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WHAT ON EARTH IS RESPONSIBLE INNOVATION ANYWAY? (AND HOW TO MAKE IT HAPPEN)

ABSTRACT

The case for Responsible Innovation has been well articulated in the areas of science research and Corporate Social Responsibility in business. This paper presents a case for adopting a design-led approach in order to promote responsibility in innovation. It uses a case-study review of ten years of innovation projects to explore the similarities and differences between approaches to Social Innovation and Commercial Innovation in order to explore the values of design-led Responsible Innovation across these contexts. The research draws upon industry expertise, Masters projects and theoretical models. In particular it relates the attributes of the design-led approach to the four dimensions model proposed by Stilgoe et al. [6]. It concludes by proposing a framework that draws upon notions of Deep Empathy as proposed by Michlewski [3], Dynamic Mapping, Consequence Visioning and Toggling between micro and macro views.

Keywords: Responsible Innovation; Design-led, Multidisciplinary Innovation

1 INTRODUCTION

The design-led Responsible Innovation Research Group at Northumbria University brings together experience and expertise in design-led innovation practice conducted over more than a decade. It is multidisciplinary and it conducts its research through an integrated academic practice model [1] that sees students, academics and external partners cooperating in partnership to address real-world challenges and deliver authentic learning. Education in this multidisciplinary innovation practice was established at Northumbria University in 2008 following pilot studies conducted in 2006 and 2007. It was founded on three principles [2]:

- To create a physical and mental environment in which creativity would be nurtured
- To develop a community of practice in which a ‘common language’ would be learned
- To promote shared values through developing self-awareness in pursuit of collaborative learning.

At the time that these principles were derived, ‘shared values’ referred to the working practices and terms of engagement adopted in the teams pursuing cooperative learning. In conducting this study, the authors have identified that there is another set of values that are equally important. These are personal values and it is apparent that these can influence individual students’ attitude when they approach a project. This, in turn, affects the collective attitude of the group towards that project. Additionally, Michlewski [3] in his book, *Design Attitude*, discusses the characteristics of the design profession’s unique attributes, one of which he describes as forming ‘Deep Empathy’ with consumers. He suggests that “*using true empathy requires courage, honesty and abandoning one’s mental models*”. This research indicates that projects where Deep Empathy is achieved on an individual level (through adopting a design-led approach) can help to transcend disciplinary mental models and norms and thereby promote more responsible innovations.

For the purposes of this paper, ‘context’ refers to the situation and focus of the innovation; Social Innovation and Commercial Innovation.

2 SCOPE

This study aims to demonstrate how adopting a design-led approach supports teams in pursuit of Responsible Innovation. It connects what we already understand about Responsible Innovation with design-led multidisciplinary innovation practices and establishes focus for future studies that will promote this type of practice as the norm. It is based upon the findings of a public debate and a review of Masters projects undertaken over the past decade.

3 BACKGROUND

Innovation is about change. Dye [4] suggests that innovation is ‘bright ideas realised’ whilst Berkun [5], defines innovation as delivering ‘significant positive change’. Change inevitably has consequences; the positive, intentional changes which are the purpose of the innovation and unintended, unforeseen consequences. It is reasonable to assume that innovators set out with good intentions, focused on improving something in whichever context their work is situated. It is also fair to assume that Social Innovation is focused on doing good in a societal context, whilst commercial innovation may be primarily interested in doing more business good and less societal bad. The distinction becomes important when we understand individual motivation within innovation teams.

3.1 Responsible Innovation

In the past decade, the notion of Responsible Innovation has gained momentum. Seeking more ethical and social balance to innovation has been the focus of those academics who have explored ‘Responsible Innovation’ [6] [7]. Their work has centred around scientific research and innovation. Stilgoe et al. [6] propose four Dimensions as being important to delivering Responsible Innovation; Anticipation, Reflexivity, Inclusion and Responsiveness. Together, they suggest that these offer a more socially democratic model of moral and ethical governance for science research and innovation.

Amongst the business community, Corporate Social Responsibility has become increasingly important as brands have sought to become more ‘transparent’ in their practices. Literature suggests that the focus of developing CSR strategy within some organisations has been more toward satisfying commercial benefit by influencing consumer perceptions than on driving socially responsible innovation. This is changing and the emergence of organisations such as the Ellen MacArthur Foundation who have used a Circular Economy model to promote both the social and commercial benefits of adopting a systemic approach to innovating responsibly are gathering momentum [8].

3.2 Design-led Multidisciplinary Innovation

Transformative innovation requires multidisciplinary expertise employed in both the co-creation of the problem-space as well as potential solutions [9] [10]. A Design-led approach to multidisciplinary innovation is particularly effective when addressing complex, ‘wicked’ problems [11] [12] [13] because it allows stakeholders with different disciplinary priorities to explore future scenarios from different perspectives and across different innovation horizons. Rationalising the competing demands of commerce, the environment, legislation and consumer-demand in any situation, is surely a wicked problem!

Essential to the success of multidisciplinary team working is that the members all share a common purpose that takes precedence over their individual agendas. Finding, and seeing, a common purpose can be difficult when the collaborators bring with them their own disciplinary ‘baggage’ and frame the situation from their own standpoint. This can be the standpoint of their disciplinary knowledge and practice, the standpoint of their organisation, or their particular role within it, or their own personal standpoint. Invariably, it is a combination of all three [14]. The methods that a design-led approach employs; externalizing, visualizing, prototyping, iterating all act as mediators in helping teams arrive at their common purpose.

4 METHODOLOGY

This study has been conducted using a mixed methodology; an auto-ethnographic and discursive approach to case-study review to establish broad principles and trends; a public debate to establish a consensus definition; on-line survey and review of student learning to understand how protagonists' motivations are affected by the two different innovation contexts.

4.1 Case study review

The authors have developed, through a decade of collaborative research with Unilever and other external partners, a design-led multidisciplinary methodology that facilitates commercial and social innovation and strategic decision-making based on generative research, design and mapping of all relevant technological, manufacturing, materials, business, retail, regulatory and consumer factors (existing & predicted). The majority of the case study projects in this study have adopted versions of

this methodology. It uses design approaches as a mediator to conceptualise and model solutions that enable teams to predict the consequences of R+D decision-making. This methodology allows the project team to alter the ‘lens’ through which proposals are viewed in order to accentuate chosen attributes. With experience of working in this way, students who don’t have a design background, gradually adopt some of the designerly approaches to communicating stakeholder stories and emerging ideas themselves. Establishing tangible and compelling communications allows the team to connect closely (form Deep Empathy) with stakeholders and envision future scenarios from multiple stakeholder perspectives and, therefore, consider the consequences of their adoption.

Royal Academy of Engineering Visiting Professor, Dr Phil Sams describes the work undertaken by the Responsible Innovation Research Group and their students thus;

“the group’s laboratory comprises the studio and the students; the experiments are real projects solving real problems with real organisations. These experiments produce a ‘swamp of data’ in the shape of ideas. By studying the data we can map trends, see what’s going on, what issues recur and what methods work well in what situation...”

The ‘laboratory’ in question has, for the past seven years, been a Masters degree programme in Multidisciplinary Innovation described by Aftab et al. [15] in the following way;

Over 7 years and 7 graduating classes, 154 students, from 15 different disciplines and 20 different nations, and 17 academics have innovated with 62 companies (regional national and global), across all sectors. 7 spin-out companies have been started, 6 PhDs registered, 12 research projects published, new systems, services and products have been developed and 3 new organisational functions have been created all by students of ONE Multidisciplinary Innovation Masters degree.

The authors have reviewed the projects undertaken with these companies in order to understand the differences of approach and learning inherent in the different contexts and the relationship of these approaches to Stilgoe et al.’s Dimensions. Through this the group has been able to explore innovation practice over time.

4.2 Public debate

Outside this ‘laboratory’, the authors were interested to explore Responsible Innovation in a broader societal context and posed the question ‘What On Earth Is Responsible Innovation Anyway?’ to the audience at a public debate conducted as part of the ‘Designing the Future’ series hosted jointly by Northumbria University and Tyne & Wear Archives & Museums. An audience of 60 business-leaders, academics, students and general public were shown a case-study project by the University which illustrated challenges around diminishing resources and increased pollution [16] and another by Unilever that demonstrated Circular Economy thinking in practice on a global scale. A chaired discussion was then conducted that explored: ‘How might we most responsibly investigate innovation consequences and openly debate their potential implications?’ The discussion was recorded and individuals were invited to contribute their own definitions through a design template.

4.3 Reflection on learning and on-line survey

Two approaches have been employed in order to gain understanding of how students’ motivations are affected by the different innovation contexts. Students involved in these projects have been assessed on a Portfolio of Practice that requires them to give a factual account of what took place, a reflection upon what they have learned and to relate this to relevant theories. An on-line survey was employed to further explore these findings.

5 FINDINGS

The authors have found that Deep Empathy with stakeholders motivates protagonists to do GOOD and strive for project success and that a design-led approach promotes this empathic stakeholder centrality. Furthermore, designerly ways of creating compelling narratives facilitate foresight and prediction.

5.1 Public Enquiry Event

Reviewing the responses from the Public Enquiry activity, along with literature, we have concluded that a simple definition of Responsible Innovation can be derived;

Responsible Innovation is democratic, has a social conscience and is concerned with the impact and consequences of innovations the nature of which are dependent upon their context.

This definition along with Stilgoe et al.'s Dimensions gave focus to the project review where the authors have sought to identify context-dependent differences and elements in the design-led approach that could be influential in driving towards more Responsible Innovation.

5.2 Project Review

The projects conducted with the 62 companies were identified as falling into one or other context; Social Innovation and Commercial Innovation. The distinction is not absolute; projects with a clear social motive often need to be fiercely commercial in order to deliver sustained social benefit whilst projects with a commercial objective need to be mindful of society in order to protect brand reputation and respond to CSR metrics. In classifying the projects for this study, we have taken the primary objective of the brief as the determining factor. Of the total projects undertaken, around 60% have a greater commercial bias. Projects with a social bias tended to be undertaken with smaller organisations that fall within the SME category.

5.2.1 Impact of context

From a review of the Portfolio of Practice reflections, it appears that students' motivations to succeed in delivering innovation were greater in social innovation projects conducted with smaller organisations where they have worked more closely with 'decision makers'. In Social projects, they were better able to connect directly with stakeholder networks including the ultimate beneficiaries and this helped them feel that they could make a greater difference and that their work would deliver actionable results. There is evidence in their portfolios that the more closely they could identify with the circumstances of the stakeholders, the more committed they became to deliver a positive outcome no matter how hard it was to do; their attitude was focused on delivering a real result, not just a good project because they had developed a Deep Empathy with the stakeholders. Additionally they have arrived at a common purpose more quickly and with greater clarity. We have observed three possible reasons for this;

- 1, Scale - projects were with smaller organisations with greater access to 'decision-makers'.
- 2, Context – projects tended to be 'closer to home' for the students and they have been able to connect directly with the problem-owners or potential beneficiaries of the innovation.
- 3, Empathy – students reported an empathic position when representing the problem-owners in group activities; this connection tended to transcend the barriers identified by Kyffin et al.

5.2.2 The leadership role of design

The authors have observed that adopting a design-led approach offers significant benefit. The designers' role in these project situations is interesting because it is a dual role. As team-member the designer brings the disciplinary knowledge and skills of their field of practice; product, system, service, communication, fashion etc. in the same way that the mechanical engineer or marketer does. However, the designer also brings the ability to translate rapidly the complex 'swamp of data' generated by the collective into tangible and testable stories, images, models and prototypes for evaluation. The application of designerly methods and tools in this way acts in a facilitatory capacity. We have also observed that designers in these group settings are particularly comfortable with 'togglng' between the macro (world) and micro (consumer) view of any given situation. In their Portfolio of Practice reflections, students of all disciplines invariably note that designers assumed a leadership or 'facilitating' role.

The project review also allowed the authors to understand more about how the design-led approach helps multidisciplinary teams to succeed. The Portfolio of Practice evidence suggests that it delivers value in a number of ways:

- Through the creation of narratives and stories it facilitates establishment of the Common Purpose
- Through its co-creative, externalizing and iterative methods it brings insights to life in order to frame the problem space and connect with stakeholders
- By visualizing, prototyping and creating compelling communications of possible solutions it

- promotes critique from multiple perspectives
- By visually mapping potential solutions against multiple metrics it promotes prediction and supports decision-making

Specifically when we consider these aspects in light of Stilgoe et al.'s Four Dimensions, we can see a clear correlation:

Table 1. Stilgoe et al.'s Four Dimensions aligned to Design Attributes

Dimension	Design-led attribute
Anticipation	Design is inherently future-focused. Case study projects highlight prevalence of 'what if?' questioning throughout design-led phases of projects. A foresight model has been developed and adopted in recent projects.
Reflexivity	Design is driven by continual process of exposure, critique and refinement. Case studies demonstrate individual and collective reflexivity, openness and sense of purpose; 'what are we doing, how are we doing it, why are we doing it & for whom?'
Inclusion	Good designing is participatory. Case studies demonstrate a high level of design-led stakeholder engagement in problem-framing and solution-making. Especially evident in social innovation projects
Responsiveness	Good design learns from, predicts and responds to changing circumstances. Case study evidence shows that design-led approach is particularly agile allowing generative research to be re-framed and re-focused as changing circumstances dictate

5.2.3 Online survey

The online survey was conducted in order to further probe the apparent motivational effect of working on Social Innovation projects. The past five years' cohorts were invited to respond to the survey which sought to understand which type of project they found more motivating and why. The quantitative results did not appear to support the initial findings; 20% preferred Commercial Innovation, 33% Social Innovation and 47% 'both the same'. However, the qualitative data revealed a difference in attitude to both. Many cited Commercial Innovation projects as being motivational as they were directly relatable to future career aspirations. In contrast, their motivation for Social Innovation was predominantly focused on doing good:

"The commercial innovation seemed to be with larger organisations and it felt like those presented opportunities after MDI i.e. Great for my cv or networking opportunities. The social innovation stimulated my commitment as much but for different reasons i.e. Felt great to be involved in local community projects and had more scope to make a change with the organisation." – respondent 9

"Commercial Innovation: Stimulated me in the sense of having a good opportunity to practice for my future employment. Social Innovation: Stimulated me in the sense of having the opportunity to help PEOPLE" – respondent 12

6 CONCLUSIONS - MAKING RESPONSIBLE INNOVATION HAPPEN

The authors propose that establishing Deep Empathy with the whole stakeholder network can help to drive responsible behaviour irrespective of the focus of the challenge. Whilst this is an attribute that Michlewski identifies as being natural amongst designers, the authors suggest that adopting a design-led approach can establish such empathy within all actors in multidisciplinary teams.

If we consider our earlier definition; *Responsible Innovation is democratic, has a social conscience and is concerned with the impact and consequences of innovations the nature of which are dependent upon their context*, we can see that there may be opportunity to harness some of the factors that have contributed to responsibly successful projects reviewed in this study in order to establish a framework for delivering Responsible Innovation by design.

This framework would ensure that the following considerations are employed in any project where a responsible outcome is prioritized (and we would argue that this is the only acceptable type of outcome). Adopting a design-led approach in order to create and communicate compelling narratives that bring the problems and potential solutions to life, this framework would enable;

- 1, Deepening Empathy - maximising proximity and contact with stakeholder networks and not just 'consumers'
- 2, Dynamic Mapping - Employing a multiple-perspective set of lenses to map and evaluate potential solutions that include the question 'Is this a good thing to do now?' and is adaptive to changing circumstances within the project
- 3, Consequence Visioning - Informing responsible decision-making by employing designerly compelling narratives to predict and highlight both positive (responsible) and negative (irresponsible) outcomes
- 4, Toggling - between macro & micro and near & far horizons in order to consider the immediate and distant consequences of potential problems and solutions

Responsible Innovation isn't an option; it is the only acceptable form of innovation whether it be in a social or commercial context. This study has revealed some of the conditions that may support Responsible Innovation practice where the objective is to avoid *Irresponsible* Innovation. Our mission must be to move beyond this to ensure that all of our work delivers innovation for GOOD.

REFERENCES

- [1] Bailey, M., Aftab M. and Smith N. Hidden Value – towards an understanding of the full value and impact of engaging students in user-led research and innovation projects between universities and companies. In *Proceedings of the 3rd International Conference for Design Education Researchers, LearnX Design*, Vol.1, Chicago, June 2015, pp. 290-307.
- [2] Bailey, M. and Smith N. Safe Environments for Innovation - Developing a New Multidisciplinary Masters Programme In *Proceedings of International conference on engineering and product design education*, Trondheim, September 2010, pp. 60-65.
- [3] Michlewski K. Design Attitude, 2015 pp.
- [4] Dye P. *Bright ideas for dark days. Inspire and Innovate*. Available: <http://www.theguardian.com/inspire-innovate/bright-ideas> [Accessed on 27 January 2014]
- [5] Berkun, S. The challenges of innovation. The Myths of innovation. 2010 pp. xvii
- [6] Stilgoe J., Owen R. and Macnaghten P. Developing a framework for responsible innovation. *Research Policy*, 2013, 42(9), 1568-1580.
- [7] Grunwald A. Responsible innovation: bringing together technology assessment, applied ethics, and STS research. *Enterprise and Work Innovation Studies*. 2011,7, 9-31.
- [8] MacArthur E. Towards the circular economy. *Journal of Industrial Ecology*. 2013.
- [9] Eden C. and Ackermann F. Mapping Distinctive Competencies: A Systemic Approach. *The Journal of the Operational Research Society*, 2000, 51(1), pp. 12-20.
- [10] Manzini E. Emerging Problems and New Potentialities, in McGrory P. and Conway L. (eds.) *On Design Leadership*. Helsinki, 1992.
- [11] Denton H. G. Multidisciplinary team-based project work: planning factors. *Design Studies*, 1997, 18(2), pp. 155-170.
- [12] O'Brian W., Soibelman L. and Elvin G. Collaborative Design processes: An Active - and Reflective - Learning Course in Multidisciplinary Collaboration. *Journal of Construction Education*, 2003, 8(2), pp. 78-93.
- [13] Buchanan R. Wicked Problems in Design Thinking. *Design Issues*, 1992 8(2), pp. 5-21
- [14] Kyffin S., Bailey, M. and Watson G. *The barriers to multidisciplinary teams achieving success*. Available:<http://www.northumbria.ac.uk/static/worddocuments/desdocs/StevenKyffinDebate.doc> [Accessed on 2013, 10 March] (2009)
- [15] Aftab M., Bailey, M., Spencer, N., Jeffs C., Smith N., Stalker B. and Sams, P. A multidisciplinary approach to innovation. In: *The Innovation & Entrepreneurship Teaching Excellence Awards 2015: An Anthology of Case Histories*. Academic Conferences and Publishing International Limited, Reading, 2015, pp. 1-14.
- [16] Bailey, M. and Stokes A. *Rethinking the Future; Northumbria University School of Design Salon Project*. Available: <https://vimeo.com/144480770> [Accessed on 2016, February 28] (2015)