Design Research for the real world: A Design-led Innovation Model for Action Research

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Abstract

The aim of this paper is to aid researchers in undertaking action research within industry with a particular focus on the study of design-led innovation. This paper presents the research design of a case study shaped to solve real world problems concerning a major Australian Airport Corporation by bridging the chasm between academia and industry. The researcher's role is one of design-innovation catalyst, facilitating the integration of design as a new strategic capability and innovation approach within an organisation's fabric [1]. A discussion of the researcher experience within industry will provide evidence on the challenges facing such a research role, with strategies for overcoming these barriers presented. Based on the authors' experience as a researcher within industry and reflection within practice [2], a project progression model for action research is presented to enable the improved management of industry based research.

Keywords: action research, industry engagement, reflection

1   Introduction

Encouraged by the success of design management, the role of design has undertaken a bolder move in to the strategic domain of businesses, where tactical and business model decisions are made [3]. The movement of design within business follows a diversification from the traditional project level domain of design associated with manufacture and styling activities. Design-led innovation in particular, uses methods central to the discipline of design to develop products and services that anticipate future user needs, build future proposals and encourage feedback to firms and organisations [4].

Research into the value that design-led innovation adds within varying industry sectors has been the focus of work completed at Queensland University of Technology (QUT), Australian, for the last three years. The Design-Led Innovation Lab based in QUT's School of Design has collaborated with various company types and diverse sectors in order to understand, expand and contribute new knowledge to the role design plays in solving some of Australian businesses' toughest innovation challenges. The challenge underpinning this type of research has been applying non-traditional and flexible approaches to research to produce validated research outcomes, whilst concurrently solving industry based problems.

This paper provides a background to design-led innovation and the role of a design-innovation catalyst as a new form of action researcher positioned within business. A qualitative action research approach is then presented in order to reveal how embedded research is structured through project work completed within a major Australian Airport Corporation. The challenges faced by the design-innovation catalyst will then be discussed within the context of the Airport sector. A strategy for overcoming these challenges are proposed through a model for project work which structures the first vital steps from academia into industry. The paper seeks to aid future researchers in undertaking similar types of research; understanding that the hardest component of industry based research is often taking the first steps out of the academic environment.

2   Design-led Innovation

Bucolo, Matthews and Wrigley [4], define design-led innovation accordingly in three phases; 1) having a vision for growth, 2) exploring this vision through deep customer insights and co-design with customers and stakeholders, 3) mapping the outcome of deep customer insights to all aspects of the business as propositions. Design-led innovation uses the well-established platform of design thinking as a theoretical and practical foundation. Within a design-led approach, the skills [5] and approach to problem identification/solving [6] is harnessed to enable value creation within business.

Design thinking describes the way in which designers think, and the approaches and processes utilised in solving problems [7]. The origins of design thinking stem from the notion that design deals with problems that are ill-defined or 'wicked' in nature [8]. The nature of wicked problems, the primary subject matter of design, determines solutions to be discovered through exploration rather than uncovered through scientific inquiry [8]. Underpinning design thinking is belief in improving the artificial environment to the benefit of society [9]. As a result, empathy is integral to any design-led or design driven approach to innovation [10,11, 12].

The Design-led Innovation Framework (Figure 1), is a visual construction of the key activities and domains of business structure in which design is applied during design-led innovation [4]. Whilst the framework suggests there is a fluent progression between domains of the matrix, a closer deconstruction of the framework reveals three distinctive activities that make up design-led innovation. These are: 1) Deep Customer Insights (left domain); 2) Opportunity [Proposition] (axis); and 3) Design Strategy (right domain). There is a need to

refine the role of a designer who can aid industry in shifting from activity and business domain throughout the framework in order to maximise the value of design-led innovation. Wrigley (2013) has termed this capability as the role of the *design-innovation catalyst* [1].
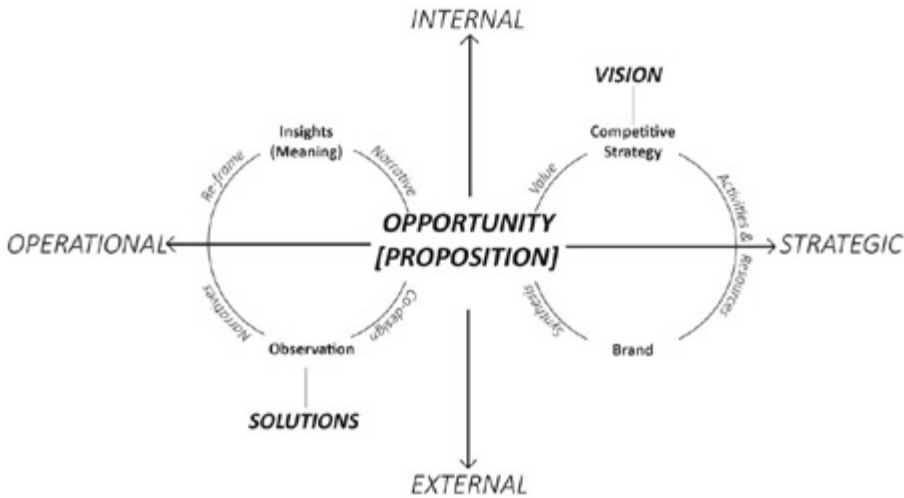

Figure 1 Design-led Innovation Framework [4]

3 Design-Innovation Catalyst

The *design-innovation catalyst* is a multidisciplinary designer positioned within business to disseminate the skills and approach of design-led innovation [1]. Another term for this is position is *transitional developer*: a capability or role which translates research into business opportunities and drives industry impact [23]. Such a role requires foundational design knowledge, the ability to emphasise, explore problems visually and reframe ideas based on customer insight [23]. Visual communication skills are important for persuasively conveying how customers might interact with new envisioned products, services or business models [1].The catalyst acts as the continual voice of the customer within the business, interlocking customer centric values into business operations and strategic planning. Importantly, the catalyst disrupts current innovation processes within the business in order to reveal design-led innovation as a new approach offering the customer centric foundations to shape and inform new opportunities and possibilities.

Within this project, based in a major Australian Airport Corporation, the catalyst is also a researcher who crosses the boundary between academic and industry. In order to map the movement of the catalyst, Wrigley has developed the Design-Innovation Catalyst Educational Framework to identify how a design-innovation catalyst traverses industry and academic (Figure 2) [1]. The framework consists of the institutional domains of industry and academia, with an intersecting axis of learning and teaching. Wrigley (2013), determines that the catalyst begins with learning within the university environment (bottom left corner) by absorbing current literature and discovering theoretical frameworks. The catalyst then moves into the top left hand corner to engaging and exploring industry – understanding business

models, business processes and internal culture. The catalyst then shifts into teaching design-led processes and skills to industry stakeholders within the business, through workshops and project work. With this knowledge of how design-led innovation is utilised within industry, the catalyst then shifts back into the academic environment to disseminate the findings and implications of their research.
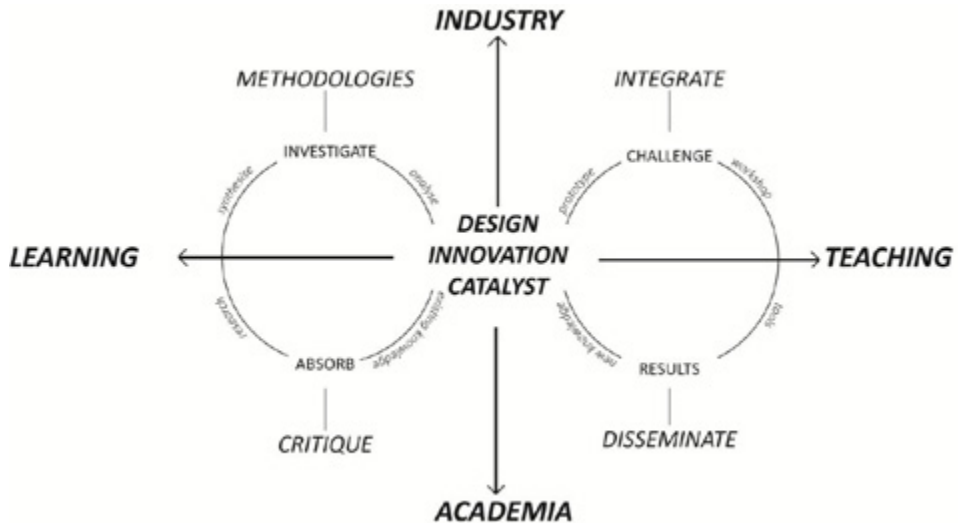

Figure 2 Design-Innovation Catalyst Education Framework [1]

4   Action Research and Design-led Innovation

The industry based rationale of the design-innovation catalyst is supported by an action research approach in order understand the practical role of design-led innovation within varying industry sectors and company types [13,14,15]. Action research can first be traced to MIT Professor and important figure in social psychology, Kurt Lewin. Lewin described action research as a comparative social action and research evolving in a spiral to contribute to both industry and academia [16]. Action research is ideal in this type of research setting as the experimental and reflection based learning present within the method supports the iterative nature of design practice [2,6], and the cyclic nature of the design-led innovation framework [4]. Whilst exploring a component of the design-led innovation framework, action research offers the researcher the ability to frame and tackle any arising problems within the unique research context through practice [17]. The stages of action research are presented as an adaption of Swann and Zuber-Skerritt (Figure 3) [13,14,15]:

1. Plan: A plan is made to apply existing framework through practice, in this case projects are created and assigned to the design-innovation catalyst (researcher) to lead and facilitate through an application of design-led innovation;
2. Act: Design-led innovation framework is applied and tested to stakeholders through collaborative project work led or facilitated by the design-innovation catalyst (researcher);

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3. Observe: Data is collected surrounding the application of the framework through three data collection techniques (semi structured interviews, focus groups, field notes and a reflective journal) which allow for the documentation of change within the research context [18, 19];
4. Reflect: A thematic [20] analysis of data collected takes place, and a reflection upon the previous phases is made in order to develop indicative findings; and,
5. Theorise: New knowledge is produced in an inductive manner [20] as an output from the data collected and corresponds to the research questions guiding the research.

Figure 3 An Action Research Cycle - adapted from Swann, (2002), and Zuber-Skerritt (1992, 2001).

Within each action research cycle is the subsequent practice of design-led innovation through project work. Design-led innovation becomes the anchoring theme throughout the research directed through its application within each project. These projects run along the 18 month timeline and are facilitated or led by the design-innovation catalyst (first author), as illustrated in Figure 4, *Action Research Cycles + Industry Projects*. Project 1 focused on the role of design-led innovation in strengthening key retail partnerships [21]. Project 2 concerned the development of the Airport mobile application [22], whilst Project 3 concerns the development of a passenger loyalty program through digital channels, a project which is yet to be presented within a publication.

The integration of design-led innovation as an approach, facilitated by the design-innovation catalyst is documented through qualitative data collection techniques including semi

structured interviews and focus groups with stakeholders, maintained field notes and a reflective journal to build upon observations within the industry context [18,19]. Crossing back into an academic setting is structured through the journal and paper outputs scoped to each project. These papers focus on analysing and contributing to the field of design-led innovation whilst also benefiting the industry in which the research takes place, in this case, an international Airport Corporation.
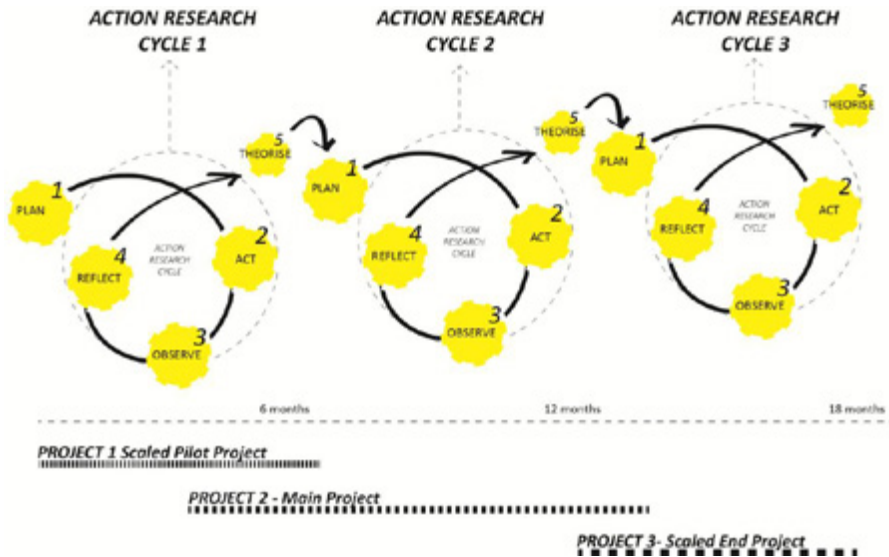

Figure 4 Action Research Cycles + Industry Projects

5   Design-Innovation Catalyst Insight

The following insights are from the researcher's reflective journal maintained throughout the entire 18 month embedded research period with entries made every two to three days. The reflective journal builds upon field notes (collected daily), focus groups and semi structured interview data (collected on in three parts throughout the 18 months). The reflective journal is an important data reflection asset enabling a transition between action research cycles. The reflective journal focuses not only on the integration of design-led innovation, but the challenges and experience of the design-innovation catalyst within industry.

Operating across academic and industry environments is a challenging activity which has required energy from the research team to sustain. This energy is focused on the production of distinct outputs that are tailored and expected in both academia and industry. Achieving contributions within industry has required concepts and theories to be synthesised and distilled into relevant and applicable knowledge at project level. Generating academic outputs and new knowledge has required expanding upon existing bodies of knowledge relating to design thinking, innovation, business strategy, marketing and new product development. Each link between the describing the industry context and bridging the identified industry characteristic to literature allows the researcher to build scope around the action research. The

nature of the business in which the design-innovation catalyst operates, undertaking action research differentiates the circumstances in which design-led innovation is utilised. This enables specific and valid research gaps to be identified and pursued through a review of current literature mapped against the industry dynamics and the business's organisational environment.

Stepping between academia and industry requires careful planning about how the design-led framework can be applied. Once an industry project is underway however, planning must become action and data collection as described in the action research cycle. These two activities occur simultaneously, as the practice of the design-led innovation framework must document the environment prior to, during and after design-led innovation has been applied in order to track changes or measure learning's amongst Airport stakeholders. A significant challenge here is letting go of an expectation that design-led innovation must be completed in a particular way as per the framework suggests. The industry sector and organisational type in which the framework is practiced will determine which parts of the framework are perhaps more relevant or have a greater impact. Therefore the industry context in which the application of the framework is studied becomes the vital constraint providing scope to the research. In the case of the Airport, only a few customer insights were truly novel but it was how these insights were used and driven into the strategic areas of the business that proved to be valuable. The collection of data concerning the influence of design-led innovation within the organisation is important to developing new industry or organisationally specific design integration models or criteria.

The next phase of action research within industry has been to reflect upon the influence or role design-led innovation has played within the business in order to disseminate these findings with academia. Whilst in the boundaries or environment of industry, reflection becomes difficult and often challenged by the operational drive to achieve optimal business performance. Reflective behaviour often requires distance from the subject matter and is therefore a challenge of embedded research. For this reason, the embedded period of action research uses four days a week within the business, with one day at university in order to unpack the events of the week, or emerging themes throughout the research cycle with other colleagues undertaking action research in contrasting and non-competing industry sectors.

6   Discussion

From the experience of the design-innovation catalyst, documented within the reflective journal for the duration of 18 months, gaining traction or acceptance within the business comes first from the action of design and experiencing the power of customer insights, and less from design rhetoric and convention. The *Design-innovation catalyst Project Model* (Figure 5) has been generated from the experience of the design-innovation catalyst researching with a major Australian Airport for 18 months and can be used to structure future research projects [1]. The model incorporates key features of Wrigley's *Design-Innovation Catalyst Education Framework* within each project domain [1]. At a higher level, the industry and academic divide is also represented through the lower and upper components of

the x axis. The model incorporates the embedded period of action research within a broader research program to take into account the total time and activities required to deliver industry and research outputs.
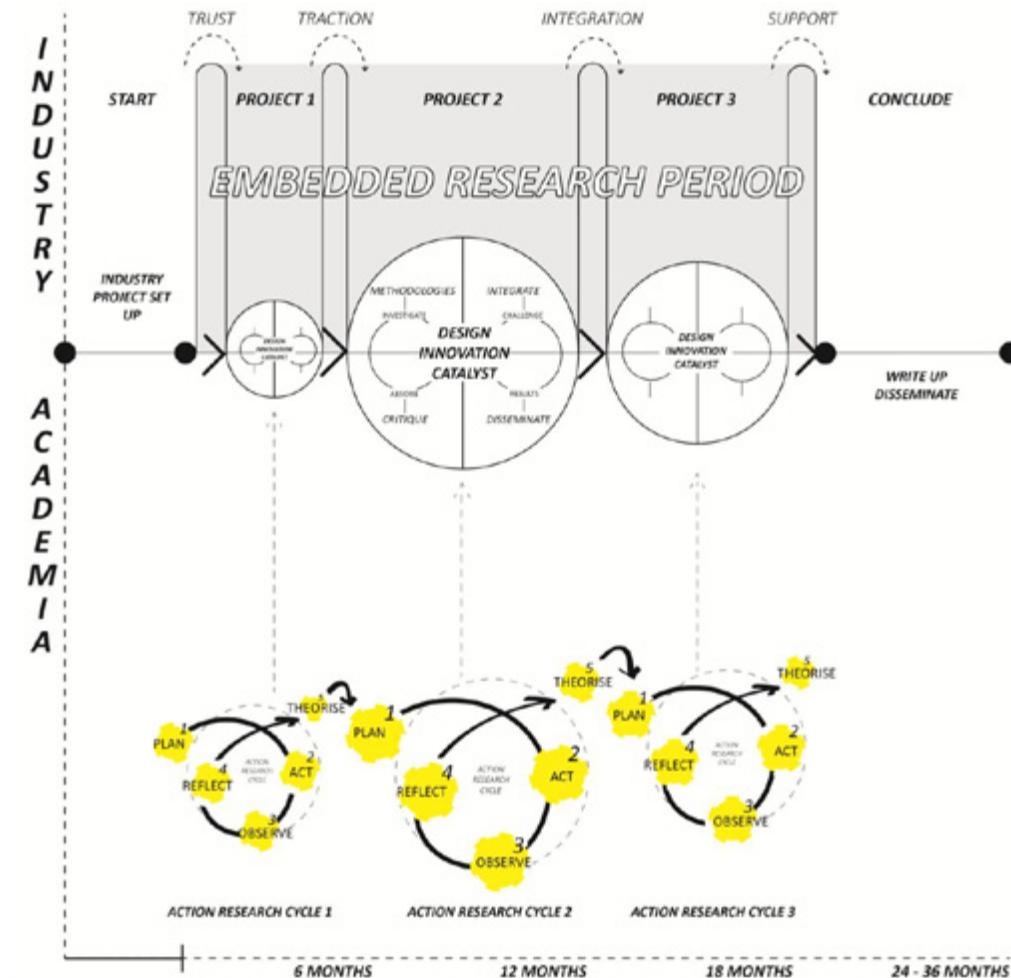

Figure 5 Design-innovation catalyst Project Model

A scaled project can build the platform using trust to build acceptance and relationships required to kick-start design-led innovation. The scaled project might be a shorter 3-4 month project not involving financial risk which acts as a demonstration of the value of design as a new way of working or leading innovation. This project from a research perspective tracks the initial impression of design-led innovation to the organisation and stakeholders. This initial engagement may be a disruptive within industry as the approach is completely novel, but with successful completion of this project comes traction which can be leveraged within the greater program of research and across projects 2 and 3. Once traction has been gained through the successful completion of the scaled project, the value of design-led innovation and the design-innovation catalyst may be established and built upon.

Using new found support within the business achieved through Project 1, the use of design-led innovation as an approach and the responsibility of the design-innovation catalyst can be scaled up to a second larger project involving financial budget and broader stakeholder groups. The design-innovation catalyst drives this project through to completion, acting as the project lead. Project 2 acts as the main component to this research and requires the most energy, time and resources. Here, design-led innovation becomes the approach which drives a project with significant organisational interest. The catalyst must champion the design-led approach to stakeholders so as to reveal the benefits of such an approach more broadly across the organisation. This visibility and interest of such an approach within an organisation produces barriers and challenges to a new way of thinking. The catalyst must document these challenges and barriers in order to map the organisations existing culture and the existing accepted project procedures in place. Whilst Project 1 focuses on disruption, Project 2 becomes the stage at which design-led innovation is learnt, applied and importantly valued by organisational stakeholders.

Finally, the third project scales back to a smaller project and importantly involves the facilitation of a design-led approach, rather than the catalyst being the primary driver of a design-led approach as witnessed within Project 1 and 2. In Project 3, stakeholders should begin to apply design-led innovation independently of the catalyst's facilitation. This ensures that a design-led innovation as an approach is not only being learnt, but is being applied and therefor becoming integrated within organisational culture. Project 3 is the integration phase and acts as the conclusion to the action research period.

Each project contains the action and research within academic and industry illustrated by the integration of the *Design-Innovation Catalyst Education Framework* within each project domain [1]. The adapted action research cycle [13,14,15] which structures the collection of data through qualitative techniques acts as a methodological approach whilst the projects undertaken sit alone the timeline factored and are influenced by the industry context.

7 Conclusion

Establishing the foundations for a successful research program using the design-innovation catalyst approach to research in business requires specific knowledge and skill. As a design-innovation catalyst, gaining traction as a new member of an employee environment – both personally, and for a new approach to innovation demands tact to think independently and convey the value of design-led innovation. Becoming a design-innovation catalyst requires one to become immersed in the culture of the research environment, but also have the ability to distance oneself from the culture in order to observe objectively and without bias.

Introducing design rhetoric is important in building up a new design orientated skills within the business. However, the research documented in this paper has shown that the skill set and approach of design-led innovation must be experienced through project work within a corporate organisation for the value of design to be recognised and adopted. It is hoped that the Design-innovation catalyst Project Model (Figure 5) aids researchers, design students and

practitioners in structuring complex non-traditional research with the concurrent aim to solve real world problems. This model can be scaled to fit Masters and Doctoral post graduate degrees in the design and innovation research area by adjusting the timeline to scale up and down the scope of the research. Additional industry sectors or company types could also be added into the model as secondary data collection phases.

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