DESIGNING RADICAL BUSINESS MODEL INNOVATION: A CASE STUDY

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ABSTRACT

"The process of innovation is often seen as being very linear, with research results, new technologies or user insights being channelled, often prematurely, into specific products and process" (Kyffin and Gardien 2009). It is precisely this perception of innovation-as-linear-process which this paper seeks to challenge. While there are many current theories and much contemporary literature available which discuss the management and catalysts of innovation, what is missing are examples of how innovation occurs from the application of these theories and literature (Wrigley & Bucolo 2010). This paper addresses both this gap and perceptions of the viability of linear innovation by presenting a case study for the commercialisation of a core technology (a cleantech, semi-portable mass-energy generator posited as a direct competitor to conventional energy provision systems), within an 18-month timeframe by the use of the Design-Led Innovation approach: "a process of creating a sustainable competitive advantage by radically changing the customer value proposition" (Bucolo & Matthews 2011).

INTRODUCTION

Design is not a linear process (Brown 2008). Indeed, the value of design is "a different way of thinking, doing things and tackling problems from outside the box" (Bucolo & Matthews 2011). It is this difference that affords Design-Led Innovation a unique opportunity for radical innovation in business value propositions by using "the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity" (Brown 2008). Martin (2009) posits the 'Knowledge Funnel' to address the intersection between linear and non-linear perceptions of innovation by defining three phases of innovation: mystery, heuristic and algorithm, from which the broadest of innovative opportunities might be identified and ultimately applied in a scalable and repeatable pattern. Conversely, Design-Led Innovation defines only three discrete components of any possible innovation outcome: user needs (also called human centred design), technology (the core intellectual property of concern) and business model (Bucolo & Matthews 2011**).** These areas nominally identify the balance between multiple sectors (or silos) of any innovative business (Wrigley & Bucolo 2011) and leave the exploratory skills of the innovation team to the non-linear, unstructured 'familiar uncertainty' of design thinking (Brown 2008). What follows is a brief overview of the three components of Design-Led Innovation with a focus upon the user needs, as is appropriate to a track which discusses participation as an intrinsic element of business model innovation.

Understanding user needs is a central element of any business model's value proposition, particularly as such understandings focus on "how to predict what users want and how they will behave" (Khalid 2006). Such outcomes arise from the application of such design tools as ethnographic and activity observations, wherein the designer analyses and interprets the overarching context of use for an innovation proposal (Dell'Era & Verganti 2010). An important element of a user needs approach is

an understanding that participatory innovation treats the user as a consultant, not a co-designer, as "radical innovation does not occur when companies get closer to users and understand what they currently need" (Verganti 2009). Verganti elaborates on this by stating that Design-Led Innovation is best applied when firms "step back from users and take a broader perspective". They explore how the context in which people live is evolving, both in sociocultural terms (how the reason people buy things is changing) and in technical terms (how technologies, products, and services are shaping that context). Most of all, these firms envision how this context of life could change for the better" (Verganti, 2009). Such a position for the suitability of user needs as a user-as-consultant model is further supported by Ulwick (2002), as customers "aren't expert or informed enough [and] should only be asked what they want a new product or service to do for them.

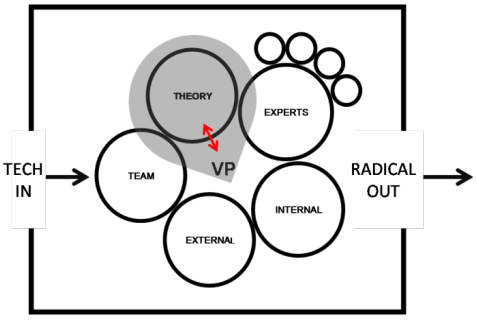

Figure 1: Participatory Innovation and Stakeholders (VP=Value Proposition)

Design-Led Innovation applies a user needs approach not only to the end-user (or consumer), but to partners' and stakeholders' needs also providing a broader platform for potential radical innovation throughout business model proposals (Bucolo & Matthews 2011). The inclusion of key stakeholders and partners as participants in the innovation process injects greater scope for participatory innovation (Verganti 2008). As this case study highlights, involvement by key partners is critical to achieving radical business model innovation when included with the application of theoretical backgrounds (Figure 1). The second component of Design-Led Innovation is the business model itself. For this purpose the Business Model Canvas (Pigneur & Osterwalder 2010) was prescribed to the design team as a tool for quickly and intuitively prototyping possible business models during early-stage generative and evaluative exercises. The third component of the Design-Led Innovation approach focuses on the technology, but "the goal is not to evaluate the particular features or experience of this existing product, but to relate it to the initial value proposition and assess its strategic competitive advantage" (Bucolo & Matthews 2011). Linear theories of innovation find their most appropriate representation in Martin's Knowledge Funnel (2009). Consisting of mystery, heuristic and algorithm (Figure 2), the Knowledge Funnel is a model for how businesses can advance knowledge and capture value. It is also an effective way to demonstrate how each business model concept is conceived and how heuristics can be developed by unlocking the knowledge at hand by involving participants and design tools. According to Martin, heuristics are rules of thumb that help narrow the field of enquiry and work the mystery down to a manageable size. In a traditional design process this would be known as the concept development stage. Finally, the algorithm stage converts the heuristic into an explicit, step-by-step procedure or formula for solving a problem (design development stage of the project).

Design (beyond innovation theory) is a "distributed social process" and as such relies upon effective communication in order to convey its message (Erickson 1996). Common tools designers use in order to effectively communicate are readily available and low-technology, from brainstorming and sketching, to cardboard prototypes and storyboarding, as "the major work of creative design is done through a kind of dialogue with some rapid production medium" (Ware & Ebooks 2008). This is a distinct process difference from conventional, linear innovation theories in that the initial focus is based on "the quantity of ideas rather than quality, withholding criticism, welcoming unusual ideas and combining and improving on them" (Scanlon 2009). Moreover, designers interact directly with users and stakeholders and thus possess the ability to see a 'humanised' version of each proposal, constantly and powerfully returning the proposal to a user-centred value proposition (Verganti 2009), effectively combining such participatory skills with simple and effective visual communications to "envision how the context of life could change for the better" (Verganti 2009).

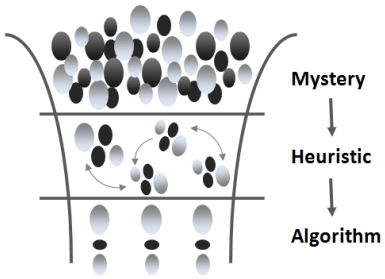

Figure 2: Martin's Knowledge Funnel (2009)

The next section therefore explores the non-linear synthesis of Design-Led Innovation theory and conventional design tools and ultimately provides an overview of the case study. By presenting three major waypoints and discussing how the theories and participatory activities helped the design team generate multiple business models in the search for radical innovation and reframing of the core value of the technology (waypoints are key milestones which signal a new phase in the evolution of the project). Ultimately the final section provides a retrospective analysis of the tools and theories presented, discussing how the synthesis of theory, design and participation might lead to radical business model innovation.

CASE STUDY

WAYPOINT 1: A REMOTE POWER SOURCE

The defined mystery for the team's first waypoint was, "What if mines could reduce their environmental footprint by generating their own electricity?" This was one of the first directions for exploration because it seemed to be the most obvious application for the technology given the generator's technical characteristics, such as size, output and not requiring re-fuelling or supply-lines to operate.

Heuristics derived from the first mystery were largely realised by brainstorming techniques internally to rapidly develop many varied contexts of use that seemed to best fit the unique benefits of the technology. By selecting the top three most compelling heuristics and proposing them to teaching staff, peers and the partners for feedback it was possible to define a value proposition for each context. The discourse generated improved value propositions that would not have been developed by the design team alone. The design team conducted further research about mining operations and transferrable knowledge from existing power supply options in this scenario to assist in the completion of business model canvases which helped refine the value of the technology. Putting the technology into any context at the beginning set a direction for the project and got the design team to start thinking more deeply about the practical aspects of the design. These aspects subsequently added a level of detail that would assist in the generation of further waypoints.

In summary, the evaluation of this waypoint highlighted the first application of the business model canvas (Osterwalder et al 2010). Using this tool, the design team was able to quickly adapt its thinking towards a systematic way of evaluating and determining radical business model innovation. This was the beginnings of the generation/evaluation criteria which will be discussed in the outcomes section. Whilst the business model and enabling technology satisfied questions of feasibility and desirability (it was both functionally possible and marketable), it failed in the areas of viability (commercialisation within 18 months). Also, no radical reframing of conventional energy delivery business models was convincingly achieved. That is, simply replacing a diesel generator with another form of generator, while feasible, is not a radically innovative proposition.

WAYPOINT 2: THE JAPAN DISASTER

The second major waypoint reframed the initial value proposition in alignment with current world events: "How can powering the recovery effort empower the people to take their recovery into their own hands?" The Japanese Earthquake and Tsunami disaster was unfolding at the time of the design process and the design team was influenced by this event. Large areas of Japan were without power and this was hampering the recovery effort.

By developing storyboards which explored and communicated the day in the life scenarios of a young survivor it was possible to engage the team's peer participants in an open discussion which produced valuable insights regarding the user context. By involving peer and staff participants in storytelling and visual thinking a deeper understanding of the social needs of the users were shared and explored. This was done by drawing storyboards and presenting them to peer participants and teaching staff as a five minute narrative. As a result the design team identified an opportunity for a business model which would enable Japanese authorities to install generators for the local population to use to rebuild their own homes. As an alternative to authorities such as the United Nations, Tepco, the owner-operators of Japan's disabled nuclear power plant was identified as a potential customer. Strategically it was surmised that Tepco's survival as a company might rely on a public relations campaign demonstrating the adoption of nuclear-free technology.

This business model emerged from a deliberate emphasis on creating maximum value for the user. It was a response to asking where this technology could be delivered, and to whom, to do the greatest good. It was an effective way to test whether or not a radically innovative business concept could be easily derived from the most compelling utilitarian cause.

Throughout waypoint 2, the team became adept at generating a large number of business model canvases and mixing and matching the best parts of each to refine business concepts for the client's review. Through involving multiple participants in the design process a more informed view of feasibility was achieved. Although the concept was technically possible and highly desirable from the end-users perspective, there were great doubts about execution within the relatively short timeframe of eighteen months. Therefore this waypoint could not pass through to algorithm stage. Despite this, the most significant outcome of this waypoint was directing the design team's thinking towards decentralised, modular power in a scalable roll-out that could grow with demand just by installing more units.

WAYPOINT 3: HOUSE, LAND AND ENERGY PACKAGE

The team's final proposal was framed by a more local, less convoluted business model opportunity with relevant inspiration coming from the Global Financial Crisis, and asked, "What if housing affordability could be improved through the provision of cheaper, flat-rate, decentralised electricity?" Following logically from the modular and scalable roll-out model proposed in the Japan Disaster waypoint, it was possible to investigate the feasibility of applying a similar model locally (South East Queensland). The onus on the team at this stage of the design process was to identify an application which delivered maximum achievable value. By adapting the

Japanese Disaster waypoint to a smaller, local scale the enabling model was not only more feasible and viable, it was possible to address cost of living pressures such as rising electricity bills and land prices experienced by South East Queenslanders.

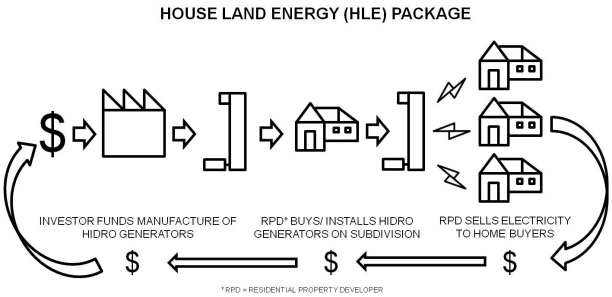

Figure 3: The final innovative model

HEURISTIC TO ALGORITHM

This final reframe of the value proposition was feasible, desirable and viable enough to be pushed to a higher resolution with more rigour and quantitative investigation. Through development of several business model canvases the existing service model of a cell phone plan was adapted and transferred to what became known as the House Land and Energy Package (Figure 3), the only waypoint that could be resolved to algorithm stage. This waypoint was the first to consist of both a business to business and business to consumer component. In this model, the property developer (business to business) would become the service provider for electricity, purchasing generators as required to maintain adequate electricity supply to match demand within the subdivision. Additionally, this model enabled a completely new revenue stream for the property developer. The home buyer (consumer) would purchase usage rights of the generators, the costs of which are built into the mortgage. The advantage of this model compared to conventional house and land packages was that electricity costs would be significantly lower over the life of a typical twenty-five year mortgage. It was identified that the savings in electricity over that period could reduce the cost of utilities thus allowing more renters to consider the purchase of their own home. Efficiency gains due to the close proximity of the generators to homes greatly reduce the cost of electricity. This is compared with conventional power plants where transmission and distribution losses account for up to fifty per cent of total output (Nera Economic Consulting 2007).

EVALUATION

By engaging in a design process that involved participation with teaching staff, experts in the field and fellow students, a more insightful design discourse was generated. By actively involving more people from varied backgrounds and levels of expertise with the design tools, the discourse generated better questions which challenged the feasibility, viability and desirability considerations of each new waypoint which ultimately resulted in a better final business design. If it had not been for the rapid exploration, experimentation and failure of earlier waypoints, it is highly conceivable that the design team would not have reached this level of resolution. The design team involved local council participants to contribute to the validation of the business model.

OUTCOMES

The practical implementation of design when aligned with an exploration of the theories of Design-Led Innovation afforded the design team an unexpected and multi-tiered value proposition, with the core technology shifting its meaning from a sole intellectual property to being the catalyst for a much larger and more radical design proposal and business opportunity. Retrospectively, the design team's varied use of the tools and theories of design-led innovation afforded a sequence of rapid, innovative potential solutions to the project brief. Parallel to the use of design tools was the interpretation, synthesis and application of contemporary theory in the field of Design-Led Innovation, which resulted in the identification of five major generative/evaluative 'criteria' sourced directly from the prescribed theory and tools to match technology with user and business needs to create customer value. The HLE Package was selected because it satisfied these criteria:

Viability – Is it likely to become a sustainable business model? Can it be achieved to cost and time budgets? (Brown 2009). Interestingly, the team's final proposal failed to be able to be commercialised in the stipulated 18 month timeframe. However, interest garnered by local council provided some flexible timeframe alternatives for the business model presented to them.

Feasibility –is it functionally possible? (Brown 2009). While the technology was patented, testing was still to be completed to commercial feasibility. As this criteria is a broad heuristic perspective, possibility was assured by existing patents and consequently satisfied this criteria.

Desirability – Does it make sense to people and for people? (Brown 2009) Is there a significant need for it? How easily can the idea be sold? The team encountered initial resistance to the nature of this technology, but continued participation on behalf of the concerned parties (stakeholders and partners) crucially afforded the design team the forum to engage the enthusiasm and ideas of sceptical participants and align them with the new value proposition. This process allowed concerns over the desirability of the technology to be readdressed and the business model consequently to be adjusted to accommodate these concerns.

Participation – Does the inclusion of participants in the innovation process stimulate radical and unexpected change? Does it create innovation through both technology and participatory design, rather than market driven forces? (Verganti 2009). Participation was a

critical element of communication and innovation of the value proposition, where arbitration on the possibilities of the technology was discussed in a casual forum. This casual approach promoted ease of discussion and freedom to conjecture more broadly on the mysteries of the waypoint in question.

Knowledge Funnel- Defining the broadest contextual vision for innovation (mystery) and testing whether proposals are logical, arithmetic, structured, repeatable and scalable (algorithm)? (Martin 2009). The heuristics stage is where the mystery was interpreted and reframed through the application of design tools by participants opening a design discourse which responded to the design team's initial concept proposals. The most effective way to convert a heuristic into an algorithm was by inserting heuristics into the business model canvas. Only the concepts that could be resolved to algorithm stage were considered capable of execution. This means that only business models that were scalable and repeatable, in addition to offering a radically innovative value proposition, were ones that were considered viable. By following a process of generating and rapidly testing and failing business model concepts, it was possible to evolve a concept toward a formulaic business model with the greatest potential for commercialisation.

The benefits of these five concepts and criteria were implicit to the expansion of the technology's value proposition beyond conventional linear innovation thinking, allowing the design team to engage with, explore and test theretofore unacknowledged, unconventional and unexpected commercialisation opportunities alongside their participatory partners and stakeholders. As the design team became more confident with the transition through the Knowledge Funnel, it refined its own design process. Various design tools and were employed strategically at different stages of the process. For example the business model canvas was seen as a way to transition the mystery into an algorithm (from concept to design). The design team also learned at which stage it was best to involve different participants (peers, teaching staff, industry experts and the client) to maximise their input in the business model design.

Not only did the design team become more confident with the use of business model canvases, it developed its own criteria for assessing business models to determine radical innovation and the potential for business success. The design team realised that the more business model canvases that could be produced and evaluated (and failed) using participatory activities, the design process would yield higher quality proposals. The participatory groups covered in this paper perform the same functions as equivalent non-designers in an industry context. For example, teaching staff and student peers could be easily substituted for co-workers, interdepartmental work colleagues, supervisors and business associates in any organization.

It is hoped that this paper has contributed to knowledge by showing how a combination of innovation theory with stakeholder participation and design tools can achieve radical business design. It aims to encourage discourse on the Design-Led Innovation approach to the generation of radical business models.

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