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Entrepreneurship, Creativity, Power:

An Ethnographic Study of a Creative Space

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ABSTRACT

Entrepreneurial thinking and behaviour in organisations are increasingly being encouraged as a creative response to demanding and competitive work environments. This has led to calls for researchers to widen the conceptual and empirical lens of entrepreneurship research and investigate the conditions in which organisational creativity can flourish. One way to do so is to regard entrepreneurship as a form of organisation-creation, whereby attention shifts from the lone individual with a 'bright idea' to organising for creative acts to happen by bringing together a variety of bodies, objects and spaces in different ways. Such creative acts may, in turn, be harnessed via other forms of organising and become innovations or solutions to various organisational, social and market-based problems. However, questions remain regarding *how* different elements of the creative process come together and *what happens* in this coming together. Likewise, the role of power in organising for such interrelations to happen -- and to be harnessed -- is unclear.

I explore these issues through an ethnographic study of *Science Gallery*, an outreach initiative of Trinity College in Dublin that combines art and science to stimulate creativity and entrepreneurship. Science Gallery seeks to 'ignite creativity and discovery' around scientific, technical and social issues by encouraging interactions between scientists, artists, businesses and the local community. Its activities are expressed both materially and spatially through exhibitions, 'live' laboratories, workshops, and related events involving a changing programme of interactive installations based on particular themes. Science Gallery, then, can be regarded as a space that entrepreneurially organises for creativity to occur, by involving a variety of bodies and objects in different ways to allow for creativity to emerge and be subsequently steered, for the purported benefit of multiple parties.

My findings show how creativity is both a situated practice and a performative act, enacted through the interaction of bodies, objects and spaces. I show that it is at the point where such bodies, objects and spaces intersect that their mutually-exclusive categories are broken down and overlap with each other, thereby allowing for new relations or connections to be established between such entities and other bodies, objects and spaces. These new relations and connections form creative capacities -- the potential for new ways of thinking and acting. I also show how, despite the indeterminacy of such interactions, the creative potential of this context is nonetheless ordered and organised to produce a particular 'brand' of creativity that is specifically identified with Science Gallery. My work makes a number of theoretical, practical and methodological contributions to the study of organisational creativity.

DECLARATION

This is to certify that:

I. The thesis comprises only my original work towards the degree of Doctor of Philosophy except where indicated in the preface
II. Due acknowledgement has been made in the text to all other material used
III. The thesis is fewer than 100,000 words in length exclusive of tables, figures and bibliographies.

Date: _____ Signature: _____

PREFACE

The following conference and workshop papers are based on work included in this thesis and have been presented:

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An áilleacht agus an praiseach

CHAPTER 1: INTRODUCTION 1

CHAPTER 2: THEORY 13

Entrepreneurship and Creativity 13

Attractions of Entrepreneurship 14

Creativity in Entrepreneurship Literature 18

Traditional Approaches to Entrepreneurship and Creativity 19

Entrepreneurship as Organisation-Creation 22

The Role of Bodies, Objects and Spaces in Creativity 26

Bodies 27

Objects 29

Spaces 32

Power and Organisation-Creation 35

Power Relations and Bodies 40

Power Relations and Objects 42

Power Relations and Space 44

Power Relations and the Assemblage of Bodies, Objects and Spaces 45

CHAPTER 3: METHODOLOGY 49

The Case Study: Science Gallery 50

Zooming In and Zooming Out: An Ethnographic Approach 57

Preliminary Research 58

Participant Observation 60

Interviews 69

CHAPTER 4: CREATIVITY -- A PERSONAL AND ORGANISED EXPERIENCE 79

Bodies, Objects and Spaces: A Personal Experience 79

Bodies, Objects and Spaces: An Organised Experience 85

Planning the event 85

During the event 87

CHAPTER 5: POWER AND CREATIVITY 94

Connecting Strategies and Research Activities 97

More intensive connecting strategies 100

Less intensive connecting strategies 110

Connecting Strategies and Exhibitions 114

More intensive connecting strategies 117

Less intensive connecting strategies 122

Intended Power Effects: A Biomedical Brand of Creativity 128

Unintended power effects 133

Tensions 133

Undermining a Biomedical Brand of Creativity 136

CHAPTER 6: POWER AND ENTREPRENEURSHIP 140

Science Gallery: Entrepreneurship as new business formation 141

Non-biomedical business ventures 146

Pushing back: negotiating strategies of connectivity 147

Connecting with actors inside Science Gallery 148

Connecting with actors outside Science Gallery 154

Entrepreneurship, creativity and opportunity 164

CHAPTER 7: DISCUSSION 166

Entrepreneurship and Creativity 166

Entrepreneurship as Organisation-Creation 167

Bodies, Objects and Spaces: Creative Capacities 169

Creativity -- A Personal and Organised Experience 170

Contributions: Creating Creativity 172

Bodies, Objects and Spaces: Power 173

Creativity -- A Power(full) Experience 174

Contributions: Organising Creativity 176

Bodies, Objects and Spaces: Entrepreneurship 178

Creativity -- A Productive Experience 179

Contributions: Entrepreneurship as new business formation 180

Methodological Reflections and Contributions 182

Contributions: Studying Creative Entrepreneurship 184

BIBLIOGRAPHY 191

APPENDIX 213

CHAPTER 1: INTRODUCTION

The present shift from an industrial economy to a post-industrial one has led to a re-evaluation of how we organise ourselves. Characteristics of traditional firms such as fixed hierarchical structures and top-down decision making have become incompatible with an increasingly complex and volatile globalised marketplace. Here, organisations previously separated by geography and industry are now interlinked in a networked society and are susceptible to factors outside of their control, such as market fluctuations and downturns (Castells, 2010; Ong & Collier, 2005). Likewise, a global expansion in information and technology has led to increased pressure on organisations to adapt to new circumstances and stay one step ahead of competitors. In response, firms have placed an increased emphasis on creativity as a way of overcoming such challenges -- not just in terms of ideas generated by lone creative individuals, but collective creativity involving different actors in different ways with the hope of producing novel solutions and ways of working (Chesborough, 2006; Chanal, 2010). In other words, there is an interest in organising *for* creativity to come about, and the subsequent harnessing of that creativity to provide organisational solutions.

In response, organisations have turned their attention to cultivating entrepreneurial thinking and behaviour (Shalley et al, 2015). Here, entrepreneurship and acting entrepreneurially have been equated with creativity, not just in terms of generating novel, useful ideas -- the way in which creativity is traditionally defined (Amabile, 1996) -- but by a perceived ability of entrepreneurs to creatively organise their environment and produce value in the form of new processes, products and services (Kaufman & Sternberg, 2006). For example, seminal entrepreneurship literature associates the entrepreneur with 'Schöpferische Zerstörung' or 'creative destruction' (Schumpeter, 1942); the ability to disrupt existing economic and social orders that prove unprofitable before reassembling the constituent parts in new and innovative ways to make profit. This theme of innate entrepreneurial creativity

has carried on into current attempts to marry entrepreneurship with the need for organisational creativity, with authors claiming that entrepreneurs -- and behaving entrepreneurially -- can bypass bureaucratic red tape (McMullen & Shepard, 2006), generate new values and belief systems compatible with a globalised marketplace (Duxbury, 2012), and harness the complexity and challenges of increased competitiveness (Shane, 2000). In sum, being creative has been expanded from an individual activity to an organisational one, while the concept of entrepreneurship has been elaborated from new business formation to acts of engaging in innovative organisational processes. Consequently, both notions of creativity and entrepreneurship have become aligned and deemed desirable for institutions attempting to gain competitive advantage in uncertain times.

This mix of creativity and entrepreneurship has been taken up and applied by a variety of institutions. Corporations such as Coca-Cola[1] and Google[2] have developed their own start-up accelerator programmes where they provide entrepreneurs with resources, mentorship and networking opportunities with the aim of harnessing subsequent innovations and future collaborations. Similar initiatives have been developed outside industry, with social incubators running programmes that bring together a variety of actors such as community groups, charities and governments with the intention of developing creative ways to meet the needs of underrepresented groups. For example, YGAP[3] run incubator programmes designed to provide indigenous Australians with the necessary resources to develop social initiatives that can in turn be embedded in their local communities, such as specialised healthcare provision. Schemes intended to marry creativity and entrepreneurship are found in academia, where triple helix models are designed to bring university, industry and government into a reciprocal relationship with each other, with the intention of enhancing each other's creative

[1] http://thebridgebycocacola.com/
[2] https://developers.google.com/programs/launchpad/accelerator/
[3] https://ygap.org/about-us/

performance. Such initiatives generally take place to compensate for a lack of government capacity -- or willingness -- through the introduction of entrepreneurial innovations, such as attempts to develop local regions and industries (Etzkowitz, 2014).

It would seem, then, that organising for creativity and entrepreneurship offers a panacea of solutions for modern economic and social dilemmas. Yet important questions remain around the very notions of creativity and entrepreneurship themselves -- terms vague enough to be appropriated and used by a plethora of diverse actors in diverse spaces and, yet, seemingly effective enough to generate solutions for industry and society. In particular, the processes that take place in creative spaces like ideas incubators and accelerators remain unclear. Who, or what gets to be included in such entrepreneurial spaces, and who or what does not? Who decides on this inclusion and exclusion? What are the processes that make such participants creative? And who benefits as a result of this creative 'becoming'?

Likewise, while entrepreneurship has been linked with creativity, actual understandings of creativity are underdeveloped in traditional entrepreneurship literature (Shane & Venkataraman, 2000). Informed by economics and psychology, these 'traditional' approaches to entrepreneurship fail to embrace calls for collective and organisational creativity and limit the understanding of such to the individual entrepreneur with creative cognitive abilities or personalities (Hayton & Cholakova, 2011; Dimov, 2007). Similarly, this literature tends to confine creativity to the opportunity recognition stage of the entrepreneurial process (De Carolis & Saparito, 2006; Fletcher, 2006) and excludes the material aspects of creativity, particularly the roles that bodies, objects and spaces play in enabling and influencing creative behaviour (Magadley & Birdi, 2009; Alcadipani & Hassard, 2010).

In response, some researchers have offered an alternative approach to entrepreneurship that foregrounds creativity. Here, entrepreneurship is viewed as a form of

organisation-creation (Hjorth, 2012; Steyaert et al, 2011), whereby attention moves from the actions of the individual entrepreneur -- in terms of identifying resources with the goal of achieving monetary profit -- or something the individual entrepreneur has -- in terms of cognitive traits and abilities -- to organising *for* creative acts to happen, and the subsequent harnessing of such acts via other forms of organising (Hjorth & Johannisson, 2008). As such, the notion of entrepreneurial creativity moves from recognising pre-existing opportunities to generating different types of opportunities that can then be explored (Gartner, 2008). Likewise, a wider array of bodies, objects and spaces -- understood as an assemblage of elements (Deleuze & Guattari, 1988), including the individual entrepreneur -- become involved in creative acts. Attention shifts, therefore, from the individual entrepreneur as the source of creative ideas to the activities that take place around entrepreneurial acts, with creativity occurring in the coming together of bodies, objects and spaces in an assemblage and the possibilities that result from these interactions.

While entrepreneurship as organisation-creation allows for a more inclusive and richer account of creativity than economic or psychological approaches, questions still remain regarding *how* different elements of the creative process come together -- in terms of the bodies, objects and spaces that constitute assemblages -- and *what happens* in this coming together. In particular, understanding how new capacities for thinking and behaving arise from assemblages is lacking. Here, the capacity of an assemblage can be understood as its ability to affect or provoke, through the arrangement of its constituent elements (De Landa, 2006) -- in this case the bodies, objects and spaces that comprise it.

I explore these issues through an ethnographic study of *Science Gallery*, an outreach initiative of Trinity College Dublin that combines art and science to stimulate creativity and entrepreneurship. Portraying itself as a creative broker or 'middleground place' (Lange &

Schüßler, 2018, p.2), Science Gallery seeks to 'ignite creativity and discovery'[4] around scientific, technical and social issues by encouraging interactions between scientists, artists, businesses and the local community. Its activities are expressed both materially and spatially through exhibitions, 'live' laboratories, workshops, and other events involving a changing programme of interactive installations based on particular themes. Science Gallery, then, can be regarded as a space that entrepreneurially organises for creativity to occur, by involving a variety of actors and materials in different ways and acting as a platform for creativity to emerge and be subsequently steered, for the purported benefit of multiple parties.

Yet what happens in the Science Gallery space is unclear, with Science Gallery itself regarding their creative process as a 'black box'[5] in which creativity simply 'becomes' as a result of actors taking part in its programming activities. As such, there is uncertainty regarding the bodies, objects and spaces that feature in Science Gallery, in terms of how they come together to 'ignite creativity and discovery', and what such creativity and discovery actually means. I shed light on these processes through my first research question, namely *how may bodies, objects and spaces be organised to produce creativity as a capacity?* I then explore and show the organisational forces active in shaping the assemblages of bodies, objects and spaces through my second research question: *what role does power play in the formation of creative capacities?* Leading from this, I examine how power shapes the notion of entrepreneurship through my third research question: *what are the implications of power for entrepreneurship?*

I adopt an ethnographic approach in my study, informed by a process of 'zooming in' to investigate the local accomplishment of creativity in the Science Gallery space, and 'zooming out' to a wider network of related stakeholders and participants to show how power

[4] https://dublin.sciencegallery.com/about
[5] Executive Director of Science Gallery International, Interview 1

influences this accomplishment (Nicolini, 2009). I employed such an iterative technique so that I could move within the localised flows of bodies and objects in the exhibition space, explore how such bodies and objects interact and get an understanding of the localised power effects produced, before taking a step back to gain an awareness of the forces and agencies that influence such localised flows and interactions.

I utilised a number of ethnographic techniques which complimented my approach and allowed me to collect and analyse appropriate data. Firstly, I engaged in a process of participant observation whereby I immersed myself in the Science Gallery environment over several months. Doing so allowed me to follow the currents of activity taking place in a variety of public and private programming activities, from exhibition openings and showcase events to staff training sessions and meetings designed to plan future exhibitions. I recorded my experiences in a number of ways, such as photography and voice recordings used to 'fix' immediate occurrences. I also developed a sensory diary (Valtonen et al, 2010; Edvardsson & Street, 2007) to record my embodied or emplaced experiences, such as the sharing of practices, routines, textures, sounds and sights. Together, my chosen methods allowed me to develop an understanding as to how participants such as exhibitors and the public experienced Science Gallery programming, in terms of meanings and affects, while also taking account of my own bodily interactions and embodied knowledge. Diary notes, visuals and recordings in particular offered tools to reflect on affective experiences and the temporal and spatial structuring practices taking place in Science Gallery.

I additionally interviewed seventy-two individuals associated with Science Gallery, including participants in Science Gallery exhibitions such as artists, scientists and entrepreneurs, Science Gallery management such as Board and advisory group members, and external stakeholders such as sponsors, Government ministers and venture capitalists. The purpose of these interviews was to understand the different logics, intents and power relations

that inform how Science Gallery programming is organised -- before the exhibition in terms of who and what gets to participate, during the exhibition in terms of the organisation of bodies, objects and spaces, and after the exhibition in terms of power effects produced. Finally, I collected a variety of online and print data published by Science Gallery itself, such as annual reports and impact documents, and material from external sources, such as media coverage and stakeholder information. These documents helped me to understand the *modus operandi* of Science Gallery, the stated intentions behind its operations and exhibitions, and how these intentions were interwoven into the experience of the exhibition itself.

My study produces a number of findings. Regarding my first research question -- *how may bodies, objects and spaces be organised to produce creativity as a capacity?* I show that it is at the point where bodies, objects and spaces intersect with each other that creative capacities are formed. I conceptualise this intersection as the *folding* (Deleuze, 2006; Ingold, 2011) of these entities into one another, whereby otherwise mutually-exclusive categories of body, object and space are broken down, allowing for new connections to be established between them and other bodies, objects and spaces. These new relations form creative capacities -- the potential for new ways of thinking and acting. I show that foldings of bodies, objects and spaces do not happen by chance in neutral, value-free ways. Instead, organising forces are active in determining which bodies, objects and spaces are brought together, when they are brought together and how they are brought together.

I answer my second research question -- *what role does power play in the formation of creative capacities?* by zooming out from the organised foldings of bodies, objects and spaces in Science Gallery to the broader context of relations and connections that influence them. Here, I conceptualise power as working through more and less intensive connecting strategies. Firstly, I show that scientific researchers with a biomedical focus and artists favoured by Science Gallery management are more intensively connected to Science Gallery

and, in turn, have more influence on the constituent bodies, objects and spaces that make up the individual exhibitions, in that they and their work feature prominently. Secondly, non-biomedical researchers and less-favoured artists are less intensively connected to Science Gallery, meaning that both they and their work featured less prominently than their biomedical counterparts.

I continue by arguing that more and less intensive connecting strategies have intended power effects in that they constitute the capacity for assemblages of biomedical bodies, objects and spaces to be facilitated over non-biomedical ones in Science Gallery programming. As such, some participants are made creative -- but creative in a way that is sanctioned by Science Gallery, and which serves to produce a particular biomedical 'brand' of creativity favoured by Science Gallery and its affiliated institutions. At the same time, both more and less intensive connecting strategies have unintended power effects which undermine the biomedical brand of creativity that Science Gallery propagates.

Vis-à-vis my third research question -- *what are the implications of power for entrepreneurship?* I show that the biomedical brand of creativity which Science Gallery promotes also favours a biomedical type of entrepreneurship. Here, individuals from a biomedical background are favoured over individuals from non-biomedical backgrounds, meaning that those specialising in biomedicine are more likely to be constructed as 'entrepreneurial' than their non-biomedical counterparts. However, I also show that non-biomedical individuals can make themselves entrepreneurial -- and creative -- by negotiating the organisational forces by which they are involved with Science Gallery. In doing so, they achieve the benefits of legitimation and publicity associated with Science Gallery's brand of creativity, whilst also retaining their own entrepreneurial and creative brands. The implications of power for entrepreneurship, therefore, are that organisational forces form the capacity for biomedical individuals to be entrepreneurial. Nonetheless, non-biomedical

individuals can form their own entrepreneurial capacities by ‘pushing back’ and renegotiating such forces. Power, then, shapes the very notion of entrepreneurship and what being an entrepreneur means.

My thesis is structured as follows. **Chapter 2** explores in more detail the increased emphasis on creativity in organisational life and how this emphasis is linked to entrepreneurship, both practically in businesses and organisations and theoretically in entrepreneurship literature. I start by examining the increasing demand for entrepreneurial thinking and behaviour in organisations as an attempt to both stimulate creativity and bring about creative outcomes or solutions to organisational problems. I continue by explaining the limits of traditional approaches to entrepreneurship in dealing with the concept of creativity before outlining an alternative notion of entrepreneurship developed to address these shortcomings, that of entrepreneurship as organisation-creation. I show how this approach offers additional insight into the notion of creativity and argue that it can be developed further by considering the productive role of bodies, objects and spaces, which tend to be excluded from the traditional entrepreneurial process in dominant entrepreneurship literature. In doing so, I elaborate a richer and more inclusive idea of creativity than that supported by more accepted entrepreneurship theory and practice. I further develop this conceptualisation by addressing power and its influence on creativity; an area that tends to be neglected by both traditional and alternative approaches to entrepreneurship.

Chapter 3 outlines my chosen methodology. I begin by presenting my case study and explaining why I selected it. I then outline my research approach of ‘zooming in and out’ (Nicolini, 2009a; 2009b), whereby I iteratively move from the immediate Science Gallery exhibition space and its associated programming activities to the wider array of actors and relations that inform them, and explain why this approach is appropriate for my study. I continue by detailing how I collected and analysed data. Firstly, I explain how I used the

ethnographic method of participant observation to zoom in and explore the situated interactions and practices that form Science Gallery, and the constituent techniques I utilised to record my experiences. For example, I show how I used voice recordings to 'fix' immediate occurrences for later reflection, and how I developed a sensory diary to record my embodied or emplaced experiences. I then explain how I used the method of interviewing to zoom out and explore the connections between the local interactions that make up Science Gallery and the translocal phenomena that influence them. Here, I shed light on how I collected and analysed data from the seventy-two interviews I conducted. I outline the substantive frame I used to guide my interviews and the abductive approach I employed to understand the interrelations of various elements in Science Gallery programming.

Chapter 4 constitutes my first set of findings with regards to my first research question, namely *how may bodies, objects and spaces be organised to produce creativity as a capacity?* I employ an ethnographic vignette to show how it is in the interactions of bodies, objects and spaces and their associated intangible elements -- such as memories of the places these entities occupied and the people and things they interacted with -- that creative capacities are formed. **Chapter 5** details my second set of findings relating to my second research question: *what role does power play in the formation of creative capacities?* Here I explain the intensive and less intensive connecting strategies through which power is realised, and make clear the intended and unintended power effects they have on associated bodies, objects and spaces. **Chapter 6** comprises my final set of findings regarding my third research question: *what are the implications of power for entrepreneurship?* I show here that it is individuals from biomedical backgrounds who have worked on biomedical ventures that are made entrepreneurial. At the same time, those from non-biomedical backgrounds can make themselves entrepreneurial -- in the Science Gallery way -- by negotiating how they are connected to Science Gallery.

I conclude my study with **Chapter 7**, where I discuss the implications of my research and present my theoretical and practical contributions. Firstly, my study builds on existing work that develops understandings of creative entrepreneurship, specifically entrepreneurship as organisation-creation (Hjorth, 2012; Steyaert et al, 2011; Gartner, 2008). It does so by opening up the 'black box' of creativity and showing the processes that take place when new ideas or ways of working -- or the potential for such -- are formed. Those interested in cultivating organisational creativity, for example in ideas incubators and workplace interventions, can benefit through a greater awareness of the bodies, objects and spaces that go into these programmes and by designing practices to facilitate all involved. By including an array of actors in different ways, such initiatives can create possible avenues to explore and realise through new innovations -- such as new products or working practices -- rather than more prescriptive or less insightful potentialities developed by a minority of actors.

Secondly, my study contributes to literature on organisational creativity by showing that power is neither divorced from creativity nor confined to the harnessing of creative outputs. Instead, power infuses creativity and the ways in which creative processes are manifested. As such, I show that power does not just kick in after creative capacities are formed, but influences how these capacities come to be by shaping which bodies, objects and spaces are put together, and how they are put together. Power therefore permeates creativity, which needs to be born in mind by researchers interested in organisation-creation to understand not just how, but why creativity 'becomes' in a certain form, and who benefits from that becoming.

Thirdly, my study expands on how entrepreneurs are judged to be creative in traditional entrepreneurship literature by shifting the focus from how opportunities are realised by entrepreneurs, to opening up the very notion of what an opportunity is. I show that opportunities are not pre-existing and subsequently 'recognised' by individuals, but come

into being through iterative interactions amongst multiple bodies -- not just the entrepreneurs' -- and multiple objects and spaces in the environment. Practitioners need to pay attention to the iterative processes of opportunity formation, not just to understand how new ventures come to be, but how constructs like 'opportunity' and 'entrepreneurship' themselves are formed. Likewise, those running initiatives designed to stimulate and develop new venture formation, such as entrepreneurial accelerator programmes, need to take into account the influence of the entrepreneurs' social environment in determining the success of the very ventures that they seek to cultivate.

Methodologically, I show researchers how to move between zooming in and zooming out by adopting an ethnographic approach that allows them to position themselves in different ways in the research process. In doing so, they can link local practices to the larger institutional contexts of which they are a part. I also demonstrate, through the methods I employed, how researchers can use their bodies and sensory repertoire to understand the nuances and subtleties of organisational phenomena that might be missed by more traditional techniques. Leading from this, I elucidate how to convey such nuanced phenomena in an appropriate writing style, thereby allowing researchers to address their own emplacement in their respective research settings. Taken together, my methodological contributions emphasise the importance and potentiality of attending to reflexivity in the conducting and writing up of academic research. Here, reflexivity becomes a practice whereby the researcher can develop different understandings of a phenomenon by taking up different positions in their research settings, and subsequently challenge dominant understandings and representations of such.

I continue by explaining the theoretical underpinnings of my study in more detail.

CHAPTER 2: THEORY

Entrepreneurship and Creativity

In this chapter I explore the increased emphasis on entrepreneurship in organisational life, and the reasons for this interest. In doing so, I discuss how 'entrepreneurship' has been linked with 'creativity' with regards to addressing organisational challenges. I outline the attractiveness of entrepreneurship and entrepreneurial behaviour to organisations, namely the perceived creative and productive abilities of the entrepreneur, the ability of entrepreneurs to work outside of bureaucratic strictures in terms of taking advantage of resources and social networks, and engaging in creative processes in order to bring about institutional change. I conclude the chapter by detailing how this creative form of entrepreneurship is attractive to organisations across a range of industries as they attempt to be more 'productive' under constraining conditions.

Recent years have seen greater demands for entrepreneurial thinking and behaviour in organisations as a creative response to increasingly challenging and competitive work environments (Shalley et al, 2015). For example, a globalised economy means that institutions are susceptible to factors outside of their control, such as market fluctuations and downturns (Florida, 2002). Likewise, a global expansion of information and technology has resulted in greater pressure on organisations to adapt to new circumstances in order to distinguish themselves from their competitors (Amabile & Khaire, 2008). This pressure can manifest itself in the need to create new products or flexible organisational structures. Such changes can prove difficult, however, as institutions are made up of established roles and routines (Czarniawska, 2008), with corresponding meanings that can constrain the development of new approaches and actions (Aldrich & Martinez-Firestone, 2015).

As a result, firms have turned their attention to cultivating alternative and creative approaches. One of these approaches is ‘entrepreneurial thinking’ (Hisrich & Ramadani, 2017) in order to identify and exploit opportunities. Here, entrepreneurship has been linked with creativity, with the former regarded as the application of creative ideas not only to new business ventures (Eckhardt & Shane, 2003) but to new systems or ways of organising at the societal and organisational level, for example in terms of new scientific findings or social programs (Sternberg, 2014) which in turn lead to profit (Shane & Venkataraman, 2000). Creativity, then, is equated with the generation of ideas (Amabile, 1996) whilst entrepreneurship becomes the implementation of those new ideas; the productivity end that organises and applies creativity (Fillis & Rentschler, 2010). Entrepreneurship, therefore, becomes an attractive concept for those seeking to find creative solutions to organisational dilemmas, as I discuss in the next section.

Attractions of Entrepreneurship

Part of the attraction of entrepreneurship is that it has become equated with creativity, via the notion of the individual creative entrepreneur with the ability to recognise and exploit opportunities (Erikson, 2002). This attraction can be seen in the allure of the creative and entrepreneurial leader with an ‘entrepreneurial mindset’ (Gupta et al, 2004, p.242) who can apply their abilities to the organisation. These abilities are often regarded as being based upon personality characteristics that are more pronounced in the entrepreneur, such as extraversion (Chell, 2008), personal initiative (Frese et al, 1996) and openness to experience (Zhao & Seibert, 2006). For example, Markman & Baron (2003) conducted a review of research on entrepreneurship and person-organisation fit with a view to determining the personality characteristics of ‘successful’ entrepreneurs. Their results suggest that individuals who score high on a number of distinct personality dimensions such as self-efficacy, ability to recognise opportunities, personal perseverance, human and social capital and superior social skills will

be closer to an ‘entrepreneurial fit’ than those who score lower, therefore increasing the likelihood of their entrepreneurial success rates. It therefore becomes an attractive proposition for organisations that are faced with adversity to encourage such personalities, and appoint those with an entrepreneurial -- and creative -- mind-set to leadership positions (Fairchild, 2014).

Such creative entrepreneurs are believed to work outside of the bureaucratic strictures of firms that are thought to suppress creativity. By enacting their efforts outside established structures, entrepreneurs are seen to escape the restrictive path dependency of organisational mechanisms (Zahra, 2007). As a result, entrepreneurs engage in creative activities that would otherwise be difficult, such as applying novel combinations of resources to new problems or opportunities through the process of ‘bricolage’ (Baker & Nelson, 2005). Here, entrepreneurs can use materials, labour or skills in ways that do not conform to standard industry protocols or practices in order to bring about institutional change. For example, Desa (2012) describes how ‘Bookshare’, a technology venture which generated an accessible online library for people with print disabilities, was initially hindered by strong intellectual property rights in the form of patents and copyrights. This meant that publishers were reluctant to provide the venture with digital content for fear that copyright materials would be posted widely on the internet. In response, Bookshare used technological resources at hand in the form or scanners, screen-readers, character-recognition software and open source code that was freely available, and deployed volunteers to scan in paperback books manually. This (re)combination of resources not only constructed the venture itself, but gave it pragmatic and moral legitimacy through the previous sanctioned uses of such equipment, software and labour, which in turn allowed Bookshare to survive confrontation with a regulatory framework. A creative, entrepreneurial use of resources, therefore, brought about institutional change by working around established structures.

Creative entrepreneurs are also perceived to have diverse social networks as a result of working outside of organisational bureaucracy. Diverse ties with a variety of other actors provide entrepreneurs with a variety of contacts and experiences which can contribute to their ventures. For example, Uzzi and Spiro (2005) argue that entrepreneurs working in the music industry tend to be embedded in networks of scientists or artists who share ideas and act as both critics and supporters for one another. Such diversity in learning is regarded as the raw material of creativity, and is partly a function of the range of sectors through which an entrepreneur moves (Corbett, 2005). The advantages of multiple entrepreneurial networks is juxtaposed with the perceived disadvantages of being embedded within one dominant organisational network, which is regarded as following the principle of 'homophily' or the tendency to associate with individuals similar to oneself (McPherson et al, 2001). Such cohesive networks are seen to have access to the same types of resources and share similar ideas, leading to less creative solutions in response to organisational challenges. Entrepreneurs, therefore, are seen to be both creative and productive as a result of having access to multiple social networks.

Overall then, it can be seen that there is an increased demand for 'entrepreneurial thinking and behaviour' in organisations because entrepreneurs are thought to engage in creative processes in order to produce economic and social value. These processes and their outputs are consequently valuable for organisations. Initiatives that encourage such thinking and behaviour can be found in a multitude of organisations in various industries. For example, corporations are developing entrepreneurship contests in order to engage their own workforces and harness the capabilities of relevant start-ups. Ernst & Young, for instance, has "The Startup Challenge," where new ventures are given access to company resources such as mentors and publicity, in exchange for working with staff and clients on technological solutions (Ernst & Young, 2017). Companies have entrepreneurs in residence (EIR) who

oversee such entrepreneurship programmes and advise on appropriate start-ups to invest in. Dell, for example, have recruited an EIR with a track record of entrepreneurial experience who is used to attract new start-ups into the corporate ecosystem (Dell, 2017).

Strategies for incorporating entrepreneurship are not just confined to industry. The development of social entrepreneurship is seen to bring the creative attributes of entrepreneurial thinking and behaviour to produce hybrid initiatives under the rubric of doing well while doing good (Baumol, 2010). For example, de Bruin & Depuis (2003) describe Whale Watch Kaikoura Limited, a community trust established in a small New Zealand town with a ninety percent rate of youth unemployment. Here, material and non-material, 'official' and 'un-official' resources were creatively combined and employed by the community to form the venture. A disparate network of actors was drawn upon to enable the initiative, such as local politicians, bankers, lecturers and community leaders. 'Entrepreneurial behaviour' is therefore seen in the coordination and utilisation of resources and actors to produce a venture, in this case the community trust.

Models for incorporating the tenets of entrepreneurship and creativity are also being developed in higher education curricula and programming. These models are then applied to organisational structures. Bresler (2013) identifies teaching and research processes that can be used for institutional change, implemented by 'Academic Intellectual Entrepreneurs' (AIEs) who work across organisational boundaries to create a 'product' in the form of teaching, research and service. In research, entrepreneurship is being used as a principle in the formation of crossover and combined laboratories, where research modes that bridge the arts and sciences and partner social and commercial sectors are being developed. Here, entrepreneurship acts as the unifying concept that focuses diverse disciplines, institutions and their actors. Examples of this are The Laboratory at Harvard and Le Laboratoire in Paris, both founded by Harvard University's David Edwards, a biomedical engineer, social

entrepreneur and writer (Book & Philips, 2013). These centres are seen as ‘pivot points’ on which regions can reinvent themselves as ‘creative economies’ (Araya & Peters, 2010).

In sum, entrepreneurial thinking and behaviour is being propagated in a variety of organisational arenas in response to both global and local pressures, including macro-economic and social events such as economic downturns and increased levels of competition. Such thinking and behaviour -- exemplified in the actions of entrepreneurs -- is seen as a way of instigating and harnessing creativity for particular ends, by generating novel ways of bringing together a variety of resources and actors to escape an organisational morass, thereby generating ‘success’. However, despite this interest in the creative entrepreneur, understandings of creativity -- in particular collective creativity -- are underdeveloped in entrepreneurship literature, where rationalistic and individualistic models limit entrepreneurship to a particular type of profit-making exercise, denying the possibility of creativity through multiple and alternative ways of being entrepreneurial. It is to this limitation that I turn next.

Creativity in Entrepreneurship Literature

The traditional -- some might say, dominant -- approaches to entrepreneurship are informed by economics and psychology. In this section, I argue that these ‘traditional’ approaches fail to embrace calls for collective and organisational creativity, and limit the understanding of such in three ways. Firstly, if creativity is discussed, it is confined to the individual entrepreneur. Secondly, these individual creative activities are limited to the opportunity recognition stage. Finally, the material aspects of creativity are not adequately dealt with, particularly with regards to the role of bodies, objects and space in creative (and entrepreneurial) acts. I then present an overview of work that provides an alternative approach to entrepreneurship research in order to foreground the role of creativity -- the view of entrepreneurship as a form of organisation-creation.

Traditional Approaches to Entrepreneurship and Creativity

Traditional approaches tend to associate creativity with individual entrepreneurs insofar as they are able to generate entrepreneurial activity via their personal decisions and actions (Murphy et al, 2006). Such decisions and actions are underscored by economic rationality, with the entrepreneur presented as a bounded, logical individual who acts in the pursuit of self-interest (Pacheco et al, 2010). Entrepreneurial behaviour is characterised by a series of prescriptive steps taken to gain profit. Both Kirzner (1997) and Shane (2003), for instance, contend that entrepreneurs discover and activate profitable responses to unfulfilled needs for goods and services. Such 'gaps in the market' are regarded as 'objective phenomena' waiting to be 'exploited through firms and markets' (Shane & Venkataraman, 2000, pp. 218-19), which are regarded as static entities that change little over time, through which entrepreneurs can rationally operate in the pursuit of capital. This rational and prescriptive approach to creativity, however, precludes 'irrational' actions that may be creative but are not specifically or intentionally directed towards profit understood solely in economic terms. Hence activities that fall outside of this narrow rubric are ignored, such as serendipitous encounters between people which may lead to new ideas or approaches to a problem or process.

The psychological approach to entrepreneurship also addresses creativity from an individual perspective in explaining why some people are more 'creative' than others. For example, Casson (2003) presents the entrepreneur as someone who specialises in taking judgemental decisions regarding the coordination of scarce resources. Entrepreneurs make decisions that differ from others because they have 'different perceptions of the situation' (p.24), implying they have cognitive abilities and personalities that separate them from others. It follows that if such abilities can be identified, it then becomes possible to encourage individuals with these creative characteristics to engage in entrepreneurial activity, while

discouraging those with less-creative personalities (Delmar, 2006). According to this approach, creativity is a property of entrepreneurs and is realised through their thoughts and actions.

There are, however, a number of weaknesses to both economic and psychological approaches that focus on individual creativity. Firstly, creativity is equated with the act of establishing and optimising a particular business model, the goal being to achieve 'profit' in terms of the resulting financial returns. Similarly, entrepreneurs are assumed to be more capable of engaging in creative acts than non-entrepreneurs without such abilities and characteristics. Taken together, these presumptions regarding who can be creative and how paint a restrictive view of entrepreneurial thinking and behaviour, denying alternative ways of being entrepreneurial that do not directly conform to particular activities that result in new business formation. Likewise, 'being creative' is equated with those who engage in these prescribed activities, thereby excluding a range of actors who do not engage in activities recognised as being part of the entrepreneurial process. Secondly, linking innate personality characteristics to creative ability, and by regarding the former as precursors to the latter, implies that such dispositions are constant over time (Mitchell et al, 2007). It also disregards the role of organisational context in terms of influencing the very idea of 'creativity' and the many ways in which entrepreneurial action can manifest itself (Hayton & Cholakova, 2011).

These traditional approaches to entrepreneurship also tend to limit creativity to the opportunity recognition stage of the entrepreneurial process, with economic approaches focusing on how entrepreneurs recognise the value of particular resources that others do not (Alverez & Busenitz, 2001). Confining creativity to this initial stage presents a number of disadvantages. Firstly, it implies that creative thinking and behaviour is largely irrelevant beyond identifying certain resources that can be used in a way that achieves monetary profit. Creativity is therefore absent from other areas of the entrepreneurial process. Secondly,

opportunities are regarded as pre-existing phenomena, waiting to be recognised and coordinated by the alert individual entrepreneur. Such an approach denies the influence of social context in forming the very notion of what constitutes an opportunity. Creativity is therefore confined to recognising certain types of opportunities that are socially sanctioned to be part of the entrepreneurial process, denying alternative 'opportunities' that fall outside of a profit-making rubric. Leading from this, resources that are not profitable in terms of generating monetary return are excluded from the entrepreneurial process, thereby delimiting the creative use of alternative resources, both material and immaterial.

Psychological models also limit creative thinking and behaviour to identifying profitable opportunities and generating ideas in order to capitalise on them. Again, these creative abilities are based on certain personality characteristics and ways of thinking. Opportunities are regarded as either generated by market forces external to the entrepreneurs' social experience, waiting to be observed and acted upon by certain alert individuals (Shane, 2012) or subjective and made by the entrepreneur (Alverez & Barney, 2010). These approaches both limit creativity to the initial 'idea' phase, and whilst the latter takes into account the social context of the entrepreneur, it does so only insofar as the environment is a primer for a certain *type* of economics-based opportunity, and fails to take into account the associated social processes that shape how the opportunity construct itself is defined, let alone recognised (Welter, 2010; Davidsson & Honig, 2003). This means that thinking and behaviour which leads to alternative ideas of what constitutes an opportunity are neither valued nor considered. As a result, creative thinking and behaviour which falls outside of generating a normative opportunity is neglected.

A third limitation of both economic and psychological approaches to entrepreneurship is that both exclude the material aspects of creativity, in particular the roles of bodies, objects and space, in the enabling and influencing of creative behaviour. Regarding

bodies, a psychological approach firmly paints creative acts as mental phenomena with the human body excluded from playing any part in the creative process. Regarding objects, an economic approach confines materials to being inert resources that are manipulated by entrepreneurs in order to achieve a surplus of monetary profit, whilst a psychological approach regards objects as being either tools to be used in realising the cognitive process of being creative (Magadley & Birdi, 2009) or the finished products of this process (Carayanis et al, 2015). The psychological approach also sees the individual as being able to creatively affect objects through conscious and calculating activity, but the ability of objects to creatively affect the individual, for example in terms of triggering emotional and embodied responses, is ignored (Alcadipani & Hassard, 2010). Space is neglected by both approaches, in terms of how bodies and objects are arranged and how this arrangement can have creative effects. In other words, the notion of creativity in entrepreneurship theorising is delimited to the individual entrepreneur acting in a prescribed way, thereby excluding other bodies and objects and alternative conceptualisations of what constitutes creativity.

Entrepreneurship as Organisation-Creation

In view of these limitations, researchers have suggested alternative approaches to entrepreneurship in order to foreground the role of creativity. One such approach is to regard entrepreneurship as a form of organisation-creation (Hjorth, 2012; Steyaert et al, 2011). Here, entrepreneurship shifts from being something the individual *does*, in terms of a rational and prescriptive process, or something the individual *has*, in terms of entrepreneurial personality traits, to an organisational phenomenon or a type of organising (Gartner, 2007). Attention shifts to organising *for* creative acts to happen, and the subsequent harnessing of such acts via forms of organising. The notion of entrepreneurial creativity, therefore, changes from the recognition of *pre-existing* opportunities to the *generation* of different *types* of opportunities which can then be explored (Gartner, 2008). Opportunities become productive rather than

reactive, in that they are formed by a variety of actors and activities rather than merely responded to by an individual, alert entrepreneur. Entrepreneurship and creativity, then, become more relational, contextual and emergent than that portrayed in more dominant entrepreneurship theories. In this section, I present an overview of this literature and identify two important implications of this approach for research on entrepreneurship -- the importance of seeing entrepreneurship as a process and the notion of the 'assemblage'.

Process

There are several conceptual implications of viewing entrepreneurship and creativity as an organisational phenomenon. The first is a need to view entrepreneurship research through a process lens that considers people, things and categories in terms of ceaseless change, emergence and transformation (Chia & McKay, 2007). This ontology shifts the focus from fixed constructs such as entrepreneurial traits and opportunities that can be exploited to one that embraces the creative practices that occur in making something or enacting an idea. For example, such a processual approach to opportunities changes the focus from identifying that which is pre-existing, or focused too narrowly on profit maximisation, to the play or contingency that shapes how opportunities are generated. Creativity, then, becomes a central focus of interest, in terms of how something new 'becomes' (Tsoukas & Chia, 2002). This 'newness' in turn can contribute to organising forces which harness or 'actualise' creativity.

To illustrate, Hjorth (2005) writes of an artist-business collaboration designed to integrate artistic forms of expression with development processes in workplaces, the goal being to create an untraditional space for workplace communication. Here, art was used to enrol employees as co-creators in the generation of a space for play within a traditional workplace environment. This space allowed for the reinterpretation of official scripts and the development of alternative ways of communicating within the company. These practices were then used to change how the work was organised and the way communications between

workers and managers took place. This example shows how creative practices emerged as a result of combining different ways of being, in terms of merging ‘art’ (and its constituent ways of involving workers and addressing communication within the organisation) with the routines and ways of operating in the established workplace environment. The subsequent practices that emerged were then realised or ‘actualised’ in terms of developing and integrating communication strategies in order to achieve ‘value’ for the company.

Assemblage

The second conceptual implication of entrepreneurship as organisation-creation is the notion of *assemblage*. Stemming from process philosophy (Deleuze & Guattari, 1988; Whitehead, 1968), assemblage thinking addresses the productive capacity of things coming together with assemblages constituting arrangements of the tangible (such as individuals and materials) and the intangible (such as different systems of knowledge and values) that together offer different capacities for action. Adopted by disciplines such as cultural anthropology (Marcus & Saka, 2006), human geography (Dewsbury, 2011) and management studies (Duff & Sumartojo, 2017), the concept of assemblage allows the researcher to talk about how organisations *emerge* from a variety of interactions between material and expressive elements. It allows for a conjunctive way of theorising (Tsoukas, 2017) that breaks down simple dualisms of cause and effect and allows for connections to be made between diverse elements of experience. Applied to entrepreneurship and creativity, assemblage thinking helps to deconstruct the scientific rationality that underlies economic and psychological models whereby the individual bounded entrepreneur is the source of creative ideas that they effect in a particular way to generate monetary profit. Instead, attention moves to the wider sets of activities that take place around entrepreneurial acts in order to understand entrepreneurship, while still taking into account the influence of the individual in such acts. Creativity occurs in the coming together of elements in the

assemblage and the possibilities that result from these interactions. Applied to organisation-creation, assemblage thinking allows us to understand how creative acts can be organised *for*, and potentially actualised in a number of ways by a number of different actors (Hjorth & Johannison, 2008). So, the emphasis here is on creating the capacity to act through assembling material and immaterial resources, which function as a kind of foundation or springboard for generating and harnessing opportunities in different ways.

An example of assemblage thinking is the development of picture messaging technology in mobile phones. Camera phones were not a 'new' product, invented by a lone entrepreneur or a mythical creative engineering team in a technology firm, driven by an equally mythical creative CEO. Camera capabilities were the result of many iterations of both phone and camera technology, involving the incremental development of smaller and more efficient handsets with smaller and more efficient constituent technologies, before they were capable of being integrated into one model. The assembling of such a model involved a complex array of human actors including engineers, managers and manufacturing workers. Both time and space were influencing factors: the technology did not develop in a seamless linear fashion but came about in fits and starts due to events which took place outside of the actual technology development, such as resource availability and capital investment. Organisations at national and international level influenced the formation through their own rules and procedures, such as the International Organisation of Standardisation (ISO) and the U.S. Federal Communications Commission. Finally, the entrepreneurial process did not end with the actual camera phone product satisfying an existing 'gap' in the market or meeting the 'need' of consumers. Instead, it held capacities for a new community of users in that it allowed for new creative potentialities to be realised, not just in terms of how the camera phone could be physically used by those operating it, but also in the form of spin-off ventures and technological developments such as web-based picture messaging platforms like

WhatsApp and Viber. These ventures were perhaps not immediately apparent when camera phone technology was developed, but the *potentiality* of such was creatively formed through the assemblage, allowing for future developments to occur as a result of other assemblages, embracing other actors, things, times and spaces.

To conclude, entrepreneurship as organisation-creation allows for a more inclusive and richer account of creativity than economic or psychological approaches. Firstly, creativity becomes infused throughout the entirety of the entrepreneurial process as opposed to being confined to the recognition of narrowly defined pre-existing opportunities. Secondly, creativity becomes productive rather than reactive, in that emphasis shifts from scanning the surroundings for existing opportunities to generating different opportunities which can then be explored. As a result, the notion of entrepreneurship as a strictly economic activity with a limited number of outcomes shifts to entrepreneurship as a social and creative activity with a variety of possible outcomes (Steyaert & Hjorth, 2007). Finally, a wider array of people, objects, expressive acts, and spaces become involved in creativity as localised ways of being creative that are influenced by different social, cultural, geographical and temporal contexts are allowed to emerge (Weiskopf & Steyaert, 2009). In this way, we can develop a relational and emergent notion of creativity, in terms of allowing for connections to be made between diverse elements involved in creative processes. However, understanding *how* such constituent parts of the creative process come together and *what happens* in this coming together is rare in entrepreneurial research (Johnstone, 2010). It is therefore necessary to look at the *creative capacities* of these component parts, how they intertwine and the effects of this intertwining.

The Role of Bodies, Objects and Spaces in Creativity

In this section, I explore the creative capacities of the entrepreneurship process by foregrounding the roles of bodies, objects and spaces, and how in turn the arrangements of

such can form the conditions for new ideas, innovations or ways of acting creatively. I draw on a number of theoretical streams in order to understand these phenomena, how they come together and what is produced, as "it takes richness to grasp richness" (Tsoukas, 2017, p.137). As I will show: bodies become more than containers for creative minds; objects become more than inert resources or final 'products'; and spaces become more than empty containers for activities. All three become active participants in the creative, entrepreneurial process as they encounter and intertwine with each other (Ingold, 2007; 2000). In short, creativity 'emerges' through this interconnectedness. Accordingly, creativity is not something that is possessed by the entrepreneur, but is a relational activity, emerging in social, working and organisational practices (Gherardi & Strati, 2012). We must, therefore, reconceptualise how bodies, objects and spaces become active components of creativity.

Bodies

Previously, I explained that creativity is understood as an abstract, cognitive phenomenon in traditional entrepreneurship studies, with the mind regarded as being the active 'knowing' participant in the creative process and the body as being the docile 'unknowing' instrument that serves to realise creative intent through physical action. This approach, however, ignores the dynamic role of the body in creativity (Gärtner, 2013). People are embedded in environments which are experienced through the corporeality of the living body as they move through them, intersecting with other bodies and materialities (Ingold, 2008). The human body therefore comes to know through practice in the form of encountering other beings and experiencing them via the *senses* -- 'the visual, the auditory, the olfactory, the gustatory, the touchable' (Strati, 2007, p.62). This translates to a form of knowledge where people implicitly know how to do things and can perhaps describe their actions in evocative and emotional ways but not in logical-analytical terms (Strati, 2008).

For example, Parolin and Mattozzi (2013) explore how craftsmen working within the Italian furniture industry use their sensory interactions with materials to guide them in the production of a new chair model. Here, the craftsmen ‘know’ at a sensory or ‘pre-reflexive’ (Gherardi, 2006) level if parts of the chair are too soft or too rigid by the pressure they apply to it with their bodies and the interpretation of this pressure through their sense of touch. Likewise, a metal supporting frame may be judged unsuitable if it cannot offer a level of support that is again experienced through the body. Similarly, Gherardi & Perrotta (2013) show how sensory knowing is key to the creative practices of a group of craftswomen, whose ideas acquire form through interpreting the materials they work with via their senses. Here, the senses are key to forming ‘newness’ in terms of interacting and shaping the materials, via their hands on the canvas and the 'feeling' of what can or should be done in order to generate a work. The senses, therefore, are actively involved in the creative process in terms of experiencing the world and producing new ways of knowing as the body interacts with it.

Sensory knowing and the ways that the body experiences the world are neither neutral nor value-free, but are enculturated depending on the contexts people exist in and the pasts they have lived through. In other words, people learn to respond sensorially in different ways depending on what they have experienced. To revisit the Parolin and Mattozzi (2013) example, the workers knew when a piece of furniture felt ‘good’ or ‘bad’ due to their past experience in the craft industry, combined with specific design guidelines requested by their clients. Likewise, Viteritti (2013) tells of the learning process by which researchers engaged in laboratory work come to develop ‘sensitive ability and expert competency’ (p.367) through their interconnections with social, technical and biotechnical materials of practice. Sensory ways of knowing, therefore, are both born of immediate interaction with other bodies and things (Orlikowski & Scott, 2008) and a result of social and cultural embeddedness (Wenger, 1998).

Linking the notion of sensory knowing to organisation-creation, it can be seen that different sensory configurations are a result of the interactions that take place in different assemblages. The assemblage of materials involved in craft work, the bodies involved in their production, the requirements set by the clients, and the way they are experienced and negotiated via the senses, result in particular pre-reflective 'sparks' that motivate the craft worker, such as an impulse to create a product in a particular way, or knowing if it feels 'wrong' or 'right'. These sparks can be thought of as 'intensities' or 'incipiencies' (Beyes & Steyaert, 2011a); the potentiality of organisation-creation, which is realised though practices of making the bespoke furniture piece. Bodies, therefore, are active participants in creativity. We know the world by interacting with it and experiencing it via the senses, while simultaneously generating new ways of knowing and experiencing the world through such interaction. This brings me to the role of objects in such interactions.

Objects

Entrepreneurship theory tends to regard material objects as inanimate: the end product of a linear creative process or the tools used to realise it (Gherardi, 2011). These 'things' exist as the objects of human agency, entities discrete and separate from living bodies (Carlile et al, 2013). This approach, however, ignores the material dimensions of creativity in two important ways. Firstly, it fails to consider the way in which objects carry meanings that are formed because of the relations people have with them and the experiences such objects have been involved in; meanings that go beyond their functional capacities. For example, Dale & Latham (2015) write that medical paraphernalia, such as catheter bags, can serve to signify the dis-abled body and the 'prejudgements and symbolic imaginaries' (Tuana, 2008, p.200) that are part of this representation. Here, the bag comes to signify an 'inert, passive' (p.177) disabled body as opposed to the cap(able) body. Humphries & Smith (2014) argue that a redundant Xerox photocopier comes to signify the organisational identity of the Fuji Xerox

company, in terms of designing and implementing new technology to achieve commercial success. Barry & Hansen (2008) contend that an artwork can carry meaning in terms of representing a particular experience, place or intent of the artist. In these three examples, the objects concerned are infused with meaning because of the social experiences they are a part of, in terms of their relationships with individuals and other things.

Secondly, failing to consider the role of material objects obscures the idea that they can mean different things to different people depending on *who* interacts with them, *where*, *how* and *when* these interactions occur. Following from this, objects can hold capacities for practice or doing (Nicolini, 2009a); in the form of influencing people in different ways as a result of these interactions. To revisit Dale & Latham (2015), the catheter bag changes from a functional piece of equipment for the individual using it, to something that provokes uneasiness and discomfort in one of the authors who interacts with it. This uneasiness is intensified in a cramped residential setting where the researcher unwittingly comes into direct physical contact with the bag, as opposed to a medical setting such as a hospital, where interaction with such an object would be mediated by medical staff. In the case of Humphries & Smith (2014), the meanings attributed to the photocopier change over time as different actors and sets of social relations come into contact with it. In turn, the tangible object gains a propensity or capacity to affect others as it comes to embody intangible organisational culture. For example, the object starts its 'biography' (p.488) in research and development labs as a trial model used to generate business and sales activities. At the point of commercialisation, it changes to a functional piece of equipment for customers and Xerox workers, before changing again to something that both represents and enforces organisational beliefs and values in how it is communicated to potential Xerox customers. For Barry & Hansen (2008), an artwork can be ambiguous and hold multiple meanings for those who interact with it, depending on the ideas it signifies and how it is interpreted. In turn, such

artwork has the capacity or potential to influence thought and action in those who interact with it. Objects, then, can hold different meanings for different people depending on the social and temporal contexts they are a part of.

Thirdly, objects do not simply become containers for meaning or the results of practices as a result of social processes, but serve to *produce* or *generate meaning and practices* as they (re)engage with social processes. In other words, objects are not simply representations of ideas separated from humans but are also capable of influencing and shaping human experience. This influence occurs as objects interact with bodies and stimulate new ways of experiencing the world. For example, the researcher in Dale & Latham's (2015) study feels physically uncomfortable and embarrassed when she accidently knocks against and spills a full catheter bag. She is acutely aware that the bag is part of the bodily functions of its user, but her lack of experience with such objects and their use, combined with her cultural norms that compel her not to discuss bodily excretion, provoke a different way of experiencing the interaction in a visceral, sensory manner. The Xerox copier of Humphries & Smith's (2014) study serves as an identity anchor point for the company, around which a particular story or experience of 'innovation' and 'risk taking' is generated and conveyed both inside the company to staff and outside the company to business partners. An object of art, such as a painting or a sculpture, can represent a particular experience of the world or a way of comprehending an issue. This logic is experienced sensorially by the individual, whether that be 'seeing' a painting, 'hearing' a musical performance, or 'touching' a piece of street art. The experience can prove evocative, as the individual brings their own biographical experiences to the encounter, which in turn intertwine or 'fold' (Ingold, 2011) into the experience of the piece. These interconnections can creatively stimulate at the pre-reflexive level, and lead to other ways of comprehending or perceiving an issue, which can in turn lead to other ways of acting. In relation to entrepreneurship as

organisation-creation, this pre-reflexive ‘spark’ can be seen as the opening up of potentialities or new ways of being. This generation is the result of the assemblage of materials, bodies and logics that take place in and around it.

Spaces

Mainstream entrepreneurship theory has done little to theorise the role of ‘physical’ sites, perpetuating a neutral ‘container’ metaphor (Taylor & Spicer, 2007) in which entrepreneurs carry out normative creative processes unimpeded. However, physical space is neither static nor value-free, but a product and a generative force in the coming together of people and activities (Massey, 2005). Spaces are in constant motion as a result of people and things meeting in different ways (Anderson, 2009); they facilitate routines, encounters, and embodied movements through the physical arrangement of bodies and objects (Lorimer, 2005) which in turn generates future encounters, routines and embodied movements. For example, a London underground station channels the movement of people in different ways in terms of its architecture. People are funnelled through the pathways, down escalators, and onto platforms. The station influences peoples’ movements outside of the station as they move to and from it to reach other destinations. The understanding of the Tube station as a transport hub, in terms of its capability to move bodies, facilitates the routines of people as they plan their journeys to intersect with it, letting them move to other spaces. A communal art space in East Berlin called Tacheles allows people to congregate and socialise in its parkland areas, around its large art pieces such as a half-buried bus, or on the steps of an old abandoned house. The presence of this open space, surrounded by old grey Plattenbau apartment blocks, compels people from neighbouring spaces to visit in order to play and relax. These physical sites influence peoples’ movements due to their structures and functions and their relations to other spaces around them. They are productive of social interaction due to their arrangement.

Spaces are not just physical however, but are comprised of past interactions of bodies and objects that have moved through them and future imaginings of how they could be. For example, Cornelissen et al (2014), in their analysis of the shooting of an unarmed train passenger by British police, describe how the representation of a particular London Tube station as a transport hub was shattered by the 7/7 suicide bombings of 2005. Further attempted bombings after the initial attack reframed the representational space of the Underground, intensifying feelings of fear amongst those travelling on it, including the armed response team who carried out the shooting. Latham (1999) writes that the Tacheles space in Berlin has been caught up in powerful and turbulent forces over time. During the 1930's and 40's it was used by the Nazi party as a meeting place and a prison for allied forces, before being employed by a trade union until the fall of the Berlin wall. It became derelict and was scheduled for demolition before an artists' initiative took it over in the 1990's. Since Latham's paper has been published, the space has been the subject of occupations and evictions, before being redeveloped as a commercial site by a financial group which generated protests at the site (The Guardian, 2012). The space has proved evocative for those who have occupied it due to the charged history of the events that have occurred there.

Both examples above show that spaces are shot through with other spaces (Thrift, 1996), in terms of the events that were enacted there in the past (such as a shooting and various occupations of a city centre site) and the imagined futures of such locations (such as a potential terrorist target, or a corporate development). Neither of these spaces are neutral containers that people simply 'use'; instead they 'become' due to how they have been occupied and how they *may yet* be occupied (Rancière, 2013). Spaces therefore are relational, in terms of both their past and future incarnations. The ambiguity around the understanding of the Underground and Tachelles due to these incarnations creates instability and ambiguity

in their present manifestations (Beyes & Steyaert, 2011b). Space, then, is not fixed and atemporal, but is in a constant state of becoming (Thrift 2008).

The illustrations also show that this becoming of space can produce strong emotional effects or intensities (Massumi, 2002) in people that are felt at the sensory level. The indeterminacy of the Underground station, caused by the wider contextual happenings of the 7/7 bombings and the real or imagined threat of incipient attacks, was felt at the pre-reflexive level by users of the Underground, including the police team that carried out the shooting. The uncertainty of the Tachelles space, resulting from the intertwining of its evocative histories and its planned commercialisation produced 'motivational propensities' (Thrift, 2008, p.26) in individuals occupying it. These propensities or intensities were not simply reactive, but productive -- they stimulated people to act at the level of feeling rather than the level of conscious, logical evaluation (Blackman, 2013; Thien, 2005). Such acts became manifested differently in the individuals that experienced them, for example in the shooting of an unarmed suspect, or in spurring people to protest. Space, then, is not a neutral, fixed container that people simply occupy, but is productive in that it can stimulate and affect those who move in and through it (Morris, 2004). This stimulation in turn contributes to the becoming of the space by influencing how it is experienced, and how it is enacted. Space then is active and alive with past incarnations, present activities and future imaginings.

The above discussion illustrates the complex and processual nature of creativity in terms of the multitude of bodies, objects and spaces -- or assemblages -- that can be involved in creative acts. It also highlights problems concerning how we 'know' creativity, and suggests a relational and emergent approach to this issue rather than a rational and deterministic one. As such, the current trend in seeking to apply rational notions of entrepreneurial thinking and behaviour to understand and stimulate organisational creativity does not go far enough. 'Entrepreneurship as organisation-creation' is an attempt to expand

the theoretical basis of entrepreneurship theory to increase the possibilities of creativity through multiple and alternative ways of being entrepreneurial (Steyaert et al, 2011). However, the application of such enactive approaches to organisational phenomena are rare (Fletcher, 2006), with empirical studies even rarer (Welter, 2010), meaning that work in understanding how potentialities or capacities for thinking and behaving arise from assemblages is lacking. This leads me to my first research question: *how may bodies, objects and spaces be organised to produce creativity as a capacity?*

Power and Organisation-Creation

The previous section highlights how entrepreneurship as organisation-creation foregrounds the role of creativity in the entrepreneurial process. In doing so, the notion of 'creativity' itself moves from a quality that is possessed or carried out by the individual entrepreneur, at the initial stage of the entrepreneurial process, to a capacity that is enacted by a variety of material and expressive phenomena coming together. I have developed this idea of enactment by discussing and illustrating the creative capacities of bodies, objects and spaces interacting as assemblages. A wider array of entities, therefore, become part of the creative process, including different ways of knowing or experiencing the world that are not simply rational-cognitive and linguistic. These interactions can generate potentialities or imaginative capacities (Chiles et al, 2017) that can be realised by certain practices, such as in the generation of value for consumers, as indicated in my mobile phone technology example. However, whilst organisation-creation opens up how we know entrepreneurship and creativity, it also creates ambiguity about the role of the 'knowing' individual or organisation in such processes. This is to say that the intent or authority of actors engaging in organisation-creation becomes a grey area, particularly with regards to the 'creation' phase of organisation-creation.

To elaborate, Hjorth (2014) writes that the potential for newness, the incipiency that can become something 'new', such as an idea or an invention, emerges out of interactions that occur in the assemblage: '[A]n idea of the new, a virtuality opening up towards its potential becoming […] emerges from experiences within an existing order' (p.102). Hjorth writes that the motivation for these experiences or interactions is the result of '*desire*', which he understands as a type of affective 'want' or 'urge' that comes about from past experiences of entities in the assemblage coming together, such as particular individuals and objects, and a similar want or urge to connect with other entities in future assemblages: 'Desire springs from previous experiences of connections with the new, and with assemblages capable of creating the new' (Ibid. p.102).

As desire intensifies, the gap between the potential for newness and the realisation of newness in the form of 'something' (such as a coherent idea or intent) somehow 'becomes'. However, there is ambiguity with regards to *intent* on the part of actors taking part in the generation of such desires; which seem to simply emerge from connectivity in the assemblage: '[d]esire is this social force […] that assembles, *but without a plan for doing so*' (Ibid. p.105; emphasis added). It is only when this newness has somehow sufficiently formed into something like an idea that intent or authority appears, in the form of organisations coding desire into socially sanctioned interests, such as a corporate strategy or a business plan. Hjorth calls this the 'managerial function', which harnesses desires along the interests of economic efficiency and social control (Hjorth, 2011). How intent or authority figures in desire is therefore ambiguous, in that these urges simply 'become'; with intent only coming into play when organisations wish to harness such desires in order to achieve some kind of organisational goal.

Hjorth illustrates his concepts with the example of a football game (2014, p.112). Here, according to the author, we 'desire' playing football based on our previous

relationships with the ball and the people we have played with (the past assemblage). We will thus anticipate 'joy' or future connectivity when we see a football, which will drive us to invite others to come and play (the desire to connect with future assemblages). We will also desire the football, as it represents all of these joyful things to us. The role of conscious intent in the coming together of the constituent parts of such a football game is ambiguous, in that it more or less appears when the desire for football becomes coded by organisational interests and is manifested, for example, as interest in a particular football club, or in consuming football merchandise: 'as soon as organisation-creation generates results […] there is a swarming crowd of social codes lying in wait […] under the burden of which it will crack' (Ibid., p.112).

There are a number of implications regarding this line of thinking. Specifically, there is ambiguity with regards to how power works in the 'becoming' of desire, in terms of the ability of the individual or organisation to exercise intent and influence in *how* desire emerges from the interactions that take place in the assemblage. In line with Deleuze and Guattari (1988), Hjorth claims assemblages are a result of affective urges and wants that motivate things to interact. The knowing agent only harnesses the potential that emerges from these interactions. This, in turn, suggests that power is absent in the formation of assemblages: instead, assemblages are drawn together by desire, which in turn stimulates desire, which forms other assemblages, and so on. As Hjorth writes: 'assemblages are thus forms of sociality that hold immanent proto-organisational potentials' (p.102). Power only appears in the 'domination' of emergence, when organisations harness desire in the act of 'maintaining orders (control) and increasing efficiency' (p.107). According to this view, creativity is limited to the time of emergence or becoming. As soon as power occurs, either directly or indirectly in the form of individuals or organisations exercising their will, 'control' happens

and ‘process’ stops: ‘control literally means stopping something from rolling’ (p.105). Creativity is therefore divorced from power.

It can, however, be argued that the assemblages of bodies, objects and spaces cannot be divorced from the intent of individuals and organisations that form them. Taking Hjorth’s football example, whilst individuals taking part in the game might be motivated by their past experiences of play and the people they played with, they ‘know’ the game of football itself due to the various actors that have helped shape it. They know *how* to play the game, in terms of dividing into teams, scoring goals, engaging with the ball itself by kicking it (as opposed to picking it up and running with it) by intentional recursive acts and decisions that have formed the sport of soccer. Likewise, these acts were influenced by certain contexts that unfolded over time: the rules that shaped the sport were influenced by the times and spaces it was played in, the decisions made by various football authorities regarding how it should be played in those times and spaces, and the subsequent legitimation of these rules by other acts and other authorities in other times and spaces (Elias and Dunning, 2008). Similarly, interest in a particular football club, generated perhaps by visiting a football ground as a child or receiving the gift of a football jersey, may have influenced an individual to play the game just as much as the anticipated ‘joy’ of connecting with others. This suggests that power -- in terms of intent or authority exercised, either directly or indirectly by individuals or organisations -- cannot be divorced from the creative interactions of bodies, objects and spaces. Intentionality and authority are intertwined or enmeshed with how assemblages ‘become’ (Ingold, 2000).

In order to explore the role of power in assemblages of bodies, objects and spaces, I draw on the work of Allen (2009, 2010) who sees power as the *capacity* of an assemblage, in that the assemblage provides actors with the *potential* to influence others. At the same time, actors who take part in the assemblage can influence this capacity, depending on how they

are positioned in relation to one another. In other words, actors can actively align themselves with other actors, thereby forming alliances, which will in turn influence how the capacity of an assemblage unfolds. For example, actors with shared goals can align with each other through decision-making practices, therefore becoming intensively connected. This intensive connectivity enables them, while at the same time distancing others who do not share their goals. Such intensive and less intensive connectivity in turn shapes the capacity of the assemblage, which becomes configured to enable those who are intensively connected while simultaneously distancing those who are less intensively connected -- power becomes iterative and recursive, with the assemblage 'set up' to favour some over others. Power therefore is not held by any one party, and is instead disaggregated and negotiated between actors in the assemblage and formed in the practices and relations that take place between them. As such, power is more than just a property that is possessed by an actor in an assemblage. Likewise, power is more than *the result* or *effect* of a particular assemblage -- for example, network approaches see power as the result of resources being organised and extended outwards across space (Castells, 1996). Instead, power is mutable and shifting in line with the ability of actors to make themselves more or less present in the assemblage. Consequently, power relationships are not so much located in space or extend across it, as compose the spaces of which they are a part (Rajchman, 2000).

Allen develops this idea in illustrating how power operates between global cities, showing how power is exercised in the forging of connections between the financial centres of London and Frankfurt by financial and business elites, such as bankers, legal professionals and management consultants. This connectivity proved mutually beneficial to both cities, with London's global business outlook enabling firms in Frankfurt to access global markets, and the latter's European business providing an entry point for London's banks and professional services (pp.2901-3). Here, authority is exercised *with*, not *over* others in any

direct, hierarchical sense. This form of power is not only brought into being and sustained by such net*work* but can be extended by engaging with and enrolling others through strategies of inducement and manipulation (Allen, 2010). Simultaneously, other cities can lose out in such arrangements through weaker and less beneficial ties, whilst still being enrolled in the general orientation of the network in order to survive. Again, to take a city example: Berlin's economic position 'outside' London and Frankfurt's networked business services leaves it disadvantaged in terms of the specific ties and connections between the former two cities (Allen, 2009). According to this view, power is performed into being through the connections forged between actors, with some actors making themselves more present by establishing more intensive connections with each other, whilst other actors become less relevant by being distanced and less intensively connected in the assemblage.

I apply this more nuanced view of power to creativity and the creative becoming of bodies, objects and spaces. In doing so, I show that power exists in how bodies, objects and spaces are configured and the relationships that are established between them. Power, then, can be productive as well as constraining, shaping what becomes -- and what counts -- as creative. To elaborate on these complex relationships, I examine research that deals with how power influences bodies, objects and spaces -- respectively, and then combined as an assemblage.

Power Relations and Bodies

Research shows that power operates on bodies in both prohibitive and productive ways. To elaborate, power constructs particular body categories or types through socially established meanings which decide in advance what kinds of behaviour or conduct are considered 'normal' or 'appropriate'. The individual brings their own subjective experience to these categories, for example their own ways of being in the world and their own sensory knowing (Strati, 2007). In this way, the body is not simply acted on by power in a top-down

manner, but actively contributes to the production and reproduction of power relations (Foucault, 1977).

This generative view of power and the body has received significant attention in feminist studies, particularly with regards to how gender is socially constructed and perpetuated. Judith Butler's (2011) theory of gender performativity perceives gender as a performance in which the individual agent acts. The script of gender performance is transmitted generation to generation in the form of socially established meanings or frameworks of intelligibility (2006). Performativity is enabled by the repetition of practices over time in a process of iterability (1993), such as bodily behaviours and emotional conditioning. Butler emphasises the role of such bodily practices in the construction of gender by stating that they both enable the subject and constitute the subject category of the individual. The body, therefore, is productive in terms of generating power relations, in that gender is not a 'choice' but it is also neither inscribed nor imposed on the individual in a totalitarian manner (1988).

Studies of how masculine work identities are constructed have also explored the ways in which the body both produces and reproduces power relations, for example in Monaghan's (2002) work on the social construction of male security staff, Godfrey's (2012) writings on the masculine military body, and Hall et al's (2007) work on male gender fluidity in service industries. Similarly, Coupland (2015) details how 'masculinity' as a category is socially produced via the organisation of masculine bodies in rugby league football. Here, the dominant social norms regarding the production of the rugby player's identity are intrinsically linked to the body, in that pain and injury can be endured and the use of (controlled) violence is masculinizing. These norms intertwine with the body through practices of exercise and training in particular gestures, movements and skills appropriate to the sport. Such practices become a form of sensory knowing in that the body learns to

perform in prescribed ways. Emotions too are manifested and regulated in accordance to these norms, with players trained to channel aggression in play and frustration in defeat. The body, then, is the performative stage on which power 'becomes'; on which power is both produced and reproduced, through the practices in which it engages. The operation of power through the body is therefore less 'power over' through direct rule or threat of punishment, to 'power to', in that power becomes immanent in the body of the subject, depending on how it interacts with other bodies and objects.

Power Relations and Objects

Studies have identified a number of significant points regarding how power relations are exercised both on and through material objects. Firstly, power works to form objects in similar ways as bodies in that they become productive of power. This is to say that objects are embedded in social and political relations which give meaning to their physicality and influence the capacities they have for action, such as by steering bodies in particular directions. For example, Harré (2002) writes that objects, defined as non-living entities that occupy space and time, are enabled by the stories and narratives within which they exist. These stories comprise relations with other bodies and objects. The author illustrates this point by discussing how a wedding ring, as object, is understood as more than a simple band of metal due to the social narrative of marriage. Communion wine, as object, is understood as more than just alcohol in a Catholic mass, due to the social narrative of religion. Objects, therefore, are social substances, brought into being by the social world.

Secondly, once objects are defined and organised in this way, they can serve to both empower and disempower individuals who interact with them, depending on the meanings and capacities they hold for people. So, Communion wine, enabled by the story of transubstantiation within the Catholic mass and the other bodies and objects that comprise this arrangement can serve to empower the priest as a figure of authority. Receivers of the

wine, in terms of the congregation, are placed in relation to the authority of the priest via the practice of engaging with the wine and, by extension, the social narrative of Catholicism. The objects of this social narrative in turn have the capacity to motivate individuals by way of the symbolic meanings they hold.

Thirdly, the meanings of such objects can vary depending on who interacts with them and why. This is to say that the narrative acts that organise objects are not single or uncontested. Objects can therefore have differing power effects as a result of this ambiguity of meaning. For example, Doolin (1998) shows how a new information technology system in a hospital placed clinicians under greater scrutiny by management. Practices of engaging with the system served to (re)produce it and encouraged the internalisation of associated norms and values, thereby creating self-disciplined users. At the same time, the ambiguity of power relations working through objects was illustrated by some clinicians diverting the system information to their own ends, principally in arguing for more resources, to the detriment of other clinicians. Similarly, Kvansky & Truex (2000) write that practices of engaging with new technology, in the form of technical expertise, can act as a form of 'symbolic capital' amongst some people while simultaneously serving to disenfranchise those without such knowledge. In this way, such new technology holds the capacity or potential to affect those who interact with it. Power then is productive and does not operationalise evenly on all individuals via the object-as-technology. It works in a more nuanced and complex manner where some people may benefit whilst others may not.

In short, objects are relational entities, formed and reformed in a meshwork of power relations with other objects and bodies. They are imbued with capacities and meaning and legitimised by these relations, serving to affect others as a result (Rasche & Chia, 2009).

Power Relations and Space

Much as with the exercise of power on bodies and objects, space is also intricately linked with power relations in that it is both a means to organise actions and an outcome of those actions. For example, Kellogg's (2009) study of two hospitals attempting to reduce the hours worked by surgical residents shows how architecture and workplace layouts can play a role in establishing and maintaining power relations. Work hour changes were not implemented in one hospital, where a variety of spaces allowed diverse staff from different departments who were opposed to such reforms to interact and generate a formalised opposition. Changes were implemented in the other hospital where such hybrid spaces did not exist, with open plan areas meaning opponents could not converse without fear of being overheard by management. Physical space, then, is productive of power relations in terms of the capacities and practices that it both enables and constrains (Taylor & Spicer, 2007).

It is important to note that physical space and the power relations that inform it are not fixed but are being continually negotiated. Spaces are not pre-formed or neutral, but exist in relation to other spaces and the bodies and objects that move through them. These other phenomena carry with them their own representations, meanings and legitimations that have been formed through other power relations. As these spaces, bodies and objects intertwine, new power effects become manifested in practice. For example, Dale (2005) writes of a highly consciously planned, designed and ordered electricity company headquarters with a corporate image expressed through architectural form. This form was manifested in terms of an open plan layout, circulation routes and meeting places designed to "act as points of social contact" (p.668) in order to facilitate interactions between people: not just the regular ones that management expects, but the unexpected in terms of the more innovative and less predictable interactions. The professional or corporate representation of the company was therefore linked to the representation of how an 'innovative' or 'creative' space *should* look.

Kornberger & Clegg (2004:1095) similarly introduce the concept of the 'generative building', which "contributes positively towards an organization's capacities" by organising flows of communication, knowledge and movement. The authors argue that where these flows intersect, "surprises emerge that cannot be intentionally produced and controlled" (p.1107). These 'creative' spaces are represented as kinds of free spaces or heterotopias (Foucault, 1986), but are nonetheless infused with power. Here, the 'surprises' are organised *for* in that the configuration of space, and the bodies and objects that move through it, is still planned and the outcomes of such configurations can be harnessed (e.g., increased worker productivity). Likewise, the employee understands herself or himself in relation to this space: they 'become' as creative subjects, but creative in a particular way.

Power Relations and the Assemblage of Bodies, Objects and Spaces

The above discussion has separately discussed some of the work on bodies, objects and space in terms of the generative and constraining effects of power. However, it is important to acknowledge that not only are the constituent components of any creative process subject to power but so, too, is the way in which they are assembled. As the examples of Kellogg (2009) and Dale (2005) show, space operates in relation to the bodies and objects that move through and interact with it. It is in and through these interactions that power works, with different combinations of bodies, objects and spaces producing different power effects. These configurations can happen without direct organisational intent but still produce certain conditions in which power may be exercised further. If we return to Cornelissen's (2014) example of the shooting at the London Underground station: different *bodies* (passengers and police officers) combined with different representations of the Underground *space* as both a transport hub and the site of a potential terrorist attack, as well as *objects* of transport (the train), communication (radio system) and enforcement (weaponry) folded together to produce particular conditions which in turn manifested themselves in the shooting

of a suspect. Similar possibilities are manifested in Knox & O'Doherty's (2015) study of a bomb scare at an airport. Here, the contained, functional representation of the airport space becomes disordered by the imagined threat of the object (the bomb) and the unknown bodies potentially using such devices (the terrorists). This ambiguous threat disrupts the regular ordering of the airport space, producing uncertainty and fear felt at the individual and group level; feelings which in turn are materialised in the practices of increased security checks and false alarms regarding other potential threats. The point here is that the operation of power in the *coming together* of bodies, objects and spaces can happen without direct organisational intent, but nonetheless produces conditions of possibility that have further, possibly indeterminate power effects.

Such conditions of possibility can also be manipulated by actors. Bodies, objects and spaces can be tactically configured so that particular sets of power relations are formed. These configurations can be viewed as purposeful attempts to stimulate and produce a particular form of creativity, which can in turn be channelled towards certain ends. For example, Beyes (2009) shows how 'Berlin City Attack', a marketing strategy devised and implemented by Nike in Berlin, involved the transformation of a disused underground station below the Reichstag. The area was turned into a large playground with soccer, basketball and skateboarding sections. Nike communicated this venture as a 'freeing up' of space for Berlin's youth, incorporating materials such as posters, signs and security fences to portray a specific space for their activities. Yet this act can also be seen as a commodification of city space in order to appeal to a particular youthful demographic. Consumers may 'perform' this space through their interactions, but their senses are stimulated by particular configurations of objects and spaces designed to produce particular bodily reactions i.e., 'interest' that is, in turn, equated with the Nike brand. Creating conditions of possibility, and the realisation of

such conditions, is therefore both performative *and* political, in that particular relational formations and how they are expressed may be enabled and constrained (McKenzie, 2001).

In summary, power cannot be divorced from the interactions of bodies, objects and spaces and is, in fact, infused throughout the production of such entities and the relations that occur between them. Power works to perform bodies, objects and spaces, and shapes the arrangements -- or assemblages -- in which they exist, both directly and indirectly in terms of the intent or authority of particular actors. These assemblages, understood as conglomerations of bodies, objects and spaces in turn have capacities through which power moves and is reproduced. Such capacities can affect individuals who meet and interact with the assemblage. Applying these ideas to entrepreneurship as organisation-creation, it can be seen that 'creativity' is not separate from power: in that power is not limited to harnessing a creative spark that comes from things interacting, but shapes how that spark in itself becomes. What counts as 'creative' therefore is a particular configuration of bodies, objects and spaces and the capacities such a configuration may produce. Accordingly, my second research question is: *what role does power play in the formation of creative capacities?*

Similarly, I also apply the ideas of power that I have discussed above to the traditional idea of entrepreneurship as new business formation. It is the body of the entrepreneur that matters most in such literature, in that it is the entrepreneur who acts to coordinate resources in the act of creating new business ventures, with non-entrepreneurs generally regarded as passive entities (Tedmanson et al, 2012). Likewise, the understanding of objects is informed by economic rationality, in that they are regarded as inert resources that the entrepreneur manipulates to achieve monetary profit (Jack & Anderson, 2002). Space, meanwhile, is understood as a neutral container in which the entrepreneur operates, even though entrepreneurship is produced differently depending on the sites it is manifested in (Steyaert & Katz, 2004). As such, power is understood in an individualistic manner that is divorced from

bodies other than that the entrepreneur's, separated from objects other than narrowly-defined resources, and excluded from spaces where entrepreneurship as a profit-making exercise can be carried out. Overall then, power has been neglected in traditional entrepreneurship literature, which has, in turn denied multiplicity and alternative ways of being 'entrepreneurial' (Steyaert et al, 2011). As such, I wish to explore how power works to make individuals as entrepreneurs through the configuration of bodies, objects and spaces that they are a part of. Consequently, my third research question is: *what are the implications of power for entrepreneurship?*

CHAPTER 3: METHODOLOGY

The previous chapter outlined an alternative view of entrepreneurship as organisation-creation which foregrounds the role of creativity, an area often neglected in traditional entrepreneurship studies. Here, entrepreneurship shifts from being something the individual *does*, in terms of a rational profit-making process, or something the individual *has* in terms of entrepreneurial personality traits, to a type of organising. Consequently, creativity is expanded from the initial opportunity identification stage of a strictly economic activity or the innate ability of the individual entrepreneur to something that can be organised *for* -- through shaping the conditions for creative acts to happen. Consequently, such acts can be potentially harnessed in the form of new ideas, innovations or processes applicable to areas that fall outside of a traditional business rubric, such as social ventures.

I further explored this notion of organisational creativity by foregrounding the roles of bodies, objects and spaces, and suggested how the arrangements of such can form the conditions for new ideas, innovations or ways of acting. All three entities can become active participants in the entrepreneurial process as they connect with each other, with creativity potentially emerging from this interconnectedness. Likewise, I highlighted the role that power -- both intentionally and unintentionally -- plays in the shaping of such arrangements. Here, bodies, objects and spaces are both formed by power relations and produce power effects, which differ depending on the ways such bodies, objects and spaces are arranged and interact with each other. Overall, then, I have illustrated how creativity is a relational activity, emerging in social, working and organisational practices. Such theoretical assumptions in turn impact on how we can empirically study entrepreneurship as organisational creativity, with a methodology designed to understand how bodies, objects and spaces interact, and sensitive enough to address the organisational forces that influence such interactions

becoming necessary. I therefore continue by presenting the methodology that I will use to explore these issues.

The remainder of this chapter is structured as follows. Firstly, I present my case study and explain why I selected it. Secondly, I describe my research approach, which was to 'zoom in' to my research site by exploring the situated interactions and practices that constitute it, and then 'zoom out' to show the connections between such local interactions and the translocal phenomena that influence them (Nicolini, 2009a). By zooming in I was able to address my first research question, namely *how may bodies, objects and spaces be organised to produce creativity as a capacity?* Correspondingly, by zooming out I could examine my second and third research questions: *what role does power play in the formation of creative capacities?* and *what are the implications of power for entrepreneurship?* Thirdly, I explain how I collected and analysed the data associated with my above-mentioned research strategy. Here, I adopted an ethnographic approach to zooming in, characterised by the method of participant observation. I then conducted an array of interviews with relevant actors in order to zoom out and understand the wider web of relations and connections that influence how Science Gallery comes to be creative and entrepreneurial. In combining both approaches I was able to focus on the practices by which a particular form of creativity is organised and accomplished, while at the same time paying attention to how this particular form or 'brand' of creativity impacts on entrepreneurship as organisation-creation.

The Case Study: Science Gallery

A case study is a research strategy which focuses on the dynamics present within a particular setting (Eisenhardt, 1989). As such, it is an ideal way of understanding the context-specific interactions of bodies, objects and spaces that can potentially produce creative moments. Likewise, it enables a nuanced and processual approach to such interactions by allowing me to explore the meanings that such bodies, objects and spaces carry with them

and how such meanings creatively change as these entities interact. A case study also allows me to explore how power influences such interactions, in terms of how such bodies, objects and spaces are organised so that they interact in particular ways.

The case study I selected for my research is Science Gallery, an outreach programme under the auspices of Trinity College Dublin in Ireland. Its stated mission is to act as a platform for young adults to realise their own creative potential by attending and participating in a changing programme of interactive exhibitions and events (Science Gallery, 2015). Exhibitions combine science and art by using scientific issues as themes, which are then deconstructed and reinterpreted through artworks. The exhibition space also involves an array of associated actors, from local businesses to education institutions. It has been described as 'the most creative, innovative and artistic venue in Ireland'[6] a 'living experiment'[7] and a space that 'bridges art and science, thereby unleashing their combined creative potential'[8] (see **Figures 3.1, 3.2** and **3.3**). It has mounted over 38 exhibitions since opening in 2008 and received over 2.5 million visitors.[9] Other programming activities include 'live' laboratories and educational programmes that are affiliated with academic departments and businesses, commercial endeavours such as the renting of Gallery spaces for various functions, and 'open nights' which host the creators of featured installations, live musical and artistic performances and educational talks.

Entrepreneurship in the form of new business formation is a unifying concept for Science Gallery, and features heavily in its programming, with the Gallery space allowing entrepreneurs to collaborate with researchers and the public and develop new products and services. For example, the 2015 Science Gallery Draft Impact Report outlines several case

[6] The Irish Times (Online) https://www.irishtimes.com/news/this-week-we-were-1.579902
[7] http://www.thejournal.ie/science-gallery-dublin-10-years-3838829-Feb2018/
[8] https://dublin.sciencegallery.com/about
[9] Ibid.

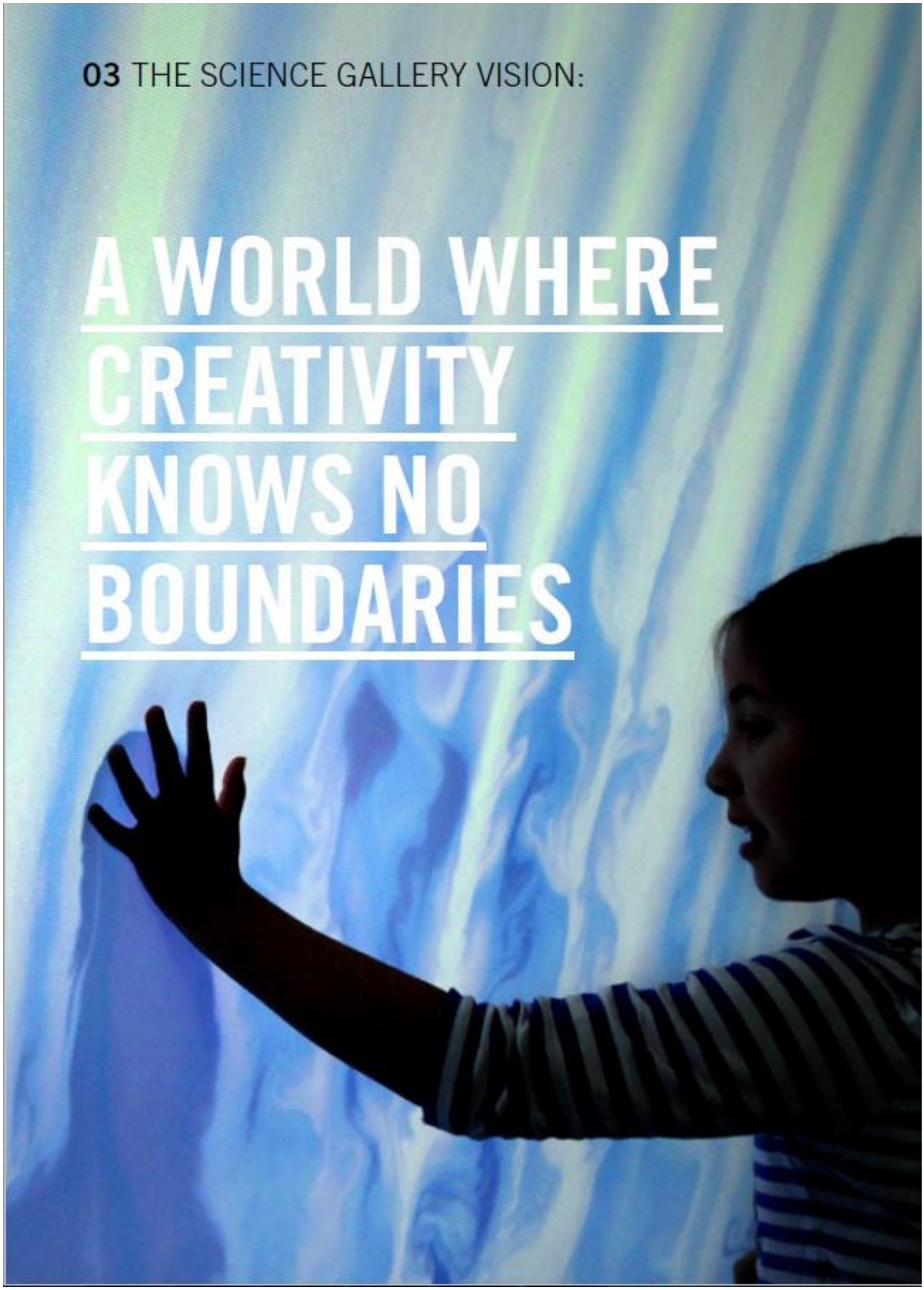
studies that illustrate how involvement in the exhibition space helped entrepreneurial ventures succeed.[10] New business ventures, particularly in the technology sector, have exhibited and trialled products in exhibitions, using visitor feedback to further refine their offerings. For example, health and wellbeing products were trialled in the exhibition HOME\SICK, including 'smart' mouth guards designed to diagnose acid reflux disease,[11] while robot 'pet' products, utilising Artificial Intelligence and developed by the startup company Anki were trialled in the exhibition HUMANS NEED NOT APPLY.[12] Likewise, business owners often lead workshops or Idea Translation Labs involving researchers, university students and corporations, the intent being to encourage a commercial orientation amongst the actors involved.[13]

[10] Science Gallery (2015) Draft Impact Report
[11] https://dublin.sciencegallery.com/homesick/bringinghealthhome/
[12] https://dublin.sciencegallery.com/hnna/exhibits/pet_robots_cozmo_and_roomba/
[13] https://dublin.sciencegallery.com/events/2018/11/ideatranslationlabshowcase

Figure 3.1: Science Gallery promotional image. Source: Science Gallery International (2014)

Figure 3.2: Science Gallery promotional image. Source: Science Gallery International (2014)

Figure 3.3: Science Gallery promotional image. Source: Science Gallery International (2014)



Science Gallery is headed by a Chairman and Director and is governed by a Board established by Trinity College (Science Gallery, 2017). Trinity College itself provides funding, as do a number of corporations such as Deloitte, Google, and Pfizer, as well as philanthropic organisations such as Wellcome Trust, and the Irish Government. Themes for exhibitions are said to be decided by the 'Leonardo Group,' which consists of around fifty individuals, including scientists, researchers, artists, designers, inventors, creative thinkers and entrepreneurs who are selected for their expertise in their particular fields. The stated aim of the group is to generate ideas for events and exhibitions that emphasise participation, facilitate social connections and provide 'an element of surprise'.[14] Themes are also chosen to align with the interests of stakeholders in order to acquire funding (O'Neill, 2014). Once an exhibition theme is selected, curatorial teams are then chosen. These teams work through the variety of different project proposals submitted by artists, entrepreneurs and others in order to decide which ones are 'appropriate' for the theme in question, resulting in the selection of exhibits and events that will take place in the Gallery space (Science Gallery, 2016). The management of Science Gallery operations is carried out by the Science Gallery Team, which consists of members in charge of areas such as programming, research, and marketing. It is the Science Gallery Team that has the final call on the composition of the curatorial panels.

I selected Science Gallery as my research site because it resonates with the concept of entrepreneurship as organisation-creation, whereby entrepreneurship is reimagined as a way of organising the environment so that creativity -- for example in the form of new ideas and opportunities -- can come about and be subsequently harnessed or actualised -- for example in new initiatives or ways of working (Sarasvathy, 2001). Science Gallery is an ideal setting to empirically explore such a concept because it attempts to act as a broker between a variety of

[14] https://dublin.sciencegallery.com/leonardos

actors and initiatives, seeking to organise for them to interact through its programming activities. In doing so, it claims to 'ignite creativity and discovery'[15] which is in turn actualised in many ways, such as public engagement, collaborations, and research outputs. In other words, Science Gallery seems an appropriate fit for a study of entrepreneurship as a creation process (Gartner et al, 2004).

At the same time, understanding the creativity that occurs in Science Gallery appears illusive, with often ambiguous language used to describe the interactions that take place in the exhibitions. For example, a senior management figure referred to the exhibition space as a 'black box', the dynamics of which Science Gallery struggles to understand.[16] This ambiguity is therefore ideal for investigating how creativity may result from the interactions of bodies and objects within the Science Gallery space, and how power is manifested in such interactions. In this way, Science Gallery can reveal rich information and insight concerning my research questions due to the variety of actors and processes that take place there. I now move on to explain my research approach and the different methods I used to answer my research questions, and why I chose them.

Zooming In and Zooming Out: An Ethnographic Approach

The discussion above illustrates how Science Gallery is an appropriate research site to explore the concept of entrepreneurship as organisation-creation in terms of understanding the coming together of bodies, objects and spaces, and the role of power in this coming together. In order to understand such complex, indeterminate processes, I needed a methodology that could allow me to move within the flows and intersections of such bodies, objects and spaces, whilst being sensitive enough to acknowledge the power effects manifested in these movements. I therefore adopted a praxeological approach whereby I

[15] https://dublin.sciencegallery.com/about
[16] Executive Director: Interview 1.

zoomed in (Nicolini, 2009a) to the local accomplishment of creativity, such as who or what is involved in such interactions and the localised power effects produced, before zooming out to get an understanding of the assembly work that goes into producing these connections, such as the forces or agencies that allow some bodies and objects to participate in the Science Gallery space while at the same time excluding others.

As such, zooming in and out becomes a process of foregrounding and backgrounding (Nicolini, 2009b) where I move iteratively between the interactions of bodies, objects and spaces within the case study and the wider forces that influence these interactions, in order to tell the story of how creativity comes to be. This approach avoids getting lost in granular micro-details of the research site while simultaneously refraining from deductively subsuming the interactions of bodies, objects and spaces under already known generic categories or behaviours. Over the following sections I detail the methods I used in my approach. To zoom in and understand the entanglements of bodies, objects and spaces I engaged in an ethnographic study based on participant observation. To correspondingly zoom out and foreground the role of power in such entanglements I conducted a study based on interviews and observations. Prior to both, I carried out background research on Science Gallery, which I explain next.

Preliminary Research

I started by collecting background data on Science Gallery. A variety of publicly available documents published by Science Gallery itself were sampled, including annual reviews and exhibition guides, along with internal documents such as an impact report and a fundraising strategy. Internal documents from sponsors and Trinity College research institutes detailing collaborations and linkages with Science Gallery were also obtained. I also selected press releases concerning Science Gallery and its operations in both national and international news media (see **Table 3.1** in **Appendix**). These documents helped me to

understand the *modus operandi* of Science Gallery, the stated intentions behind its operations and exhibitions, and how these intentions were interwoven into the experience of the exhibition itself. I continued to collect such material over the course of my research.

I also conducted nine semi-structured preliminary interviews during my initial visit to Science Gallery between June and July 2015 where I pursued pre-determined domains of inquiry related to the stated purposes of Science Gallery; the actors involved in the Gallery spaces; reasons for their involvement; how these actors are brought together; and particular tensions or conflicts that become manifest in the organising of such.

I carried out two interviews with Science Gallery employees who regularly explain meanings and functions of exhibits to the public, the purpose being to gather information on installations in the Gallery space and to understand how they were received by visitors. I also carried out interviews with two artists exhibiting their work at Science Gallery which focused on the meanings and intents behind these pieces, their experiences of exhibiting at Science Gallery and how these experiences had affected their work. I also conducted interviews with curators regarding their experiences of working and exhibiting at the Gallery; meanings behind curated works; and their motivations for being involved with Science Gallery. All interviews were digitally recorded and transcribed as well as being augmented with notes, which were finally enriched with post-interview writing. Data obtained from this first round of interviews helped me refine my areas of inquiry and identify a wider array of individuals to target for interview the following year.

Taken together, my collection of background data and my preliminary interviews laid the foundations for two intensive periods of data collection: the first characterised by the ethnographic method of participant observation, and the second characterised by semi-structured interviews, which I detail in the remainder of this chapter.

Participant Observation

I adopted an ethnographic approach to my localised, 'zoomed in' study of Science Gallery and the intersections of bodies, objects and spaces that constitute it, as such a style resonated with my overall theoretical approach to entrepreneurship as organisation-creation. To elaborate, an ethnography places encounters, events and understandings in their setting (Tedlock, 2013) and allows for a combination of various methods of inquiry to produce rich accounts of human experience (Hamera, 2011). At the same time, the goal of ethnography is not to produce a description of a pre-existing reality, but to allow the researcher to actively participate in the coming together of persons and things in a 'practice of observation' (Ingold and Vergunst, 2008). Ethnography therefore allows for 'emplaced knowing' (Howes, 2003); a way of understanding how bodies and objects are constituted in a research setting and how such bodies and objects change as they interact, which is my theoretical premise of creativity in entrepreneurship as organisation-creation.

Ethnography is commonly misconceived as a set of methods used to understand the 'other' in research (Eriksen, 2015). This misconception has become more and more prevalent as ethnography has been adopted by various disciplines over the past three decades -- including organisation studies -- in what Carter (2018) describes as a "veritable explosion" of the concept in academia (p.392). A consequence of this explosion is that ethnography has been equated with popular, early anthropological studies such as those of Malinowski (1922) and Mead (1928) and understood as a set of formal methods used to carry out fieldwork in a series of distinct phases: observation, description and comparison. An underlying assumption of such studies is that cultures exist 'out there' in the field and can be understood and observed by the researcher (Peterson, 2009).

The last few decades have seen anthropology evolve from a study of '*a* culture' to a form of cultural critique (Marcus, 1998), of engagement and encounter (Rabinow et al, 2008), of emergence (Tsing, 2015) and of assemblages (Ong & Collier, 2004). As a result, ethnography is now best understood as a methodology -- a form of knowledge production based on the researcher's entanglement with the object of enquiry (Chung, 2009). The diversity of experiences, interpretations, and continuously-changing and shifting researcher-participant relations are what constitutes ethnography. Consequently, there are no specific 'ethnographic methods' or formal procedural means to understand an objective phenomenon that exists 'out there'. Instead, an array of methods can be employed in an ethnographic study -- from interviews and observation to photography and archival work – as long as they are used in an open, flexible way to understand a changing phenomenon, rather than the perspective of a subjective 'other' in a classic emic/etic sense. For my own study, I utilised the ethnographically inspired method of participant observation throughout my study as it allowed me to position myself in different ways within Science Gallery and thereby gain an understanding of the variety of bodies, objects and spaces involved there, how they intersected with each other and how they changed as a result. I therefore attended and participated in a range of Science Gallery exhibitions and activities open to the general public (**Table 3.2** in **Appendix**). Firstly, I visited two Science Gallery exhibitions -- 'HOME\SICK' and 'SEEING' -- on different days and at different times in order to understand both the arrangement and interaction of bodies, objects and spaces. The first exhibition, 'HOME\SICK', which explored the meanings of 'home' in different contexts, coincided with my 2015 fieldwork. The second exhibition, 'SEEING', which dealt with the experience of vision and perception, concurred with my 2016 fieldwork. Secondly, I attended a variety of public seminars and events related to these exhibitions, from talks held by exhibition curators and featured artists to exhibition launches. I attended such events to understand how Science

Gallery communicates itself as a creative organisation and the constituent bodies and objects of its exhibitions to the public, while simultaneously involving visitors in its activities.

I also obtained access to internal Science Gallery activities. Firstly, I attended staff training days, including a workshop for exhibition ground staff (or 'Mediators') designed to increase their awareness of the sensorial aspects of the exhibits and how to communicate such to the public. These aspects included which senses individual exhibits were designed to stimulate, such as sound, touch or taste. Again, such training sessions allowed me to understand how Science Gallery is constructed through its constituent bodies, objects and spaces and the different intents and purposes that steer such a construction.

Secondly, I attended and participated in the 2017 exhibition brainstorm session, where Leonardo Group and Science Gallery Team members generated themes for the four exhibitions planned for the following year. This event proved valuable as it showed the power dynamics of how these themes are developed, such as who decides the bodies and objects that get to be included, and how these bodies and objects are featured.

Thirdly, I visited several institutes that had their own creative spaces, such as an artists' residence, an educational space designed to encourage second-level students to learn collaboratively through technology, and a corporate headquarters physically structured to increase staff interaction. I visited these places primarily to conduct interviews with relevant actors involved in the Science Gallery set up who were employed there, but my subsequent tours of such spaces allowed me to understand the dynamics of organising for bodies and objects to interact outside of the Science Gallery environment.

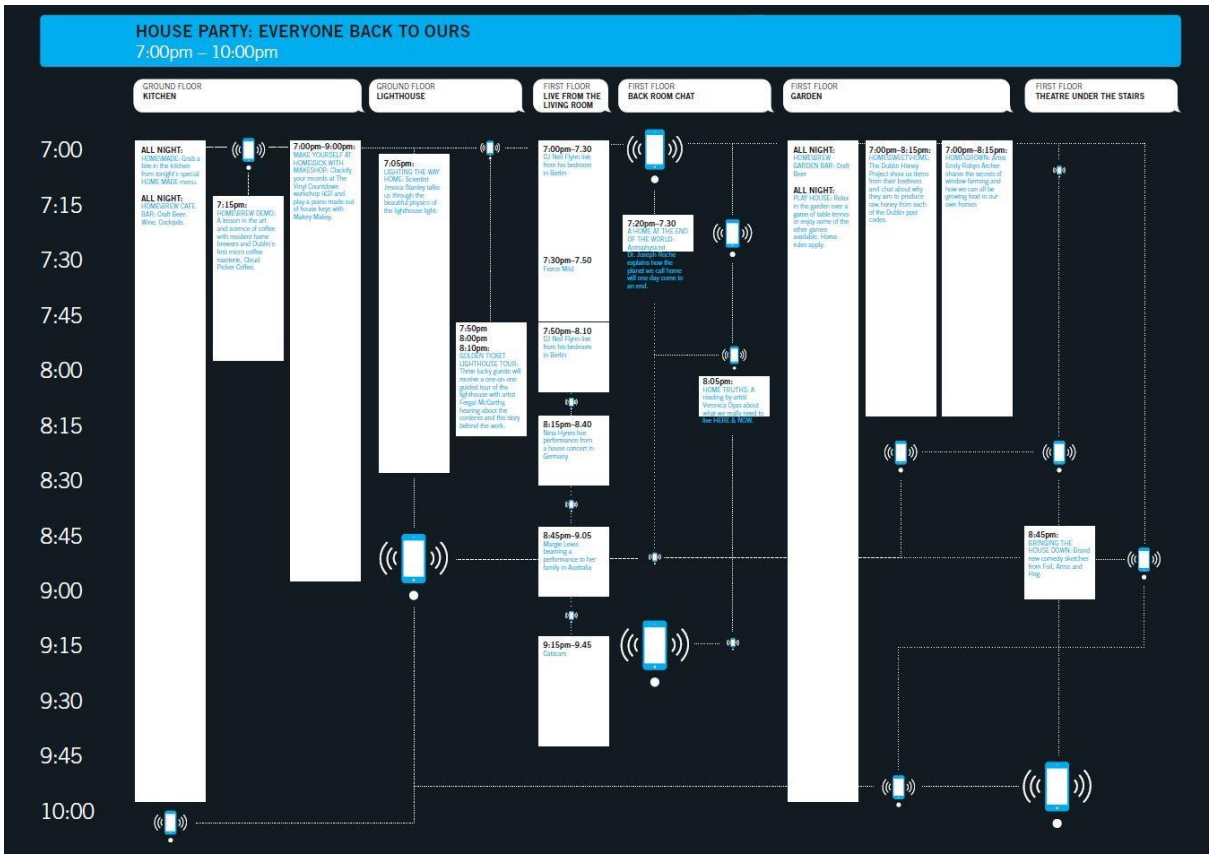
Finally, I participated in a three-hour evening event entitled *'House Party – Everyone Back to Ours'* which took place on 26th June 2015. This heavily publicised event was designed to showcase the HOME\SICK exhibition which took place in Science Gallery from

5th May to 19th July 2015. This exhibition explored the meanings of ‘home’ and how these meanings can change as a result of phenomena such as emigration, changing consumption practices and the increased incorporation of technology in living spaces. It featured a variety of exhibits, from interactive pieces designed by artists that highlighted issues of homelessness in the context of economic and social cutbacks in Ireland, to a collaborative research project that gathered data from visitors with regards to water consumption in the home and alternative conservation practices. There were also a number of exhibits illustrating products developed by entrepreneurs to monitor health and wellbeing in the home, such as sensors designed to measure the composition of intestinal fluids and biomechanical measures to indicate stability and injury issues for people engaged in post-surgery rehabilitation. Another installation entitled ‘Host’ explored the plethora of bacteria that call the human body ‘home’ by inviting visitors to swab their own skin and watch the bacteria grow and develop in an incubator. These samples were then collectively displayed as an installation incorporating questions concerning the role of non-pathogenic bacteria in human health (**Figure 3.4**).

Figure 3.4: Photo of wall display from the exhibit 'Host' containing bacteria samples taken from visitors (Science Gallery, 2015)

'House Party – Everyone Back to Ours' featured a variety of performances and talks by exhibiting artists and local entrepreneurs, as well as live acts by musicians; local artisan food and beverage businesses; a workshop inviting people to experiment with and develop simple devices such as rudimentary clocks and apps; and an area which allowed people to socialise and play games. I chose to conduct an in-depth ethnographic study of the evening event site because it served as a microcosm of Science Gallery itself and the activities that occur there. It featured the coming together of bodies, objects and spaces in an intensive three-hour time period, heightened in turn by various performances incorporating a range of sensory stimuli. Furthermore, the distribution of these performances was structured and scheduled to a particular timetable (see **Figure 3.5**) to allow for the various 'mini-events' to be experienced by visitors in a particular order, engaging their senses in particular ways at particular times.

Figure 3.5: Timetable of events at ‘House Party – Everyone Back to Ours’ (Science Gallery, 2015)



In order to understand how bodies and objects came together it was necessary to insert myself into the same trajectories that visitors to the evening event were experiencing (Ingold, 2008). Whilst I could not access their experiences directly, I could become emplaced and practically engage with the event in a similar manner, thereby allowing me to construct correspondences with their embodied experiences. I therefore employed mobile methods (Fincham et al, 2010), or walking with others (Büsher & Urry, 2009) within the event space according to the schedule detailed in **Figure 3.5**. Sharing the steps, rhythms, and postures of others was intended to afford an alignment with visitors’ engagements in the Gallery space and an ‘attunement of the senses’ (Grasseni, 2004, p.53) so as to develop an understanding of how they experienced the event, in terms of meanings and affects. These procedures also infer that my own bodily interactions and embodied knowledge constitute part of the creative

process. Such bodily knowledge both affected and was affected by the interactions that took place with the social, material and intangible components of the event. This required me to become connected with other senses and materials in a reflexive way in terms of being affected in Science Gallery, the approaches taken to exhibition topics, the memories encountered in exhibition spaces; in essence my own ways of being in the world.

Therefore, the emphasis was not simply on observing what was going on, but sensing what was unfolding as bodies, objects and meanings interacted at different spatial points in the Gallery. This sensorial interaction and the emotional affects produced during the event were accessed and recorded by means of a sensory diary (Valtonen et al, 2010), an extract of which appears in **Table 3.3**. Moreover, photographs were taken to 'fix' particular experiences, such as the materiality of an exhibit, the spatial distribution of people at a particular location, or my own point of view as I negotiated the Gallery space (see **Figures 3.6, 3.7, 3.8** and **3.9**).

Table 1.3: Extract from sensory diary

Exhibit	Sense	Affect
'Host'	*From afar:* Shiny, pristine medical agar dishes, white lab coats Group of people obscuring some of my view Sound of different objects, surfaces meeting. Glass? Tiles? *Close up:* Blobs of bacteria, different sizes and shapes, colours Smell of disinfectant from the swabs Feel of the swab against my skin, like a medical procedure	*From afar:* Intrigue, curiosity, not sure what's happening… something medical *Close up:* Mixture of aversion to what I'm seeing; so much bacteria. Yet curious, more intensity in terms of thinking about the questions posed by the exhibit

Figure 3.6: Photo of 'Home.Heart.Hope.' installation by the artist Niamh Riordan

Figure 3.7: Photo of medical devices and incubator as part of the exhibit 'Host'

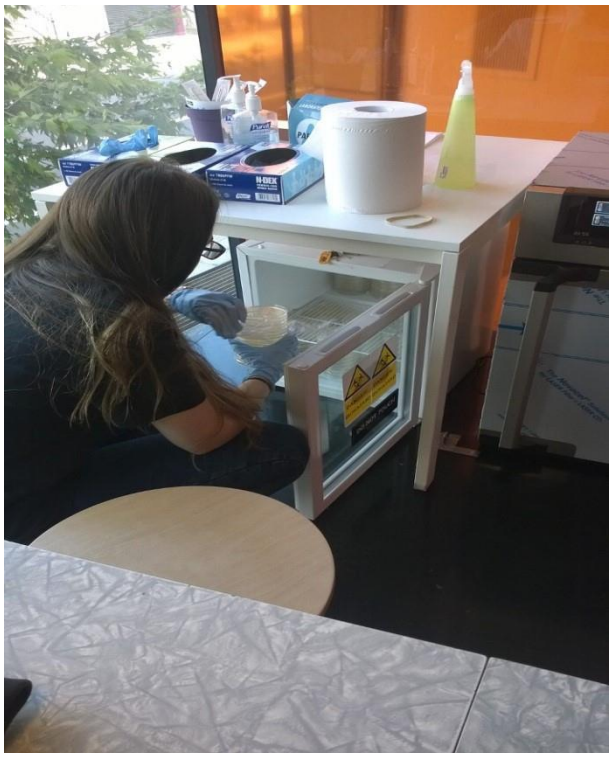
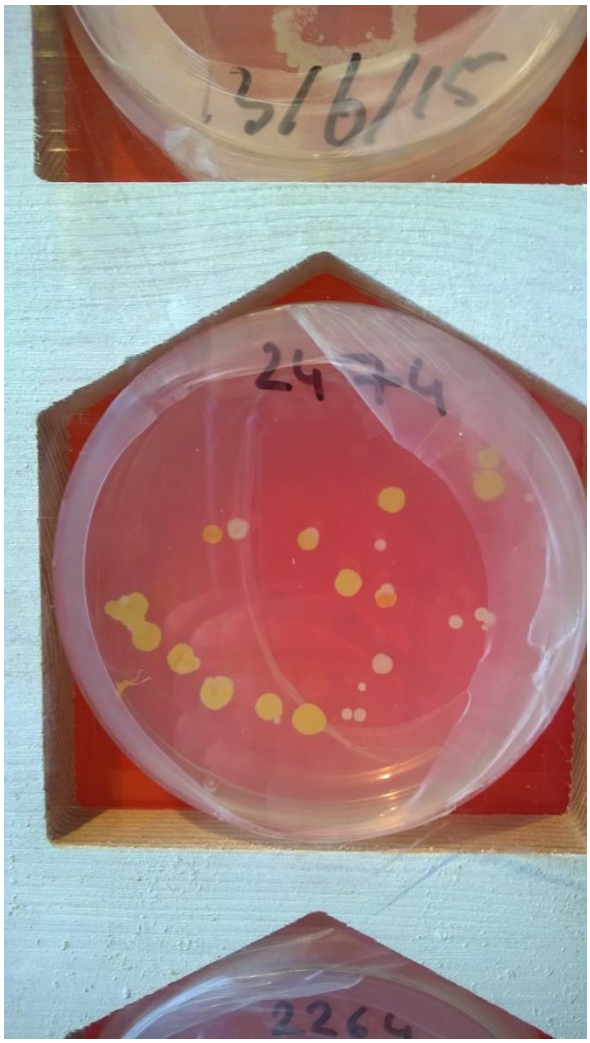


Figure 3.8: Photo of visitors gathering around visuals and text as part of 'Home.Heart.Hope.'

Figure 3.9: Close-up photo of my own bacteria sample contributed to 'Host'



Directly after the event, I made voice recordings to detail my immediate impressions and reactions. These recordings, for example, noted the rhythms (Böhme, 1993) and movements (Latham & McCormack, 2009) of the event within the Gallery space; those performances and installations that 'held' people -- including myself -- or interrupted their flow; and how visitors interacted sensorially with these pieces and each other. Together, these diary notes, visuals and recordings offered tools to reflect on affective experiences and the temporal and spatial structuring practices taking place in the Gallery (Pink, 2009).

The accounts that emerged from these different methods were designed to portray different aspects of the research site and, at the same time, show how they folded into one another to evoke a particular sense of the event. As such, there is no strict demarcation between 'data collection' and 'analysis' as a preliminary analysis began as soon as I began to arrange my experiences into sensory categories and in deciding what to include and what not to include in my descriptions. Chapter 4 analyses my experience of how bodies, objects and their associated meanings and memories meet in the exhibition space, and the effects of such a meeting.

Interviews

In order to understand the translocal forces and relations that influence how Science Gallery is formed, I interviewed a range of actors who were both emplaced in these forces and relations, and actively contributed to shaping them. These interviewees were both directly involved with Science Gallery, such as employees or exhibitors, and indirectly involved through governance activities, such as representatives of Trinity College. Interviews were ideal for understanding the processes by which Science Gallery comes to be, as the interviewees could tell their first-hand stories or experiences of being part of such processes (Denzin & Lincoln, 2011), thereby allowing me to build a rich and dynamic picture

of the accomplishment of Science Gallery and how power is manifested in this accomplishment. In this way, interviews complemented my other methods of participant observation and document analysis by allowing me to zoom out (Nicolini, 2009a; 2009b) and understand aspects of the accomplishment of Science Gallery that were previously unknown to me. All interviews were semi-structured, thereby allowing me to pursue particular lines of inquiry while still having the flexibility to follow other topical trajectories as they presented themselves (Angrosino, 2007).

In total, I carried out seventy-three semi-structured interviews over two visits to Science Gallery (see **Table 3.4** in **Appendix**). Nine preliminary interviews were carried out during my initial visit between June and July 2015, as outlined earlier, while sixty-three semi-structured interviews were conducted between May and August 2016. My interviewees during this second phase of fieldwork were predominantly senior figures in the Science Gallery set up such as Board Members, actors on the Leonardo Group advisory panel, and the Science Gallery Team. I also carried out more interviews with participants in Science Gallery exhibitions, such as curators, artists, entrepreneurs and researchers working at Trinity College and affiliated institutes. In addition, I targeted several secondary actors connected to Science Gallery, such as a graphic designer involved in shaping the exhibition space, a representative from a corporate sponsor and a number of second-level teachers who had participated in related Science Gallery programming activities such as teaching workshops.

I gained informed consent from all interviewees via the use of appropriate ethics forms and verbal confirmation which I recorded before the relevant interviews. I have protected the identities of all interviewees who I have quoted directly, and provided pseudonyms for the two artists who contributed to my first round of interviews. Both artists provided me with approval to detail their specific artworks I refer to in this thesis. All Science Gallery, Government, Trinity College, media and other third party documents and

illustrations I have referenced are publicly available. I have hidden the identities of individuals who could be clearly identified in photographs I took during exhibitions and events. The musician photographed and identified in Figure 4.2 provided me with permission to use her image and name in this thesis.

The goal of this second round of interviews was to develop an enhanced understanding of the processes by which bodies and objects are made creative in the Science Gallery space, and how power figures in such processes. As such, I developed a detailed substantive frame (Hesse-Bieber & Leavy, 2011) which I could adapt to the relevant interview to help me answer my research questions (**Figure 3.10**). Here, I had four general areas of interest I wished to ask about: the interviewee's involvement with Science Gallery, their opinions on the purpose of Science Gallery, how power works, and how Science Gallery has changed since their involvement. I constructed more specific and targeted domains of inquiry under each of these general areas in order to guide my interview questions which were still sufficiently open-ended to allow the respondent latitude in their responses, thereby allowing for rich and potentially unexpected insights to emerge (Stringer, 2007).

Figure 3.10: Substantive frame adapted for respective interviews

Research Theme:

HOW IS SCIENCE GALLERY, AS A CREATIVE SPACE, ACCOMPLISHED?

Substantive Frame:

Involvement with Science Gallery	Purpose of Science Gallery	Power	Process

Domains of Enquiry:

Personal role	In general	Who benefits?	How Science Gallery has changed:
Benefits of participating (personal)	For specific groups (e.g. researchers, artists)	How do they benefit?	- Over the course of their involvement
		Why do they benefit?	- Longer term
		Tensions between actors, groups	How does Science Gallery endure, or impact?
		Challenges (to Science Gallery, participants)	

It is important to note that, much like my method of participant observation, there was no articial separation between my interviewees -- understood as particpants in the the Science Gallery assemblage -- and myself -- understood as a detached, neutral interviewer. To an extent, I fashioned the circumstances of my interviews by actively sourcing particular interviewees involved with Science Gallery programming. Many of these interviewees, in turn, connected me with their own contacts involved with Science Gallery who in turn became future interviewees. Likewise, I had a hand in steering the interviews through the utilisation of my substantive frame and specific domains of enquiry. As such, I myself was enrolled into the Science Gallery assemblage -- and in turn perpetuated this assemblage -- through the practice of interviewing. I connected with individuals in Science Gallery, and

reinforced their own connectivity with their colleagues. As such, I became a generative force in the power relations that took place in this assemblage. Likewise, I contributed to ‘pushing back’ against the sanctioned notion of creativity according to Science Gallery by firstly giving voice to interviewees who felt disenfranchised by their positionality in the Science Gallery assemblage, and secondly by critically analysing the interviews of senior figures in the Science Gallery set-up. I was, therefore, as much a part of the power relations in Science Gallery as I was of the more indeterminate, creative moments that occurred there.

Interview Analysis

The first stage of data analysis was to transcribe the interviews. This process involved spending time working with the material, becoming immersed in it and developing a sense of the interviews in their entirety beyond the immediate impression of the basic transcripts. Leading from this, I adopted an abductive approach to my interview analysis (Tavory & Timmermans, 2014) whereby I moved back and forth between theory and my empirical interviews to help me understand how power is manifested throughout the organisation of bodies, objects and spaces in Science Gallery. This iterative approach, or ‘systematic combining’ (Dubois & Gadde, 2002, p.553) helped me see the interrelations of various elements in Science Gallery and how the activities that took place there were intertwined, an area that is traditionally difficult to elucidate in case study research (Kohlbacher, 2006). Likewise, this process of combining echoed my overarching methodology of zooming in and zooming out in that it also involved positioning myself in different ways within the research process -- in this case, getting close to the immediate empirical findings, before moving back to take theoretical considerations into account. It also allowed me to combine other sources of evidence, such as observations, which further enriched my findings by revealing more aspects of the workings of power in Science Gallery.

In order to carry out my abductive approach, I sought to deductively identify the areas of interest expressed in my substantive frame, which were in turn derived from my theoretical suppositions detailed in chapter 2 and my preliminary interviews carried out the previous year. I did this by developing a colour code guide (Ochs & Capps, 1996; Tannen, 1989) designed to highlight repeated points of note in the interviews that were relevant to my areas of interest. **Table 3.5** details an example of this transcription convention, where I have highlighted two themes that became evident in the interviews and were related to my domains of inquiry: the interviewees' personal involvement in Science Gallery (in green) and the issue of power (in red). Overall, by applying such a colour code convention I could illicit increased richness and depth of analysis in my transcripts.

Table 3.5: Transcription convention and colour code guide

Leonardo Group member: CEO of Social Innovation Fund Ireland	
Interview excerpt	*Notes*
So, I suppose what I'd say is, for the first 18 months I hardly ever went because everything was totally insane, I had no time. Then when I finished up in [organisation name] I had some time from the middle of 2013, [and] I became more engaged for about 2 years. And then I've gone a bit less now just recently again. But, I guess… one of the reasons why I was less engaged was that I found that the LG was very Trinity-dominated, it was very academically-dominated and it was all scientists. So it was senior scientists who all had a very particular view of the world, of SG, of their role, and how their role was, you know, pretty much the only role that was required. So I found that going to LG [meetings], it didn't really matter what you said, it never got written on the flip chart	PERSONAL INVOLVEMENT: Minimal personal involvement in early stages POWER: LG: - Trinity dominated - Science dominated Particular world view, what should be addressed They have the input, not 'outsiders' (re: NH meeting)

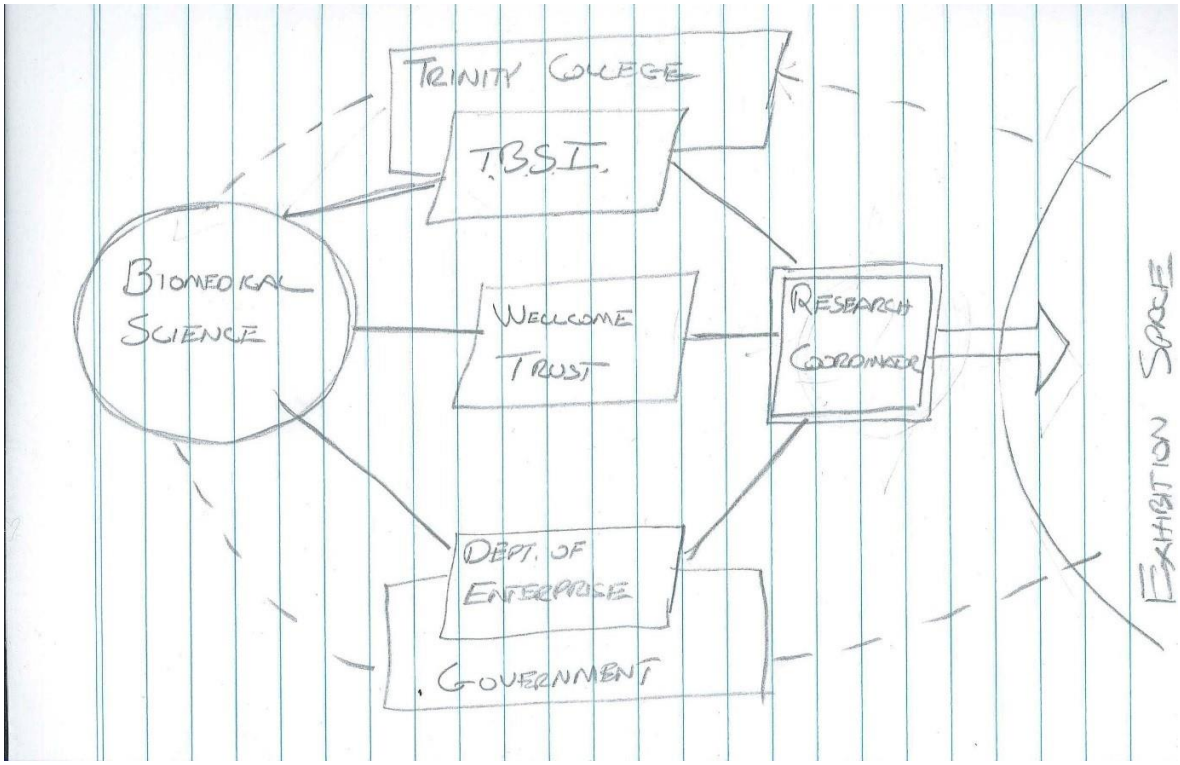
At the same time, I inductively allowed for other themes to emerge from the second round of interviews. For example, I began to see that my interviewees with a scientific background, whether they were exhibitors, researchers or Leonardo Group members, fell into two distinct categories. Firstly, there were those from *biomedical* backgrounds who specialised in biomedical disciplines such as neuroscience and immunology. Secondly, there were those from *non-biomedical* backgrounds who specialised in traditional scientific disciplines such as physics and geoscience, and social scientific arenas such as geography and sociology.

I also identified specific sets of practices that actors from both categories engaged in, which led to some benefitting more than others. For example, biomedical actors from Trinity College research institutes were often heavily involved in exhibitions by way of having their research work featured in the exhibition space, holding seminars on their research areas, and occupying curatorial positions. At the same time, non-biomedical actors and their work were featured less prominently in the exhibition space or not at all, were rarely invited to speak at related seminars, and held few curatorial positions. These practices were enabled by certain management figures in the Science Gallery Team, such as the Director, Research Coordinator and Programming Manager, who facilitated the participation of biomedical actors in exhibitions while at the same time limiting the involvement of non-biomedical actors. As such, it became apparent that particular bodies and objects -- in the form of biomedical actors and their work -- were benefitting by being connected to significant Team figures in Science Gallery, manifested in publicity for the objects of their work. I sketched conceptual maps (Butler-Kisber & Poldma, 2010) of such connections at various points throughout my

interview schedule to help me understand the themes that were emerging (see **Figure 3.11** below).

In this way, I could arrive at an understanding of how power operated by moving between my deductive domains of inquiry designed to identify who is involved with Science Gallery and how they may or may not benefit through such involvement, and my inductive, emergent interview themes showing the types of benefits and practices taking place. Specifically, power worked through connecting strategies whereby biomedical actors were made powerful by being intensively connected to important actors in Science Gallery and subsequently featuring prominently in exhibitions and related programming. At the same time, non-biomedical actors were made less powerful by being less intensively connected to the relevant Science Gallery Team members than their non-biomedical counterparts, and being less prominently featured in Science Gallery activities. Similarly, I could link my

Figure 3.11: Conceptual map of emerging connections between biomedical actors and Science Gallery

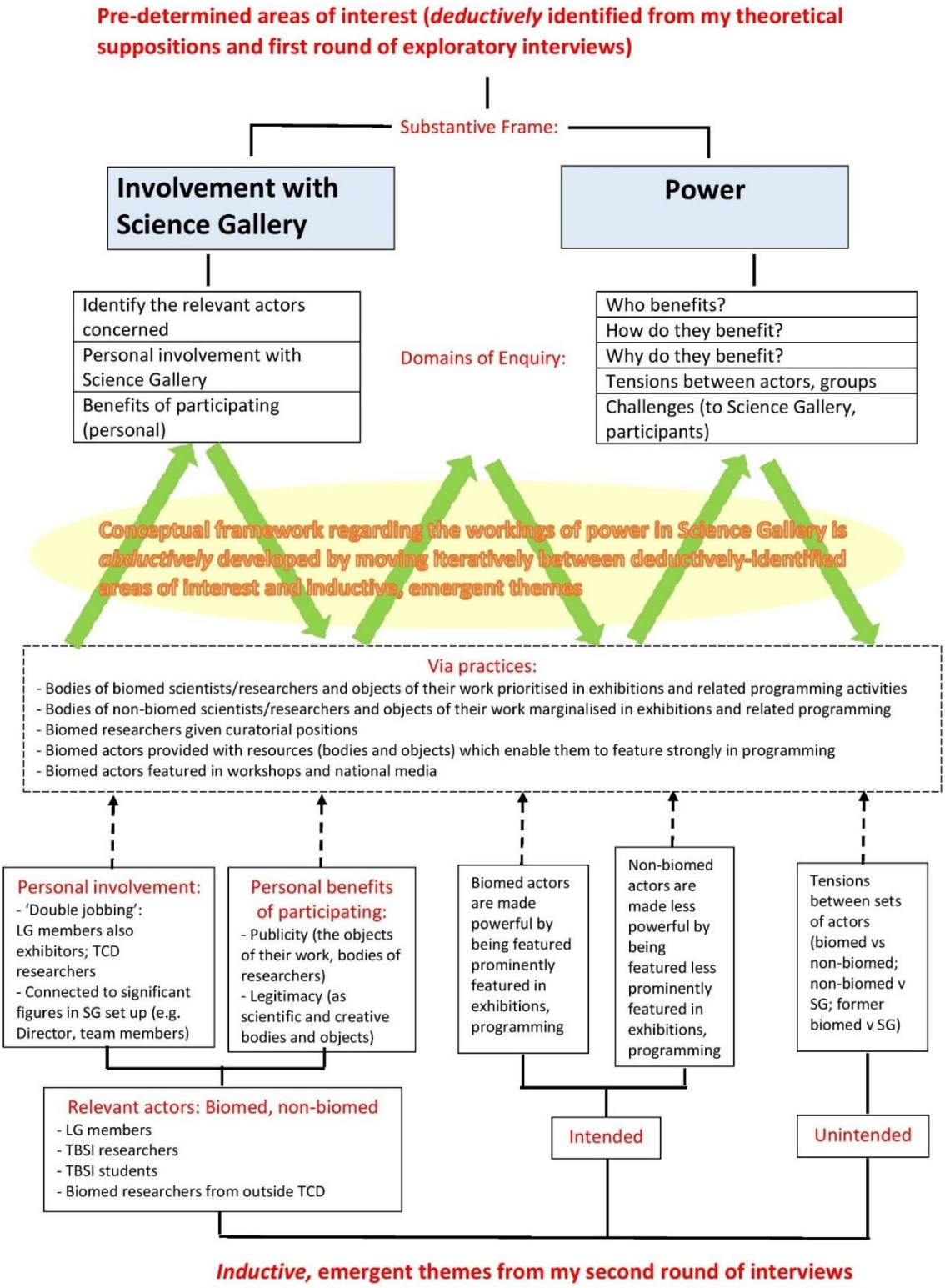


deductive domain of enquiry concerning possible tensions between actors or groups involved

in Science Gallery and the inductive theme of unintended power effects, whereby different sets of actors such as biomedical and non-biomedical actors clash over the distribution of benefits that result from the different connecting strategies affecting them. **Figure 3.12** details my abductive interview strategy and its constituent deductive and inductive elements, which, taken together, led me to the conceptual framework regarding the workings of power in Science Gallery that I detail in Chapter 5.

Overall, it can be seen that my research approach of zooming in to the localised accomplishment of Science Gallery and zooming out to the translocal forces and relations that influence this accomplishment maps onto my theorisation of creativity and power, in that it allows me to position myself within the flows and intersections of bodies, objects and spaces of my case study. In so doing, I was able to address my research questions. The subsequent findings are presented in the following three chapters.

Figure 3.12: Abductive research strategy



CHAPTER 4: CREATIVITY -- A PERSONAL AND ORGANISED EXPERIENCE

In this chapter, I address my first research question: *how may bodies, objects and spaces be organised to produce creativity as a capacity?* Specifically, I 'zoom in' (Nicolini, 2009a; 2009b) on both my observation and my participation in the evening event *'House Party – Everyone Back to Ours'* associated with the exhibition HOME\SICK. I start with a vignette based on my personal experience of this event, before reflecting and analysing my experience to show how creativity, or the potential for such, comes about through the interaction of bodies, objects and spaces. As these entities intersect, creativity 'becomes'. The vignette accounts for my own emplacement, as researcher, in this coming together of bodies, objects and spaces. Interactions are interpreted through my body -- not as a detached, neutral observer of a particular process, but as a subject caught up in the various intersections. Following my personal experience of the event and explaining how it led to creativity as a capacity, I show that, despite the indeterminacy of these interactions, this creative potential was nonetheless ordered and organised. In this way, I show how creativity is both a situated practice and a performative event, enacted through the interaction of bodies, objects and spaces, but not completely free-flowing or neutral.

Bodies, Objects and Spaces: A Personal Experience

In this section, I show how creative capacities are produced by the interactions of bodies, objects and spaces. Importantly, I contribute to these interactions by bringing my own emplaced knowledge and experience which is (re)combined with other entities. This recombination is experienced through my sensory repertoire (King & Vickery, 2013). I therefore understand the event through personal experience. Accordingly, I present the research account as a performative, narrative piece (Denzin, 2003) in order to convey this intertwining of personal experience with other bodies, objects and spaces. In doing so, I can

convey the 'messiness' of such interactions (Beyes & Steyaert, 2006) and the indeterminacy or capacities that such interactions may bring (Thrift, 2004).

House Party – Everyone Back to Ours

The Science Gallery event has begun. The ground floor is filling up with people who disperse in different directions to interact with exhibits; in ones, twos or small groups. A frisson of excitement ripples through the Gallery space, manifested in chatter, the noise of a DJ playing upstairs, people interacting in a makeshift 'workshop' at the far end of the ground floor. The smell of locally-produced food and drink from the bar and participating local artisan businesses fills the air. Suspended on a wall in the centre of the Gallery space is a timetable, detailing the mini-events scheduled to take place over the course of the evening. I see that a reading by an exhibiting artist, Saoirse O'Connell (pseudonym) is about to take place upstairs. I had interviewed Saoirse in the days leading up to the evening event, and join with the steady stream of people as we move to the spiralling staircase, leading to the upper level of the Gallery where Saoirse's installation is.

The layout and lighting are different on the upper level. The natural light and sense of openness from downstairs morphs into an enclosed space. Subtle lighting illuminates a number of different installations, creating a sense of intimacy. To my right is Saoirse's exhibit. Entitled *'Extracts of the HERE & NOW'* it consists of several pieces. *'Vacant'* is the chair of the artist's deceased Grandmother, old and worn with hand and headrests smooth from the body of its occupier. The headrest is flatter and more worn on one side. A sign details how the artist's Grandmother, incapacitated after a stroke, would sit with her head leaning to the left. Down the side of the one cushion is a crumpled copy of her Last Will and Testament. To the left of the chair is a fireplace, with a video recording of a burning fire playing in the grate. *'What's Left'* consists of a blue nylon sleeping bag the artist slept in during a trip along the Camino de Santiago, shortly after losing her home. Sounds of that environment play softly on a hidden speaker. Visitors are invited to sit and lie in these pieces, taking the embodied place of the artist and occupier as they were. Labels hang from a central 'tree' installation detailing a project where she gave away her possessions. A rucksack containing her only belongings at the time, and a redacted diary of her experiences on this trip, lie close by. To my left is *'Home. Heart. Hope,'* a collaborative piece produced by the artist Niamh Riordan (pseudonym) and the non-profit housing association 'Habitat for Humanity'. Simple red house structures are suspended from the ceiling, rotating with the movements of passing people. The wall behind the structures details the outline of a house, while to the left are a series of fifteen 'hope' stories from Habitat for Humanity's families, telling how being given the opportunity to possess a home has influenced their lives. People move in and around both exhibits, some sitting in the old chair, some lying on the ground. Others stretch to touch the moving small houses. Some talk to each other, some laugh, some whisper, others stand silently reading the stories of home.

After a minute or so, Saoirse makes her way to the front of her exhibit, a large hardback book in her hands. The gathered crowd quietens and she begins to read a passage, an extract written for a former theatre exhibit and adapted for this exhibition. Her words detail her own experience of losing her home during the economic downturn, her struggles with addiction and how the loss of that home intensified her problems. It's hard to hear all her words, with the hum and rhythm of other activities intermingling and drowning out some parts of the reading. More people gather, curious as to what is going on. She finishes after a few minutes and the crowd applauds. Saoirse disappears as quickly as she arrived. People move forward towards the exhibit, touching the materials, reading the notes. Some move laterally into Niamh's work,

others move to the connecting rooms of the upper level. About five minutes pass before a band of musicians start playing in another room. People begin to move to this next mini-event. As the space clears, I move towards Saoirse's exhibit. I walk around the sleeping bag and lower myself into the chair. My body sinks into the pre-existing mould of the cushions and backrest, made over time by the frail body of Saoirse's Grandmother. Without thinking, I place my hands on the arms of the chair, feeling the worn material made smooth by the hands of someone else. The texture is almost the same as the old-style upholstery that my own deceased Godmother used to have in her home. The mould of the chair makes my body lean slightly to the left. It doesn't feel right, this posture, or sitting in this person's chair, but it's something I just fall into. It makes me feel vulnerable; it makes me think of the helplessness of the person who sat here for God knows how long, living out their last days, weeks, years. I instinctively rest my head against the same worn support she would have rested her own head against. I realise there's a small speaker somewhere inside the headrest, playing an audio recording of the same words Saoirse spoke a few minutes ago:

The time I lived there I steadied myself
Incremental change is what I had
and grateful I was to even have that from where I'd come from
But I can't journey backwards
No, not anymore
Someone else lives in my home now

I can smell the chair. It smells like a home that's been lived, something deep, something intimate, something comforting, something out-of-place here in the Gallery floor space. The smell, the touch, my posture, triggers memories of losing my own home a number of years ago. The sense of insecurity, the helplessness that comes with losing the place you grew up in, the feeling of not belonging in your own city, in your own country. My stomach feels queasy. I can feel my heart beating faster; I can hear the beats in my head as my blood flows harder, the rhythm blending with Saoirse's words:

And these are my people
These are my ways
These are our rebels bold and true
This is our pain
Our suffering our shame
carried over and over and over
Generation savaged and we're raging again

I wasn't expecting this; to feel like this. I came here with a notebook and a voice recorder, thinking I'd be writing some lines about what I saw, what I heard, with the distance of an academic study separating me from everything. I stand up quickly; I have to get out of the chair. I can feel the hairs on the back of my neck are raised, my skin tingling. I suddenly become conscious of how I must look; is it obviously to others how I'm feeling? Is my body betraying how I want to look -- interested but disengaged; attentive but 'professionally' removed? I turn away from the exhibit, walking towards the band playing in the next room. As I'm leaving I notice a written sign, the title of the exhibition, displayed large on the wall in bold: 'HOME\SICK: POST-DOMESTIC BLISS'.

I now reflect upon this vignette, using my experiences of interacting with the installations of the exhibit and interviewing the artist who produced them, with the aim of discussing its implications.

The 'event' of the exhibit produced a different, unexpected way of experiencing -- a deliberate disorientation (Beyes & Steyaert, 2013) -- that heightened awareness of particular themes of interest to the artist, Science Gallery, and myself. This defamiliarisation can be best understood through the concept of folding (Deleuze, 2006) whereby typical accounts of subjectivity that presume a simple interiority and exteriority -- or in this case, the bounded and mutually-exclusive categories of bodies, objects and spaces -- are broken down and overlap with each other. These foldings or overlaps produce a 'scrumpled geography' (Doel, 1996, p.421) of such entities which ruptures how they are normally represented and interpreted. New relations or connections are established between bodies, objects and spaces which form the capacity, or potential, for new ways of thinking or acting (Whybrow, 2010). In other words, the foldings of bodies, objects and spaces can lead to the corresponding unfoldings or 'landing strips' (Thrift, 2008) for new possibilities or ways of comprehending a phenomenon.

To elaborate, the object of the exhibit, in the form of the chair, became more than the basic materials of which it was composed. It was imprinted and formed by the experience of its past life -- the places it occupied and the person who occupied it. As Saoirse explained when interviewed:

> *"It was my Granny's chair ... my uncle lives in her house now. Like that there's all fights going on about the money as well. Her house was never sold so that's ongoing… And I was just thinking that was a [Dublin] Corporation house. They came from tenements and they moved to Ballyfermot when it was built, and they literally worked all their*

> *lives to buy that house, and by the time they died nobody needed it. Nobody needed it… this house that became a shell."*[17]

These personal memories were folded into Saoirse's experience of being without a home, which in turn were folded into Saoirse's intent for the exhibit:

> *"I want HERE & NOW to investigate what it means to us, inside ourselves to be without a home, the feeling of what 'home' means… I hope it would… if people aren't aware to make them a little bit more aware? And the point of that [audio] text for me was to say I'm not different; none of us are any different. We all need safety, we all need security, we all need space… And I don't know if people, unless they experience it themselves or know someone close to them. Get that sense of what's going on for people. In our own home; in our city."*[18]

> *"What I'd like people to feel is that hair's breadth, between having a house and being comfortable and having absolutely nothing and no agency to change that."*[19]

As my field notes illustrate, the meaning of the chair is folded into my own biographical experience through the act of practically engaging with it and interpreting it via my own sensory perceptions or 'sensorium' (Merchant, 2011). *Sitting* in the chair, the evocative *smell* of the material, hearing the *sound* of Saoirse's words in my ear, the *sinking sensation* as my body was enveloped in the material, and the *feel* of the old-style worn upholstery triggered memories of losing my own home; suddenly being without the stability it afforded; feeling uneasy in my own city. A temporal folding therefore occurs as my body imports its own emplaced past into its present social experience in the Gallery space. This was the point where such bodies, objects and spaces folded, their normative representations ruptured and they (re)connected in new ways.

Taking a step back, we can see that the notion of 'space' transcends the physical arena of the exhibit, in that the positioning and folding of bodies and objects evokes or enrols a multitude of other spaces or 'scapes' into the creative project. For example, 'time-scapes', in the form of personal and cultural memory, are combined with the 'sense-scapes' of the body,

[17] Saoirse Riordan: Interview 1
[18] Ibid.
[19] Ibid.

such as sight, sound, touch and olfaction. The physical land-scape is arranged to facilitate and enable these combinations through the scheduling of mini-events over the course of the evening. Collectively, these mini-events served to both produce and be the products of the overarching event-scape of the Science Gallery 'House Party'.

As a result, new meanings were created for me. My personal experience of losing my home was connected to that of the artist by way of her artwork, and in turn connected to a critique of the narrative of a booming post-recessionary Ireland; a successful bailed-out role model for other 'at risk' European Union countries. This dominant representation is favoured by politicians and financial institutions such as the Irish Central Bank and its chief economist, who uses the analogy of an Irish "Phoenix miracle"[20] rising rapidly from the ashes of recession, creating new jobs and attracting investment. This is the official narrative that ignores the unofficial experience of many Irish citizens, where the number of people sleeping rough in Dublin alone increased by 33% between April and November 2017[21], where market rental prices have increased by 50% between 2013 and 2017[22] and where the number of mortgaged homes repossessed by banks hit the highest level on record in the final quarter of 2016[23].

The vignette therefore provides an illustration of one moment in the 'creation' of creativity through a 'charged social field of potentials' (Hjorth, 2012, p171), in which intersections of bodies, objects and spaces layered with cultural, emotional, historical and personal meanings were combined with other objects and sensed through the body. In so doing, I show that it is in the coming together or folding of bodies, objects and spaces and their constituent material and immaterial forces -- in this case personal memory laced with

[20] https://www.irishtimes.com/business/economy/is-there-a-boom-is-it-getting-boomier-1.3047706
[21] http://www.homelessdublin.ie/homeless-statistics
[22] https://www.daft.ie/report
[23] https://www.independent.ie/business/personal-finance/property-mortgages/spike-in-mortgage-arrears-as-banks-repossess-more-homes-35539209.html

social and political commentary -- that the capacity for creativity becomes. This folding in turn leads to a corresponding unfolding, whereby a particular form of organising or distribution of the sensible (Rancière, 2013) -- the 'official' representation of the housing situation in Ireland -- is problematised, thereby allowing the potential for alternatives to be imagined.

Bodies, Objects and Spaces: An Organised Experience

The creative potentiality that emerged in this event, however, did not simply 'become' in a neutral, value-free environment. Instead, organising forces were active in determining which bodies, objects and spaces were brought together, when they were brought together and how they were brought together. In the following section, I show how this organisation was manifested in the *planning* of the event in terms of the objects of art that got to take part and the *enactment* of the event in terms of how the constituent bodies and objects were arranged to interact. At the same time, I show how the ability to 'control' the enactment of such an event -- through the arrangement of bodies, objects and spaces -- is difficult, as such entities will 'push back' against organising forces. As such, there is indeterminacy in these arrangements, which in turn generates the capacity for creativity.

Planning the event

Science Gallery actively shaped the objects of art that featured in the evening event, firstly by ensuring that they were aligned with the overall theme of the exhibition and secondly by encouraging artists to incorporate interactive, sensory elements that could stimulate visitors who encountered them. For example, Niamh Riordan described how Science Gallery influenced the design of her piece *'HOME. HEART. HOPE.'* to convey positive stories of families that had been provided with social housing:

> *"So I had a few sketches and talked to them about the idea of the heart and the home. They (Science Gallery) talked a lot about hope in the works, so HOME.HEART.HOPE is the idea that we came up with."*[24]

As such, Science Gallery shaped the object of the exhibit to reflect these positive stories:

> *"So we ended up working together. And we ended up with just the simple idea of the stories along the wall, a few little tags on some of the little houses, and then just suspend the houses."*[25]

In addition, Science Gallery renegotiated Niamh's existing plans for the materiality of the exhibit so that it would engage visitors via their senses:

> *"The guys in Science Gallery got involved because originally I wanted [visitors] to scan stories with their phones, but that disengages them at the same time, because they end up in phone world rather than 'being' with the exhibition. [Science Gallery] were actually saying, they were saying no to doing that."*[26]

The subsequent sensorial format of the artwork in turn created a level of intimacy with the wider exhibition theme, ergo with Science Gallery itself:

> *"And we ended up with just the simple idea of the stories along the wall, a few little tags on some of the little houses, and then just suspend the houses, so you can even step into them. The idea of creating something that people step into and creating an experience that could touch somebody's heart, that could actually touch them emotionally."*[27]

Similarly, Saoirse O'Connell spoke of Science Gallery actively sourcing her work *'Extracts of the HERE & NOW'* for the *'HOME\SICK'* exhibition, as they felt it resonated with the overall theme:

> *"I got an email from [Exhibitions Producer] and she said [HOME\SICK] would be a great platform for your work … I never submitted anything [to the open call]. And the email asked can you come in for a meeting about this. The Science Gallery felt because of the nature of the exhibition, being called 'HOME\SICK' and everything? That the social side of everything that's happening now in Ireland, they needed to kind of cover it in that kind of way."*[28]

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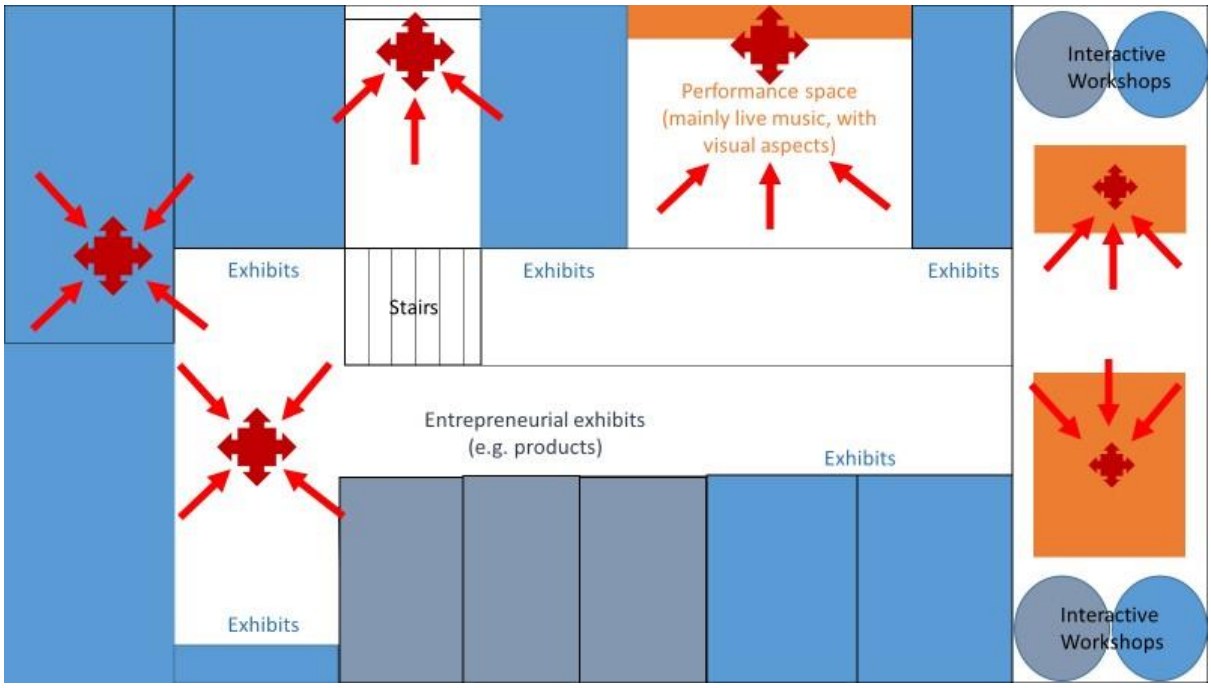
[24] Niamh Riordan, interview 1
[25] Ibid.
[26] Ibid.
[27] Ibid.
[28] Saoirse O'Connell, interview 1

The objects of the evening event were therefore organised *for* by Science Gallery -- in the planning and design stages -- so that their constitutive materiality both aligned with the general theme of the exhibition HOME\SICK and allowed for visitors to interact with them in ways that proved sensorial and evocative. How these interactions were structured over the course of the evening event is the subject of the next section.

During the event

Much like in its planning, organisational forces influenced how the event was enacted over the course of the evening. For example, Science Gallery tried to spatially and temporally organise *House Party - Everyone Back to Ours* so that the various mini-events -- such as musical and artistic performances, readings by curators -- were experienced by visitors in a particular order, thereby engaging their senses in particular ways at particular times (see **Figure 4.1**).

Figure 4.1: Choreographed 'mini-events' that took place on the upper level of Science Gallery. Red icons represent each mini-event, with red arrows represent the resulting flows of people to the respective events



To elaborate, the evening event was ‘launched’ with a speech by the Founding Director, who stood on a platform at the top of the first flight of stairs between the ground and upper level in the very centre of the exhibition space, exalting the success of Science Gallery. From there, a series of choreographed mini-events began, which were orchestrated to occur in specific areas of the exhibition space at specific times. Some smaller performances ran concurrently while larger, more centrepiece ones held by high-profile performers occurred with no other mini-events to distract the attention of the crowd. Each mini-event was designed to connect the bodies of visitors to the objects of the performance in different ways, for example through physically touching or moving through an artwork (such as Niamh O’Riordan’s piece – **Figures 3.6** and **3.8**) or hearing and seeing a musical performance take place, whereby the lighting in the exhibition space changed in tone and intensity according to the musical notes played (**Figure 4.2**).

Figure 4.2: Photo of a musical performance by Margie Lewis as part of the evening event

Similarly, Science Gallery organised for individual exhibits featured to be communicated to visitors by their own staff, and not the artists themselves. For example, there were a number of part-time Trinity College students working as floor staff or 'Mediators' at the event, their job being to answer questions and explain the meanings of individual exhibits to the public. These Mediators were briefed by the artists and Science Gallery Team members, such as the Research Coordinator, as to how such pieces should be explained to the public. However, their function at the event meant that Science Gallery organised the communication of such exhibits to visitors without the artists' direct involvement, which meant artists lost immediate control over how their work was framed. As Saoirse remarked:

> *"I went over to talk to [the visitors] and the Mediators said 'No no no we'll do that'. So I was like, removed from it myself … And I came in just before the opening and I was just standing back watching the Mediators talking about my life, like. It was very surreal. Now they're very good at what they talk about because you do have a meeting with them all so they know exactly… but you'd wonder… how much removed they get over time or what they tune into. I don't know."*[29]

In this way, Science Gallery acted as the 'scaffolding' around which different clusters of socio-material relations, in the form of bodies, objects and spaces intersected and connected with each other. Science Gallery intervened and organised for the objects of artistic exhibits to have sensorial capacities or capabilities, whereby they could stimulate and interest visitors in different ways. The Gallery also spatially and temporally organised for the evening event to unfold in a predetermined order, with different performances being enacted in different areas of the exhibition space, thereby encouraging visitors to move or 'flow', and stop or be 'held' by certain exhibits at particular times. As such, the organising of bodies, objects and spaces became a nuanced and atmospheric phenomenon (Beyes, 2016) with different constellations of bodies, objects and spaces influencing what could be felt or

[29] Saoirse O'Connell, interview 1

experienced. Leading from this it was the organisation of bodies, objects and scapes in the evening event that generated a sense or 'atmosphere' (Biehl-Missal, 2016) of Science Gallery as a creative space.

Organisational Tensions

I have discussed above how Science Gallery worked to organise which bodies, objects and spaces interacted, how they interacted and when they interacted both in the planning and the enactment of the evening event. However, the ability to control such an enactment proves difficult, as the creative capacities produced in the foldings of bodies, objects and spaces can serve to undermine and subvert the organisational forces which attempt to manage them. For example, visitors bring their own histories, memories, intents and purposes to the Gallery and these multiple, different pasts fold into the objects, spaces and intents that make up the exhibits. Each has a personal experience, and as 93,339 people attended this exhibition,[30] countless other creative potentialities may have been formed in the coming together of visitors, artists, events and exhibits in the Gallery space.

Regarding my own experience described in the vignette, this particular creative moment occurred when the crowds in the Gallery had moved to the next orchestrated mini-event (a live music performance), and I was left to interact with the exhibit on my own terms. Here, the folding of my own experience with the object of the chair and the spaces or contexts it held -- all experienced through my body -- and the corresponding unfolding or way of comprehending did not necessarily 'fit' into the organised experience or 'expressive infrastructure' (Thrift, 2012) of the evening event. As such, the indeterminacy of my 'potentiality' (Beyes & Steyaert, 2011a) led to a creative capacity that resisted, and was in tension with the Science Gallery way of organising.

[30] Science Gallery Dublin Annual Review 2015: https://dublin.sciencegallery.com/files/yearly/SG_AR_15.pdf

The participating artists may also resist the ordering of the event. For example, during House Party, Saoirse felt that the immediate physical proximity of Niamh's work altered the composition of her own work -- people moved through Niamh's piece before arriving at Saoirse's, experiencing positive stories of people provided with housing. She felt that this potentially compromised the effectiveness of her own piece in communicating the experiences of losing a home. Saoirse therefore rearranged the materiality of her own piece as much as she could. First, she moved the sleeping bag, chair etc. so it was as far removed from Niamh's work as possible. Feeling that this rearrangement condensed her work into too small a space, Saoirse then arranged the 'softer' objects with less narrative significance, such as the fireplace, to be at the interface between her exhibit and Niamh's, thereby leading people into the 'harder' objects with a stronger narrative significance, such as the chair. In this way, objects such as the sleeping bag became transition points (Beyes et al, 2009) that affected how individuals accessed and participated in the exhibit. While Saoirse was able to resist Science Gallery's ordering, she was not always able to impose her own order by influencing how visitors interacted with the objects of her piece:

> *"I printed out copies of that text [for people to read], but I don't think anyone took one … when I was up in [an artistic retreat], someone suggested that, because some people can't hear for instance, and some people hear in a certain way and they'd like to have it [written] in front of them at the same time. So I took that on board. And I left [them] here and when I was in with my Da at that time none of them were gone like. You can't control that."*[31]

While Saoirse notes that she cannot control her audience, she goes on to point out that the point of her installation is not to control the reactions that it produces:

> *"And [my Da] was like: 'you should have a big sign up saying take one of these.' I was like: 'No' because that's kind of against the ethos of it … If they want to engage then they've got to have that agency. If they don't want to read it, then that's … their stance … if people, unless they experience it themselves or know*

[31] Saoirse O'Connell, interview 1

someone close to them. Get that sense of what's going on for people in our own home, in our city."[32]

As such, indeterminacy and creativity are relational and tensional: if organisational forces bear down on bodies, objects and spaces and seek to control how they fold and unfold, the capacity for new ways of comprehending a phenomenon are subsumed. At the same time, organisational forces are necessary to assemble such hybrid bodies, objects and spaces that can lead to creative moments. As Niamh remarked:

> *"I think the whole idea of using art, art in any situation, it isn't right or wrong or good or bad, you might like that or you might not like that, but you'll have an opinion. It generates a space, and it creates an experience and if people are… it's up to people then… if people are open, some people are just like 'NO!' they don't want to go there. And some will open up a little bit more, sometimes people will be really moved. It kind of depends on your own story. But then if you hold space, with something like that, to invite people in, there's potential for them to open up a bit more to the discussion… to engage. It engages the emotions; it engages something else in people, and often in a very impassioned way."*[33]

In sum, creativity is both an organised and performative event that produces alternative imaginings. Bodies, objects and spaces can be organised to interact with each other in different configurations, with the aim of provoking creative moments. It is at the point where these entities intersect that the various meanings and experiences they carry fold into each other and momentarily disconnect how we routinely make sense of things, thereby creating the conditions of possibility for alternative ways of knowing or experiencing the world. As such, these creative moments can be regarded as the generation of potentialities rather than definite indications of a future process or product. At the same time, organising such bodies, objects and spaces in a rigid, deterministic way precludes the generation of such alternatives. As such, the answer to my first research question*: how may bodies, objects and spaces be organised to produce creativity as a capacity* lies in the organised foldings of such bodies,

[32] Saoirse O'Connell, interview 1
[33] Niamh Riordan, interview 2

objects and spaces, and an allowance for unplanned lines of flight from the subsequent unfoldings or potentialities that are produced.

CHAPTER 5: POWER AND CREATIVITY

In this chapter, I address my second research question: *what role does power play in the formation of creative capacities?* I do so by 'zooming out' (Nicolini, 2009a, 2009b) from the organised foldings of bodies, objects and spaces in Science Gallery -- the subject matter of the previous chapter -- to the broader context of relations and connections that influence these foldings. Specifically, I explore how Science Gallery is connected to scientists and artists and how power is manifested in this connectivity, which in turn influences the 'brand' or 'style' of creativity that is accomplished in Science Gallery activities.

Science Gallery portrays itself as a space that 'ignites creativity and discovery' (Science Gallery, Online)[34] by bringing together actors from scientific and artistic backgrounds and facilitating interactions and new connections between them, thereby allowing a certain type of 'creativity' to emerge. These interactions are carried out through two overlapping domains: *research activities* and *exhibitions* -- which can be regarded as extensions to the more localised 'scaffolding' of bodies, objects and spaces discussed in the last chapter.

With regards to *research activities*, some take place 'back stage' away from the immediate exhibition space and consist of workshops and classes facilitated by the Science Gallery Research Coordinator that involve scientific researchers from Trinity College and affiliated institutes. The aim of these activities is to break down the silos of scientific research within university departments and centres and encourage a more outward-facing, public engagement orientation amongst scientific researchers[35]. Related projects involve collaborations with other European science and education centres, designed to increase

[34] https://dublin.sciencegallery.com/about
[35] Research Coordinator: interview 1

communication and encourage partnerships between researchers at different institutes[36]. At the same time, other research activities take place 'front stage' as part of the featured exhibition content in Science Gallery. Such activities manifest themselves in the form of 'live' experiments or 'wet labs' in the exhibition space, whereby the public interact with various objects of research. The purpose of these activities is threefold: generate public interest in scientific research[37], instil a public engagement focus in the researchers involved (many of whom also participate in concurrent back stage research activities[38]), while at the same time allowing these researchers to carry out real-time studies using the public as participants.[39] For example, experiments have ranged from relatively simple electronic surveys designed to gather information on personal washing behaviours with data feeding back into a larger water conservation project[40], to more complex interactions such as the extraction and analysis of DNA material from the saliva of participants, the intention being to map the distribution of a gene that determines 'risk-takers' and the 'risk-averse'[41].

In this way, research activities overlap with *exhibitions* and their constituent artistic exhibits and performances, seminars and open nights. Here, artists are encouraged to develop their own exhibits based on the scientific themes of exhibitions. In turn, Science Gallery claims such work inspires creativity in the public and generates interest in and awareness of both science and art[42]. In addition to live labs and experiments being held in exhibitions, Science Gallery encourages collaborations between artists and scientists with a view to translating scientific research into a format that can prove accessible to the public. In doing so, Science Gallery aims to build on back stage workshops and classes and strengthen

[36] https://dublin.sciencegallery.com/research
[37] Interview with Founding Director
[38] Research Coordinator: interview 2
[39] Ibid.
[40] https://dublin.sciencegallery.com/homesick/washlab
[41] https://dublin.sciencegallery.com/humanplus/free-will/
[42] Programme Manager: interview.

scientists' public engagement skills, thereby allow them to engage with the public in alternative ways outside of a traditional didactic form of scientific communication[43]. A further linkage between research activities and exhibitions is the Science Gallery curatorial panel. Here, following an 'open call' process, scientific researchers and artists, along with specialists working in fields related to the exhibition themes are claimed to work together in order to filter and select works for inclusion in each season's exhibition programme[44].

Taken together, research activities and exhibitions are seen to generate capacities for creativity by organising the interactions of actors -- or bodies -- that participate, and the materials -- or objects -- of their work in the Science Gallery space. I will show, however, that the type of creativity that emerges from these activities and collaborations is both influenced by power and produces power effects. Specifically, I show how, with regards to front stage research activities, scientific researchers with a biomedical focus are *more intensively connected* to significant actors in Science Gallery, such as Science Gallery Team[45] (SGT) members in charge of research, public engagement and programming. This intensive connectivity allows such actors and their work to feature prominently in the exhibition space. For example, some biomedical researchers are sourced directly by the relevant Programming Manager and asked to help plan exhibitions. In turn, these researchers have more influence on the constituent bodies, objects and spaces that make up the individual exhibitions, in that they and their work feature prominently.

In contrast, researchers from non-biomedical areas are *less intensively* connected to significant actors in Science Gallery and are, as a result, marginalised in terms of

[43] Education Officer: Interview.
[44] Science Gallery Dublin (2013) Annual Review. Available: https://dublin.sciencegallery.com/files/yearly/SG_AR_13.pdf
[45] Science Gallery Team members are: Director, Programming Manager, Operations Manager, Exhibitions Producer, Marketing and Communications Manager, Research Coordinator, Development Manager, Development Coordinator, Education Officer.

programming. This marginalisation manifests itself, for example, in less involvement with exhibition planning and minimal incorporation of their work into the exhibition space. In terms of the curatorial panel, it is again biomedical curators who are more intensively connected to significant Science Gallery actors, while 'expert' curators (for example, scientists from a non-biomedical background) and 'big-name' curators (for example, well-known authors or commentators in the public eye) are less intensively connected. The same strategies operate with regards to artists who take part in exhibitions, with some artists judged to be the right 'fit' for Science Gallery being more intensively connected to significant actors than their counterparts, which I will elaborate on later. Overall, it is biomedical researchers who are more intensively connected to Science Gallery than artists and non-biomedical curators.

In the remainder of this chapter, I show the practices whereby actors are more or less intensively connected to significant actors in Science Gallery in the two overlapping domains of research activities and exhibitions. I then discuss the benefits that result from both types of connectivity, such as differing levels of legitimation and publicity for actors depending on whether they are more or less intensively connected. I then take a step back to show how certain assemblages of bodies, objects and spaces, formed by more and less intensive connecting strategies and their associated power effects, constitute a particular 'brand' or 'style' of creativity espoused by Science Gallery. Finally, I show the unintended power effects that arise from the different connecting strategies in the form of tensions that undermine this brand of creativity.

Connecting Strategies and Research Activities

Science Gallery claims that a major focus of its research activities is to produce collaborations with a public engagement focus, which in turn feed back into wider research

projects engaged in by researchers and research institutes at Trinity College. As the Research Coordinator says:

> *"One of the key things that we do with research departments across Trinity is facilitate real and meaningful research happening in a space in which the public take part, and they're essentially the test subjects. So they're contributing data; information. And that's been really useful to researchers, especially in the social sciences."*[46]

At the same time, 'art' is featured in such research projects and is regarded as an integral ingredient in experiments and in the display of scientific work in the exhibition space. Consequently, as one former Governance Board member remarked, researchers are said to benefit from such collaborations by incorporating a more 'engaging' and 'publicity-friendly' style of communication into their work.[47] Simultaneously, artists are regarded as obtaining 'inspiration' from such collaborations and securing a higher public profile through working in the exhibition space.[48] Science Gallery therefore portrays itself as the *facilitator* of such connections between those who take part in its programming, by creating a space for scientific researchers, artists and the public to interact through experiments.[49]

In addition to facilitating connectivity, Science Gallery claims to intervene in such engagements by way of structuring the space and constituent objects of the experiments, to ensure equal balance and benefit for both researchers and artists:

> *"In Arts/Science spaces it's historically difficult to have, I keep saying 'meaningful' [research] because what I mean is, sort of that fair balance where a scientist would get as much out of it as an artist. Because it's either… it usually turns out to be either one of two things: one is the artist uses the scientist's area of research as inspiration for their work, or the second is that the scientist benefits from learning what the artistic process is so that they can go and be a bit more*

[46] Research Coordinator: Interview 1
[47] Former Governance Board member: Interview 1
[48] Science Gallery Director: Interview 2
[49] https://dublin.sciencegallery.com/about

creative with how they approach their research. In each of those scenarios one group is getting more than the other."[50]

Science Gallery, therefore, is portrayed by SGT members such as the Research Coordinator[51] and senior management[52], and in how it is communicated to the public via its website[53], press releases[54] and by Trinity College itself[55] as an entity that both facilitates and intervenes in the connectivity between researchers, artists and the public via the practices of generating live experiments in the exhibition space.

My analysis suggests, however, that such collaborations do not benefit all participants equally and different strategies connect actors in more or less intensive ways. Specifically, certain researchers working in the area of the biosciences tend to be more intensively connected to significant actors in the SGT and the Founding Director[56], who are responsible for managing research activities, exhibitions and related programming. This connectivity comes about through a variety of practices which, in turn, bestow legitimacy on researchers and reproduce Science Gallery as a legitimate 'scientific' space. This intensive connecting strategy is productive of power in that it is mutually beneficial for both the actors concerned and Science Gallery itself.

Conversely, researchers working outside of the biosciences are less intensively connected through a variety of other practices. Whilst still incorporated into Science Gallery activities through their involvement with 'live' experiments, they are negligibly connected to the SGT and feature minimally in Science Gallery exhibitions. This in turn delegitimises their areas of research: they become less aligned with Science Gallery and the 'type' of science it

[50] Research Coordinator: Interview 2
[51] Research Coordinator: Interviews 1 and 2
[52] Science Gallery International Executive Director: Interviews 1, 2 and 3
[53] Website (https://dublin.sciencegallery.com/about) and annual reviews (https://dublin.sciencegallery.com/page/annualreview)
[54] https://dublin.sciencegallery.com/press_releases
[55] http://crann.tcd.ie/Education-Outreach/Science-Gallery.aspx
[56] Who stepped down in 2016.

wishes to engage with and reproduce via its programming. Both more and less intensive connecting strategies therefore create differing power effects. In the remainder of this section I discuss these strategies and how they operate in the research arena.

More intensive connecting strategies

Biomedical researchers are more intensively connected to other actors associated with Science Gallery than researchers in other scientific sub-disciplines, with the result that biomedical research features more prominently in Science Gallery programming than other scientific work. For example, whilst claiming that a variety of researchers from different research backgrounds benefitted through involvement in live labs and exhibition experiments, the SGT Research Coordinator acknowledged that there was a heavy focus on facilitating and exhibiting biomedical research projects developed in conjunction with the Trinity Biomedical Sciences Institute (TBSI)[57]. Established in 2011, TBSI represented a new strategic undertaking on the part of Trinity College which brought together a variety of biomedical and pharmaceutical schools in an attempt to be more competitive in securing research grants, develop biomedical research outputs, and spin off these outputs through pharmaceutical and medical device companies. Science Gallery is required to partner with TBSI as a condition stipulated by the Wellcome Trust[58], a significant sponsor of Science Gallery which facilitated the initial collaboration between both organisations with a €1.8M grant in 2013.[59] A stipulation of this partnership and funding is that two biomedical-themed exhibitions, with associated research activities, must be featured in the Science Gallery space each year:

[57] https://www.tcd.ie/biosciences/
[58] https://wellcome.ac.uk/
[59] https://www.tcd.ie/news_events/articles/science-gallery-at-trinity-announces-new-funding-worth-over-2-million-as-it-turns-five-years-old/2671

"Half of my role which is as a researcher for the biomedical exhibitions that we do; we're doing two a year. That's part of the Wellcome strategic partnership with TBSI."[60]

As a result of this partnership, biomedical researchers from TBSI became intensively connected to the SGT Research Coordinator. This connectivity was manifested in programming activities, with several biomedical professors repeatedly invited to curate exhibitions featuring their own research projects. These individuals were held in high esteem by not only the SGT but the Science Gallery Governance Board,[61] which, combined with the authority of their curatorial roles, meant that they became key figures in determining both who and what got to be including in the exhibition space. For example, the Chair of Biochemistry at TCD and former Director of TBSI has curated a number of exhibitions since Science Gallery's inception featuring research projects and initiatives developed by himself and his colleagues. In addition, he has delivered Science Gallery-facilitated talks on his research areas and the benefits of engaging with Science Gallery to potential investors and contributors. [62] He has also appeared in print, online and on radio to champion Science Gallery as a method of public engagement with science. [63]

By being connected to Science Gallery in this way, biomedical researchers secure visibility and legitimacy for their research and in turn legitimise Science Gallery through participating in its activities. In addition, heavily-featured biomedical researchers are 'made' creative through such involvement. For example, the above-mentioned professor was held as an exemplar of Science Gallery itself over the course of my research, with members of the

[60] Research Coordinator: Interview 1
[61] The Governance Board consists of 13 individuals, consisting of 7 Trinity College academic and administrative representatives, and 6 government, industry and sponsor representatives. Source: Science Gallery (2016) Annual Review. Available: https://d27ndtgrrbv7wj.cloudfront.net/files/podcast/images/sg_ar_2016_d.pdf
[62] http://www.sfi.ie/news-resources/press-releases/international-science-leaders-to-science-gallery-for-new-speaker-series.html
[63] https://www.irishtimes.com/sponsored/luke-o-neill-the-bottom-line-for-me-is-that-science-should-be-fun-and-i-think-that-s-reflected-in-the-event-s-mission-1.2403556

Governance Board and SGT often referring to the individual in question as possessing 'creative' personal attributes of vision and imagination that in turn fuelled Science Gallery activities. This high esteem, in turn, reinforced the professor as a legitimate and creative scientist by portraying him as a key individual who sought to involve colleagues and students in programming activities. As one Governance Board member remarked:

> *"It's just because of his personality and it's just because he's so successful. He has that ability ... that others don't. He gets people involved, and people get him."*[64]

We can see evidence, therefore, of how intensive connectivity benefits both Science Gallery and a key individual in the biomedical field, with both being reinforced as scientific and creative through their mutual involvement. Moreover, it results in biomedical researchers securing a prominent position in terms of Science Gallery programming which, in turn, results in a greater emphasis on biomedical research.

A similar story was found in relation to individuals with a biosciences background who sit on the 'Leonardo Group' advisory panel. Described as the 'brain trust of Science Gallery'[65], SGT members overseeing Programming[66], Research[67] and Development[68] claimed the function of the Leonardo Group is to inspire ideas for new exhibitions and events through 'brainstorming sessions' held intermittently on Science Gallery premises. Observing one such session designed to help generate the content for the 2017 season, I noted that members from a biomedical background had more say in who and what got to be involved in exhibition content compared to those working outside of the biosciences. For example, attendees were divided into four smaller constituent groups, each chaired by one SGT

[64] Governance Board Member: Interview 2
[65] https://dublin.sciencegallery.com/leonardos
[66] Interview with Programming Manager
[67] Research Coordinator: Interview 1
[68] Interview with Development Coordinator

member. The purpose of each group was to discuss ideas around an exhibition theme -- one for each season -- that had been decided in advance by the SGT, with suggestions written and elaborated on a whiteboard. These groups rotated after twenty minutes or so to discuss the next theme chaired by another SGT member, until all four exhibition themes had been covered by each group.

Based on my observations and interactions with those present, individuals attending the brainstorm were primarily from outside of the 'official' Leonardo Group listed on the Science Gallery website[69]. Many participants were first-time attendees from local companies and sponsors who were unfamiliar with the brainstorm concept and with the work of Science Gallery in general. Moreover, the format of the brainstorm session legitimated the biomedical researchers and the overall biomedical orientation of the exhibitions, with most of the suggestions being made by a small number of Trinity College-based individuals with a biomedical background, particularly those involved with TBSI. SGT members also directed questions specifically to these biomedical researchers, gave prominence to their suggestions over others when writing and elaborating them on whiteboards in the meeting room, and asked them specifically if they could implement their ideas in the exhibition space in the form of exhibits or experiments -- or if they had personal contacts who could do so. Those outside of the biomedical sphere were largely spectators, unfamiliar with how Science Gallery programming worked and unable to offer much in the way of suggestions. The nature of these brainstorm sessions meant that biomedical researchers were more intensively connected to SGT members, and ergo the Gallery itself which, in turn, meant they were more likely to influence the format of exhibitions and include their own work in the form of exhibits and experiments.

[69] https://dublin.sciencegallery.com/leonardos

Biomedical researchers were also more intensively connected to SGT members through their membership of the Leonardo Group. Many of these researchers had been members for nearly the entire lifespan of Science Gallery itself, despite official claims that membership of the Leonardo Group is temporary and new individuals are sourced after each exhibition to keep ideas fresh.[70] These biomedical researchers were repeatedly invited by SGT members to participate in events ancillary to the exhibitions such as public talks, thereby allowing them to advertise their work to a wider audience and increase their public profile. When interviewed, biomedical researchers talked of the 'unofficial' benefits of participating in Science Gallery programming which were often at odds with the 'official' benefits communicated by the SGT, such as increasing public awareness of scientific issues[71] and obtaining valuable data from scientific experiments[72]. One such biomedical researcher, who co-curated an exhibition and contributed to three live experiments, summed up the most significant 'unofficial' benefit:

> *"Now what I got out of it, was a huge amount of publicity. Because, you're in all the papers. There was something on TV, on RTÉ[73]… it is certainly a big platform. I mean the Irish Times writes about all the openings. And… RTÉ gives… a radio interview. And so you get huge publicity."[74]*

The same member was able to leverage his curatorial role and involve his own work in the relevant exhibition:

> *"Because I was a curator I could control a bit and I could bring in my own material as well and some [of my] own original work."[75]*

Another biomedical researcher and member of the Leonardo Group, who was due to hold a book launch at the Gallery, claimed 'almost everyone' from his research institute

[70] Based on information obtained through informal conversations with both Leonardo Group and SGT members.
[71] Interview with Science Gallery Development Coordinator
[72] Interview with Science Gallery Programme Manager
[73]Raidió Teilifís Éireann: Ireland's national television and radio broadcaster
[74] Leonardo Group: Interview 1
[75] Ibid.

worked in curatorial roles, even though the validity and usefulness of the data collected from live labs held by Science Gallery was questionable:

> *"I wouldn't worry about the actual data. I don't know about other people; our data wouldn't have been that brilliant that we got here. We got a bit, [but] it's more the… you feel that you're interesting people in your research… which is fantastic, so the university has benefitted enormously from having this kind of contact with the outside world, you know?"*[76]

Other members reinforced the view that data were largely irrelevant:

> *"I'm not sure how much science we actually got out of it, because a lot of people, we were trying to do ERG*[77] *recordings here, we did, but then there was so much noise, we didn't really use the data."*[78]

> *"There was nothing really publishable in the end… There could have been, but eh… in that case as well it was a known result kind of replicated so it wouldn't have been scientifically that amazing. It would have been something that was already known somewhere else."*[79]

What was important was less the data, and more the exposure of the scientists to a broader audience including the public and media. This exposure in turn raised the profile of the respective scientists within Trinity College, as indicated by a former Governance Board member:

> *"The Gallery, it's the way it's got scientists to show off their research, it's really helped. [Science Gallery have] got a brand, so you've automatically got a market lead by being part of that."*[80]

The assertion that data gathered was largely unusable, and was often never intended to be used in the first place, was backed up by a Science Gallery researcher. On discussing the logistics of holding live labs in the exhibition space, they asserted that the *objects* of science (such as software used by researchers or lab materials) and the *process* of taking part in

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[76] Leonardo Group: Interview 2
[77] Electroretinography measures the electrical responses of various cell types in the retina (http://www.sciencedirect.com/topics/neuroscience/electroretinography)
[78] Leonardo Group: Interview 3
[79] Leonardo Group: Interview 4
[80] Former Board Member: Interview 3

experiments (such as completing ethics forms) were not compatible with the performative space of Science Gallery, whose mission is to provide an 'experience' of science for visitors that is both instant and entertaining via objects that are stimulating and can be interacted with.[81] The exposure to both the media and public from these research activities nonetheless legitimated Science Gallery as a 'creative' and 'collaborative' scientific space; one that engages in scientific work and involves the public in seemingly novel, interactive and generative ways. Biomedical researchers and Science Gallery therefore *both* benefitted from this intensive connecting strategy.

A secondary benefit of such intensive connectivity between SGT members and biomedical researchers acting as members of the Leonardo Group was the involvement of students and early career researchers from TBSI and related departments in Science Gallery activities. Students, in the most part recommended by Leonardo Group members, took the lead in engaging with the public through experiments, with the Leonardo Group members taking a more hands-off approach.[82] Science Gallery also benefitted by leveraging these students as resources to help build and run such exhibits and labs:

> *"[T]hat's why the [individual named] and the [individual named] do it because they are part, they're the [Principle Investigator] of a big team. And so they can get Joe Bloggs who knows a carpenter to build the thing. They can get little Freddy to sit there the half day they can't make over there, and so on. So they swan in and they say 'yes yes yes it's my exhibit' but actually it's their team's exhibit. That their team has done all the work for."*[83]

Science Gallery also ran public engagement programmes with students and early career researchers at TBSI in the form of seminars and priority access to Science Gallery

[81] Science Gallery researcher: Interview 1
[82] Based on comments made by two student 'Mediators' interviewed
[83] Former Board Member: Interview 3

programming via workshops incorporated into the exhibition space.[84] The goal for Science Gallery here was to:

> *"first of all pique [students and early career researchers'] interest in public engagement, and second of all, give them a place to go to with that interest if they want to continue… So we're not just saying 'here is how you write about science well' it's 'here's what we do when we write about science and you can get involved … This is what we do and this is sort of the people we draw from, and so if you're interested in getting involved you can come to us.'"*[85]

It was hoped that, in this way, students and early career researchers would learn the Science Gallery way of 'doing things' with respect to science and public engagement and promote it to their colleagues in their respective departments and faculties, thereby becoming *"champions of Science Gallery … who can understand the virtues of our way of communicating."*[86]

Table 5.1 summarises the connecting strategies applied to research activities. In sum, biomedical researchers were intensively connected to Science Gallery via practices of exhibiting in live labs, experiments and associated events, as their work aligned with the particular biomedical 'style' of science that the Gallery, its sponsors, and the associated research institutes at Trinity College wished to project. The particular researchers connected were identified by Science Gallery as key actors in their field, in that they had well-developed professional and personal networks with associated authority and resources that Science Gallery could leverage. In turn, Science Gallery provided biomedical researchers with resources to enable their participation in Gallery exhibitions, such as constituent materials for their exhibits and assistance from Science Gallery staff in designing such. Biomedical researchers also utilised their students and in effect used them to set up and run their experiments and exhibits in the exhibition space. In return, these students were given the

[84] https://dublin.sciencegallery.com/makeshop
[85] Research Coordinator: Interview 2
[86] Leonardo Group: Interview 5

opportunity to network with other biomedical researchers involved in programming activities. In this manner, connecting strategies beget further connecting strategies, with more students and early career researchers identified and brought on board by initial high-profile Leonardos and the relevant SGT members in charge of research, via the practices of live labs, exhibitions and public engagement programming.

As a result, biomedical researchers involved in Science Gallery activities benefitted less in the way of hard scientific data or feedback from experiments and exhibits, and more in terms of personal and professional publicity and association with a ‘creative’ and ‘engaging’ space. Science Gallery in turn benefitted from both the primary incorporation of key biomedical researchers and the secondary incorporation of their students, who served to (re)produce Science Gallery as a ‘creative scientific space’ by engaging in exhibition and programming practices, aligning themselves with the Science Gallery ‘style’ of science and public engagement, and by growing Science Gallery operations as they were incorporated and subsequently incorporated others. Particular bodies and objects of research were given legitimacy by Science Gallery programming practices, which simultaneously gave legitimacy to Science Gallery.

Table 5.1: Intensive connecting strategies applied to research activities

Who is connected	*Practices involved*	*Benefits*	*Productive power effects*
TBSI Researchers	• Involved in labs, exhibitions, public engagement programmes and events. • Provided with resources which enable their participation in exhibitions (e.g. assistance from SG staff in setting up exhibits, constituent materials for exhibits, prominent space on the exhibition floor to exhibit).	• Research work is publicised in media (due to involvement in SG programming). • Kudos within Trinity College, in that their work, and their status as biomedical researchers is legitimised (due to raised research profile).	• SG makes TBSI researchers and their work creative. • Biomedical researchers make SG scientific (with a biomedical orientation).
Leonardo Group members with a biomedical interest	• Curation of exhibitions, Involvement in labs, programming, brainstorming sessions, seminars and events. • Senior scientists get students who work with SG to set up and run their exhibits and experiments.	• Relevant Leonardo Group members are given authority to influence exhibition content due to their curatorial roles -- such as bringing in their own work. • Opportunities to collaborate with other scientists and industry partners. • SG exhibitions achieve legitimacy due to the involvement of participating scientists.	• SG makes LG members and their work creative and scientific. • LG members make SG scientific (with a biomedical orientation).
TBSI students	• Access to programming via workshops, public engagement programmes and events.	• Students are given the opportunity to network with TBSI researchers and LG scientists. • Students develop public engagement skills. • Science Gallery uses students as resources in setting up and staffing the relevant live labs and exhibits featured in exhibitions.	• SG makes TBSI students 'exemplary' or 'the elite' of science students. • TBSI students make SG a young, fashionable and creative space -- one that inspires students to achieve.

Less intensive connecting strategies

Researchers from non-biomedical disciplines were also connected to the SGT but, compared to their biomedical counterparts, far less intensively. This less intensive connectivity occurred through the same brainstorming sessions whereby biomedical researchers were enabled. For example, one former Science Gallery Governance Board member, who headed a Department outside of TBSI, argued that suggestions offered by those working outside of biomedical and technological fields failed to be entertained by the SGT who facilitate such brainstorm sessions:

> *"We write all over the walls, and what happens with it? And why don't we see anything appearing? And then we go down to the exhibits and it looks like a completely random set of things … And we think 'we could have done much better stuff if only you'd listened to our suggestions. But you don't do it!'"*[87]

The same interviewee argued that the reason her suggestions and work was not entertained in both the brainstorms and the subsequent exhibitions was because it did not represent a particular image of scientific research that Science Gallery wished to associate itself with and portray to both its sponsors and the public:

> *"There is no science. It's all technology … And that is irritating as well, because they are using the word 'science' to mean 'technology'. And 'engineering.' It's a brand thing … It's not really science research that it's communicating. It's not communicating science, it's not communicating art."*[88]

Non-biomedical individuals were still connected to Science Gallery via the same practices of brainstorming and exhibiting, but in a less intensive manner than their biiomedical counterparts, in that they played a less significant role in such practices. This 'looser' involvement allowed Science Gallery to utilise such actors when they proved useful to Gallery programming in terms of leveraging their respective colleagues -- if these

[87] Leonardo Group: Interview 6
[88] Ibid.

colleagues were deemed relevant by the SGT. For example, when asked about involvement of the Leonardo Group in Science Gallery programming, the Programme Manager stated that the true value of Leonardos lay in their personal and professional contacts who may be able to contribute to Science Gallery activities:

> *"The team probably plays more of a hands-on role … We don't ask them to do a lot of hands-on stuff but they do provide useful connections. And a few of them [have] really tucked into a particular theme that they're involved in. So the [Leonardo] Group itself is almost not as integral and necessary as the individual Leonardos, you know, because, that one, once twice a year brainstorm, well twice a year, two or three times a year I suppose, is [it] really useful? But when one Leonardo says 'you know what, that's my theme; that I'm really into, I want to work with you guys on it' and we follow themes, we develop concepts with them, they accept researchers, artists. Those are the ones that are kind of the most useful, I think."*[89]

There was, then, benefit to Science Gallery from such less intensive connections and, while those non-biomedical researchers who were less intensively connected did not benefit as much as their biomedical colleagues, they nonetheless talked about the *potential* for such in the future, if circumstances (or Science Gallery) permitted:

> *"I guess from my perspective it's a bit of a black box, Science Gallery. There's not really any sense, even though I'm really interested in it and [in] getting involved and I have ideas for exhibitions… I don't feel like I'm being encouraged to engage with it."*[90]

> *"Because of course I'm not a Leonardo and I would love to be. Then I feel I would have some influence, and I have some great ideas … I've always worked on this kind of interface between design and things like that so I'd be really interested. But it's… just really difficult to know."*[91]

The hope of such potential involvement helped keep these non-biomedical researchers from other disciplines interested and involved in Science Gallery research activities, even if this

[89] Interview with Programme Manager
[90] Non-biomedical exhibitor: Interview 1
[91] Non-biomedical exhibitor: Interview 2

involvement was limited and with fewer resources available, such as help in setting up experiments in the exhibition space.[92]

All-in-all, less intensive connecting strategies offered benefits to both non-biomedical researchers involved and Science Galley itself, in that the researchers still achieved legitimacy and publicity from their participation in Science Gallery research activities and associated events, but to a lesser extent compared to their biomedical counterparts. At the same time, Science Gallery benefitted through leveraging non-biomedical researchers' involvement when it saw fit -- particularly by utilising these researchers' personal and professional contacts. As such, Science Gallery made non-biomedical researchers creative through association, but less creative than more intensively connected biomedical researchers. Concurrently, non-biomedical researchers made Science Gallery a pluralistic scientific space, one that featured a variety of scientific work in its activities and not just biomedical research. **Table 5.2** summarizes the less intensive strategies of connectivity and how their power effects were manifested.

[92] Based on informal conversations with a number of non-biomedical exhibitors

Table 5.2: Less intensive connecting strategies applied to research activities

Who is connected	*Practices involved*	*Benefits*	*Productive power effects*
Non-bio medical researchers	• Involved in brainstorms, but to a limited extent -- mainly through being asked by SG Team if they have professional or personal contacts that can participate in the exhibition. • Limited involvement with labs, exhibitions, public engagement programmes and events. • Fewer resources provided to enable participation (e.g. help in setting up exhibits, experiments in the exhibition space).	• Non-biomedical researchers still obtain publicity and legitimation from being involved with SG, but less so than their biomedical counterparts. • SG benefit by leveraging their involvement, and being associated with a wide spectrum of scientific research (even if this work is less prominently featured). • SG utilise these researchers for their professional contacts that they might wish to feature in programming activities.	• SG makes non-biomedical researchers less creative than their biomedical counterparts by featuring them and their work less prominently. • Non-biomedical researchers make SG a pluralistic scientific space (due to its association with non-biomedical researchers and their work).

Connecting Strategies and Exhibitions

The above discussion shows how power, in the form of more and less intensive connecting strategies, operates in the domain of research activities carried out at Science Gallery. Here, biomedical researchers are more intensively connected to SGT members than non-biomedical researchers. The effect of this intensive connectivity is that biomedical researchers working within Trinity College and their research feature prominently in Science Gallery back stage activities such as classes and workshops, and front stage activities such as live labs and experiments in exhibitions. Thus, certain biomedical *bodies* (researchers) and biomedical *objects* (their research work) get the chance to become creative through inclusion in the Science Gallery *space*.

The curatorial process also serves as a linkage between research activities and exhibitions, in that biomedical researchers occupy positions on the curatorial panel by virtue of being intensively connected to SGT members. This intensive connectivity, in turn, allows these researchers to feature their own work in the exhibition space and participate in associated exhibition programming, such as presenting public seminars on their research interests. Such activities benefit biomedical curators in the form of publicity and legitimacy through association with Science Gallery, and vice versa. However, there are other actors involved in exhibitions who are subject to more intensive connecting strategies, specifically other 'types' of curators and artists, as I will now discuss.

Firstly, what I refer to as 'big-name' curators, such as authors and commentators well known to the public, are intensively connected to SGT members and achieve publicity and legitimation via public talks, association with Science Gallery and the resulting media attention this brings. Science Gallery, in turn, achieves popularity and media attention through affiliation with these curators. Secondly, artists who produce a particular style of

artwork that stimulates the senses and compliments the biomedical themes of exhibits -- without being too provocative -- are intensively connected to SGT members, with their work featured prominently in the exhibition space. These artists bypass the open call and curatorial processes and are enabled and legitimated as being creative through their association with Science Gallery and their involvement with exhibitions. Science Gallery, in turn, is made creative by involving such work in its programming.

Figures 5.1, **5.2** and **5.3** illustrate some examples of more intensively connected artwork. **Figure 5.1** shows 'Blood Vessels' by UK artist Charlie Murphy, exhibited as part of the Science Gallery exhibition 'BLOOD'.[93] Composed of glass and both red and blue toluene (a chemical used in thermometers), the work is intended to show visitors the anatomical structures, connections and associations of human blood vessels, veins and arteries. **Figure 5.2** is a snapshot of a visitor interacting with 'Delicate Boundaries' by U.S. artist Chris Sugrue, exhibited as part of the Science Gallery exhibition 'ILLUSION'[94] but created in 2007 for a context outside of Science Gallery. It consists of a computer monitor with a touch screen that, when touched, draws representations of organic bugs towards the hand of the user. These bugs appear to move across the surface of the skin due to a projection incorporated into the touch-activated display. **Figure 5.3** illustrates 'ATP Synthase' by UK artist Colin Rennie, exhibited as part of the Science Gallery exhibition 'FAT'.[95] Created originally for the ATP Synthase-Design 4 Science Exhibition at the University of Sunderland, UK in 2007,[96] the work is a sculptural representation of an enzyme within mitochondria which helps generate adenosine triphosphate (ATP) -- the energy currency of the cell.

[93] https://dublin.sciencegallery.com/blood/
[94] https://dublin.sciencegallery.com/illusion/
[95] https://dublin.sciencegallery.com/fat/
[96] http://sure.sunderland.ac.uk/445/

Figure 5.1: 'Blood Vessels' by UK artist Charlie Murphy

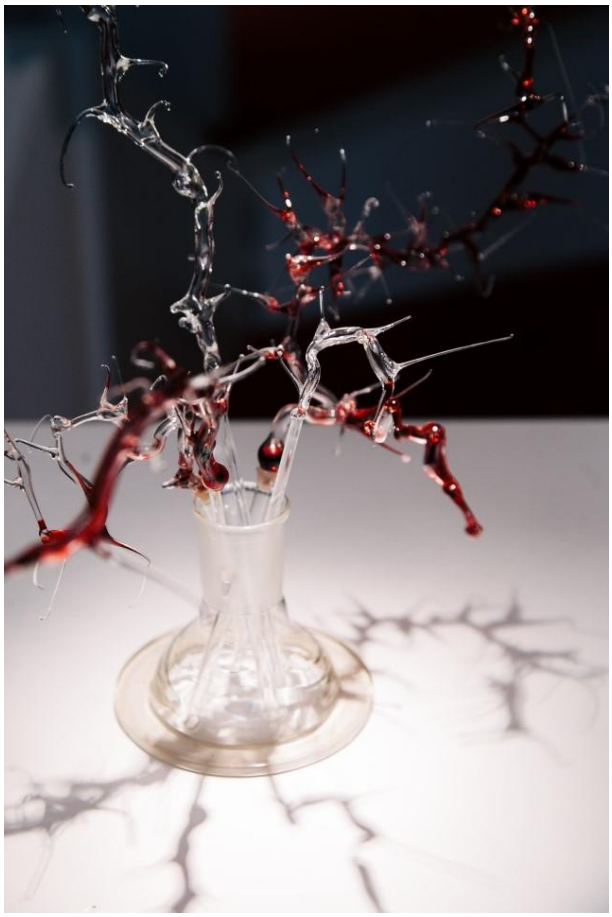
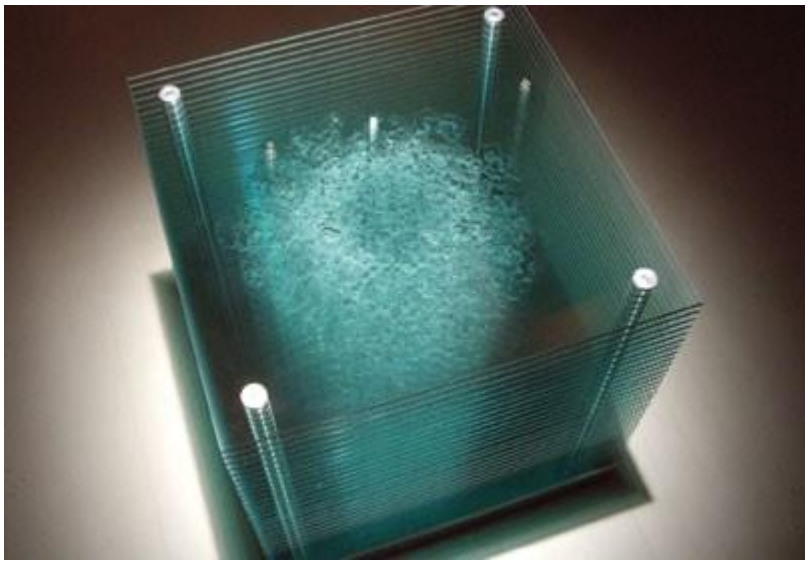


Figure 5.2: 'Delicate Boundaries' by U.S. artist Chris Sugrue

Figure 5.3: 'ATP Synthase' by UK artist Colin Rennie



Contrastingly, 'expert' curators -- for example less well known non-biomedical and social scientists -- are less intensively connected to SGT members, which results in their curatorial decisions being bypassed by the SGT. These actors still get a certain amount of legitimacy by having the label of 'curator' and being associated with Science Gallery, while the Science Gallery open call application process and subsequent exhibitions are legitimated through association with the 'expert' status of these curators. Similarly, artists whose work stimulates the senses but does not necessarily 'fit' with the biomedical themes of exhibitions -- particularly if that work is related to a local, Irish context -- are less intensively connected to the SGT and are either excluded or featured minimally in the exhibition space. These artists do achieve some publicity and exposure to press coverage and are made creative, albeit to a lesser extent compared to more intensively connected artists. In turn, Science Gallery is made creative through utilising these less intensively connected artists and their work to make up the 'art' quota of exhibition content and in effect being seen to feature a diverse spectrum of artwork. I will now detail how these more and less intensive connecting strategies operate in exhibitions.

More intensive connecting strategies

In the case of exhibitions, an 'open call' process is used to attract submissions for artworks and projects that are both fully formed and in various stages of development. This process happens after the development of exhibition themes decided by individuals from the Leonardo Group and the SGT. A curatorial panel, claimed to consist of 'expert artists, scientists and clinicians working in the fields related to the season theme' is purported to filter and select the final works to 'ensure the season's exhibition and event programme facilitate creative collisions in art and science.'[97] However, it is the SGT, and particularly the

[97] https://opencall.sciencegallery.com/spare-parts

Science Gallery Director, who often decide upon the composition of the curatorial panel based upon their own network of contacts or that of the Leonardo Group.[98] Therefore, 'big name' curators tend to be more intensively connected to SGT members than less well-known non-biomedical curators, with the result being that the former benefitted through the publicity of occupying Science Gallery curatorial positions.

Many curators are chosen based on their public profile in order to attract visitors and media coverage. To illustrate, one former curator interviewed stated that individuals were invited by SGT members to be curators based on their public profile, with recognisable 'big names' chosen over those more knowledgeable and relevant to the exhibition theme.[99] The same interviewee claimed that many of these curators had limited involvement in selecting exhibition content as they are often absent during the selection process[100] -- an assertion backed up by other exhibitors interviewed who purported to have had no contact with curators until the official exhibition launch nights.[101] Some big-name curators did have exhibits featured in Science Gallery exhibitions, but had little to no involvement in developing and setting up these pieces.[102] For example, I interviewed a graphic designer who was responsible for composing the layout of a section of exhibition space, including an exhibit intended to showcase a technological device developed by a big-name curator. When asked how much contact he had with the curator, the interviewee replied:

> *"Really we didn't speak to [curator] at all. It was very much like hands-on, like the guys in the Science Gallery… But [the exhibits are] very much their own*

[98] Based on comments made by the Programming Manager, Research Coordinator and Development Coordinator in the relevant interviews
[99] Former curator: Interview 1
[100] Ibid.
[101] Based on interviews with exhibitors
[102] Based on an informal conversation I had with a big-name curator following a public seminar at Science Gallery

individual little installations. They've all got their own backstory. And I think it's always been pretty much like that, you know."[103]

Several other interviewees suggested that big-name curators benefitted through the publicity of being associated with Science Gallery, and vice versa. [104] My own experience of attending associated seminars and events held in conjunction with exhibitions reinforced this assertion, with curators in effect advertising their own work such as film productions and published books.[105]

Big-name curators, then, were intensively connected to SGT members and were involved in Science Gallery exhibitions by having their work incorporated into the exhibition space and by participating in related exhibition programming, such as public seminars and exhibition launch nights. This participation legitimated and publicised their work and made them creative through association with Science Gallery as a creative entity. Conversely, big-name curators legitimated and attracted media attention to Science Gallery via their involvement in exhibitions, subsequently making Science Gallery creative.

Certain artists are also more intensively connected to SGT members through the direct sourcing of their work and its incorporation into the exhibition space. The reason that some artists are chosen to exhibit over others is that they fit the bill of a particular 'type' of art that (re)produces the aesthetic experience Science Gallery wishes to convey to its visitors. This style of art is one that piques the visitor's interest sensorially in the exhibition -- and ergo Science Gallery itself -- without diverging too much from the overarching biomedical themes. As such, it is art that is often accessible to the public and does not distract from the overall 'style' of the exhibitions that gets to feature in the exhibition space. For example, one

[103] Graphic designer: Interview
[104] Based on interviews and email correspondence with a number of artists
[105] Based on attendance at seminars associated with the exhibitions 'HOME\SICK' and 'SEEING'

course coordinator, past curator and 'resident artist' who has a significant amount of authority in determining which artists get to be sourced, believed that art:

> *"is about stimulating conversation. It is also about providing aesthetic experiences, that tactile, that activating of a sense of smell and taste, the multimodal experience is important irregardless [sic] of any instrumental purpose."*[106]

Asked to expand on this latter point and the possibility that the 'art' component of an exhibition may be subsumed by a stronger biomedical focus, the interviewee replied:

> *"It can be but I'm not sure that's a problem … I don't have a fear they'll ignore contemporary artists, but I hate most contemporary art. Because of its lack of honesty about the commitment to what its audience is. Because of its lack of honesty about what it does in the world, it's making claims that it can't stand behind … On the art side I get frustrated with, there is a complete lack of honesty. I've probably said too much. It's ok that art doesn't do a lot. It just needs to be honest about that. Those are to me more the bigger issues [sic]. Which sometimes get hacked out here which is brilliant."*[107]

Thus, it is art that *"doesn't do a lot"* but instead served to cosmetically enhance the biomedical themes and exhibits on display that was more intensively connected to Science Gallery. This intensive connectivity was in turn manifested in the practices of being included in the Science Gallery exhibition space, and the subsequent legitimacy that the exhibitions provided to both the artists and Science Gallery itself. **Table 5.3** summarises the intensive connecting strategies that operate in Science Gallery exhibitions.

[106] Interview with resident artist and past curator
[107] Ibid.

Table 5.3: Intensive connecting strategies applied to exhibitions

Who is connected	*Practices involved*	*Benefits*	*Productive power effects*
Biomedical curators	• Involve own work in exhibition space. • Association with Science Gallery exhibition, publicity via associated seminars and lectures, attendance at opening nights, media coverage.	• Biomedical curators get publicity and legitimacy from association with Science Gallery -- particularly by using the authority of their curatorial positions to bring their own work directly into exhibitions. • SG gets publicity and legitimacy from association with such curators.	• SG makes biomedical curators creative. • Biomedical curators make SG scientific (with a biomedical orientation).
'Big name' curators (e.g. well-known authors or commentators, with an established public profile)	• Involve own work in exhibition space. • Participation in seminars and lectures associated with exhibitions, attendance at opening nights, media coverage. • Little involvement in the curatorial process (do not shortlist applicants from the open call process).	• Curators get publicity and legitimacy from association with SG. • SG gets publicity and legitimacy from association with such high-profile curators.	• SG makes such curators prominent and popular through association with Science Gallery as a creative, current and high-profile space. • Such curators make SG creative through association with their renowned and publicly-recognisable profiles.
Artists favoured by Science Gallery Team	• Artists sourced directly by SG Team members. • Open call and curatorial processes bypassed. Artists allowed to import 'pre-packaged' work used in other exhibitions or performances into the SG exhibition space. Such work is therefore not tailored to Science Gallery exhibitions.	• Favoured artists and their work are enabled and legitimated as creative and multidisciplinary -- in terms of being useful in facilitating collaborations with scientists -- through involvement with SG.	• SG makes artists and their work creative. • Artists make SG artistic and creative.

Less intensive connecting strategies

Less intensive connecting strategies operate in exhibitions, with 'expert' curators -- mainly non-biomedical researchers and social scientists from Trinity College and affiliated institutes -- along with artists -- whose style of work is judged as less aligned with exhibition themes by the SGT -- being marginalised through certain practices.

To elaborate, expert curators are asked to curate by the SGT if their areas of research align with a particular exhibition theme. For example, a past exhibition concerning climate change[108] had an expert curator from the Trinity College Geography Department while an exhibition concerning aspects of design[109] had an expert curator from the Faculty of Architecture. Whilst these expert curators were selected and appointed by the SGT, the same Team members would often override their subsequent curatorial decisions and directly source exhibitors themselves. For instance, one expert curator interviewed remarked that the SGT were responsible for making the first cut of applicants to the open call process before they reached the curators, with subsequent decisions being overruled in favour of exhibitors deemed more appropriate to the theme, many of whom did not even apply through the open call process itself:

> *"I mean even when I was curating, we were given kind of a short list, so the Team curated the long list … But then we spent a day, all four curators, selecting and identifying a shortlist, and then in the interim period we were informed down the line that they had had a change of mind around their focus and they'd come up with their own list basically. So then you're just a bit like, well… what was the point of that? And we were never really told. But then we came to the launch and I didn't even know what exhibits were going to be in there."*[110]

[108] https://dublin.sciencegallery.com/strangeweather/
[109] https://dublin.sciencegallery.com/designandviolence/
[110] Expert curator: Interview 2

This assertion was backed up by another non-biomedical scientist and expert curator, who had little awareness of how the curatorial process worked because he was less intensively connected to the SGT:

> *"It's more the team that are involved [in selecting participants]. You're involved, you're in charge of a few projects but you don't then have any oversight into the whole thing. Yeah, not much."*[111]

The ability of SGT members to bypass the decisions of expert curators was made easier by a lack of criteria or guidelines concerning the selection of applicants, with the same interviewee claiming that they were unaware as to how many exhibitors should be chosen, what the profile of selected exhibitors should be (for example, should there be more researchers than artists featured, or vice versa), and whether the applicants' submissions were final or works in progress.[112] As such, by being less intensively connected to the SGT, expert curators were denied the information and understanding of how the Science Gallery exhibitor selection process 'worked'.

Despite being subject to such practices of marginalisation, expert curators still achieve a certain level of publicity and legitimacy by having the label of 'curator' and being associated with Science Gallery as a creative space. Likewise, Science Gallery's curatorial process and the exhibitor profile of subsequent exhibitions is legitimised and made credible through association with their expert status.

Similarly, artists who produce work that does not fit the cosmetic style espoused by Science Gallery, in particular Irish artists, are less intensively connected to the SGT. This less intensive connectivity is manifested in the practices of such work being excluded from exhibitions or featured on the periphery of the exhibition space, while the work of more

[111] Expert curator: Interview 3
[112] Expert curator: Interview 1

intensively connected artists is featured prominently in central locations of the exhibiton space. I detail such practices of less intensive connectivity over the folloing paragraphs.

Irish art tends to be excluded or featured minimally in the Science Gallery exhibition space. The reason for this is that Irish artists and their work are, in general, viewed by the relevant Team members as being 'too conservative' and ill-fitting with the Science Gallery's 'way of doing'. As one SGT member explained:

> *"I'm from the U.S., and [I come] from that U.S. context … I think in Ireland, in particular, the art community has no funding and is very weak, compared to other European countries … So the arts scene, in my opinion, is not as dynamic as in other capital cities. So it makes it much more conservative, I would say. Therefore, Irish artists I don't feel [are] as involved here, but international artists who come, particularly artists who are less conservative and are more at the cutting edge, really find a home here. So all the artists that I really look up to, they come, like, for SECRET[113] we have [named artist], we have really important hacker artists, so I'm not sure that Irish artists would understand that as art. If it's shown here especially. Now if the same work was shown in a different context, they might. But not in Ireland because it is a fairly conservative Arts [scene]."*[114]

This individual was not aware of either Saoirse O'Connell or Niamh Riordan, the artists referred to in Chapter 3, despite their work being exhibited in HOME\SICK. Contemporary art, and in particular Irish contemporary art, is thus held in low esteem by the relevant SGT member, who influences which artists can access Science Gallery programming and how their work will be displayed in exhibitions. Artists who do not fit the favoured mould are subsequently rejected and excluded from the exhibition space in favour of artists who do:

> *"I've done all the work here in terms of [being] an artist, a curator, and now as an employee, so right away I can say 'can we ask them to do these things?' And if not, can we get back-up artists to do it?"*[115]

This quote illustrates that the practices of exhibiting the work of intensively connected artists is less about allowing such work to generate creative capacities -- in the form of connecting

[113] Past exhibition: https://dublin.sciencegallery.com/secret/
[114] Interview with resident artist and past curator
[115] Ibid.

with other bodies, objects and spaces in novel ways -- and is more about creating the capacity for Science Gallery to reproduce as a particular type of biomedical and sanctioned 'creative' space in the eyes of visitors and stakeholders. Therefore, local artists are less intensively connected than international artists who are artistic in the Science Gallery way and who produce work that captivates interest in Science Gallery biomedical themes, without straying too far from such -- thereby keeping visitors aligned with the Science Gallery experience or 'brand' of creativity.

The practices of including the work of international artists over Irish ones was observed in 'SEEING,'[116] heralded by Science Gallery as their exhibition that featured the largest number of artistic exhibits to date. [117] Out of twenty-one exhibits only two originated in Ireland, neither were artistic pieces and neither came through the open call process. I charted the development, launch and run of this exhibition over the course of three months, including a 'Mediator walkthrough' whereby ground staff were instructed by SGT members as to what each exhibit consisted of and how they all converged into the overarching theme of the exhibition. Repeated questions from Mediators during this briefing concerned the meanings behind the individual exhibits and how they could be communicated to visitors. The repeated answer, in different formats, was that the message of the individual piece was less important than how all pieces meshed together to create the *"Science Gallery experience"*[118] of being stimulated sensorially.

Irish artists and their work that did feature in the observed exhibitions were still less intensively connected to Science Gallery than their international counterparts. Again, such artists were directly sourced by SGT members, and their work was, like that of more

[116] https://dublin.sciencegallery.com/seeing/
[117] Via informal conversations with a number of SGT members
[118] Quote from SGT member leading Mediators through the exhibition space

intensively connected artists, 'pre-packaged' or imported from other exhibitions or performances, thereby allowing it to be slotted in to the Science Gallery exhibition space. For example, neither Saoirse O'Connell nor Niamh Riordan were sourced via the open call process for the exhibition HOME\SICK; the former was personally asked to participate by the Exhibitions Producer[119] while the latter was brought on board by a non-profit organisation interested in exhibiting.[120] Neither artist had contact with the curatorial panel prior to the exhibition, nor were they aware of the existence of the Leonardo Group and their purported role in generating exhibition themes.[121] Both works were generated for other artistic spaces and organisations and not the HOME\SICK exhibition itself, with Saoirse's *'Extracts of the HERE & NOW'* taken from a more extensive creative research project held a year previously at the Dublin Projects Art Centre[122] and Niamh's *'Home. Heart. Hope.'* made to fit the remit of the associated charity in question. Likewise, neither artist received feedback regarding how their work was received by the public following the completion of the exhibition.[123] **Table 5.4** summarizes the less intensive connecting strategies that operate in Science Gallery exhibitions.

[119] Based on Saoirse O'Connell interview
[120] Based on Niamh Riordan: Interview 1
[121] Based on interviews with both Saoirse O'Connell and Niamh Riordan
[122] https://lineupnow.com/event/here-now
[123] Based on follow up interviews with both artists, conducted via email

Table 5.4: Less intensive connecting strategies applied to exhibitions

Who is connected	*Practices involved*	*Benefits*	*Productive power effects*
'Expert' curators (e.g. scientists or researchers from a non—biomedical background)	• Curatorial decisions bypassed. • Lack of information provided to these curators regarding exhibitors and exhibition content. • Excluded from genuine curatorial decision-making process, which is controlled by SG Team (e.g. Programme Manager).	• Expert curators get a certain amount of legitimacy by having the label of 'curator' and association with the exhibition. • Science Gallery exhibition and 'open call' application process is legitimated by association with their 'expert' status.	• SG makes expert curators less creative than their biomedical counterparts by featuring them and their work less prominently. • Expert curators make SG a pluralistic scientific space (by having such scientists or researchers as curators and featuring their work -- albeit minimally).
Artists less favoured by Science Gallery Team	• Artists and their work excluded from exhibitions or marginalised in the exhibition space. • Some artists known to team members included but in a tokenistic manner. • Open call and curatorial processes designed to select such artists are bypassed by the SG Team. • Artists receive little feedback on how their work was received by visitors.	• Artists achieve some publicity and legitimation through press coverage and exposure of their work to visitors. • SG obtains artwork for exhibitions.	• SG makes such artists and their work less creative compared to their preferred counterparts. • Less favoured artists make SG creative (through featuring their work). • SG is made creative through the involvement of such artists and their work in exhibitions.

To conclude this section, more intensive and less intensive connecting strategies operate in Science Gallery exhibitions, whereby biomedical and big-name curators, and artists who produce a certain accessible style of work, are more intensively connected to SGT members. Concurrently, expert curators from non-biomedical disciplines and artists whose work is more ill-fitting with the overarching biomedical themes are less intensively connected to SGT members. More intensive connecting strategies are manifested in sets of practices,

such as public seminars whereby biomedical curators achieve publicity and legitimacy, and the work of more intensively connected artists being featured prominently in the exhibition space. Less intensive connecting strategies materialise in other sets of practices, for instance expert curators have their curatorial decisions bypassed, while ill-fitting artists are marginalised in the exhibition space and are provided with little feedback on how their work is received by visitors. Both more and less intensive connecting strategies provide benefits to those involved -- such as publicity and legitimacy -- but to a greater or lesser extent depending on how intensively connected the respective actors are. Similarly, both strategies have productive power effects, with actors being made more or less 'scientific', 'artistic' and 'creative' depending on how intensively connected they are. All actors, regardless of whether they are more or less intensively connected, make Science Gallery a scientific, artistic and creative space through their involvement in exhibitions, albeit in different ways.

Intended Power Effects: A Biomedical Brand of Creativity

Taking a step back from Science Gallery back stage and front stage research activities and exhibitions, it becomes possible to see how the intended power effects of more and less intensive connecting strategies produce a particular brand of creativity: one that is less about art and more about science, particularly biomedical science. Science Gallery makes biomedicine 'creative' by using biomedical themes to guide its exhibitions and prominently features biomedical work in its exhibition space, in the form of exhibits and live labs. At the same time, non-biomedical work is minimally featured. As such, visitors to Science Gallery interact with biomedical science, and come to view biomedicine as 'collaborative' and 'creative' by how it is communicated through exhibits and experiments.

In turn, Science Gallery uses the biomedical brand of creativity it produces to position itself as a legitimate scientific space. In the eyes of the public, therefore, Science Gallery

becomes the 'go to' place to visit in order to experience and learn about science, particularly as there are no similar science-based public engagement initiatives existing in the Republic of Ireland. As a former Leonardo Group member explained:

> *"There is no other [science initiative]. Nothing else. So of course if you give the public anything resembling science they're going to come on mass. [Science Gallery are] pushing against a completely open door because nobody else is doing this in Ireland … And they do realise that. In fact they've got as many visitors as they can handle."*[124]

Science Gallery therefore uses the scientific brand of creativity that it produces to position itself as the dominant player in science communication -- a space with no other competitors. This dominant position subsequently allows Science Gallery to align with the relevant Government funding agencies, which provide it with resources (in the form of capital) and legitimation (through association with such agencies and Government policy). For example, one Science Gallery Governance Board member interviewed outlined his previous role as a Director of Science Foundation Ireland (SFI), the national foundation for investment in scientific research and public engagement.[125] He described how funding for scientific public engagement initiatives was prioritised by the Irish Government at the onset of the Irish recession to encourage young people to take up scientific careers, and illustrate the importance of investing in scientific research to the Irish public. He stated that Science Gallery fitted the bill of such an initiative, and, being an advocate for scientific public engagement, he was able to help orient funding towards it:

> *"Around that time, you've got to remember, this was all going on in 2009, '10, when the world was crashing here. And budgets were being cut. And never more did I think, basically, scientists are crap at telling stories, you know? And I was a champion within SFI of the idea that we kind of needed to train the scientific world to speak English … So I became a Leonardo as they call it. But I guess we partnered with them, is that the right word to use, in terms of helping Science Gallery position themselves with respect to SFI funding. I probably positioned*

[124] Leonardo Group: Interview 9
[125] http://www.sfi.ie/about/

some of the SFI programmes somewhat to suit… not just Science Gallery, but that general area."[126]

The Science Gallery biomedical brand of creativity, therefore, formed the capacity for Science Gallery to position itself relative to significant funding agencies, in that it allowed the Gallery to align with shared government strategy regarding the funding of science communication initiatives. This positioning -- or aligning -- in turn legitimated and reinforced Science Gallery as a bona fide 'scientific' space:

"The point is, now, significant funding for this type of endeavour was legitimised. Science Gallery would be one of the key players in this kind of space."[127]

Concurrently, organisations affiliated with Science Gallery benefit through association with its biomedical brand of creativity. For example, a senior Academic Officer within Trinity College remarked that Science Gallery helps 'sell' the College as a creative, modern university:

"The value for the college goes beyond the science anyway. I mean, it's in terms of placement, in terms of a statement it makes about Trinity."[128]

Likewise, a Governance Board Member and senior Irish Government official stated that the Science Gallery brand of creativity is useful for advertising Ireland as both creative and scientific at a national level:

"There's no doubt Science Gallery is good for Trinity. And there's no doubt Science Gallery is good for us, good for the government. It's been the go-to place if we're asked 'is there something cutting edge here in Dublin you want to do'. You know, you've somebody like Angela Merkel visiting, Science Gallery is a kind of go-to spot because they're not expecting this on a campus in the corner with a nanotechnology institute upstairs."[129]

[126] Science Gallery Governance Board member: Interview 4
[127] Ibid.
[128] Trinity College Academic Officer interview
[129] Science Gallery Governance Board member: Interview 5

The main 'creative product' of Science Gallery, therefore, is the biomedical brand of creativity it constructs through its programming activities and its alignment with enabling organisations, such as Government funding agencies and Trinity College. These organisations in turn reinforce the Science Gallery brand of creativity and benefit by association with such, using the brand to communicate their own organisations as creative to the relevant stakeholders:

> *"I don't mean this in a derogatory way, but the [Science Gallery] process is part of the product … You're always going to have to explain your science, you're always going to need the business of being cutting edge, of looking for somebody to support that, whether it's in the college, whether it's an EU institution, whether it's a path programme, whether it's a government department, you've got to sell your project."*[130]

While biomedicine is more intensively connected to Science Gallery, 'art', compared to biomedicine, is less intensively connected and is used merely to generate interest in the biomedical exhibition themes and work featured. The way this interest is generated in turn (re)produces the experience of Science Gallery as a 'creative' entity by engaging the public in ways that involve a variety of senses, which are stimulated through interaction with the artistic objects in the exhibition space. Leading from this, art plays only a limited role in Science Gallery's brand of creativity, as one Leonardo with a visual arts background commented:

> *"visual arts has never made its way into Science Gallery in any meaningful way, from what I can see. Apart from the odd talk now and then."*[131]

The importance of biomedicine over art is evidenced in the make-up of the Science Gallery Governance Board, Leonardo Group and SGT members, with most coming from a

[130] Ibid.
[131] Leonardo Group: Interview 6

scientific or public engagement background rather than the arts. As the same interviewee remarked:

> *"It's funny when you look at the Leonardo Group, there's about fifty members now, and there's only really, there's myself and there was a guy from a visual arts background. So that tells you how seriously they take the visual arts as a catalyst of what they do."*[132]

This lack of representation is, according to the interviewee, partly down to the lack of compatibility between the visual arts and science, with the former being more individualistic than collaborative in methodology. The effect of this is that the visual arts is often not a suitable way of opening up a space for conversations or facilitating collaborations between participants:

> *"It's not that [Science Gallery] don't want to look at the visual arts, they can't see how it would actually fit. Because the visual arts comes down to, the make-up of the individual artist, and they usually have their own agenda, but the fact that, Science Gallery is probably looking for a very broad agenda. So they wouldn't be looking for visual artists specifically … So I would feel that visual arts, it never really sells itself very well, and it doesn't serve as something like the Science Gallery's programme. Because it's too involved in itself, it's too up its own hole I suppose."*[133]

Art, therefore, becomes ancillary to the more consequential biomedical brand of science that the Gallery wishes to be associated with. Nonetheless, it is utilised to stimulate interest or curiosity in the Gallery itself by captivating or evoking a sense of allure in those who interact with it. Overall then, art becomes a commodity in the consumption of Science Gallery as a creative space; a way of managing the performance of the Gallery by aesthetically engaging the visitor through their senses. This bodily engagement in turn allows the individual to understand themselves as an active, creative participant in the Science Gallery way of being

[132] Ibid.
[133] Ibid.

creative. Art, therefore, has a performative role in Science Gallery programming by way of making Science Gallery, and its visitors, creative -- in a biomedical way.

Unintended power effects

The previous sections showed how more intensive and less intensive connecting strategies had intended power effects in terms of producing the particular brand of creativity described above. In this section, I show how these strategies also had unintended power effects, stemming from the unequal distribution of benefits between those who are more intensively connected and those who are less intensively connected. I also show how such unintended power effects in turn undermine the dominant biomedical brand of creativity that Science Gallery espouses. I therefore explore, first, how such unintended power effects arise through tensions between actors who are more and less intensively connected to Science Gallery and, second, how they undermine Science Gallery's ways of being 'scientific' and 'creative'.

Tensions

With regard to research, more intensively connected biomedical researchers receive extensive legitimation and publicity through their back stage research activities -- such as workshops and public engagement classes -- and their front stage involvement with exhibitions -- such as live labs and experiments. Consequently, biomedical researchers and their work are given primacy in the exhibition space while those who are less intensively connected benefit less, being either marginalised or excluded from exhibitions and related events such as seminars and launch nights. However, *tensions* arise between both sets of researchers, with those who are less intensively connected viewing their more intensively connected counterparts as benefitting career-wise through the legitimacy and publicity that

Science Gallery provides. For example, when referring to more intensively connected biomedical researchers, one non-biomedical Leonardo Group member stated:

> *"They're getting kudos within Trinity. So they're getting promotion. Because they appear to be being very interactive and innovative. But actually, what are they producing? I don't know."*[134]

Leading from this, tensions arise between less intensively connected researchers and Science Gallery itself, with the former viewing the latter as an instrumental vehicle used to advance the careers of their more intensively connected colleagues -- at their own expense. As one former Board and Leonardo Group member remarked:

> *"The only people they ever work with are [more intensively connected scientist] and [more intensively connected scientist]. And you think "Why?!" What's wrong with the rest of us? All of our other stuff is equally as fascinating and really interesting to make into an exhibit and we're more than willing to do it, but we can't. Because [Science Gallery] just never choose it."*[135]

This individual's exclusion has the unintended power effect of denying them exposure to industry and the public:

> *"If you speak to any academic, particularly ones who are not involved in Science Gallery, they're really resentful of it. Because all it does is irritate us by offering us something that it then doesn't give us. So it's like dangling a carrot and then whipping it away and giving it to somebody else. And so that's one aspect of it, that it's deeply frustrating. And the more you get involved with it the more irritating it is because the more you spend time trying to give them help and they will not take it."*[136]

Another tension arises between less intensively connected researchers and Science Gallery regarding the extent to which Science Gallery communicates the spectrum of scientific work being undertaken at Trinity College. Here, a Leonardo Group member and prominent academic from a non-biomedical background argues that Trinity College suffers in terms of legitimacy as a result of such:

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[134] Leonardo Group: Interview 7
[135] Interview with former Governance Board member and current Leonardo Group member
[136] Ibid.

> *"Trinity's showcase is not showcasing Trinity. And that's such a waste. Because actually if they could showcase us, the Government would realise what massively amazing stuff is going on here. And then the public would realise and therefore we would get over the feeling that the country is wasting its money maintaining the university because look what does the university ever do."*[137]

This assertion is backed up by a Governance Board Member representing Trinity College and shows the tension that subsequently arises between Trinity College and Science Gallery:

> *"Science Gallery brands itself with little relation to Trinity at all. And it can, it feels almost like a one-way teenage love affair; we love Science Gallery and they don't really love us back."*[138]

A former Board Member echoes these statements when discussing the original start-up capital that Trinity College invested in Science Gallery, claiming that the Gallery has failed to reciprocate and feature the diverse research at Trinity College:

> *"To some extent [Science Gallery] is parasitic in that it needed Trinity to get it going and it still hasn't paid us back. It could be so much more effective at selling Trinity. Because it isn't selling Trinity. The only thing it's selling Trinity by is by being trendy and then going to the places where Trinity wants to associate its name with being trendy."*[139]

The opinions of the interviewees above stand in contrast to those biomedical researchers who are intensively connected to Science Gallery. For example, one Governance Board Member with a biomedical background who has been heavily involved in curating and exhibiting believes Science Gallery communicates a broad spectrum of science produced by Trinity College to the public:

> *"There's a democratic imperative for the science parts of the universities to bring science to the public and raise awareness of the scientific method and rational thought. And while its impact, or the reason for doing this is to try and protect democracy ... It's all to do with increasing access to that critical thought. And I think we have to use the sciences as a way of doing that. So that's where I see the Science Gallery."*[140]

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[137] Interview with Trinity-based non-biomedical academic and Leonardo Group member
[138] Governance Board member: Interview 3
[139] Former Board member: Interview 4
[140] Board member: Iinterview 4

Another former curator echoes these sentiments, arguing that Science Gallery succeeds in communicating a variety of scientific research to the public, thereby increasing positive public perception of science in general:

> *"You can sell science to the public, or the public knows what science is about … There's a bit of… people are a bit wary of science I have thought because… they say well it also produces atomic bombs, and nuclear power stations, and genetically modified food, and God knows what. And scientists destroy the world or something. I mean this is around, and people don't like chemistry in their foods and so on. So this is a very negative perception maybe. Now maybe it's changing because I talk to people from Science Gallery and they say well, there's lots of people that think science is really cool; it's trendy."*[141]

It can therefore be seen that connecting strategies produce unintended power effects in the form of tensions between those who are more intensively connected and those who are less intensively connected. These tensions arise due to the distribution of benefits -- for example, publicity and legitimacy -- which, in turn, challenge the representation of science that the Gallery espouses. This challenging of science, in turn, leads to the undermining of the Science Gallery brand of biomedical creativity, as detailed in the next section.

Undermining a Biomedical Brand of Creativity

Unintended power effects, in the form of tensions between more and less intensively connected actors, conglomerate and call into question the very brand of science that the Gallery propagates. Here, some actors view Science Gallery as failing to be 'scientific' at all, while others argue that such opinions are outdated and those who express them fail to truly understand science communication. For example, the Founding Scientist of Science Gallery, now retired, considers the Gallery to have moved away from communicating science to the public by connecting and incorporating other actors and disciplines into its programming, such as artists and their artwork:

[141] Former curator and Leonardo Group member, interview

> *"I never imagined that it would turn into basically what is hardly a Science Gallery at all. Essentially, it's science light."*[142]

The response of Science Gallery is to frame the issue as one of how science is communicated in the Gallery space, rather than what 'type' of science is communicated and who communicates it. Here, the Founding Director describes scientists and researchers who question Science Gallery content as failing to understand how to communicate 'science' to the public:

> *"I think some of the physicists involved -- while they had very developed ideas around the scientific research -- were talking about things like 'we should have Maxwell's equations on the wall, then the public will learn about electromagnetism' and so on."*[143]

These sentiments are echoed by the Science Gallery Development Coordinator, who says researchers critical of Gallery live labs *"fail to see the benefit"* of featuring their research in a public space. She claims that it took a *"top-down"* decision from a Leonardo Group member and head of a particular scientific school to *"encourage"* researchers into participating in the first live lab in 2008 as they *"weren't especially enthused in participating"*. The subsequent failure of less intensively connected researchers to reap usable data as a result is blamed on the researchers themselves:

> *"[T]he researchers were probably regretting after the fact that they hadn't more time to hone the experiments they had in the public space."*[144]

To sum up, unintended power effects are manifested in the form of tensions between those who are more and those who are less intensively connected. The latter are critical of the 'type' of science propagated by Science Gallery and call into question whether the Gallery is 'scientific' at all. This questioning, in turn, challenges the dominant representation of how

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[142] https://ianbrunswick.wordpress.com/2017/06/02/229/
[143] Ibid.
[144] Interview with Development Coordinator

science 'should' be, who should produce it, and how it should be communicated, thereby opening up the potential for alternative understandings of such.

In questioning what constitutes 'science', the brand of creativity that Science Gallery produces is undermined. Here, former exhibitors and Leonardo Group members -- all of whom were from non-biomedical backgrounds and worked outside of Trinity College -- were critical of programming activities that Science Gallery claimed were creative, and the notion of creative outputs that came from such activities. To illustrate, one former Leonardo Group member argued that programming intended to produce 'innovative' outputs such as back stage Idea Transition Labs[145] did not generate sustainable impacts beyond creating interest in Science Gallery itself:

> *"The problem with those kind of short time-bound interventions is I think that they're very effective at creating enthusiasm, but my own personal opinion is that they are very ineffective at creating any reasonable potential for ideas and initiatives that are in any way sustainable; to have any potential to generate impact. They're very weak at generating projects that can emerge and survive out of it … Pretty much everything that comes out of there has a life span of a couple of weeks. It just fades away."*[146]

This argument was backed up by another former Leonardo who had founded several media companies and initiatives. He believed that the main 'creative product' of exhibitions is the reinforcement of Science Gallery itself thorough self-generated publicity:

> *"So what happens is, the Science Gallery do an exhibition, and it's big news, big news in the Irish Times, it's big news on RTE1, news news news news news. And then it just goes bumf! It's gone."*[147]

Another Leonardo Group Member questioned whether individuals with alternative exhibition proposals that fall outside of the biomedical themes of exhibitions and are unrelated to Trinity College would be supported by the SGT:

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[145] https://dublin.sciencegallery.com/education/itl
[146] Interview with former Leonardo Group member
[147] Leonardo Group: Interview 9

> *"There's a mismatch between some of the people who hold knowledge that would be useful, and the ways they need to be represented in the Gallery context. Like I can't imagine [an artist acquaintance] exhibiting in a Science Gallery context. It's a kind of shiny, squeaky clean, new, hey-bang-whizz-isn't-this-cool-kids format that other models don't fit in with. And it's more than just their aesthetic, do you know what I mean?"*[148]

Accordingly, the tensions that arise serve to undermine dominant notions of who and what gets to be creative in the Science Gallery way, and what that 'way' actually means. As such, the capacity for other ways of thinking about who and what gets to be scientific and creative emerge. My next chapter shows how some actors exploit and act on this capacity, thereby subverting the less connecting strategies that involve them in Science Gallery activities. In doing so, such actors make themselves more creative -- and more entrepreneurial.

[148] Leonardo Group: Interview 10

CHAPTER 6: POWER AND ENTREPRENEURSHIP

This chapter addresses my third research question, namely *what are the implications of power for entrepreneurship?* In answering this question, I show how Science Gallery promotes a particular style of entrepreneurship that favours individuals with biomedical backgrounds and who are involved with biomedical ventures. These individuals are constructed as 'entrepreneurial' as a result of being intensively connected to the relevant Science Gallery Team members. As a result, a distinctly biomedical brand of entrepreneurship is sanctioned, produced and perpetuated by Science Gallery.

Whilst individuals from biomedical backgrounds are constructed as entrepreneurial, those from non-biomedical backgrounds who engage in non-biomedical ventures are constructed as less entrepreneurial by virtue of being less intensively connected to the same SGT members. Nonetheless, I explain how such individuals can construct themselves as entrepreneurial by negotiating the less intensive connecting strategies they are subjected to, thereby making themselves more intensively connected to significant actors such as the Founding Director and members of the Governance Board. They do so by engaging in practices that are unsanctioned by Science Gallery, such as informally approaching and pitching to such significant actors outside of appropriate Science Gallery protocol, in addition to engaging in sanctioned practices such as official Leonardo Group brainstorm meetings.

Leading from the above, I illustrate how non-biomedical individuals obtain the benefits associated with being more intensively connected to significant members of the SGT, in particular the Founding Director, such as publicity and legitimacy in the eyes of potential stakeholders and the public. As such, these individuals make themselves creative through association with the Science Gallery brand of creativity. At the same time, they resist becoming too intensively connected to SGT members and the subsequent intensive association with the Science Gallery brand of creativity that these connections bring. This

reluctance stems from a fear of losing control of their own ventures to Science Gallery and associated organisations in the Science Gallery assemblage, such as Trinity College and Government start-up 'accelerator' programmes. Likewise, such individuals want to retain control of their own entrepreneurial brand in the eyes of stakeholders and the public. Non-biomedical individuals therefore negotiate the more and less intensive connecting strategies that link them with Science Gallery via a mix of sanctioned and unsanctioned practices. In the process, they make themselves creative and entrepreneurial -- in their own ways.

In the remainder of this chapter, I present Science Gallery's version of entrepreneurship which, combined with more and less intensive connecting strategies, serves to produce entrepreneurs with biomedical backgrounds. I then turn my attention to individuals with non-biomedical backgrounds, or who are engaged with non-biomedical ventures, and show how they are able to make themselves entrepreneurial and creative by negotiating more and less intensive connecting strategies. Finally, I show how individuals are made entrepreneurial and creative not by discovering pre-existing opportunities or forming such in isolation from other actors, but by negotiating how they are positioned in relation to significant actors in their environment. This iterative process of negotiation in turn influences not just why entrepreneurial opportunities arise, but how such opportunities take shape.

Science Gallery: Entrepreneurship as new business formation

Science Gallery claims that entrepreneurship in the form of new business formation features heavily in their programming, in addition to the domains of research and art. For example, the Lead Research Coordinator stated that exhibitions can allow ventures trialling new products and initiatives, in the tech space at least, to gain feedback on their work:

> *"Our exhibitions have acted as a platform for some products. So for products, we tend to be a space where they can road test things."*[149]

At the same time, according to a founding member of Science Gallery, the exhibition space can provide a platform for Trinity College and its researchers to showcase their work to potential investors and bring a commercial skill set to the academic environment:

> *"It's a shop window for entrepreneurs looking for their next project in terms of what's actually happening, in the research sector, in the universities, what interesting new ideas are the researchers working on that could be commercially profitable. Quite often, in my experiences in the universities, is people are doing interesting research, you think could be commercialised, they want to commercialise it but don't know how."*[150]

Such assertions are reinforced by the 2015 Science Gallery Draft Impact Report, which outlines several case studies based on anecdotal experiences relayed to the SGT that claim involvement in the exhibition space helped such ventures succeed.[151] Taking a step back, the lead Research Coordinator claimed that involving individuals undertaking business ventures in the Leonardo Group can provide a unifying focus for collaborations that may arise through different actors interacting in the exhibition space or outside of it through related projects. Having a commercial orientation, he explained, can *"harness the energy and expertise"* of art-science-technology collaborations and be *"the piece that's needed for meaningful interaction",* manifested in practices such as business owners leading workshops or Idea Translation Labs involving researchers, university students and corporations. [152] Entrepreneurship, therefore, is held as an integral part of the Science Gallery 'way' of being creative, both in the exhibition space and in associated programming activities.

My analysis shows, however, that Science Gallery promotes a particular biomedical brand of entrepreneurship informed by biomedicine. Much like in the arenas of research and

[149] Research Coordinator: Interview 1
[150] Founding member Interview
[151] Science Gallery (2015) Draft Impact Report
[152] Research Coordinator: Interview 1

art, more and less intensive connecting strategies operate with regards to entrepreneurship, with biomedical business founders and their ventures more intensively connected to SGT members which in turn ensures their involvement in Science Gallery programming. For example, the entrepreneurial success stories mentioned in the 2015 Draft Impact Report were primarily biomedical companies founded by individuals already intensively connected with significant members of Science Gallery and Trinity College itself. Such intensive connectivity and facilitation in Science Gallery programming ensures that these individuals and their ventures are made 'entrepreneurial' in a relatively straight-forward manner. They align with the biomedical brand of creativity that Science Gallery espouses, which in turn makes them creative -- and entrepreneurial. The following case study illustrates this type of entrepreneurship and the dynamics involved in its production.

Case Study: SureWash

Science Gallery claims to have played a significant role in the development of SureWash[153], an interactive hand washing system designed to prevent the spread of disease in healthcare facilities. Using image processing and gesture recognition technology, SureWash comprises a hand hygiene training and assessment unit that gameifies the handwashing learning technique for healthcare staff and visitors.

In its 2015 Draft Impact Report, Science Gallery states it aided the founder of SureWash, Professor Gerard Lacey, in securing investment for the SureWash product, thereby helping launch his company from its initial start-up phase to commercial success. This investment and growth, Science Gallery claims, came about from the inclusion of SureWash in its 2009 exhibition 'INFECTIOUS'[154] which explored various mechanisms of contagion and strategies of containment. Here, the report states that visitors to the Gallery space could interact with the SureWash technology and provide feedback, thereby allowing the product to be made more user-friendly.

Science Gallery's assertion that it enabled SureWash is backed up by Gerard Lacey, who asserts that exhibiting the product allowed him to expose the technology to the public while it was at a very early stage. Likewise, he states that the Science Gallery visitors who engaged with SureWash are the *'classic early adopters'* that are interested in technology and provided the ideal type of *'challenging but supportive audience'* the product needed to become a success.[155]

[153] https://surewash.com/about
[154] https://dublin.sciencegallery.com/infectious
[155] Science Gallery (2015) Draft Impact Report, p.88

Deeper analysis shows that Professor Lacey and SureWash were constructed as both entrepreneurial and creative through being intensively connected with organisations in the Science Gallery assemblage. As a result, Professor Lacey and his venture were easily aligned and associated with the Science Gallery brand of creativity, which constructed and reinforced him as a creative entrepreneur through being prominently featured in Science Gallery programming. To elaborate, the SureWash technology was developed over the course of five years by Glanta Ltd, a Trinity College spin-off company whose mission is to deliver working applications for camera-based algorithms across the spectrum of health, consumables and defence.[156] The key factor in developing the technology was not so much the involvement in Science Gallery's exhibition, but two funding and development agencies: Leaf Investments,[157] a venture capital fund focused on early stage learning technology businesses and Enterprise Ireland,[158] the government organisation responsible for the development and growth of Irish enterprises in world markets. In particular, it was Enterprise Ireland who proved key to the commercialisation of SureWash by showcasing its technology to future business partners and investors at its 'High Potential Start-Up Showcase 2011.'[159] It also awarded Gerard Lacey the 2011 Enterprise Ireland ICT Commercialisation Award at the Big Ideas Technology Showcase.[160] Enterprise Ireland therefore created the capacity for Professor Lacey to pitch his technology and business proposition to the Irish research and investment communities. Furthermore, it was the involvement with Enterprise Ireland and a venture

[156] https://www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=254560023
[157] http://www.leafinvestments.net/
[158] https://www.enterprise-ireland.com
[159] https://www.enterprise-ireland.com/en/Events/OurEvents/Startup-Class-of-2011/HPSU-Start-Up-Showcase-2011.pdf
[160] http://www.tcd.ie/news_events/articles/trinity-spin-out-company-receives-enterprise-ireland-commercialisation-award/2013

capital fund which led to the testing and trialling of SureWash in several hospitals within Ireland and abroad.[161]

Other organisations also formed the capacity for the development of SureWash as an entrepreneurial venture. Firstly, Professor Lacey graduated from Trinity College and held a number of academic positions in Computer Science and Project Management, which provided relevant technical knowledge and networking opportunities necessary for engaging in technology start-ups. Secondly, SureWash is based in the Trinity Enterprise Centre,[162] a campus site intended to feature the majority of Trinity College's research, combined with an enterprise hub that includes the Trinity Entrepreneurship Training Programme for Trinity College postgraduates. Trinity College, therefore, provided the basic infrastructure from which SureWash could operate. Thirdly, Trinity College provided Professor Lacey with the experience of running new business ventures, in that it served as the platform from which he could found several technology spin-off companies with similar technologies to that of SureWash. For example, he was both Chief Executive Officer and Chief Technical Officer of Haptica Ltd.[163] where he led a team that developed a surgical simulator now used for surgical training by teaching hospitals and medical device companies in a variety of countries. Fourthly, Trinity College allowed Professor Lacey to gain extensive experience of engaging with Enterprise Ireland and EU research projects involving academic and commercial collaborators, and from 2012 to 2015 he was Bursar and Director of Strategic Innovation at Trinity College where he was responsible for developing a commercialisation strategy for the university. Finally, Trinity College played an instrumental role in constructing Professor Lacey as a creative entrepreneur by awarding him the Trinity College Dublin Innovation

[161] https://www.irishtimes.com/business/health-pharma/tcd-spin-off-will-teach-the-world-to-handwash-1.516118
[162] http://www.dcebenterpriseguide.com/directory/trinity-technology-&-enterprise-campus
[163] https://www.solocheck.ie/Irish-Company/Haptica-Limited-329437

Award 2011, which is given each year to an individual or company who *has "made an outstanding contribution to the promotion of an entrepreneurial culture within the university."*[164] This award was presented by the Provost of Trinity College Dublin in front of the media at Science Gallery, where Professor Lacey sat as a Leonardo Group member from 2008 - 2011, a period which coincided with the display of SureWash in the exhibition INFECTIOUS. In presenting the award, the Provost declared Professor Lacey as *"someone who embodies all those virtues of entrepreneurship and innovation which we strive to inculcate in our students."*[165]

To summarise, SureWash and its founder Gerard Lacey were intensively connected with key organisations in the Science Gallery assemblage, namely Trinity College and Enterprise Ireland. It was Trinity College and Enterprise Ireland that were instrumental in making SureWash commercially viable as a biomedical venture, in that they provided Professor Lacey with appropriate resources and infrastructure. In turn, Professor Lacey and his biomedical product were prominently featured in the Science Gallery exhibition INFECTIOUS. In this way, Science Gallery 'made' the venture and its founder creative and entrepreneurial in the Science Gallery way: by claiming that the Science Gallery environment was the creative catalyst for SureWash through organising for the bodies of visitors to interact with the object of SureWash in the Science Gallery exhibition space. As a result, SureWash is now a creative and entrepreneurial product that aligns with and reinforces the Science Gallery brand.

Non-biomedical business ventures

Non-biomedical individuals and initiatives who are less intensively connected with the Governance Board, Leonardo Group and the SGT may feature in the Science Gallery

[164] https://www.tcd.ie/provost/addresses/2012-04-12-TrinityInnovationAward2011.php
[165] Ibid.

exhibition space, but less prominently so than their biomedical counterparts. For example, 'The Dublin Honey Project' has been involved in a number of Science Gallery events such as exhibition launch nights, yet founder Gearóid Carvill believes that their product offering -- raw honey harvested from each of the postcodes of Dublin -- is both too small and not 'technical' enough to play a significant role in the exhibition space.[166] This lack of relevance was manifested in exhibition launch nights that the company participated in. I observed two such events, whereby this venture and the objects of its products were located at the periphery of the upstairs floor space, far removed from biomedical products deemed more relevant, interactive and sensorially-stimulating.

Both more and less intensive connecting strategies therefore operate in the arena of entrepreneurship, with individuals from a biomedical background and with biomedical ventures more intensively connected to significant actors in the SGT. As a result, biomedical individuals feature more prominently in Science Gallery activities than their non-biomedical counterparts. However, some non-biomedical individuals contest the less intensive connecting strategies they are subjected to by actively negotiating how they are positioned in relation to the SGT. Here, they push back against their less intensively connected status by making themselves more intensively connected to other significant actors in Science Gallery. As a result, such non-biomedical individuals make themselves creative and entrepreneurial through practices that are both sanctioned and unsanctioned by Science Gallery, which I detail next.

Pushing back: negotiating strategies of connectivity

In this section, I detail how non-biomedical business owners used a combination of sanctioned and unsanctioned practices to negotiate their less intensively connected status

[166] Based on email correspondence

within Science Gallery. The first sub-section illustrates how these individuals alternated between both types of practices in order to make themselves more intensively connected to significant actors *inside* Science Gallery, such as the Founding Director. At the same time, they avoided becoming too intensively connected to SGT members via sanctioned Science Gallery practices such as Leonardo Group brainstorm meetings, realising that such connectivity was not in their own personal, entrepreneurial interests. The second sub-section details how the same individuals again used sanctioned and unsanctioned practices to connect with significant actors from *outside* Science Gallery, such as stakeholders and the public. As such, these individuals utilised other participants taking part in Science Gallery programming to further their own entrepreneurial ventures and make themselves creative.

Connecting with actors inside Science Gallery

Non-biomedical individuals actively negotiate the less intensive connecting strategies that involve them in Science Gallery programming, thereby making themselves more intensively connected to significant actors. For example, the head of a social enterprise spoke of the iterative process by which she made herself more intensively connected to Science Gallery. Firstly, she detailed the unsanctioned practices she initiated and carried out in order to establish contact with the Founding Director. Here, she became aware of Science Gallery in the early years of its development, and with a background in venture philanthropy she realised that Science Gallery could potentially act as a platform for her own venture:

> *"We were interested in ambitious [initiatives] that aligned with our objectives and our objectives were really about transforming Ireland in relation to certain things like mental health services for young people or establishing entrepreneurship as a core part of Irish values, things like that. Getting children's rights in the Constitution, things like that. So we had very big vision, that could maybe overlap with Science Gallery's [vision]."*[167]

[167] Entrepreneur 1: Interview

As such, she carried out background research on Science Gallery, particularly with regards to the organisations it involved in its programming at the time and the organisations it wished to involve in its future. In doing so, she realised social entrepreneurship was underrepresented in both the make-up of the Leonardo Group and in Science Gallery exhibitions. She subsequently approached the Founding Director outside of the Science Gallery space, highlighted this lack of representation and pitched her business venture as the appropriate solution:

> *"[The Founding Director] was quite new to the job, Science Gallery was quite new, and we were talking to him about 'if you're interested in, you know, science and technology and creativity, and entrepreneurship in relation to that, what about the social applications of all of those things? Because you're not really talking about those.' So what we would have been saying [is] 'if we go to your exhibitions, we see the social applications popping up everywhere, you know? You're looking at food security!' So we started a conversation."*[168]

This individual therefore actively engaged in practices unsanctioned by Science Gallery, whereby she researched the remit of Science Gallery, identified a gap in its programming concerning social entrepreneurship, and then pitched herself and her venture to the Founding Director as a way of addressing that gap. As such, she 'made' herself and her venture as a creative and entrepreneurial solution to a Science Gallery problem -- the lack of social entrepreneurship representation in Science Gallery programming.

The above-mentioned unsanctioned practices led to the Founding Director inviting the social enterprise founder to become a member of the Leonardo Group, where she could engage in the sanctioned practice of participating in brainstorm meetings and offer her suggestions for entrepreneurial content in Science Gallery exhibitions. However, she quickly realised that her influence was negligible as she was from a non-biomedical background:

> *"It was all scientists. So it was senior scientists who all had a very particular view of the world, of Science Gallery, of their role, and how their role was, you know,*

[168] Ibid.

> *pretty much the only role that was required. So I found that going to Leonardo Group [brainstorm meetings], it didn't really matter what you said. That kind of experience. So… I thought the culture on the Leonardo Group, and that is not what the staff would say to you? The staff would engage in everything. But in the end... the point of the Leonardo Group was to generate ideas, critique ideas, build networks, and sort of lead on the inter-cultural engagement. And I felt like that just didn't really happen."*[169]

She therefore engaged in the unsanctioned practice of using her Leonardo Group member status -- and the access it provided to other Leonardos and exhibitors -- to source contacts that she felt were useful to her own venture. In so doing, she circumvented the sanctioned practice of contributing her time and ideas through Leonardo Group brainstorm meetings and subsequently failing to reap personal, entrepreneurial benefits as well as failing to see her efforts materialise in the exhibition space. Similarly, she used her sanctioned status as a Leonardo Group member to strengthen her unsanctioned connectivity to the Founding Director, thereby bypassing the SGT who were responsible for engaging with Leonardo Group members and facilitating brainstorm meetings. The subsequent intensive connectivity with the most senior figure in Science Gallery management further legitimated her as both entrepreneurial and creative, allowing her to take advantage of her association with the Science Gallery brand of creativity to source contacts relevant to her own venture:

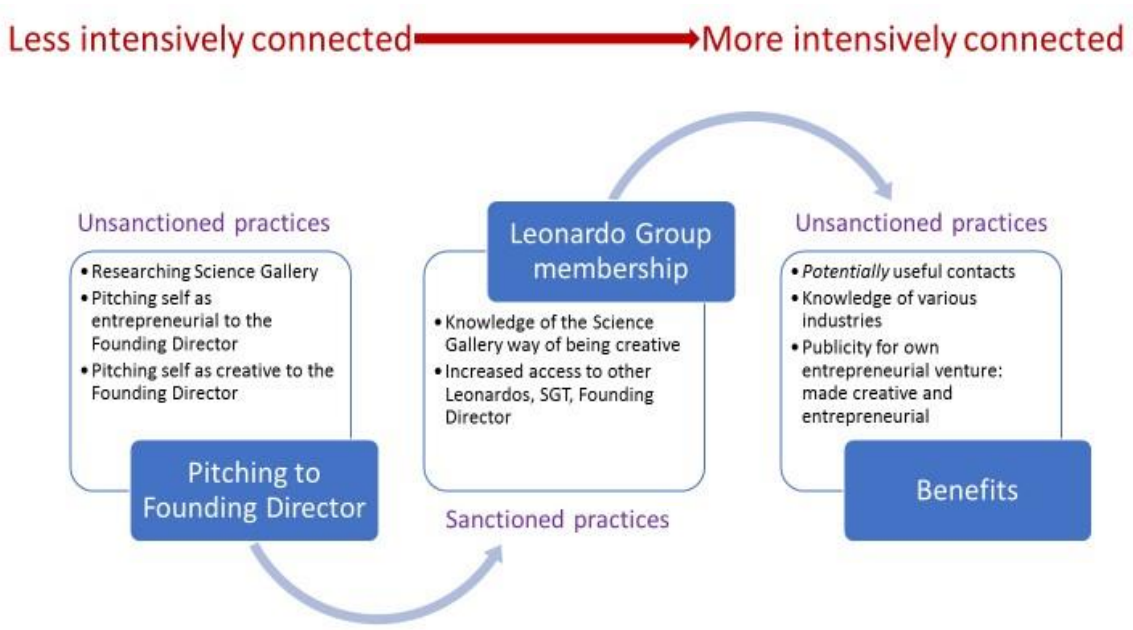
> *"So I was very frustrated [about the Leonardo Group] for a long time. I felt that I had a lot to offer but I wasn't able to find a way to offer it? And what I would end up doing is having coffee with [the Founding Director], giving him my ideas, or offering him this that or the other."*[170]

This non-biomedical business founder therefore engaged in a combination of sanctioned and unsanctioned practices to make herself more intensively connected to the Science Gallery Founding Director. Likewise, the intensive connectivity these practices produced allowed her to learn the Science Gallery 'way' of being creative, via participating in Leonardo Group brainstorms and understanding the actors and organisations Science

[169] Ibid.
[170] Ibid.

Gallery wished to connect with. Subsequently, she could source participants taking part in Science Gallery programming activities such as exhibitions who could further her own venture. As such, the individual negotiated her more intensive connectivity to the Founding Director and her less intensive connectivity to the SGT -- because of her non-biomedical background -- which in turn allowed her to make herself creative and entrepreneurial in her own way. **Figure 6.1** summarises the iterative process of sanctioned and unsanctioned practices that she engaged in.

Figure 6.1: The iterative process of sanctioned and unsanctioned practices engaged in by social enterprise founder



Much like the social enterprise example detailed above, several founders of digital media ventures utilised their position as Leonardo Group members, and the sanctioned practice of Leonardo Group brainstorm meetings, to identify exhibition participants that could prove useful for their own businesses. Here, one such individual describes how he used the sanctioned practice of Leonardo Group brainstorm meetings to identify exhibitors who

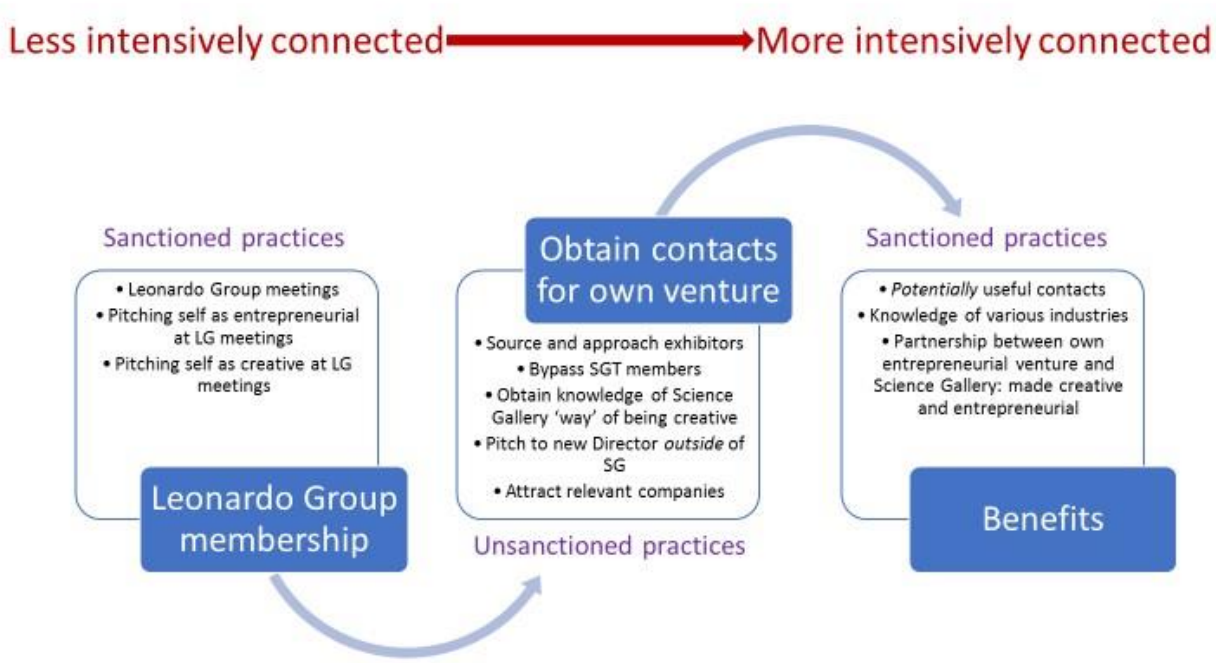
had been sourced by SGT members to take part in forthcoming exhibitions, before engaging in the unsanctioned practice of approaching said members informally outside of the Science Gallery space and pursuing collaborations with them:

> *"The nice thing about [Science Gallery] is it's a platform. I see it from my point of view, from my experience of it, as a sales pitch? Or a showcase... if you know what I mean. So, as in, because I'm kind of interested in stuff going on there so it might be like 'Oh my God, that's an interesting video artist'. And as much as all of that is kind of a showcase for him, so for example if you spot his project and you're curious about it then you'll find out that he's taking part in a certain exhibition or is with a certain company, and that's what he's interested in, then it becomes kind of a sales pitch for me [to connect with this video artist]."*[171]

Another digital media venture founder spoke of how he used unsanctioned knowledge gained from his sanctioned membership of the Leonardo Group to further his own business. Here, the individual learned from his sanctioned interaction with the SGT that the Science Gallery Governance Board was due to officially appoint a new Director of Science Gallery. He subsequently acted on this knowledge through the unsanctioned practice of approaching the incoming Director outside of the Science Gallery space with the hope of pursuing future business collaborations. In so doing, he sought to pre-emptively establish intensive connectivity with the Director-elect -- through bypassing the sanctioned practices of Leonardo Group brainstorm meetings and having to communicate with the incoming Director through the relevant SGT members -- to pitch his online company and potentially become a media partner for a forthcoming exhibition.[172] **Figure 6.2** again outlines the practices sanctioned and unsanctioned by Science Gallery in which this individual engaged.

[171] Entrepreneur 2: Interview
[172] Entrepreneur 3: Based on informal comments made post-interview.

Figure 6.2: The iterative process of sanctioned and unsanctioned practices engaged in by digital media enterprise founder



To recap this sub-section, individuals from non-biomedical backgrounds who engage in non-biomedical business ventures use a combination of sanctioned and unsanctioned practices to negotiate the less intensive connecting strategies by which they are connected to the SGT. In doing so, they make themselves more intensively connected to senior management figures -- such as the Founding Director -- and participants in Science Gallery programming -- such as exhibitors relevant to their own entrepreneurial ventures. These individuals subsequently achieve associated benefits, such as obtaining legitimation through more intensive connectivity with the Founding Director and utilising targeted exhibition participants to enable their own businesses. As such, non-biomedical individuals make themselves creative and entrepreneurial by negotiating the more and less intensive connecting strategies that involve them in Science Gallery programming.

Connecting with actors outside Science Gallery

Non-biomedical individuals position themselves with relation to stakeholders and the public in a similar manner as to how they position themselves with relation to the Founding Director and relevant exhibitors. Here, they negotiate the more and less intensive connecting strategies by which they are connected to Science Gallery in order to be associated with the Science Gallery brand of creativity, thereby making themselves creative and entrepreneurial in the eyes of outsiders. At the same time, they avoid becoming too associated with the Science Gallery brand of creativity, and in doing so portray themselves and their ventures as nimble and independent of Science Gallery strictures, such as partnerships with Trinity College and Government organisations. As such, non-biomedical individuals use both Science Gallery's brand of creativity and their own brand of creativity to make themselves creative and entrepreneurial in the eyes of stakeholders and the public.

Stakeholders

Non-biomedical individuals recognised the appeal of Science Gallery to stakeholders such as corporate sponsors, in that such organisations could become creative in the eyes of their peers and the public by being seen to be associated with the Science Gallery brand of creativity. This association could be brought about through practices such as funding initiatives:

> *"[Sponsors] also invest money in Science Gallery which potentially, they're aligning themselves, it's good for their corporate image and it works well and they're happy to do it."*[173]
>
> *"[A] lot of the businesses would sign up for [Science Gallery sponsorship] just because they like the Science Gallery."*[174]

[173] Entrepreneur 4: Interview
[174] Entrepreneur 5: Interview

> *"I think it is, like with IBM, I look at a lot of what they're doing, they do it with TED too, for them it's all about this association with the 'cool thought leaders', you know? And getting their message out there that they're on that interface, that they're cool and that what they do is cool."*[175]

Such individuals, therefore, recognised the role and reasoning of sponsoring organisations in providing funding and associating with Science Gallery, in that they could raise their profile and align themselves with a fashionably scientific -- and creative -- public engagement space.

Following from the above, non-biomedical individuals recognised that by associating with Science Gallery through the sanctioned practices of Leonardo Group membership and participation in programming activities such as Idea Transition Labs, they too could appropriate the Science Gallery brand of creativity and in turn become appealing to sponsors:

> *"Brands would come to us because they liked what we did [with Science Gallery]. And they liked what we represented. So because we'd built a particular cachet and respect [by being associated with Science Gallery], then it makes it much easier. The discussion happens because they want to be part of your platform. Therefore you have more control over it."*[176]

As such, they could make themselves creative through association with the Science Gallery brand of creativity, which in turn enabled their ventures as creative in the eyes of affiliated organisations. At the same time, they made themselves and their ventures entrepreneurial by using their new-founded creative status to engage in partnerships or business initiatives.

Whilst non-biomedical individuals saw the benefits of associating with the Science Gallery brand of creativity in terms of attracting corporate sponsors and collaborators, they were also wary of the potential disadvantages of becoming overly associated with this brand. This reluctance stemmed from their belief that if they became too intensively connected with Science Gallery programming -- via engaging in strictly sanctioned practices -- they would, in effect, become 'boxed in' to Science Gallery strictures, thereby losing control over their

[175] Entrepreneur 6: Interview
[176] Entrepreneur 2: Interview

own ventures. This loss of control, in turn, could potentially result in their entrepreneurial ventures being subsumed by larger academic and Government organisations. For example, one non-biomedical interviewee voiced his concern that Trinity College could gain control of any entrepreneurial initiatives that he might develop as a result of participating in sanctioned Science Gallery practices, such as workshops involving students:

> *"This is in Trinity College. Trinity College business and innovation hub is right behind you. They want to own everything. So if you come along here with a great idea or product or something, there's a big question mark as to what are we doing, who gets to develop it, who gets to own it, who gets to… and I think that needs to be worked out unfortunately at a higher level really; within Trinity College. Because I would think that… they're always watching what's going on here to see… they can feel that anything that's developed here should go straight in there. And they're not great."*[177]

The sanctioned channelling of entrepreneurial outputs from Science Gallery into such accelerator programmes, therefore, equates with individuals losing personal control of their entrepreneurial ventures:

> *"So when you talk to the [entrepreneurs] in those accelerators, their biggest problem is that they're in these accelerator programmes and they're taught this and this guy comes in and teaches them that and they sit down with their modelling… and the same thing happens with Enterprise Ireland*[178] *here. I have a friend who spent one and a half years on a start-up and I told them on day one where he should go and he just listened to them the whole time. And a year and a half later he came back and said 'I should have listened to you. I've just wasted a year and a half of my life'. I said 'Donal the reason I can see it is I'm on the outside looking in. I can see it. You just can't see it. You're just following the same programme that they developed for everybody.' So they're basically pushing every single HSBU*[179] *through this programme. 'We're over fence number one, we're over fence number two, now where do we go? We're over fence number three, we're over fence number four.'"*[180]

Another digital media founder and Leonardo Group member spoke of a similar reluctance in becoming too intensively connected to Science Gallery via the sanctioned

[177] Entrepreneur 5: Interview
[178] Enterprise Ireland is the government organisation responsible for the development and growth of Irish enterprises in world markets: https://www.enterprise-ireland.com/en/
[179] High Start-up Business Unit
[180] Entrepreneur 5: Interview

practices of engaging in 'official' collaborations run in the Gallery space. The risk of such intensive connectivity, he feels, lies in an incompatibility between academia -- which he sees Science Gallery as representing -- and entrepreneurship, in that academia is too slow and fails to be nimble enough in responding to market and consumer trends:

> *"If you go, and get into bed with a college accelerator, you're going to be working with maybe a Professor or a Dean or something like that who might be an eminent expert in a particular area but won't understand the fundamentals of how quickly things move. I mean, six years ago we didn't have iPhones. I mean it seems like forty years ago. I mean <u>six years ago</u>. In six years' time we won't have desktop computers. I mean, you have to move."*[181]

Likewise, the same individual felt that an intention of Science Gallery is to channel entrepreneurial spin-offs into associated Government programmes through sanctioned practices, whereby the ability of the venture founder to control -- and eventually sell their business for maximum financial return -- would be lost:

> *"When you're dealing with a third level college, and all the third level colleges are the same around the world, they're creating these business and innovation hubs, they're scaling businesses, they're becoming accelerators, they're doing all of these things. At the end of the day they're academics, right? And the core difference between an academic and a business person, I mean business people go to academics to learn to be smarter. Academics study business people and look at them. But when you turn a whole bunch of academics into accelerator experts, a whole set of problems emerge. You've the same set of problems that emerge with, you know, Enterprise Ireland and people like that who are trying to start up as many businesses as possible, but also have an underlying absolute purpose to not selling businesses and to keep everybody in Ireland and to keep all the jobs in Ireland. So if you get in to bed with Enterprise Ireland they don't necessarily ever want you to sell your business even if you want to do that. You know, they'll try and stop you from doing that."*[182]

To recap this sub-section, individuals engaged in non-biomedical ventures negotiate how intensively they are connected to Science Gallery, with the purpose of making themselves appealing to Science Gallery stakeholders. In doing so, they associate with and use the Science Gallery brand of creativity to attract and connect with relevant stakeholders.

[181] Entrepreneur 7: Interview
[182] Entrepreneur 7: Interview

At the same time these individuals are careful not too overly-identify with Science Gallery's brand of creativity for fear of losing control of their ventures. As such, entrepreneurs make themselves creative and entrepreneurial by negotiating how intensively connected they are to Science Gallery.

The Public

Individuals engaged in non-biomedical ventures are able to make themselves creative and entrepreneurial in the eyes of the public much like they make themselves creative and entrepreneurial in the eyes of stakeholders, in that they associate with the Science Gallery brand of creativity to further their own ventures without overly-identifying with such. For example, one owner of an entertainment company and former Leonardo Group member described how the life span of a former entertainment venue that he founded was extended through the publicity it received from association with Science Gallery. He stated that the press coverage his venue achieved from his participation in a Science Gallery exhibition resulted in greater visitor numbers, without which the venue would have closed a lot sooner than it did:

> *"We had no f***ing clue what we were doing [in running our venue]. It was like being in a band. We just did it … And Science Gallery certified it. They helped push us. That's the hustle, man. That's what we're all about."*[183]

Such individuals, therefore, recognised the benefit of association with the Science Gallery brand of creativity in that they too could achieve the label of being 'creative' in the eyes of the public, which in turn could lead to entrepreneurial benefits -- in this case increased visitor numbers to their venues.

Whilst associating with the Science Gallery brand of creativity had its benefits for some non-biomedical individuals, others were wary of over-association with it. For example,

[183] Entrepreneur 8: Interview

one business owner working in the graphic design industry spoke of the danger of his own brand of entrepreneurship becoming equated with Science Gallery and its associated sponsors. The danger here, he felt, was having his own 'edgy' brand of creativity diluted through association with Science Gallery's corporate affiliates; something that the public -- his potential future clients -- can sense quite easily:

> *"If you don't execute that [association] well and you give the corporate sponsors too much power, then it becomes this kind of corporate showcase crap."*[184]

Non-biomedical business owners, therefore, were wary of over-associating with the Science Gallery brand of creativity, for fear that their own brand of creativity and entrepreneurship would be negated in the eyes of the public.

Other non-biomedical individuals spoke of the legitimacy achieved through association with Science Gallery as a creative space being outweighed by the fact that Science Gallery produces little in the way of tangible creative outputs, other than itself. Investing time and effort participating in sanctioned Science Gallery exhibitions, therefore, is not considered a productive use of time and resources for some persons who feel they achieve little in terms of exposure to the public as a result:

> *"If 'success' is getting people engaged, and if you've gotten a million people in the door, but you know, seventy percent of those have never walked up the stairs and [have] just sat in the café, have you actually really done what you want to do? And you might feel great about it, but actually has it got you to where you want to be? So you might be saying 'that's fine', or you might be saying actually 'that isn't fine because really what we're doing is we're using the café to mask the fact that we aren't really engaging with a lot of people in the city.'"*[185]

These sentiments were echoed by a social enterprise founder and former Leonardo Group member who questioned the official Science Gallery exhibition visitor numbers:

[184] Entrepreneur 4: Interview
[185] Entrepreneur 7: Interview

> *"When you talk about footfall for example, you talk about the number of people who walk in the front door. I can guarantee you that the number of people who walk in the front door and the number of people who visit the exhibits, the exhibits is a percentage that is nowhere near the total amount of footfall. And yet, in a sense, everyone's counted as having been to the Science Gallery, right? And so you talk about hundreds of thousands of people, a lot of them just come in to get a coffee, right? Because it's a nice café, you can see the street, there isn't kind of that much around the area there, it's good for the college, it's a good place to meet."*[186]

As such, non-biomedical business owners were reluctant to equate their own brands of entrepreneurship and creativity with that of Science Gallery, feeling that the Science Gallery brand of creativity was not necessarily compatible with their own, and failed to produce tangible creative outputs that could benefit their ventures.

Finally, whilst those involved in non-biomedical ventures often participated in the sanctioned 'creative' practices of Science Gallery workshops and Idea Transition Labs involving the public that were run in conjunction with exhibitions, they were wary of investing too much time and effort in such. Their reasoning again was that these initiatives produced little in the way of sustainable creative outputs, and therefore failed to boost their own brands of creativity and entrepreneurship in the eyes of the public:

> *"So they happen on the weekend, get them in on a Friday morning, send them home on a Sunday evening. Get in speakers, get in facilitative workshops, get them into small teams, blah de blah. I think it's great, I've got nothing against them. I think it generates enthusiasm. But… I haven't done the analysis, it might be something that you're doing, but if you do the analysis, I would be stunned if you didn't find that most, pretty much everything that comes out of there has a life span of a couple of weeks. It just fades away, right?"*[187]

Subsequently, the same individual sees Science Gallery's entrepreneurship and creativity initiatives as failing to be entrepreneurial or creative at all:

> *"So I think, you know, but in a way everyone feels great, because they say 'hey, we're in the entrepreneurship movement, we help hackathons, right? So now we are in the entrepreneurship space, that's great, good for press, good for going to*

[186] Entrepreneur 9: Interview
[187] Ibid.

the university, good for going to government saying you should give us some money because we're doing the entrepreneurship thing.' Everything feels great; great for a couple of press releases, all good, ok, and you walk away saying 'yeah, we've done our part.' But actually you haven't really."[188]

Non-biomedical individuals therefore make themselves creative in the eyes of the public much like they make themselves creative in the eyes of stakeholders, in that they negotiate between being more and less intensively connected to the Science Gallery brand of creativity. This negotiation is achieved through a combination of sanctioned practices, such as participating in Science Gallery exhibitions, workshops and Idea Transition Labs, and the associated legitimacy of being 'creative' in the eyes of the public that these practices bring. At the same time, they are careful not to invest too much time and effort in such sanctioned practices, and in effect 'pull back' from overly-associating with the Science Gallery brand of creativity to preserve their own brands of creativity and entrepreneurship. The following case study illustrates the dynamics involved in making a non-biomedical business venture entrepreneurial and creative.

Case Study: Adaptics Ltd.

Science Gallery claims to have played a fundamental role in the development of Adaptics Ltd,[189] a software technology company that specialises in developing a range of app-connected hardware products. Officially founded in 2012,[190] Adaptics Ltd. provides 'Drop,'[191] an iPad-connected kitchen scale and digital baking assistant for home bakers. The company offers an interactive recipe platform in App form that guides home cooks through finding, making, and sharing their dishes.

In their 2015 Draft Impact Report, Science Gallery purports to have acted as the creative catalyst for Drop insofar as the Gallery space connected the team of individuals who went on to form Adaptics Ltd. through one of its exhibition projects called 'Playhouse'.[192] A large art/technology project, Playhouse transformed a building in Dublin's city centre into a giant fifty metre, low resolution TV screen upon which members of the public were invited to create animations with sound and music via the Playhouse website. Science Gallery states that Playhouse began through a 'conversation' facilitated in the Gallery space[193] from which

[188] Ibid.
[189] https://www.bloomberg.com/profiles/companies/1084245D:US-adaptics-ltd
[190] https://www.solocheck.ie/Irish-Company/Adaptics-Limited-516536
[191] https://www.getdrop.com/
[192] https://web.archive.org/web/20141226072752/http://playhouse.daft.ie:80/about
[193] https://dublin.sciencegallery.com/blog/timredfern/2009/09/playhouse-project

Science Gallery provided the *'network of creators and innovators with the skills'*[194] to realise the project. In turn, this catalysing role is supported by the narrative in the 2015 Draft Impact Report of entrepreneur and Playhouse co-founder, Brian Fallon:

"A series of conversations in Science Gallery sparked the Playhouse project. It started with a single chat about how cool it would be if someone did a 'Blinkenlights'[195] *style installation in Liberty Hall. Before I knew what was happening, I was introduced to likeminded interactive artists, lighting designers, event producers, software programmers and LED specialists — all of whom were somehow connected to Science Gallery. Within one week of that first conversation it became clear that we had the makings of a team that could pull off such a project. Without the catalytic presence of Science Gallery, I have no idea how the unique set of skills required for such a project could ever have been brought together."*[196]

Similarly, Chief Technical Officer of Adaptics Ltd. Tim Refern endorses Science Gallery as the instigator of both Playhouse and Drop through the network of specialists and inspiration it provided via the Gallery space:

"After Playhouse, a discussion began between three of the core developers about starting our own hardware company. Three years later, our start-up company, 'Drop' is in partnership with PCH International[197]*, has attracted investment from China, Ireland and the US, and will soon be shipping our first product, 'Drop', an iPad kitchen scales, from a factory in Shenzhen, China. A journey that began in the unique creative atmosphere of the Science Gallery."*[198]

A deeper analysis suggests a more complex story. When I contacted Tim Redfern and asked about the role Science Gallery played in influencing Drop, he responded that the Gallery's influence was far less than that which he expressed in the Draft Impact Report:

> *"Science Gallery was certainly instrumental in the inception of a project we did from 2008-2009, 'Playhouse Dublin'. Although 3 of the founders [of Drop] were involved in Playhouse, I think it's a bit tenuous to say there's a real connection between Science Gallery and Drop. The real turning point for Drop was Highway1."*[199]

Highway1 is an American-based four-month hardware start-up accelerator programme run by PCH International designed to provide business support ranging from product design, financial planning and branding networking opportunities to selected participants. It was this

[194] Science Gallery (2015) Draft Impact Report, p.76
[195] http://blinkenlights.net/
[196] Science Gallery (2015) Draft Impact Report, p.76
[197] PCH International is a product design and engineering company: http://www.pchintl.com/about-pch/
[198] Science Gallery (2015) Draft Impact Report, p.76
[199] Email correspondence with Tim Redfern

programme that provided the creative and entrepreneurial ingredients to enable and realise Drop, in terms of bodies -- such as business development coaches, community connections, manufacturing experts and venture capitalists -- and objects -- such as investment capital, product design and development equipment, manufacturing and distribution technology; all in the space of Highway1. Similarly, an important catalyst for Playhouse was a trip to Berlin in 2003 where co-founder Brian Fallon observed and experienced a similar project:

> *"After stumbling upon the Blinkenlights Reloaded installation on a trip to Berlin in 2003, Brian became captivated with the concept and the idea of doing a similar project in Dublin."*[200]

As such, the intensive connectivity between the core members of the founding team and the Science Gallery Founding Director played an important role in the formation of Drop. This intensive connectivity came about through personal association between one of the co-founders and the Founding Director. This significant actor in the Science Gallery assemblage then personally introduced co-founder Brian Fallon to CTO Tim Redfern, and subsequently introduced both to the future producer of Playhouse.[201]

In this way, the founding members of Adaptics Ltd. aligned themselves with and reinforced the narrative of Science Gallery being the catalyst of their venture, thereby receiving the benefits of publicity and legitimation as a 'creative' enterprise inspired by the 'creative' Science Gallery environment. As such, we can see how the creative and entrepreneurial brand of Adaptics Ltd. and Drop were formed through iterative interactions between the founding team and Science Gallery as the former negotiated both more and less intensive connecting strategies. Firstly, they utilised their more intensive connectivity with the Founding Director to become associated with the Science Gallery brand of creativity and achieve the benefits of publicity and legitimation that such association brings. Secondly, they

[200] https://web.archive.org/web/20141226072752/http://playhouse.daft.ie:80/about
[201] Based on email correspondence with Tim Refern

negotiated between being completely embedded within the Science Gallery brand -- thereby being seen by stakeholders and the public as merely a Science Gallery product or initiative -- or completely independent of this brand -- thereby failing to achieve any of the publicity and legitimation that comes with such association. As a result, both parties benefitted through mutual association, in that Science Gallery helped make Adaptics Ltd. and Drop creative through association and vice versa, with the co-founder and CTO negotiating their connectivity to Science Gallery by way of the Founding Director as significant actor.

Entrepreneurship, creativity and opportunity

In this chapter, I have illustrated how individuals are neither 'entrepreneurial' nor 'creative' because they discover pre-existing opportunities in their environments or cognitively form opportunities in isolation from their environments, as espoused by traditional entrepreneurship theory informed by economics and psychology. Instead, my data shows that individuals *make* themselves entrepreneurial and creative through an iterative process of engaging with their environments, which in turn shapes not just *how* opportunities are realised by entrepreneurs, but the very notion of *what* an opportunity is.

For those individuals with biomedical backgrounds and engaged in biomedical ventures, being entrepreneurial and creative is relatively straightforward. Here, the iterative process is already established and endorsed by Science Gallery and organisations in the Science Gallery assemblage, in that the opportunities formed are in a sense guided by Science Gallery power strictures and relations, and are carried out via sanctioned practices. As such, negotiating more or less intensive connecting strategies is not an issue for those individuals with a biomedical orientation, as they already align with the Science Gallery 'way' of being creative and, subsequently, entrepreneurial. Indeed, for these parties, opportunities come to be in a relatively easy and normative manner.

The situation is more difficult in the case of individuals engaged in non-biomedical ventures. Here, the iterative process is less established and is unendorsed by Science Gallery, in that opportunities are formed through negotiating the more and less intensive connecting strategies via a combination of sanctioned and unsanctioned practices. Here, individuals make themselves creative by establishing their own intensive connectivity to significant actors inside Science Gallery, such as the Founding Director, and outside Science Gallery, such as stakeholders and the public. In so doing, non-biomedical individuals make themselves entrepreneurial and construct their own brands of creativity in relation to that of Science Gallery. Here their brands are neither entirely aligned or associated with Science Gallery's nor entirely separated and divorced from such, but are formed through negotiating more and less intensive connecting strategies. Consequently, it is in this iterative process of moving back and forth between both brands that individuals make themselves creative and entrepreneurial, and both generate and realise opportunities.

CHAPTER 7: DISCUSSION

I begin this section by recapping the main points of my preceding chapters. In doing so, I revisit my three research questions and explain how I have answered them. I then discuss the contributions of my study to creative forms of entrepreneurship -- in particular entrepreneurship as organisation creation -- including ways of researching these areas based on my experiences in this study. I conclude by emphasising the importance of foregrounding creativity in future entrepreneurship studies.

Entrepreneurship and Creativity

In the early sections of this thesis I outlined the increased emphasis on entrepreneurial thinking and behaviour in organisational life. Here, organisations have sought ways to become creative as a response to a more complex and volatile globalised marketplace where they have become susceptible to factors outside of their control, such as market fluctuations and downturns. Creativity is seen as a way of overcoming such challenges -- not just in terms of the lone individual generating new ideas, but by shaping the conditions whereby multiple actors can interact and form novel solutions or new ways of working, which can be subsequently harnessed by the organisations in question.

Entrepreneurship and acting entrepreneurially are seen by organisations as ways of generating creativity in that entrepreneurs are perceived as able to creatively organise their environment and produce value, for example in terms of new products, processes or services. In doing so, entrepreneurs are believed to circumnavigate restrictive bureaucracy and red tape, thereby identifying and exploiting opportunities that might otherwise be missed by those working within traditional organisational structures. Entrepreneurs, therefore, are seen to creatively think and act ‘outside the box’, and by encouraging such thinking and acting though certain initiatives -- such as ideas incubators and accelerator programmes --

organisations from industry to academia can, in turn, instigate and harness creativity for their own ends.

I went on to show how, despite the burgeoning interest in creative entrepreneurship across a variety of organisational arenas, understandings of creativity are limited in traditional entrepreneurship literature informed by economics and psychology. Firstly, I showed how both economic and psychological approaches to entrepreneurship confine creativity to the individual entrepreneur. Economic models delimit creativity to a set of prescriptive steps taken by the rational, calculating entrepreneur in the pursuit of monetary profit, while psychological models confine creativity to the cognitive abilities and personalities of entrepreneurs, which are implied as being more advanced creatively than the abilities and personalities of non-entrepreneurs. Secondly, I argued that traditional approaches to entrepreneurship tend to limit creativity to the opportunity recognition stage of the entrepreneurial process, with economic approaches focusing on how entrepreneurs recognise the value of particular resources that others do not, while psychological approaches tend to restrict creativity to the initial idea recognition stage. Thirdly, I explained how economic and psychological approaches both exclude the material aspects of creativity, particularly the roles that bodies, objects and spaces play in enabling and influencing creative behaviour. Taken together, I showed how traditional approaches to entrepreneurship deny alternative ways of being creative outside of the individual bounded entrepreneur behaving in a prescriptive manner.

Entrepreneurship as Organisation-Creation

I proceeded by outlining an alternative approach to entrepreneurship designed to foreground the role of creativity: entrepreneurship as organisation-creation. Here, attention moves from the actions of the individual entrepreneur -- in terms of identifying resources with the goal of achieving monetary profit -- or something the individual entrepreneur has --

in terms of cognitive traits and abilities -- to organising *for* creative acts to happen, and the subsequent harnessing of such acts via other forms of organising. As such, the notion of entrepreneurial creativity moves from recognising pre-existing opportunities to generating different types of opportunities that can then be explored.

I presented two key implications of such a relational and emergent approach to entrepreneurship. Firstly, there is the need to view entrepreneurship research through a *process* lens that considers people, things and categories in terms of ceaseless change and transformation. In so doing, attention shifts from the fixed categories of traditional entrepreneurship literature such as personality traits and opportunities to the creative practices that occur in making a product or enacting an idea. Secondly, I presented the notion of the *assemblage,* which addresses the productive capacity of bodies, objects and spaces coming together. Assemblage thinking breaks down the scientific dualism of cause and effect that characterises traditional approaches to creativity in entrepreneurship literature, whereby the individual entrepreneur is the source of creative ideas that they implement in a linear, prescriptive manner. Instead, the focus turns to the activities that take place around entrepreneurial acts, with creativity occurring in the coming together of elements in the assemblage and the possibilities that result from these interactions. As such, the material and immaterial elements of the assemblage constitute the capacity for new opportunities by being arranged or organised in particular ways -- they form the springboard for new potentialities.

While entrepreneurship as organisation-creation allows for a more inclusive and richer account of creativity than economic or psychological approaches, questions still remain regarding *how* different elements of the creative process come together -- in terms of the bodies, objects and spaces that constitute assemblages -- and *what happens* in this coming together. In order to answer these questions, I explored the creative capacities of bodies, objects and spaces, how they intertwine and the effects of such intertwining.

Bodies, Objects and Spaces: Creative Capacities

Firstly, I showed that the body has a dynamic role in creativity, in that people come to know the world by interacting with other bodies and objects within it and experiencing such interactions through their senses. These interactions translate into an implicit form of knowledge that is hard to explain in logical, analytical terms, but can prove to motivate or provoke at an emotional or pre-reflexive level. Bodies, therefore, are active in generating new ways of knowing and experiencing the world -- or the assemblages that they find themselves in -- through such interactions.

Secondly, I argued that objects are more than just inanimate resources or products in the traditional entrepreneurial process. Instead, they are infused with meanings because of the social experiences they take part in, in terms of their relationships with other individuals and things. These meanings vary depending on the assemblages that such objects are a part of -- what bodies they interact with, where and when these interactions take place and how they occur. Objects can, in turn, serve to produce new meanings through such interactions by stimulating individuals at the pre-reflexive level, thereby provoking other ways of comprehending or perceiving an issue.

Thirdly, I showed that spaces are not simply neutral containers in which entrepreneurs operate but influence how bodies and objects in an assemblage interact. Such interactions occur through the physical arrangement of space, which can, in turn, effect other interactions in related spaces. Likewise, spaces are not just physical but are comprised of past interactions of bodies and objects that have moved through them and future imaginings of how they could be. Spaces therefore are relational, in terms of both their past and future incarnations and the bodies and objects that pass through them. Like bodies and objects, spaces can produce strong emotional effects or intensities that are felt at the pre-reflexive level, which can

stimulate people to act at the level of feeling rather than the level of conscious, logical evaluation.

In sum, I have shown how entrepreneurship as organisation-creation attempts to expand the theoretical basis of entrepreneurship to increase the possibilities of creativity through multiple and alternative ways of being entrepreneurial. Likewise, I showed how bodies, objects and spaces -- and the interactions between them -- can also increase such possibilities through the generation of creative capacities. However, empirical studies that seek to understand the creative capacities of assemblages -- and the bodies, objects and spaces that constitute them -- is relatively rare. Accordingly, I developed my first research question: *may bodies, objects and spaces be organised to produce creativity as a capacity?*

Creativity -- A Personal and Organised Experience

I addressed my first research question by zooming in through my observation and participation in the evening event *'House Party – Everyone Back to Ours'* associated with the Science Gallery exhibition HOME\SICK. In doing so, I showed how creativity, or the potential for such, came about at the point where bodies, objects and spaces intersect. In the case of my study, it was the intersection of my own biographical experience with the object of the chair and the experiences of its past life -- the other bodies, objects and spaces it had previously been connected with and the land-scapes and time-scapes the chair and such connections evoked -- all experienced through my sensory repertoire.

Foldings of bodies, objects and spaces

I conceptualised the intersection of bodies, objects and spaces as the *folding* of these entities into one another, whereby the mutually-exclusive, subjective categories of body, object and space are broken down and overlap with each other. Such foldings rupture how bodies, objects and spaces are normally represented and interpreted, and allow for new

relations or connections to be established between them and other bodies, objects and spaces they evoke. These new relations and connections form creative capacities -- the potential for new ways of thinking and acting. In the case of my vignette, my own personal experience was connected to that of the artist and the object of her artwork, which in turn problematised the dominant narrative of post-recessionary Ireland, thereby allowing for other alternatives to be imagined.

I went on to show that such foldings do not simply happen by chance in neutral, value-free ways. Instead, organising forces are active in determining which bodies, objects and spaces are brought together, when they are brought together and how they are brought together. In the case of Science Gallery, such forces were manifested in the spatial and temporal planning and enactment of the evening event whereby Science Gallery organised for visitors to interact with particular objects of art, which were in turn guided by particular exhibition themes.

Organising forces, however, cannot completely determine the intersections of bodies, objects and spaces because the foldings that occur at such points -- and the corresponding unfoldings that result -- serve to undermine that which seeks to order them. In Science Gallery, this undermining was manifested in the actions of the participating artists and the indeterminacy of my own creative capacity that did not 'fit' with the Science Gallery exhibition experience. As such, indeterminacy and creativity are relational and loaded with tensions: if organisational forces bear down on bodies, objects and spaces and seek to control how they fold and unfold, the capacity for new ways of comprehending a phenomenon are subsumed. At the same time, organisational forces are necessary to assemble such hybrid bodies, objects and spaces that can lead to creative moments.

To conclude this section, the answer to my first research question*: how may bodies, objects and spaces be organised to produce creativity as a capacity* lies in the organised

foldings of such bodies, objects and spaces, and an allowance for unplanned lines of flight from the subsequent unfoldings or potentialities that are produced.

Contributions: Creating Creativity

My study contributes to existing work that seeks to understand the conditions for organisational creativity and entrepreneurship (e.g., Pallesen, 2018; Koch et al, 2018; Thompson, 2018; Sternberg & Krauss, 2014; Moeran & Christensen, 2014) by opening up the 'black box' of creativity and showing the processes that take place when new ideas or ways of working -- or the potential for such -- are formed. In doing so, I show empirically that creative processes involve a rich set of ingredients in the form of bodies, objects and spaces that 'fold' and 'unfold' in different ways. Theoretical understandings of how the constituent parts of such creative processes come together and what happens in this coming together are rare (Johnstone, 2010; Weiskopf & Steyaert, 2009) while empirical studies are even rarer (Welter, 2010). Work that does exist tends to prioritise one ingredient of creativity at the expense of others, such as the individual creative entrepreneur (McMullen et al, 2017; Sørensen, 2008), physical instruments or tools (Duff & Sumartojo, 2017; Gallagher & Grimm, 2018) text (Dashipour & Rumens, 2017) or a particular spatial set-up (Alexandersson & Kalonaitye, 2018; Sheffield et al, 2017). Likewise, work that pays attention to the non-human factors involved in creativity is often ambiguous when it comes to the role of the 'knowing' subject in generating creativity (Finkel et al, 2017). In this thesis, I demonstrate to scholars the importance of going beyond reducing creative processes to one or two ingredients or false dualities such as agency and structure, and instead complexifying in order to understand how such phenomena happen, and who and what is involved. In turn, I show how such conjunctive theorising (Tsoukas, 2017) can be achieved by focusing on the relations and connections between the bodies, objects and spaces -- often investigated in a compartmentalised manner -- that are involved in creative processes.

Bodies, Objects and Spaces: Power

I moved on to explore the role of power in shaping creative capacities by addressing how people and organisations act to influence assemblages, in terms of manipulating how bodies, objects and spaces come together. I showed that, in entrepreneurship as organisation-creation, researchers suggest that the intent or authority of such actors only takes effect *after* bodies, objects and spaces intersect, when such creative sparks are directed to managerial ends (Hjorth, 2014). According to this view, creativity is limited to the initial phase of organisation creation -- the coming together of bodies, objects and spaces -- before power takes over in harnessing such creativity for instrumental ends.

I argued, however, that intent or authority influences the coming together of bodies, objects and spaces. To reinforce my argument, I drew on the work of Allen (2009, 2010) who shows that actors can influence the creative capacities of an assemblage by positioning themselves in relation to one another. Here, actors who align and intensively connect with each other -- because they have shared goals, for example -- consequently enable each other, while at the same time distancing others who do not share their goals. These more and less intensive connecting strategies influence how the capacity of an assemblage unfolds. Power, therefore, is not held by any one party and is instead disaggregated and negotiated between actors in the assemblage.

I elaborated on Allen's view of power by examining research that deals with how power influences bodies, objects and spaces. Firstly, I argued that power operates on bodies in both prohibitive and productive ways. As such, the body is not simply acted on by power in a top-down manner, but actively contributes to the production and reproduction of power relations. Secondly, I argued that power relations are exercised both on and through material objects, in that objects are embedded in social and political relations which give them meaning. These meanings can in turn empower or disempower individuals who interact with

such objects. Thirdly, I argued that space is intricately linked with power relations in that it is both a means to organise actions and an outcome of those actions. Relating this work on bodies, objects and spaces to Allen's notion of connectivity, I discussed how assemblages of bodies, objects and spaces have differing power effects depending on how the constituent parts are organised and related to each other, with different conditions of possibility produced by different arrangements of such. Linking this work on power to entrepreneurship as organisation-creation led me to my second research question: *what role does power play in the formation of creative capacities?*

Creativity -- A Power(full) Experience

I addressed my second research question by zooming out from the organised foldings of bodies, objects and spaces in Science Gallery to the broader context of relations and connections that influence these foldings. Specifically, I explored how power was manifested in the more and less intensive connecting strategies that linked Science Gallery to different scientists and artists. These connecting strategies, in turn, had intended and unintended power effects, which consequently influenced the 'brand' or 'style' of creativity that was accomplished in Science Gallery activities. As such, I showed that power infuses the formation of creative capacities through more and less intensive connecting strategies, and in intended and unintended ways.

More and less intensive connecting strategies

My findings showed power working through more and less intensive connecting strategies, whereby scientific researchers with a biomedical focus were more intensively connected to significant actors in Science Gallery such as Science Gallery Team members. In turn, these researchers had more influence on the constituent bodies, objects and spaces that made up the individual exhibitions, in that they and their work featured prominently.

Conversely, non-biomedical researchers and artists were less intensively connected to the same significant actors, with the result that both they and their work featured less prominently than their biomedical counterparts. Essentially, these more and less intensive connecting strategies had intended power effects in that they constituted the capacity for assemblages of biomedical bodies, objects and spaces to be facilitated over non-biomedical ones in Science Gallery programming.

I proceeded to zoom out from the immediate Science Gallery exhibitions and showed how certain assemblages of bodies, objects and spaces, formed by more and less intensive connecting strategies and their associated power effects, constituted a particular 'brand' or 'style' of creativity espoused by Science Gallery. I illustrated how this brand was distinctly biomedical, in that Science Gallery made biomedicine creative by using biomedical themes to guide its exhibitions and by prominently featuring biomedical work in its exhibition space. As such, visitors to Science Gallery interacted with biomedical science, and came to view biomedicine as 'collaborative' and 'creative' by how it was communicated through exhibits and experiments. In turn, I showed how Science Gallery used the biomedical brand of creativity produced to position itself as the dominant player in science communication, thereby aligning itself with relevant government and corporate agencies that provided it with resources and legitimation. The Science Gallery biomedical brand of creativity, therefore, formed the capacity for Science Gallery to position itself relative to significant funding agencies.

I continued by showing that more and less intensive connecting strategies had unintended power effects, stemming from the unequal distribution of benefits between those who were more intensively connected and those who were less intensively connected. Such unintended power effects were manifested in tensions between the respective sets of actors, such as biomedical and non-biomedical researchers, Science Gallery and non-biomedical

researchers, and Science Gallery and artists. Taken together, I illustrated how such tensions called into question the very representation of science that Science Gallery propagated, and in turn undermined the dominant biomedical brand of creativity that Science Gallery espoused. As such, I concluded by showing that such unintended power effects allowed the capacity for other ways of thinking about who and what gets to be scientific and creative to emerge.

To conclude this section, the answer to my second research question: *what role does power play in the formation of creative capacities* lies in the more and less intensive connecting strategies that link the bodies, objects and spaces of an assemblage in particular formations. The resulting power effects further shape such creative capacities, in that intended power effects constitute the capacity of an assemblage to strengthen and perpetuate itself by aligning with compatible bodies, objects and spaces, while unintended power effects form the capacity for other ways of being creative to emerge. Power, then, infuses the formation of creative capacities.

Contributions: Organising Creativity

My study contributes to literature on organisational creativity by showing that power is neither divorced from creativity nor confined to the harnessing of creative outputs, but infuses creativity and the ways in which creative processes are manifested. To elaborate, the relationship between power and creativity is ambiguous in entrepreneurship as organisation-creation (Hjorth, 2012; Gartner, 2012; Hjorth, 2011; Gartner, 2008). Here, the potential for a new idea or way of working is disconnected from power in that it emerges from interactions between different entities without the direction or intent of individuals. Instead, power is seen as a factor after this creative potential is sufficiently formed so that it can be harnessed by organisations (Hjorth, 2014). Such new ideas or ways of working are established in spaces of provocation (Hjorth, 2005) which 'withdraw from the reigning order and the necessities of the present and offer spaces for imagination, for creation, and for everyday creativity'

(p.392). The creativity produced in these spaces is juxtaposed with ‘managerial regimes in business organisations, and society at large’ (p.396) who seek to screen and control that which is produced.

I contribute by showing that power extends beyond the harnessing of new ideas or ways of working, and instead influences the potentialities or ‘incipiencies’ (Beyes & Steyaert, 2011a) of organisation-creation by shaping which bodies, objects and spaces are put together and how they are put together. Likewise, spaces of provocation (Hjorth, 2011a, 2005) are neither neutral nor value-free and separate from organisational structures, but are infused with power relations. These relations consequently determine the creative potential produced by allowing some bodies, objects and spaces to participate while excluding or marginalising others. As such, scholars interested in learning how to enhance the conditions for organisational creativity -- and how to incorporate this creativity into organisational projects -- can benefit by considering the symbiotic relationship between creativity and power. There is no demarcation between the two concepts: instead, both are relational and productive of each other, in that creative capacities cannot be formed without the power relations that inform them, and creative outputs -- for example, new practices or ways of working -- cannot be realised without the power relations and strategies that shape how they are manifested. Power therefore permeates creativity, which needs to be born in mind by those interesting in understanding not just how, but why creativity ‘becomes’ in a certain form, and who benefits from that becoming.

My study also makes a practical contribution in that those interested in cultivating organisational creativity through initiatives such as ideas incubators (Sayiner, 2015) and workplace interventions (Kudesia, 2015) can benefit from a greater awareness of the power relations and strategies that occur there. Such relations and strategies determine the bodies, objects and spaces that are included in these programmes, and how that inclusion is

manifested. Here, the goal is often to produce a particular 'type' of creativity, such as new workplace practices that prove beneficial to the organisation in question. As I have shown, however, creative potentials are not value-free and are influenced by organisational strategies and relations that allow some bodies and objects to participate more meaningfully than others. As such, more inclusive and useful practices may be developed if those organising such initiatives have a greater awareness of the employees and objects of work that get to participate, and how such participation is facilitated. In terms of workplace interventions, this awareness could take the form of facilitating a diverse cohort of staff and transparently communicating how the emerging ideas and practices are harnessed. Likewise, organisations might benefit by developing cross-functional teams consisting of employees from different departments or functional units who can run relevant projects. Creative capacities, therefore, are generated by organising *for* a diverse set of bodies and objects to interact in different spaces, with the resulting practices developed and incorporated into the organisation through other ways of organising. As such, more unexpected and valuable practices may be developed compared to similar initiatives involving a narrower or more restricted spectrum of employees, or projects that fail to utilise the variety of operational units within an enterprise.

Bodies, Objects and Spaces: Entrepreneurship

Finally, I highlighted the limited attention to power in traditional entrepreneurship literature. Here, power is restricted to that possessed by the body of the the individual entrepreneur. The role of objects in the traditional entrepreneurial process is limited insofar as they are utilised in the act of new venture creation, while space is reduced to a neutral container in which the entrepreneur operates in. From this, I developed my third research question: *what are the implications of power for entrepreneurship?*

Creativity -- A Productive Experience

My findings showed that the biomedical brand of creativity that Science Gallery promotes also favours a biomedical type of entrepreneurship. Here, individuals from a biomedical background who worked on biomedical ventures were favoured over individuals from non-biomedical backgrounds who worked on non-biomedical ventures. Therefore, individuals specialising in biomedicine were more likely to be constructed as 'entrepreneurial' because they were more intensively connected to the relevant Science Gallery Team members than those specialising in alternative disciplines.

My analysis showed how individuals involved in non-biomedical ventures were able to make themselves entrepreneurial -- and creative -- by negotiating the more and less intensive connecting strategies by which they were involved with Science Gallery. Specifically, these individuals made themselves more intensively connected to significant members of the Science Gallery Team, thereby achieving the benefits of legitimation and publicity. Furthermore, the same individuals made themselves creative in the eyes of the public and Science Gallery stakeholders, such as corporate sponsors and Government agencies, by associating with Science Gallery's brand of creativity. At the same time, such individuals retained their own creative and entrepreneurial brands, thereby avoiding becoming overly-identified as part of Science Gallery and, in their own eyes, risking their ventures being subsumed by government and university suborganisations and initiatives.

The implications of power for entrepreneurship, therefore, are that intensive connecting strategies form the capacity for individuals to be entrepreneurial, with those more intensively connected to key management figures being constructed as being more entrepreneurial than their less intensively connected counterparts. Nonetheless, individuals who are less intensively connected can form their own entrepreneurial capacities by 'pushing

back' and renegotiating their less intensive connectivity. Power, then, shapes the very notion of entrepreneurship and what being an entrepreneur means.

Contributions: Entrepreneurship as new business formation

My study expands on how entrepreneurs are judged to be creative in traditional entrepreneurship literature by shifting the focus from how opportunities are realised by entrepreneurs, to opening up the very notion of what an opportunity is. To elaborate, economics-based approaches see entrepreneurs as creative insofar as they discover pre-existing opportunities which can be subsequently exploited (Casson, 2003). Psychological models also limit creative thinking and behaviour to identifying profitable opportunities which are either generated by market forces external to the entrepreneurs' social experience (Shane, 2012) or subjective and made by the entrepreneur possessing creative abilities based on personality characteristics (Alverez & Barney, 2010). My work shows, however, that opportunities come into being through iterative interactions amongst multiple bodies -- not just the entrepreneurs' -- and multiple objects and spaces in the environment. Furthermore, I show that power influences who is made creative and entrepreneurial and who is not, in that some individuals are made more creative and entrepreneurial because of how intensively connected they are to significant actors in influential organisations. Such organisations can enable and advance new ventures, for example by providing 'hard' and 'soft' resources in the form of capital and publicity. At the same time, others are made less creative and entrepreneurial due to their less intensive connectivity to the same organisational members. My study also contributes by showing how less intensively connected individuals can *make* themselves creative and entrepreneurial by negotiating their less intensive connectivity through practices that are both sanctioned and unsanctioned by the organisations they are involved with. It is through these negotiations that individuals acquire the resources they need to make themselves creative and entrepreneurial -- for example, investment capital or

legitimation in the eyes of stakeholders. Entrepreneurs, therefore, make themselves creative -- and create opportunities -- through an iterative process of engaging with their environments.

My study suggests that entrepreneurship scholars need to pay attention to the iterative processes of opportunity formation, not just to understand how new ventures come to be, but how constructs like 'opportunity' and 'entrepreneurship' themselves are formed. Likewise, practitioners running initiatives designed to stimulate and develop new venture formation, such as entrepreneurial accelerator programmes, need to take into account the influence of the entrepreneurs' social environment in determining the success of the very ventures that they seek to cultivate. Whilst such projects provide valuable educational, mentoring and financial support, the positive impact of accelerator programmes on new ventures is ambiguous, with only two percent of companies emerging from the top twenty accelerators in the USA having a successful exit.[202] Critics have attributed such ambiguity to the inability of accelerators to prepare candidates for the complexities and uncertainties of navigating a marketplace, and essentially cocooning those involved in an 'accelerator bubble'.[203] For example, static business plans developed in such initiatives -- detailing offerings such as products and services, market opportunity and cash flow -- rarely hold true in the execution phase of a new venture when a complex ecosystem of bodies, objects and spaces can influence the opportunities and decisions a new business founder faces. By taking into consideration the social dynamics that influence entrepreneurial opportunities, such accelerator iniatives might develop programmes and tools that enable entrepreneurs to survive and adapt to the complexities of the marketplaces they operate in. For example, iterative sensemaking programmes might be developed for entrepreneurs engaging in specific ventures and

[202] https://www.forbes.com/sites/briansolomon/2015/03/17/the-best-startup-accelerators-of-2015-powering-a-tech-boom/#468a17a267ca
[203] https://www.fastcompany.com/3055445/do-accelerators-and-incubators-serve-themselves-better-than-startups

industries. Such programmes could provide the capacity for entrepreneurs to navigate the marketplaces they will enter through a sensibility to the array of bodies, objects and spaces they may interact with -- in effect, the 'assemblages' they will become a part of.

Methodological Reflections and Contributions

I conducted my research through an ethnographic study of Science Gallery, an organisation that seeks to combine art and science to 'ignite creativity and discovery' (Science Gallery, Online).[204] I chose Science Gallery for my study because it resonates with the concept of entrepreneurship as organisation-creation, in that it seeks to bring a variety of bodies, objects and spaces together -- in the form of people from different backgrounds, and the materials of their work -- so that creativity may emerge and be harnessed in different ways -- such as public engagement initiatives and research outputs. Yet understandings of the processes by which creativity happens in the Science Gallery space are ambiguous, particularly with regards to how bodies and objects come together to produce the capacities for creativity, and what happens in the formation of these capacities. Likewise, the role of power in the formation of these capacities is also unclear. In this way, Science Gallery was an ideal case study for me to explore my research questions due to the variety of actors and processes that take place there.

In order to answer my research questions, I needed a methodology designed to understand how bodies, objects and spaces interact, and sensitive enough to address the organisational forces that influence such interactions. I therefore adopted a praxeological approach whereby I zoomed in (Nicolini, 2009a) to the local accomplishment of creativity, such as who or what is involved in such interactions and the localised power effects produced, before zooming out to get an understanding of the assembly work that goes into

[204] https://dublin.sciencegallery.com/about

producing these connections, such as the forces or agencies that allow some bodies and objects to participate in the Science Gallery space while simultaneously excluding others.

To zoom in, I engaged in an ethnographic study based on participant observation which enabled me to understand the local entanglements of bodies, objects and spaces. I chose ethnography because it resonated with my overall theoretical approach to entrepreneurship as organisation-creation, in that it allowed me to actively participate and understand the coming together of bodies, objects and spaces while also avoiding the presumption of a fixed, pre-existing reality -- one of the ontological weaknesses of traditional entrepreneurship literature that denies the possibility of different 'forms' of creativity outside of economic and psychological approaches. Ethnography also allowed me to employ a combination of methods to produce rich accounts of such interactions, such as walking with others (Büsher & Urry, 2009) and the use of a sensory diary (Valtonen et al, 2010).

In order to zoom out and understand the translocal forces and relations that influence how Science Gallery is formed, I interviewed a range of actors who were both emplaced in these forces and relations, and actively contributed to shaping them. My interviewees were both directly involved with Science Gallery, for example employees, curators and exhibitors, and indirectly involved through governance activities, for example representatives of Trinity College. I chose interviewing as my method here as it allowed me to understand how Science Gallery comes to be through the interviewees' first-hand stories or experiences of being part of such processes. I could therefore build a rich and dynamic understanding of how power is involved in the accomplishment of Science Gallery.

In total, I carried out seventy-three semi-structured interviews. I developed a substantive frame and associated specific domains of enquiry which I could adapt to the relevant interview. The purpose of these techniques was to help me answer my research questions, while at the same time allowing the interviewees latitude in their responses so that

rich and potentially unexpected insights could emerge. Likewise, I adopted an abductive approach to my interview analysis whereby I moved back and forth between theory and my empirical interviews. In doing so, I could further develop my understanding of how power is manifested throughout the organisation of bodies, objects and spaces in Science Gallery.

Overall, I adopted a praxeological methodology of zooming in to the localised accomplishment of Science Gallery and zooming out to the translocal forces and relations that influenced such. My chosen approach mapped onto my theorisation of creativity and power, in that it allowed me to position myself within the flows and intersections of bodies, objects and spaces of my case study. Accordingly, zooming in -- informed by my ethnographic method of participant observation -- and zooming out -- informed by my method of interviewing -- allowed me to build a complex mosaic of how creative capacities are formed in Science Gallery and the influence of power in the formation of these capacities.

Contributions: Studying Creative Entrepreneurship

My research design makes the following methodological contributions. Firstly, I show how researchers can move between zooming in and zooming out by adopting an ethnographic approach that allows them to position themselves in different ways in the research process. Whilst being an appropriate way of highlighting practices and their relationship with the organising process, empirically engaging in the process of zooming in and out is difficult as it means switching theoretical lenses by moving from studying local practices to the larger institutional contexts of which they are a part of (Nicolini, 2009a). It is easy therefore to get lost in this process as it requires choosing different angles for observation and interpretation frameworks -- different methodological traditions -- without giving prominence to just one of those vistas (Nicolini, 2009b). An ethnographic approach, however, embraces multiple methodological traditions, in that ethnography itself is predicated on the notion that a research site is ‘multiply produced’ (Marcus, 1995, p.97) and formed in relation to other sites,

institutions and actors (Conquergood, 2006). As such, researchers can generate novel explanations of their own research sites by adopting ethnography, and in the process avoid reducing their respective studies to essentialist explanations of linear cause and effect. This is particularly important for scholars interested in entrepreneurship and creativity. Here, researchers can avoid reducing these phenomena to the individual entrepreneur with creative abilities and, instead, tease apart the intersections of bodies, objects and spaces that give rise to the very notions of what it means to be 'entrepreneurial' and 'creative' in a particular context.

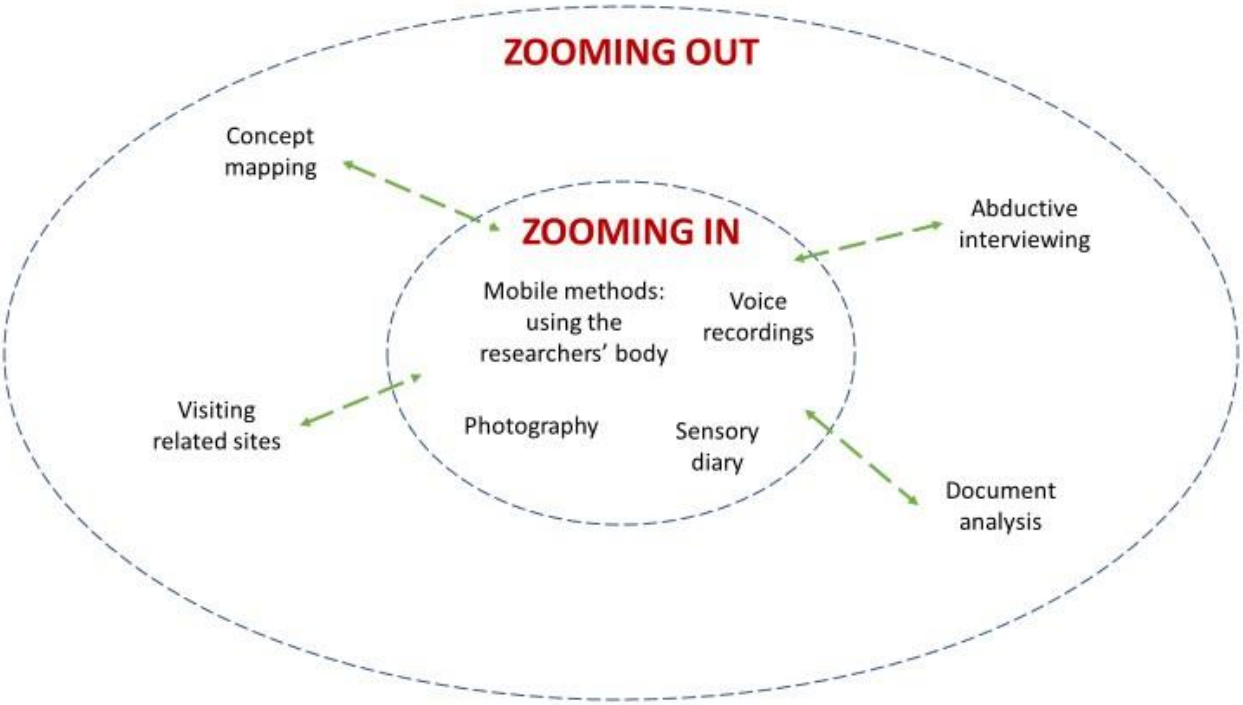
Following from the above, my work also indicates how researchers can employ specific ethnographic methods to position themselves in different ways in the research process. In doing so, they can gain an understanding of subtle organisational phenomena that more detached methods might otherwise miss, such as the workings of organisational forces, and the effects of such forces on the bodies that occupy a research setting. For example, I have explained both the benefits of participant observation and how to engage in such, principally through mobile methods (Fincham et al, 2010) or walking with others (Büsher & Urry, 2009). Here, researchers can insert themselves into the same trajectories that their research subjects experience by way of sharing their steps, rhythms and postures, thereby gaining an intimate understanding of how the latter experience their research site. Such methods are particularly useful for researchers interested in the affective processes of empirical settings -- the forces that motivate and move people -- such as in social entrepreneurship pitches (Mauksch, 2017), artistic interventions (Reestorff, 2015), political protests (Juris, 2008), expeditions in challenging environments (Helmreich, 2007), techno clubs (Biehl-Missal, 2016) and crowd control at sporting events (Hill, 2016).

In addition to the above, I have demonstrated to researchers the usefulness of taking voice recordings to chart their affective experiences and detail their immediate reactions as

they engage in mobile methods. Such experiences are often subtle and ephemeral and can prove hard to recall after leaving the research site. Likewise, I have shown researchers the benefits of engaging in photography -- particularly from their own point of view -- and using a sensory diary to fix such experiences for later review and reflection. In utilising my chosen methods, I have emphasised to researchers the importance of using their own bodies and sensory repertoire to understand the nuances and subtleties of how organisational phenomena occur -- an area that several writers have argued has received little attention in organisation studies (Beyes, 2016a; Beyes, 2016b, Merchant, 2011; Warren, 2008).

Correspondingly, I have shown researchers how to zoom out and identify the wider forces that influence the more localised processes taking place in their research settings by using an abductive interviewing method. Here, I have explained how researchers can move between deductively identifying their areas of interest by utilising an appropriate substantive frame, while at the same time allowing for inductive themes to emerge from their interviews. In doing so, they can arrive at a comprehensive and novel understanding of how processes work in their research settings while simultaneously avoiding getting lost in the granular micro-details of their research sites or deductively subsuming their research interests under already known generic categories or behaviours. Researchers can further enrich their interview data with relevant document analysis, visits to similar or related research sites, and employing concept mapping as a tool to trace and understand the linkages and connections between the various entities in their research settings as they become apparent. **Figure 7.1** illustrates the combined and interlinked methods of zooming in and out that researchers can draw from to aid their own studies.

Figure 7.1: Combined methods of zooming in and zooming out



I also show researchers how to convey affective and nuanced organisational phenomena in an appropriate writing style, thereby addressing their own emplacement in their respective research settings. Conveying such experiences in text can be hard due to academic conventions and the predominance of normative accounts that try to capture such occurrences, which tend to ignore the presence of the researcher and make them seem disembodied. Consequently, researchers need to embrace calls for a 'wilder sort of empiricism' (Dewsbury, 2003, p.1927) that can convey the sensory and affective aspects of their research to their audience. I show how this can be achieved in the form of my vignette in Chapter 4, and in the process answer the call for critically affective performative texts (Linstead, 2017) that attempt to communicate the non-linear, messy and often uncomfortable aspects of organisational life (Taylor & Hansen, 2005).

In using an evocative writing style, I address calls for such texts to be legitimated with relation to their research project (Pérezts et al, 2015) by aligning my chosen research methodology with my epistemology. To elaborate, my research focus was not certain individuals, objects or spaces per se but the entanglement of these phenomena, the forces that shaped these entanglements and the embodied knowledge that was subsequently produced. In order to understand the dynamics of these entanglements it became necessary for me to position myself within them and experience them bodily and affectively. My own experience of researching became the methodological focus, which changed from trying to capture a sense of 'nearness' to things and happenings, to engaging with the practical experience of being part of that entanglement. As such, my senses and experiences became a way of producing 'informed material' (Latham & McCormack, 2009, p.260). This material is in turn reflected in the more personal writing style, not as self-indulgence but as a way of apprehending and conveying my understanding of collective experience, processes and forces to a wider audience. In this way, writing itself becomes a creative act central to the research process (Hjorth & Reay, 2017).

Finally, my research approach emphasises the importance and potentiality of attending to reflexivity in the conducting and writing up of academic research. Like the artificial separation that often occurs between method and theory, reflexivity is more than just a caveat in the methodology section of a paper, acknowledging that the author is part of the research site before getting on to the business of carrying out fieldwork. Instead, reflexivity becomes a practice whereby the researcher can develop different understandings of a phenomenon by taking up different positions in the research setting, thereby challenging dominant understandings of such. To return to my earlier ethnographic piece, it was by positioning myself in the entanglements of bodies, objects and spaces -- and combining my own body and experience with such entanglements -- that I came to understand the

subsequent foldings and unfoldings that occurred. In this way, I show that there is no separation between the author and the research site, with both being constructed through reflexive practices. In turn, this reflexivity-as-practice can challenge dominant ways of knowing something -- in this case creativity -- in that my body-as-researcher became a tool that allowed an alternative creative moment to become; one which ran against the normative understanding of how to 'be' creative, at least according to Science Gallery. Taking a stance that embraces reflexivity, therefore, may open other 'creative' potentialities that may, in turn, lead to new insights or points of departure for future studies.

In conclusion, work that challenges conventional understandings of creativity in entrepreneurship is important for a number of reasons. Firstly, it addresses creativity throughout the entirety of the entrepreneurial process and does not confine such to an initial identification of pre-existing opportunities. Secondly, it adopts a relational and enactive approach that accounts for a variety of actors, entities and contexts rather than confining creativity to the lone individual with a bright idea. Thirdly, creativity becomes productive rather than reactive, in that the focus shifts from finding to generating opportunities, and exploring such in different ways. I have sought to contribute to this literature by exploring how creative capacities are generated, the power relations that shape these capacities, and the ways in which individuals negotiate these relations. In doing so, I have attempted to weave together a variety of entities and forces to explain the creative processes that occurred in and around Science Gallery, how they were experienced, and the potential these processes have to be re-experienced. As such, perhaps the best contribution that I can hope for is that my study produces insights in ways that resist foreclosure -- much like organisational creativity in itself.

In my study, I have shown that creativity occurs in those indeterminate moments when bodies, objects and spaces meet. Alternative imaginings occur in these moments which

rupture existing configurations of bodies, objects and spaces through what can be felt and experienced, allowing for a realignment of such bodies, objects and spaces around different ways of knowing and experiencing. Power infuses these indeterminate moments and is productive of creativity, in that more and less intensive connecting strategies pull and push and align and realign constellations of bodies, objects and spaces, thereby influencing -- but not determining -- the formation of creative capacities and how they can be realised. This indeterminacy continued with the process of writing this thesis, as the enactment of organisation-creation passed from Science Gallery and moved into the academic domain. Here, the enactment simultaneously enabled and constrained the foldings of bodies, objects and spaces that occurred in Science Gallery. The foldings, the indeterminacy, and the organisation of creativity therefore continue long after the initial ethnographic encounter.

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APPENDIX

Table 3.1: Preliminary research

Science Gallery published materials
Science Gallery (2017) *Blog* [Online]
Science Gallery (2016) *Design and Violence* [Online]
Science Gallery (2016) *SEEING* [Online]
Science Gallery (2016) *Field Test* [Online]
Science Gallery (2016) *Trauma* [Online]
Science Gallery (2016) *Annual Review 2016*
Science Gallery (2015) *Makeshop* (Detailing workshops running as part of the Gallery activities, open to public)
Science Gallery (2015) *Secret* [Online]
Science Gallery (2015) *Blood* [Online]
Science Gallery (2015) *Fail Better* [Online]
Science Gallery (2015) *HOME\SICK* [Online]
Science Gallery (2015) *Education Programmes* [Online]
Science Gallery (2015) *Blog* [Online] – Regular updates
Science Gallery (2015) *Sponsors* [Online]
Science Gallery *Going Deeper – Strategy 2014 – 2017*
Science Gallery (2014) *Annual Review 2014*
Science Gallery (2014) *Studiolab* (Collaboration project with thirteen other institutions, funded by the European Commission)
Science Gallery International (2014) *Annual Review – The Emergent Network*
Science Gallery and sponsor internal documents
Science Gallery International (2016) *Strategic Plan 2017-2020*
Science Gallery International (2016) *Fundraising Strategy*
Science Gallery (2015) *Impact Report*
Electricity Service Board (2015) *Alliance Business to Arts Awards Pitch 2015: ESB and Science Gallery*
Other documents
Trinity Biomedical Sciences Institute (2018) *About the Institute* [Online]
The Centre for Research on Adaptive Nanostructures and Nanodevices (2018) *About Us* [Online]
Science Foundation Ireland (2018) *About SFI* [Online]
Trinity College Dublin (2016) *Strategy for Innovation and Entrepreneurship*
The Expert Group on Future Funding for Higher Education (2016) *Investing in National Ambition: A Strategy for Funding Higher Education* [Online]
Press Articles
Irish Times (2015) *HOME\SICK exhibition review* [Online]
Hire Space (2015) *Science Gallery Events Hire* [Online]
Irish Tech News (2015) *Science Gallery International announces €1.1M in new funding* [Online]
The Life of Stuff (2014) *'Fail Better' exhibition review* [Online]
RTÉ (2014) *Dublin Science Gallery's 'Grow Your Own' exhibition* [Online]
The Hindu (2014) *World's third Science Gallery to come up in Bengaluru* [Online]
Silicon Republic (2013) *Science Gallery review* [Online]

Wired (2011) '*Human+' exhibition review* [Online]
SCIENCE (2011) '*Visceral' exhibition review* [Online]
The Irish Examiner USA (2010) *Science More Popular Than Whiskey* [Online]

Table 3.2: Participant observation

Participant observation
Visits to the Science Gallery exhibition 'HOME\SICK': 17th June 2015, 10:00 – 13:00 20th June 2015, 14:00 – 16:00 29th June 2015, 15:00 – 17:00
'Something to Write Home About' evening seminar held by a curator of 'HOME\SICK', 25th June 2015: 18:00 – 19:15.
'HOUSE PARTY – EVERYONE BACK TO OURS' evening event (After-hours event designed to highlight the exhibition 'HOME\SICK' featuring live performances and activities), 26th June 2015, 19:00 – 22:00.
Visit to the artist residence of Saoirse O'Connell to see her work outside of the Science Gallery context), 1st July 2015, 16:00 – 17:00.
A multitude of visits to the Science Gallery exhibition space, on different times and days, from May to September 2016, coinciding with the exhibition 'SEEING'.
Leonard Group brainstorming session to determine the 2017 Science Gallery exhibition themes and content, 18th May 2016, 18:00 – 20:00.
Visit to University College Dublin SmartLab (an ideas incubator and software development centre), 15th June 2016, 16:00 – 17:30.
Visit to Trinity College Dublin Zoological Museum (an initiative headed by a former Science Gallery Board Member), 16th June 2016.
Visit to the EMEA (European, Middle East and African) Twitter headquarters in Dublin (to see how a corporate ideas space is structured), 17th June 2016, 10:00 – 11:00.
Visit to MicroMedia (a local advertising company that uses a digital space to involve the bodies of customers and the objects of their work, with the aim of generating tailored marketing campaigns), 18th June 2016, 15:00 – 16:30.
Training day for Mediator exhibition staff facilitated by VocalEyes (a London-based organisation that tailors courses to the Arts and Heritage sectors on how to communicate the sensory aspects and related programming to visually and sensorially-impaired visitors), 22nd June 2016, 09:00 – 13:00.
Artist talk for Mediators (where artists participating in the 'SEEING' exhibition discussed their featured work with Science Gallery ground staff), 22nd June 2016, 14:00 – 16:00.
Mediator walkthrough of the 'SEEING' exhibition (where Science Gallery ground staff were informed of the exhibition content and how to communicate it to the public), 22nd June 2016, 16:00 – 18:00.
'SEEING' exhibition launch party (featuring live performances, talks by participants), 23rd June 2016, 18:00 – 22:00.
Artist talk for Science Gallery visitors (where artists participating in the exhibition 'SEEING' discussed their work with the public), 24th June 2016, 11:00 – 12:00.
'FOR YOUR EYES ONLY' (After-hours event intended to highlight the exhibition 'SEEING', featuring live performances and activities), 22nd July, 2016, 19:00 – 22:00.
Visit to Bridge21 (an education programme based in Trinity College Dublin, designed as a space of play for second level students that invites them to explore themes and ideas using a variety of technological tools), 16th August 2016, 14:00 – 15:30.
'OUT OF SIGHT: Cinema for your Ears' (a live narrative event telling the stories of the invention of medical devices, experiences of the visually impaired as they navigate the city, and other stories using different soundscapes), 18th August, 18:00 – 19:30.

Table 3.4: Interviews conducted

First visit: June – July 2015		
Science Gallery team		
Position	*Method*	*Date*
Founding Director	In person	23/06
Research Coordinator	In person	24/06
Mediator	In person	13/06
Mediator	In person	20/06
Curators		
Social scientist	In person	23/06
Author and public figure	In person	18/06
Artists		
Saoirse O'Connell	In person	23/06
Niamh Riordan	In person	18/06
Niamh Riordan	In person	01/07
Second visit: May – August 2016		
Science Gallery Governance Board		
Position	*Method*	*Date*
Trinity College Board Member	In person	18/05
Trinity College Board Member	In person	24/05
Chair of Science Gallery Board	In person	25/05
Government Minister (Department of Arts, Heritage and Gaeltacht)	In person	07/06
Professor (Biological Sciences)	In person	10/06
Venture Capitalist	In person	13/06
Chief Executive Officer of Government health research funding organisation	In person	14/06
Trinity College Dean of Research	In person	10/07
Manager of initiative to promote engineering, science and technology education at university level	In person	13/07
Leonardo Group		
Position	*Method*	*Date*
Biotech Professor at Trinity College Dublin, former curator	In person	19/05
Publisher	In person	24/05
Founder of Dublin-based art gallery and studio	In person	25/05
Entrepreneur (digital media)	In person	02/06
Science journalist and former professor (outside of Trinity College)	In person	02/06
Professor of Neuroscience and Psychology, Trinity College Dublin	In person	07/06
Social entrepreneur (founder and CEO of multiple social entrepreneurship organisations)	In person	08/06
CEO of Government-sponsored social entrepreneurship fund	In person	09/06
Technology Professor (outside Trinity College Dublin)	In person	15/06
Managing Director of social media multinational	In person	17/06
Entrepreneur (digital and print media)	In person	17/06

Biotech professor (Trinity College Dublin)	In person	18/06
Technology Professor (outside Trinity College Dublin) and Science Foundation Ireland principal investigator	In person	23/06
Non-biotech professor at Trinity College Dublin	In person	11/07
College Archivist at Trinity College Dublin	In person	12/07
Provost of Trinity College Dublin	In person	19/07
Entrepreneur and program director of a multinational start-up accelerator program	In person	28/07
Biotech professor, Trinity College Dublin	In person	05/08
Science Gallery team		
Position	*Method*	*Date*
Executive Director (Science Gallery International)	In person	15/05
Executive Director (Science Gallery International)	In person	26/05
Executive Director (Science Gallery International)	In person	03/08
Marketing and Communications Manager	In person	03/06
Development Coordinator	In person	08/06
Programme Manager	In person	13/06
Education Officer	In person	16/06
Research Coordinator	In person	17/06
Head of Programming (Science Gallery London)	In person	07/07
Other employees		
Course Co-ordinator, past curator	In person	28/07
In-house Researcher	In person	27/07
Former Mediator	In person	27/07
Former Mediator	In person	21/07
Mediator	Telephone	20/07
Mediator	In person	26/07
Mediator	In person	27/07
Mediator	Email	10/08
Mediator	Email	10/09
Research Associate	In person	18/08
Sustainability Manager, Science Gallery International	In person	19/08
Curator		
Position	*Method*	*Date*
Social scientist	In person	21/06

Artists			
Name	*Position*	*Method*	*Date*
Niamh Riordan	Artist	Email	21/05
Juan M Castro	Exhibitor (at HOME\SICK)	Email	22/06
Saoirse O'Connell	Performance artist	In person	29/07

Entrepreneurs (participating in exhibits)		
Position	*Method*	*Date*
Software developer and digital artist	Email	31/05
Co-founder of Dublin-based artisan food company	Email	07/07

External researchers (participated in Science Gallery live lab)		
Position	*Method*	*Date*
Researcher at INSIGHT (the Centre for Data Analytics at Dublin City University)	In person	23/06
Researcher (as above)	In person	23/06
Researcher (as above)	In person	23/06
Education and Public Engagement Manager at INSIGHT	In person	23/06
Graphic Designer for 'SEEING' exhibition		
Position	*Method*	*Date*
Co-founder of design company	In person	16/08
Sponsors		
Position	*Method*	*Date*
Corporate Reputation Manager at Electricity Supply Board (ESB)	Telephone	20/07
Second-level (high school) teachers – involved in Science Gallery training programmes		
Position	*Method*	*Date*
Secondary school teacher	In person	29/07
Secondary school teacher	Telephone	30/07
Secondary school teacher	Email	02/08
Secondary school teacher	Email	05/08
Total interviews conducted (2015 and 2016): 72		