building for implementing positive change. It culminated in a report to the Russian Commission for Training of Administrative Personnel for Economic Organizations of the Russian Federation. The report was part of the Russian State Plan and as such was an exemplar of Civic Entrepreneurial Leadership. It comprised the Strategic Design of a competency framework and change management standards. The impact was that it underpinned the development and initiation of the President Putin Enterprise Management Development Programme across the Russian federation.

Support Material

11. Rusk, Michele. (2016) *The University as a Catalyst for Entrepreneurial Leadership - It's a Matter of Design*. The 39th Annual Conference of the Institute for Small Business and Entrepreneurship. ISBE CONFERENCE 27-28 October, Paris. 2016, Institutional Voids, Entrepreneurship and Small Business Development. Conference Theme: The training, education and preparation of entrepreneurs- How can the entrepreneurs of the future be better trained and prepared?

Main Focus

Entrepreneurial Leadership (Socio - Economic Value Creation)

Comment

The focus is the North East of England, where transformative regeneration runs has been identified as a means building future socio- economic value through the Northern Powerhouse debate. Northumbria University Business School's track record of stimulating entrepreneurship together with the Design School's role as a generator of new economy solutions makes the University and its students at the heart of rejuvenation and cultural change. The paper describes a new method of fostering entrepreneurship by drawing on both design thinking methodology and innovative entrepreneurial practice to look at entrepreneurship differently. This provides new ways of fostering value creation and sustainability. It describes innovative new approaches initiated by Northumbria university that aim to stimulate a community of practice of strategic entrepreneurial leaders as a catalyst for transformative change.

Support Material

12. McKee, Dorothy, Sheerman, Janette and Rusk, Michele. (2013) *Civic Leadership for Cities in Transition*. In: 8th European Conference on Management Leadership and Governance, (ECMLG), Neapolis University Pafos , Cyprus.

Main Focus

Entrepreneurial Leadership (Socio - Economic Value Creation)

Comment

The paper describes how multidisciplinary University research and innovation can be a catalyst for conflict transformation activities that embrace sustainable social cohesion and active citizenship. It illustrated an issue focused methodology. It described a partnership approach with statutory agencies and representatives from the community and voluntary sector. It concentrated on how to build the civic leadership behaviours, trust, networks and the management competence necessary to implement community planning. It advocated utilising a strategic design approach to internationalising the curriculum of the Advanced Diploma in Civic Leadership and Community Planning by partnering with a network of cities emerging from conflict.

Support Material

13. Rusk, Michele. (2011) *New Ways of Knowing: Strategic Design for Social and Economic Innovation*. In: IED Design Business Conference, Processes and Models of Designing Business, Istituto Europeo di Design Barcelona. IED <http://www.designbusinessconference.com/the-conference/provocations>

Main Focus

Strategic Design Management (Socio - Economic Value Creation)

Comment

This was a Provocation Statement presented in Barcelona at IED Conference. The focus was Northern Ireland where the conversation on conflict transformation runs concurrently with building for the future – literally and metaphorically. As Belfast responded to global economy convulsions, new developments provided a new context for policy and practice, not least as the recession opened new spaces to present alternatives to consumerism. Against this background the study highlighted a window of opportunity in which conflict transformation activities could be redefined. This redefinition enabled progress towards sustainable social cohesion and provided substantial incentive for active citizenship in building shared futures in urban contexts.

The work was published in: Faust, J.(Ed) Business Design Conference: - a discursive summary. Create Space Independent Publishing Platform (2011) ISBN-10: 1482039966 ISBN-13: 978-1482039962

Support Material

14. Poncini, Gina, Rusk, Michele, Wolff, Aline and Stehlik. Susan. (2010) *Using creativity and innovation to integrate research into master's program*. 10th ABC Europe convention + 2nd GABC conference 27-29 May 2010. Lessius University College (Antwerp, Belgium). Panel "Integrating research into business and corporate communication degree programs"

Main Focus

Strategic Design Management (Higher Education Innovation)

Comment

This conference paper illustrated the processes of building trust and sharing in educational contexts between international academic collaborators from Ulster University, University of Milan and NYU Stern. The work described how innovative thinking in research informed teaching is shared as part of an ongoing discussion on intertwining common research interests. This work encompassed notions of creativity, communities of practice, design thinking, knowledge sharing, innovative thinking, and projecting credibility – all key for business and communication today. It promoted how these elements can enhance the integration of research into master's programs.

By

Issue, Key Words, Research Methods & Key Influences

Item	Differentiated Issue	Key Words	Research Methodology	Key Influences
1	Reframing Multi-Disciplinary inquiry	Entrepreneurial Strategic Design Community of Practice	Exploratory Domain Orientation - Expert Reference, Focus Group	Bucci, A. 1997. <i>Innovation for Strategy</i> . Design for Business Lecture Series, Belfast, May 1997. Cox, G. 2005. <i>Cox Review of Creativity in Business: Building on the UK's Strengths</i> . HMTreasury,UK. <i>BusinessWeek</i> . 2005. Special Report: Building Innovative Companies. Brown, T. 2008. Design Thinking. <i>Harvard Business Review</i> . June
2	Creating Value through International knowledge exchange	Design Thinking, Appreciation & Value Creation, Building Trust	Exploratory Issue Scoping- Conceptual Enquiry Generative Elemental Analysis - Thematic Networks	Rusk, M.1993. Integration for Innovation: Design as a Strategic Tool. Proceedings of the 23rd European Small Business Seminar on International Markets - E FMD Vanderbeeken, M. 2007. Giacomo Mojoli: Slow+Design, L'approccio Slow al Design, Interview in <i>Flexibility: The Way We Change</i> , Poncini, G. 2010. Discourse, Knowledge Creation and Communities: A View from Italy. 3rd WU Symposium on International Business Communication, Vienna,
3	University Led Global Enterprise Development	Nascent Technology, Entrepreneurial University, Strategic Business Design	Evaluative Reflection- Literature Review, Self – Reporting	Mason,C., Brown,R. 2014. Entrepreneurial Ecosystems and Growth Oriented Entrepreneurship The Hague, Netherlands. OECD LEED Programme and the Dutch Ministry of Economic Affairs Cunningham, J.A. & Link, A.N. 2015. Fostering university-industry R&D collaborations in EU countries. <i>International Entrepreneurship and Management Journal</i>
4	Translational Design as a Meta Skill	Social innovation Adaptation Translational Design	Generative Elemental Analysis- Relational Schema Reconfiguring - Problem Based Thought Experiments	Moss Kanter, R. 1997. <i>Frontiers of Management</i> . Cambridge, MA: Harvard Business Review. Mulgan, G. 1997. <i>Connexity: how to live in a connected world</i> . Cambridge, MA: Harvard Business School Press. Martin, R. 2009. <i>The Design of Business</i> . Cambridge, MA: Harvard Business Press.
5	Strategic Entrepreneurial Leadership the Academy as Community of inquiry, learning and practice	Entrepreneurial Leadership, Learning, Identity	Evaluative Reflection- Literature Review, Conceptual Modelling	Kuratko, D. F. 2007. Entrepreneurial Leadership in the 21st Century: guest editor's perspective, <i>Journal of Leadership and Organisational Studies</i> , 13(4) Roomi, M A. and Harrison, P.2011 Entrepreneurial Leadership: What Is It and How Should It Be Taught? <i>International Review of Entrepreneurship</i> 9(3).

6	Entrepreneurial Leadership Debate, Exchange & Learning	Entrepreneurial Leadership, Threshold Concepts, Meta-Design Thinking	Generative Reconfiguring- Problem Based Thought Experiments Evaluative Reflection- Literature Review, Conceptual Modelling	Meyer, J H F and Land, R 2003. 'Threshold Concepts and Troublesome Knowledge 1 Linkages to Ways of Thinking and Practising' in <i>Improving Student Learning Ten Years On</i> . C. Rust (Ed), OCSLD, Fayolle, A. 2013. Personal views on the future of entrepreneurship education, <i>Entrepreneurship & Regional Development</i> , 25(7) Rae, D., Matley, H., McGowan, P. and Penaluna, A. 2014. Freedom or prescription: The case for curriculum guidance in enterprise and entrepreneurship education, <i>The Industry and Higher Education Journal</i> , 28 (6)
7	Method Learning for Design & Management Synthesis	Studio Practice Co creation New School of Thought	Exploratory Issue Scoping- Design Ethnography, image Boards Generative Elemental Analysis- Mind map, Stakeholder Walk - Though	Manzini, E. 2011. Design Schools as Agents of (sustainable) Change. 1st International Symposium CUMULUS // DRS for Design Education Researchers. Mc Gowan, S. 2013 Stimulating Support for the Creative Economy and Social Innovation, DCAL Briefing, Northern Ireland Assembly
8	Regenerative Creative Hubs	Design Thinking, Innovation, Strategy, Entrepreneurship, Business.	Exploratory Issue Scoping- Ladderingf Image Boards Evaluative Deployment &Evaluation- Focus Group Effectuation Improvisation	Wenger, E.1998. <i>Communities of Practice: Learning, Meaning and Identity</i> . Cambridge: Cambridge University Press Robinson, K. 2009. <i>The Element: How Finding Your Passion Changes Everything</i> . USA: Viking Penguin. McQueen, M. 2008. <i>Your Space or Mine, Belfast</i> : Community Relations Council.
9	Stimulation Platform for Nascent Technology Industry	Triple Helix collaboration Silicon Valley Diaspora	Exploratory Domain Orientation- Stakeholder Maps, Territory(position) Maps Generative Elemental Analysis- Stakeholder Walk - Though	Sanoff, H. 2000. <i>Community Participation Methods in Design and Planning</i> . New York: John Wiley & Sons, Inc. Etzkowitz, H. 2004. The evolution of the entrepreneurial university <i>International Journal of Technology and Globalisation</i>
10	Underpinning Standards for Global Innovation	Enterprise Support Agency Management Capacity Building in Russia	Generative Reconfiguring- Parallel Prototyping Evaluative Deployment & Evaluation- User trials	British Management Standards Adams, R., Bessant, J., Phelps, R.2006. Innovation Management Measurement: A review <i>International Journal of Management Reviews</i> 8(1)

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Zott, C., Amitt, R. (2007). Design and the Performance of Entrepreneurial Firms Organization Science 18(2),181–199 ISSN 1047-7039 Business Model

Declaration of Co-Authorship of Published Work Forms



DECLARATION OF CO-AUTHORSHIP OF PUBLISHED WORK

(Please use one form per co-author per publication)

Section A

Name of candidate: Michele Rusk

Name of co-author: Pauric McGowan

Full bibliographical details of the publication (including authors): Rusk, Michele, Poncini, Gina and McGowan, Pauric (2011) *Using Design, Innovation and Entrepreneurship in Community Building and Regeneration*. Design Principles and Practices: An International Journal, 5 (5). pp. 117-128. Common Ground, Illinois, USA. 2011. ISSN: 1833 187

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I declare that my contribution to the above publication was as:

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My specific contribution to the publication was (maximum 50 words):

I was joint author with 2 other authors responsible for approximately 45% of the work

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Rusk Michele and Mc Gowan Pauric, (2015) *Entrepreneurial Learning In Context - An Exploration of learning models in different domains*. Proceedings of ECIE 2015 10th European Conference on Innovation and Entrepreneurship. The University of Genoa Italy 17-18 September 2015. Edited by Renata Paola Dameri, Roberto Garelli and Marina Resta. Published by Academic Conferences and Publishing International Limited Reading, UK. Print version ISSN: 2049-1050, ISBN: 978-1-910810-49-1. E-Book ISSN: 2049-1069, ISBN: 978-1-910810-50-7 <http://academic-bookshop.com>

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I was joint author with 2 other authors responsible for approximately 50% of the work

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 Rusk Michele and Simpson, Kellie (2016) *Entrepreneurial Identity and Leadership: The research imperative*
 Proceedings of ECIE 2016 11th European Conference on Innovation and Entrepreneurship. JAMK University of Applied Science, Jyväskylä Finland 15-16 September 2016. Edited by Dr Iiris Aaltio and Dr Minna Tunkkari Eskelinen. Published by Academic Conferences and Publishing International Limited Reading, UK Print version ISSN:2049-1050, ISBN:978-1-911218-07-4. E-Book ISSN:2049-1069, ISBN:978-1-911218-08-1 <http://academic-bookshop.com> (REF eligible 2021)
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Section B
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My specific contribution to the publication was (maximum 50 words):
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or **(ii)** I do not agree with the above declaration by the candidate for the following reason(s):

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Full bibliographical details of the publication *(including authors)*:

McKee, Dorothy, Sheerman, Janette and Rusk, Michelle (2013) *Civic Leadership for Cities in Transition*. In: 8th European Conference on Management Leadership and Governance, Neapolis University Pafos, Cyprus. European Conference on Management, Leadership and Governance (ECMLG), 4 pp

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Section B

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- (ii) joint author**
- (iii) minor contributing author

My specific contribution to the publication was *(maximum 50 words)*:

I was joint author with 2 other authors responsible for approximately 30% of the work

Signed: (candidate) 9th January 2018 (date)

Section C

STATEMENT BY CO-AUTHOR *(delete as appropriate)*

Either (i) **I agree with the above declaration by the candidate**

or (ii) **I do not agree with the above declaration by the candidate for the following reason(s):**

Signed: (co-author) 15 January 2018 (date)

DECLARATION OF CO-AUTHORSHIP OF PUBLISHED WORK

(Please use one form per co-author per publication)

Section A

Name of candidate: Michele Rusk

Name of co-author: Janette Sheerman

Full bibliographical details of the publication (including authors):

Mckee, Dorothy, Sheerman, Janette and Rusk, Michelle (2013) *Civic Leadership for Cities in Transition*. In: 8th European Conference on Management Leadership and Governance, Neapolis University Pafos, Cyprus.

European Conference on Management, Leadership and Governance (ECMLG), 4 pp

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Janette Sheerman Senior Lecturer Business Institute, Ulster Business School, Jordanstown Campus, University of Ulster, Newtownabbey, BT37 0QB ja.sheerman@ulster.ac.uk

Section B

DECLARATION BY CANDIDATE (delete as appropriate)

I declare that my contribution to the above publication was as:

(i) principal author

(ii) joint author

(iii) minor contributing author

My specific contribution to the publication was (maximum 50 words):

I was joint author with 2 other authors responsible for approximately 30% of the work

Signed:(candidate) **9th January 2018** (date)

Section C

STATEMENT BY CO-AUTHOR (delete as appropriate)

Either (i) I agree with the above declaration by the candidate

or (ii) I do not agree with the above declaration by the candidate for the following reason(s):

Signed:(co-author) 16th Jnuary 2018 (date)

Declaration

I declare that no outputs submitted for this degree have been submitted for a research degree of any other institution. I also confirm that this work fully acknowledges opinions, ideas and contributions from the work of others.

I declare that the Word Count of this Commentary is 10,719 words

Name: Michele Rusk

Signature:

Date: 18th January 2018