

Innovation, Influence, and a Deck of Cards: Exploring an innovation intermediary through Human-Centred Design – By John Barker, Prof. Nick Clifton and Prof. Gareth Loudon (Cardiff Metropolitan University)

## **Context**

Intermediaries in the innovation process are described in a variety of terms; innovation intermediaries (Billington and Davidson, 2013), innovation consultants (Wright, Sturdy and Wylie, 2012; Bianchi *et al.*, 2016), boundary organizations (O'Mahony and Bechky, 2008), specialist knowledge providers (Tether and Tajar, 2008), virtual knowledge brokers (VKBs) (Verona, Prandelli and Sawhney, 2006), and third parties (Howells, 2006).

The role of intermediaries in the innovation process has changed depending on the context, with Fabbri and Charue-Duboc (2016) and Groves and Marlow (2016) outlining incubation and co-working space as an intermediary, and Nambisan, Bacon and Throckmorton (2012) highlighting venture capitalists as performing the same function. For the purpose of this paper, the role of the intermediary will be defined broadly as brokering and transferring knowledge into the recipient organisation through the mechanism of a digital platform (Boudreau, 2010; Hossain and Islam, 2015; Kokshagina, Le Masson and Bories, 2017).

## **Regional Innovation Landscape**

Contextually, less economically developed regions, in this case Wales, can have lower labour productivity expressed through below average gross value added (GVA) (Edwards, Delbridge and Munday, 2007; Pugh, 2018). Research and development and organisations such as intermediaries who catalyse this activity can have a positive effect on this deficit as Baughan (2015) states “innovation...accounts for 25-50% of labour productivity growth”. This study seeks to explore the inner-workings of a specific digital innovation intermediary in Wales.

The business, which for the purposes of this study is anonymised and referred to as Innovation Station, is a software-as-a-service company based in Wales. The company provides a digital platform to link private, public, and third sector organisations around challenges provided by typically large corporate entities. The company has 10 employees, so by definition is an SME, with a relatively young workforce with a mean age of 25. The organisation has been in business for 3 years with most of the existing customer base coming from the public sector. Recently, the organisation has strategically developed into the digital innovation space and this has meant a diversification towards a private sector customer base. This change in focus has also meant that understanding the mechanics of developing, creating and executing innovation has gained significant importance for the company as it becomes the main business driver of the organisation. This study will shed further light on the process and how an intermediary supports innovation, and in gaining an understanding will potentially add perspective to how businesses and policy-makers can engage and assess the impact of these intermediaries.

## **Open and Closed Innovation**

As this study explores both through the testing of hypotheses, and the understanding in an industrial setting, how open innovation is constructed, it seems useful to define and explore both terms within the literature.

In creating the concept of open innovation Chesbrough (2003, p.35) defined the approach as developing increased research and development (R&D) activity to “commercialize internal ideas through channels outside of their current businesses to generate value for the organization”. This prevents what Boschma, (2005, p. 62) describes as “the problem of lock-

in” caused by insular and less democratic innovation and by the proximity of economic actors to the organisation that is innovating (see also Yun, Won and Park, 2016).

The concept of open innovation is to some extent framed by comparison to closed models of innovation, which are standardised and internally resourced R&D. Described by Chesbrough, (2003, p. 36) as a philosophy of “control” and “self-reliance”, this approach to innovation allows the management of risk and reward internally within an organisation. Although closed innovation is not the focus of this study, it is useful to understand the difference between the two forms of innovation to contextualise the study.

### Objective

To explore, through a human-centred design perspective, an innovation intermediary and its approach to assisting organisations with innovation activity. To fulfil this particular objective this study seeks to answer the following research question:

- 1) How does an innovation intermediary in Wales model innovation?

The study seeks to explore this question by suggesting 4 hypotheses which are formed from the results of previous ethnographic observation within Innovation Station (see Barker, Clifton and Loudon, (2018) for further detail) which culminated in the following:

- H1) Innovation is technologically led.
- H2) Shared values need to be present in the crowd creating the innovative solutions
- H3) The process of open innovation relies on the crowd having knowledge overlaps
- H4) Customers who value innovation strategically are the best fit for the company

The study also aims to apply a novel methodological approach by adopting an ethnographic methodology and a human-centred design method to help understand and explore this specific environment.

### Contribution

The role of the intermediary in an innovation relationship and process is important for this study given the limited effects and successes of public sector policy interventions in both innovation and entrepreneurship, illustrated earlier in this literature review, and the hosting of the study by a digital innovation intermediary. The core needs of customers wishing to innovate are around speed and distance (Afuah and Tucci, 2012) of the knowledge transferred (Kokshagina, Le Masson and Bories, 2017). In fact, this speed alters the relationship and proximity of the solvers and the seekers as “intermediaries may bring employees and community participants into such a close relationship that community can no longer be clearly distinguished from firm.”(Lauritzen, 2017, p. 293). This overlaying of institutional/crowd boundaries can be viewed both positively and negatively as the externality brings risk and uncontrollable resources (Chesbrough, 2003), while the enveloping of these communities into the internal fold creates better solutions and intrinsic motivation to provide suggestions and ideas (Eckhardt, Ciuchta and Carpenter, 2018).

Digital platforms also shorten the space between these elements transforming the ability and proximity of innovative collaborators turning “the distant search into local search, thereby enabling firms to enjoy the many benefits of distant search without having to endure many of its costs”(Afuah and Tucci, 2012, p. 356). However, the openness of this search also has

limiting factors; “the benefits to openness are subject to decreasing returns, indicating that there is a point where additional search becomes unproductive”(Laursen and Salter, 2006). This point of no return in terms of the openness of the search is difficult to pinpoint, as Lauren and Salter (2006) also reflect, and the geographical bounds are even more complex to define. But this concept of proximity has a particular prevalence to regional economies as the reach of an innovation platform can put organisations from a particularly less-developed economic region in the same virtual space as a large corporate entity from a more economically developed region which benefits both parties.

The importance of the role that these intermediaries take in the process of innovation is integral to the success of any proposed innovation. Colombo, Dell’Era and Frattini (2015, p. 126) outline the responsibilities of these intermediaries as “brokers, mediators, collectors and connectors”. This ability to broker relationships between “seekers” and the “providers” in a “matchmaking” process (Holzmann, Sailer and Katzy, 2014, pp. 612–13) is again a site of contention between scholars. The physically-based approach outlined by Holzmann, Sailer and Katzy (2014) in their study of the innovation in BMW is focused on an intermediary who assesses the needs of these providers and actually facilitates pitching and then client management after contract award. While Kokshagina, Le Masson and Bories (2017) and Randhawa *et al.*, (2017) focus on the online platforms that act as the matchmaking tool enabling the organisation to extend their search and reach into new innovative solutions and provide further automation than the more human-driven Holzmann *et al.* (2014) solution. But this digital utopia is also challenged by Randhawa *et al.* (2017, p. 1331) whose findings state that “along with providing digital platforms to clients, intermediaries also have to develop their ability to leverage this platform as a tool for meaningful community engagement.” The solution to this challenge to the digital intermediary is both human and technologically-centred, as the authors make it implicit that human interaction in the process would better support the transfer of knowledge between organisations. However, the development of chat-bots, and the management through moderation and user-experience (UX) of online communities strengthen the hand of the technologists. The impact of technology on the intermediary’s process of open innovation will also be explored through the results of this study.

Conversely, Billington and Davidson (2013, p. 1468) see the challenge of innovation adoption through intermediaries as not just technical adoption of a platform, but fundamentally transforming ways of working as “there are still significant costs of creating and maintaining internal routines and capabilities...to amortise investment”. In developing new internal processes there also needs to be a “centralized structure” to support the implementation (Ades *et al.*, 2013, p. 15). Digital intermediaries offer support with this implementation allowing, in the case of Wazuko’s IdeaSpotlight (Wazuko, 2019) and Spigit’s platform (Spigit, 2019) administrators of the system to track the status of innovative projects from idea to action and the return on investment of the innovation.

These organisational cultural hurdles can not only be managed by the innovation intermediary but are sometimes created by them; “Open Innovation can be considered an organizational innovation in itself” (Christensen, 2006, p. 35). These barriers can be around corporate culture and the approach to “risk-taking” as open innovation requires a “continuous process of experimenting, adapting and learning in order to proactively define its context” (Aquilani, Abbate and Codini, 2017, p. 450). While the propensity to change, evolve and transform is important, the question of the internal impact of innovation intermediaries within an organisational environment is especially relevant. In assessing the level of resource needed to support these virtual knowledge brokers, companies have previously “underestimated the internal resources (time and know-how) needed to support scientists in working with the innovation intermediary” (Sieg, Wallin and von Krogh, 2010, p. 285). The time and cost

implications of working with these brokers are shown over the longer term to reduce and are helped by digital platform delivery (Verona, Prandelli and Sawhney, 2006; Schäfer *et al.*, 2017; Brunswicker and Chesbrough, 2018).

The impact of the intermediary on the innovation process is dependent on factors such as resource, role, responsibility, and reach within both internal and external environments. While each of these factors is explored in the body of knowledge there is little focus on the how intermediaries “mediate knowledge collaboration between organizations and online user communities” (Randhawa *et al.*, 2017, p. 1294). This study will, in part, examine and explore how the innovation intermediary mediates this knowledge through observations in the host organisation, Innovation Station, using an ethnographic methodology and a human-centred design approach which takes the study into the bounds of new knowledge. Hossain and Anees-ur-Rehman's (2016, p. 35) systematic literature review of open innovation highlights the novelty of this approach suggesting the method to explore this; “Open innovation disciplines can be enriched by borrowing research techniques from other disciplines [including]... ethnography”. This study adopts this overarching methodology for data capture, alongside human-centred design methods, and in doing so, seeks to gain insights from the inside of this relationship between the intermediary and the knowledge receiver in open and closed innovation relationships.

### Methodology

This study adopts an ethnographic methodology, partly because the research was exploratory in nature and sought to understand fundamentally how an innovation intermediary operates to illuminate Howells' (2006, p. 717) call to establish “a distinction between studies that have focused on intermediaries as organizations and intermediation as a process”. This study aims to shed light on both the organisation and the process that they undertake.

The ethnographic methodology also has validity for use in this field as it has been highlighted as an identified gap in the literature to explore open innovation (Hossain and Anees-ur-Rehman, 2016). Other methodologies available included a simple case study, which could be viewed as exhibiting “fuzzy” (Bassegy, 1999) findings, and obviously, a comparative study would be beneficial but is an area for development as part of further study.

In adopting an ethnographic methodology, the study employs Martinko and Gardner's (1985, p. 676) widely used criteria for ethnographic methodologies and capturing data in that; “(a) the method relies on observation by a person other than the subject; (b) the method must rely on the use of category systems; and (c) the method does not use randomized activity sampling procedures”. Taking each of these points in turn this study (a) relies on an individual who is both a researcher and then has become a member of staff at the intended organisation. This draws a particular bias into the process as the research is at once both the observer and the observed as a “complete participant” (Roller and Lavrakas, 2015, p. 173). This position goes a step further than the participant-observer, who builds “rapport” and “to act in such a way as to blend into the community” (Kawulich, 2005, p. 2), to a position where there is both an embedded part of the culture and a researcher. Unfortunately, this can lead to an “overenmeshment” of the researcher to a space where the personal/subjective intertwines with the detached/objective perspective (VanderStoep and Johnston, 2009, p. 202). Navigating this tension is aided in part by keeping a self-reflective learner journal “reflecting on and in action” to create a critical distance from the subject (Smith, 2006, p. 210). The researcher has also ensured that participants gave informed voluntary consent in line with the Association of Social Anthropologists of the UK and the Commonwealth (ASA) Ethical Guidelines for Good Research Practice (2011).

## Methods

In order to explore the approach to open innovation of this intermediary, human-centred design research methods were deployed to see how groups within Innovation Station would challenge and confirm the hypotheses previously. This section will explore the methods used to uncover the findings of this study.

### Human-centred Design (HCD) Methods

The Human-centred Design methodology is utilised in a wide range of academic settings with predominant usage in the product/design fields (De Crescenzo *et al.*, 2019; Grandi *et al.*, 2019), alongside software development (Costa, Holder and MacKinnon, 2017; Watson *et al.*, 2017) and especially linked with the methodological construct of ethnography ((Lloyd and Dykes, 2011; Kelly and Matthews, 2014; Rose, 2016). The approach taken with this study is broadly formed and adopted from *The Field Guide to Human-Centered Design* (IDEO.org, 2015), and rather than becoming a method to support ethnographic exploration in settings where language and technology may provide barriers to engagement with product design (Holeman *et al.*, 2014; Rose, 2016), this adaptation of the HCD method is used to explore participants underlying belief and values in relation to innovation.

The sample studied aligns with Martinko and Gardner's (1985) framework in terms of a lack of randomised sample. In this case, it is purposive and accommodates the entire staff-base of Innovation Station. It should also be noted in terms of the sample that is what deliberately stratified as the employees were split into 3 groups involving; the Senior Management Team, Software Engineers and Sales Team. The division of staff in this way was due to the implied influence of management figures within group settings. The division between the software engineers and sales team also considers the propensity for salespeople to be more gregarious and potentially assertive within these group settings.

The study employed the following group activities involving all participants which are mapped to the hypotheses of the study. These human-centred design methods have been adopted from *The Field Guide to Human-Centered Design* (IDEO.org, 2015):

- 1) Card Sort – Visual exercise to test how employees view technology in the process of innovation. The deck of cards, each card with a word or single image, will then be ranked by participants in order of preference. This activity is specifically designed to explore Hypothesis 1 - Innovation is technologically led.
- 2) Collage – Visual creative exercise using imagery and text from a selection of magazines and publications to understand what the participants believe is the makeup of the innovation crowd and how knowledge is shared and centred across the group. This activity is specifically designed to explore; Hypothesis 2 - Trust and shared values need to be present in the crowd creating the innovative solutions; and Hypothesis 3 - This process of open innovation relies on the crowd having knowledge overlaps.
- 3) Drawing– This pen and paper exercise will ask participants to visually represent the customer persona, which provides insight into the values and beliefs of both the participants and their intended customers. This activity is specifically designed to explore Hypothesis 4 - Customers who value innovation strategically are the best fit for the company.

## **Card Sorting**

Card sorting is used widely within business management research (Budhwar, 2000; Smith-Jentsch *et al.*, 2001; Blanchard, Aloise and Desarbo, 2016), utilising categories to create the deck of cards, with participants ordering the cards preferentially to illustrate the importance of the elements of the process/category.

In order to create the categories used for this card sort, the study adopts Stokes (1997) Science-push linear model of innovation as a baseline to create the following categories of an innovative process:

Basic science, Design and Engineering, Manufacturing, Marketing Sales

The Stokesian model, which while formative, lacks the awareness of the development of open innovation since its theoretical inception, so in order to enhance this categorisation, and ensure relevance for the organisational setting, elements of de Paulo, De Oliveira and Porto's (2017, p. 109) "Open Innovation Practice model" are incorporated. They include; "involvement of non-R&D workers in innovation initiatives", "customer involvement" and "external participation". The benefits of extending this categorisation are that there is a broader parity between technology, market-driven forces, and human capital.

Participants were presented with a total deck of 18 cards. It included 2 null variables to ensure consistency in the results and to test any assumed methodological bias in the ordering of the cards. The deck was made up of 8 cards with the categories clearly marked in the top left-hand corner of each card, alongside an accompanying image which represented the category. The other 8 cards just featured an image relating to the category, which was identified by keyword search through an image search engine. This was in order to test the validity of selections of the categorised cards, as a comparison between the abstract image-only cards and categorised cards should illustrate a clearer set of results.

Each participant group was then given a shuffled deck with the following prompt; "Please sort the set of cards which represent an innovation process, in order of importance. The most important innovation feature should be at the top of the deck, and the least important last, or at the bottom of the deck." The employees were then given 10 minutes to sort the cards in order of importance.

## **Collage**

The use of collage making in research activity is used to:

"overcome the overly rationalistic approach of many data collection techniques commonly used to produce qualitative data... ethnographic research mainly relies on data drawn from spoken words, text and observed reality and tend to downplay perception and experiential aspects of research participants' lives." (Vacchelli, 2018, p. 172)

Using the collage technique to complement and test the results of the previous study by Barker, Clifton and Loudon (2018), allows the study to enhance the perception and experiential aspects of this study. This approach has also been used in the following studies to capture data; (Koll, von Wallpach and Kreuzer, 2010; Soltanifar and Ansari, 2016; Pavesi, Denizci Guillet and Law, 2017). The use of category systems (Martinko and Gartner, 1985) was difficult to implement with such an exercise given the unstructured nature of images/texts in a variety of publications. However, in order to add an element of reliability

into the research method the following publications were given to each group which were published on the same day/month:

- Metro Newspaper
- The Sun Newspaper
- The Voice Magazine
- Women's Own
- Homes Property Magazine
- A selection of flyers from local tourist attractions including Folly Farm, Digger Land and Monmouthshire Railway.

In order to prompt participants, the following statement was read out to ensure relevance to the hypothesis "Make a collage that represents the innovation crowd (our users) and tries to illustrate how knowledge or expertise is shared and centred across the group?". The participants then had 20 minutes to create their collages.

### **Drawing**

There are many benefits offered by using visual methods as a research tool as articulated by Prosser and Loxley (2008, p. 4)

"visual methods can: provide an alternative to the hegemony of a word-and number-based academy; slow down observation and encourage deeper and more effective reflection on all things visual and visualisable; and with it enhance our understanding of sensory embodiment and communication, and hence reflect more fully the diversity of human experiences.

Studies have also suggested that reporting the contents of a drawing is seen as less threatening than verbal feedback from direct events or emotion (Miller et al., 1987) so using this method to reinforce the findings of the semi-structured interviewing is appropriate.

In order to provide a structure for the participants to work around, the study employed a category system to define customer personas which should be "composed of attitudes (motivations, beliefs, wishes) and behaviours"(Ferreira *et al.*, 2018, p. 280). This framework to discover customer attitudes and behaviours were then combined with category systems taken from an Empathy Map for innovation (Gray, Brown and Macanufo, 2010) which are; context, technology experience, problems, needs, and existing solutions. This use of a categorisation system again aligns with Martinko and Gardner's (1985) guidance around the formation of ethnographic methodologies.

Participants were then given the following prompt: "Please use the pens and paper provided to draw representations of what you believe to be Innovation Station's clients, so the paying customers?" They were then given 10 minutes to draw representations of the customer.

### **Capturing Respondent Feedback**

After each exercise, respondents were then asked to explain their creative choices, selection and prioritisation. Responses were videoed and then transcribed for thematic analysis.

## Results

The results of this study will be synthesised between the HCD activity and participant responses to unstructured questioning regarding the HCD in order to provide reflections on the hypotheses.

### **Card Sorting Results**

The groups were split into Senior Management Team, Software Engineers, and Sales Team were each given a set of cards to sort by order of importance. The first group is made up of the Senior Management Team and produced the following sort:

**Figure 3. Group 1 Senior Management Card Sort**



The most important elements of this group's deck are indicated as being customer involvement and external participants. This indicates a rejection of Hypothesis 1 as human elements are ranked higher in terms of importance than the technological elements of engineering and manufacturing. This was also highlighted in the exploratory discussion of the sort with Participant 1 commented that; "you're constantly going back to your customers and going does this kind of work for you?" and Participant 2; "I think the theme is always coming back to the customers and the externals because they always see the people we're selling to you". It is also interesting to note that the two null variables (the handprints and apples) are ranked the lowest, which indicates that the participants correctly identified them as not being of any importance and reinforces their understanding of the task and results of this exercise.





Again, Group 3 put the human elements at the top of the deck with external participants and customer involvement ranking highest in terms of importance and marketing, sales, and manufacturing ranked lowest. Participant 7 indicated that; “towards the bottom, we put the actual process itself because that we felt like that was more part of how you do it and not why and what you do it for”. Confirming the rejection of Hypothesis 1, Participant 6 said “most of the innovation kind of comes in with like the idea generation and speaking to customers and everything. So, by the time he gets to the manufacturer and you’ve kind of done most of the innovation process”. This, alongside the other groups ordering of the deck, means that we can conclusively reject the Hypothesis 1 - Innovation is technologically led and conclude that within this organisational environment that innovation is people-led.

### Collage Results

In this exercise, participants were asked to create a visual representation of the innovation crowd (people providing innovation solutions) and illustrate how knowledge, or expertise, is shared and centred across the group.

**Figure 6. Group 1 Senior Management Collage**

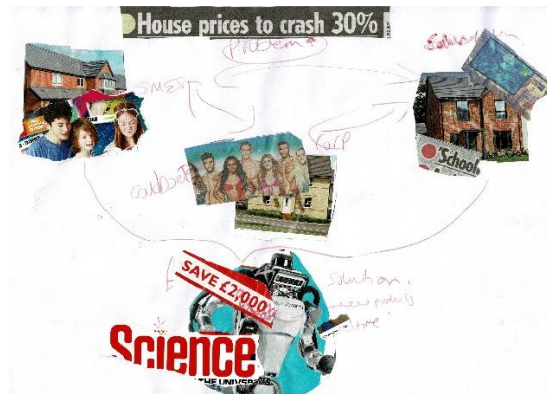


The collage created was described by Participant 2 as illustrating “how you are going to convey your ideas”. The importance of communication within the innovation crowd is also illustrated by the inclusion of images of a telephone, camera and headphones; “communicating your ideas and speaking to people...listening to other people’s ideas in order to build your own”(Participant 2). The image of the wheelbarrow was also highlighted as indicating a shared value of the crowd (Hypothesis 2) in its reason for inclusion; “collaboration needs to happen...you need support”. This is also reinforced by Participant 2’s comment that “everyone gets something from that particular collaboration as well” when pointing at the image of three men fist pumping. When asked about expertise, or knowledge overlaps (Hypothesis 3), in their collage Participant 1 stated that crowds exhibited “knowledge exchange, I suppose when you get communication”. This is a slightly ambiguous reflection and certainly speaks more to separate banks of knowledge that the overlaps, or shared knowledge, that Hypothesis 3 suggests. Furthermore, when probed about another image of three gentlemen shaking hands Participant 1 offered this explanation, “Diversity in the collaboration is where it adds value, but also I think that the technology is the enabler of that diversity... I suppose a more accessible way for you too, you know, to collaborate”.



This statement clearly indicates a rejection of Hypothesis 2 and 3, as diversity is sought rather than similarity.

**Figure 7. Group 2 Product and Sales Team Collage**



This collage also features text to supplement the images as part of a process to accurately illustrate, in the participant's mind, the innovation crowd which are represented by the houses. Participant 3 says the crowd, "collaborate between each other" and "although I've pinpointed corporates, SMEs and education within those, there's different crowds that might then go collaborate on solutions that come forwards". This collaboration for this participant is less about shared knowledge and more about bringing "different areas of expertise into ultimately providing a solution that addresses it from every angle" (Participant 3). This again much as with Group 1 suggests a rejection of Hypothesis 2 and 3 in favour of diversity within the crowd and the solutions they provide.

**Figure 8. Group 3 Software Engineers Team Collage**

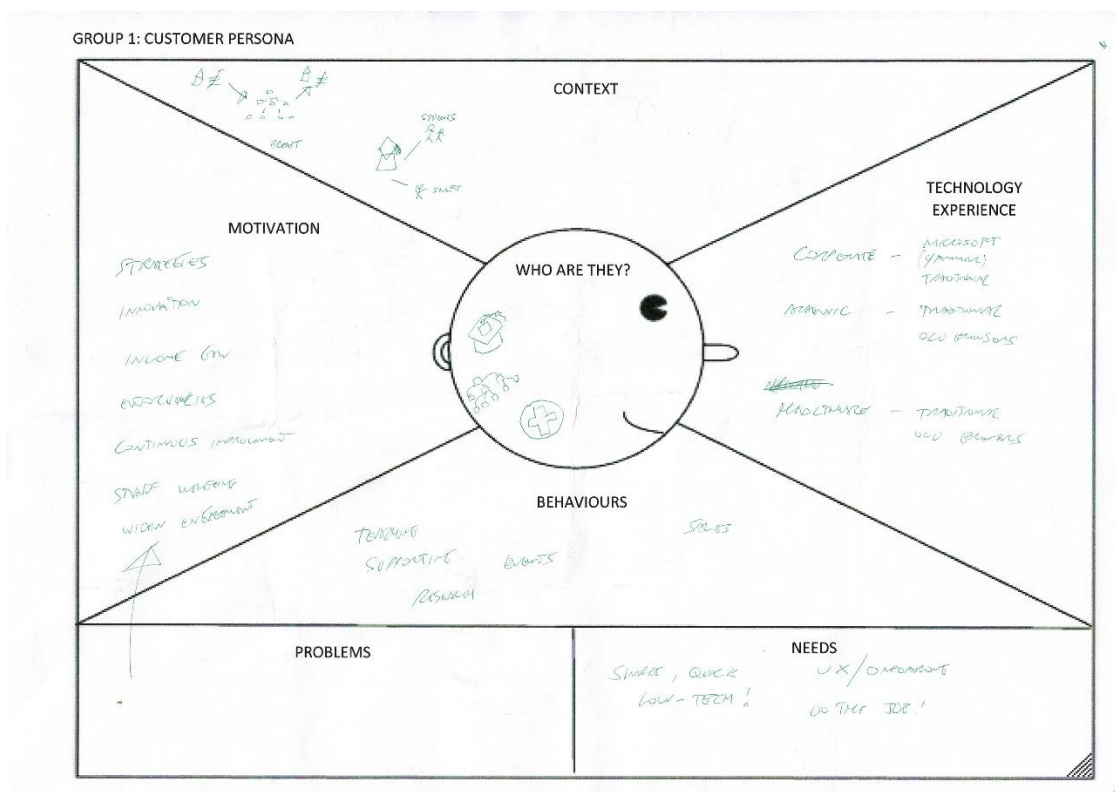


The final group's collage again presented a different representation of the innovation crowd which Participant 7 described as having a "shared knowledge...almost more of a shared culture". This clearly indicates a confirmation of Hypothesis 2 as a 'shared culture' indicates a sharing of values. Participant 7, much like Participant 1, also suggests that the diversity and scope of the crowd is hugely important; "If you limited the crowd, the thing of the danger would be sort of, not to see a lot of solutions from a huge amount of people with the similar knowledge, because that's where the drive comes from". The inherent risk in restricting the crowd is eluded to here, therefore, confirming Hypothesis 2, alongside the need for 'similar knowledge' as part of the crowd which supports Hypothesis 3.

## Drawing

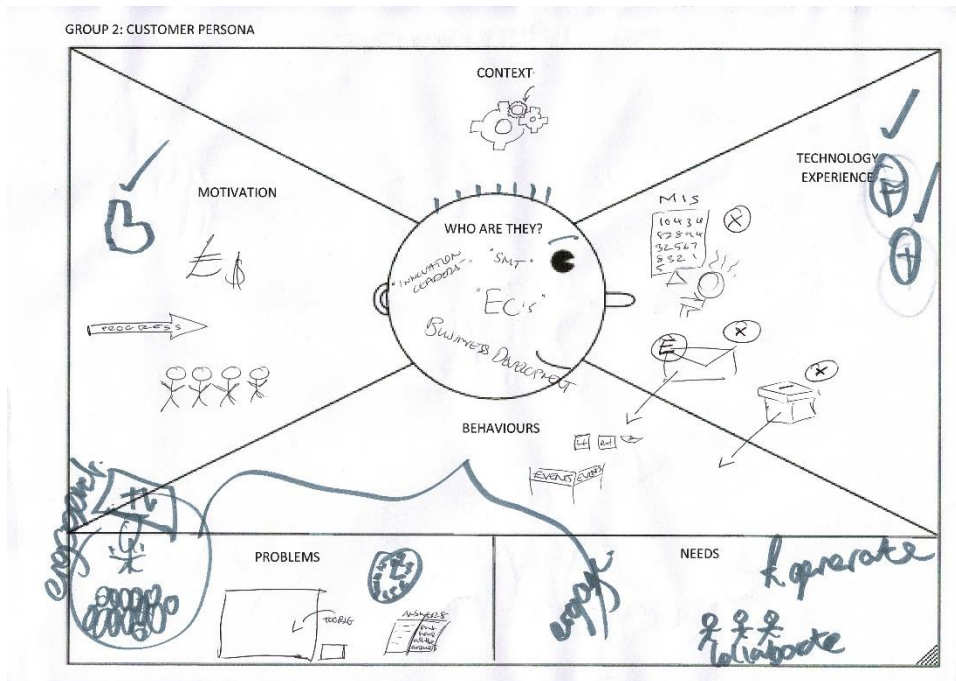
Each group produced drawings representing the Innovation Station customer base using the aforementioned Empathy map for innovation (Gray, Brown and Macanufo, 2010) format:

**Figure 9. Group 1 Senior Management Drawing**



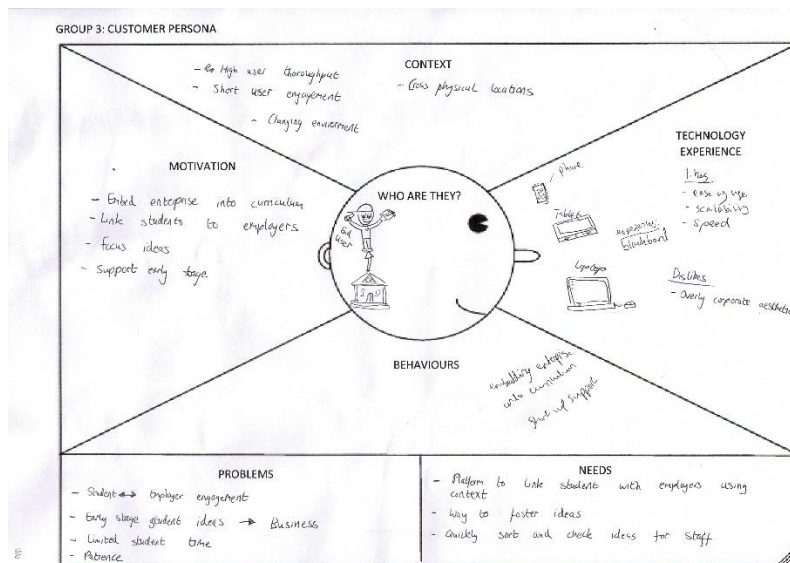
The completed Empathy Map from Group 1 illustrates a combination of text and drawings. In exploring who the Innovation Customers are for the company they were described as "education and then large corporates and kind of more hierarchical organizations and then healthcare" (Participant 1). The motivations for these customers to innovate align with Hypothesis 4; "driven from top down, could be around strategy around say innovation" as Participant 1 highlights the importance of a strategically supported innovation initiative is key to a successful Innovation Station customer experience. Interestingly, Group 1 also highlights the behaviours that their customers exhibit in terms of "risk aversion" and "all three sectors, education, big, corporate and healthcare tend to be quite backwards and traditional technology wise". The low-risk approach, and technology deficit of customers will be interesting facets to test in further study.

**Figure 9. Group 2 Sales and Product Drawing**



Group 2 identified several customers including the Senior Management Team, Innovation Leaders and Enterprise Champions in the core of the Empathy Map. This highlights the importance of strategic leadership of innovation in line with Hypothesis 4. The problems that these customers experience are described by Participant 8 as “So to innovate, collaborate, is really, really challenging to move quickly and be agile is really challenging”. This speed of movement aligns with Afuah and Tucci (2012) theory that the core needs of customers wishing to innovate are around speed and distance. This Empathy Map, however, illustrates that the needs and motivations for customers are financial for engaging with Innovation Station. This aspect of motivation to innovate will be explored through further quantitative surveying with companies in Wales to understand more fully why companies choose to innovate, how they innovate, and the interventions used.

**Figure 10. Group 3 Software Engineers Drawing**





Group 3 viewed the task from the perspective of end users in this case students, which directly opposes Hypothesis 4 which put strategy at the centre of the Innovation Station customer. This response foregrounds the innovation process as led by the users, or beneficiaries, in the Innovation Station ecosystem. This may be due to the software engineer's perspective on user-centred design and focus on the users of the digital platform, which are mostly students. The group went on to explore the motivations for these customers as being, "link students to employers... support early-stage ideas from focus, following on and focusing them" (Participant 7). This commentary aligned with the needs of customers which were to "get in touch with a lot of different universities, contract employees and employers want to contact universities. The sort of idea is to engage more easily". These relationships are highlighted as important to customers and end-users, and also to highlight the need for open innovation service from this innovation intermediary.

### **Summary**

The results of three human-centred design activities mapped against the studies hypotheses indicate the following:

H1) Innovation is technologically led.

Result – Hypothesis rejected – all participants in the Card Sort exercise indicated human factors as the most important element of an innovation process.

H2) Shared values need to be present in the crowd creating the innovative solutions

Result – Hypothesis rejected – 2 out of 3 groups identified that diversity was important in the innovation crowd.

H3) This process of open innovation relies on the crowd having knowledge overlaps

Result – Hypothesis rejected – 2 out of 3 groups identified that shared knowledge was less important than variety in the innovation crowd.

H4) Customers who value innovation strategically are the best fit for the company

Result – Hypothesis accepted – 2 out of 3 groups identified that customers of Innovation Station needed to have a strategic goal around innovation.

The results illustrate that in this particular ethnographic study that despite the focus on technological outputs and a digital platform to deliver open innovation, individuals within the company view innovation as a people-focused activity, rather than technology, as illustrated through card sorting group activity. The collage elements illustrate a broadness and variety of thinking from employees in the intermediary in relation to the motivations and identity of the crowd of solvers for their innovation challenges, which will need to be tested further in a broader business environment to really ensure the validity of these results.

Interestingly, the drawing exercise which focused on the customer persona, and who the staff identified as the company's main customer was varied across the three groups. But what was confirmed by Groups 1 and 2 was the importance of strategic support for innovation within the customer-base.

## Conclusions

This study concludes that in this particular instance the intermediary generates innovation activity from a human-centred perspective which challenges the technological focus of the innovation literary domain (see Howells, 2006; Lichtenthaler and Ernst, 2008; Katzy, B. et al. 2013; Ahn et.al 2016). Gaining an understanding of how an intermediary operates and supports this process, helps form further planned study into the wider innovation ecosystem in Wales. The themes of this study will feed into planned quantitative and qualitative data capture examining the role of innovation in Welsh-medium sized enterprises. This will then, in turn, be reflected to key policy-makers to ensure project impact.

Although this study cannot make wider conclusions outside the bounds of the organisation in which the human-centred design and ethnographic research took place. The study does provide insight and learning into the inner-workings of an innovation intermediary helping to frame future research on innovation intermediaries through ethnographic and human-centred design methods.

WORD COUNT: 5648

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