MEETING IN THE MIDDLE: BRIDGING THE PRACTICE RESEARCH DIVIDE FROM BOTH SIDES

Research

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Abstract

The need for IS research to be more impactful and interesting has long been debated with fruitful discussions but disappointing results in narrowing the significant divide between IS Practice and IS Research. While a number of solutions have been explored, the concept of the Practitioner Researcher has only recently gained traction in the domain. With the objective of providing pragmatic guidance into bridging the divide, this research explores the concept of a Practitioner Researcher, from both the academic and practitioner side of the divide. In doing so, an exploratory case study was implemented and included a 24 month journey for 18 practitioners and their 2 academic mentors in becoming Practitioner Researchers. Key outputs from the study include an explicit description of the bridging actions for both the academics and practitioners as well as the shared understanding that is vital in crossing the practice research divide. In addition, it was found that Design Research provided an excellent platform to build a shared understanding between the academic mentors and practitioners in the study. Moreover, the importance of this shared understanding is detailed, as without it the ability to become a Practitioner Researcher is severely limited.

Keywords: Practitioner Researcher, Design Science Research, Bridging Actions, Shared Understanding.

1 Introduction

It has been argued that "IS research needs to get closer to wealth creation rather than reporting", where wealth creation or value creation is the creating of a consumable product/service (Desouza *et al.*, 2006, p.348). In the past so much effort was placed in debating the rigourous merits of IS research through topics such as: qualitative versus quantitative methods (Lee and Hubona, 2009), or positivist versus interpretivist approaches (Fitzgerald and Howcroft, 1998, Weber, 2004), the relevance of IS studies to practice was seen as a secondary importance (Benbasat and Zmud, 1999). As a result, the balance between rigour and relevance in IS research was heavily weighed on the side of rigour. A number of other factors have added to this imbalance, such as: (i) the lack of a cumulative research tradition, (ii) the fast paced dynamic environment of IS, (iii) the limited practical exposure of IS academics in the areas they research, and (iv) the restrictions on academics undertaking action in their research (Benbasat and Zmud, 1999). However, in an effort to redress this imbalance IS academics have explored a spectrum of solutions that range from: including an additional step to existing research approaches (Rosemann and Vessey, 2008), to sourcing industry sponsored research (Desouza *et al.*, 2006) to implementing new research approaches such as action research (Susman and Evered, 1978) or design research (Hevner *et al.*, 2004). While the first two solutions provide sound guidance in becoming more relevant, they are but incremental changes to the current way of thinking and operating for IS researchers. The last solution sets out more substantive changes as the approaches enable the researcher to become more involved in the practical nature of their areas of expertise and also provide operationalization guides which put real world problems at the focal point of academic research (Davison *et al.*, 2004). While these approaches have met with a huge degree of popularity they still only view the solution of becoming more relevant as a function of the academic. In addition, a view held by the authors is: the utilisation of these approaches as a structuring mechanism for academic studies rather than a problem solving protocol have meant the initial bridging of the research practice divide are primarily superficial.

As a result, this study focuses specifically on "how to more effectively structure and shape the way that practitioners participate in IS research" (Desouza *et al.*, 2006, p.343). Similar to Mathiassen and Sandberg (2013) this paper explores the authors approach of bridging the research practice divide by enabling 18 practitioners to become Practitioner Researchers over the course of two years while completing a Masters of Science (MSc). Explicitly detailed in this paper are the bridging actions undertaken by the practitioners in bridging aspects such as academic rigour and reflection to the solving of wicked problems they had identified within their organisation. Moreover, this paper also details the bridging actions by the 2 academic mentors as they strived to understand the intricacies or local relevance of each problem as well as putting the practical need to solve the problem before the research potential of the situation. The result is the development of adjacent skills that align with the notion of "engaged scholarship" (Van de Ven and Johnson, 2006) and a shared understanding where the practitioners come to understand the potential impact of research and research skills to their work, while the academics understand how better to utilise their skills to solve tough problems for industry. More importantly, the study has found that methodologies such as Design Research should not be viewed as just guides for a practitioner or academic to enable them to become more rigorous or relevant. These methodologies should be viewed as platforms that enable academics and practitioners build a shared understanding of the process and focus of the research, with the aim of improving organisational performance and adding to the scientific body of knowledge.

2 The Practitioner Researcher

Practitioners are in a better position to identify relevant problems that are difficult to solve and have real organisational impact. As researchers are primarily abstracted from the world of the practitioner, it

has been advised they qualify the problems they have identified with practitioners to ensure relevance (Rosemann and Vessey, 2008). Moreover, as highlighted by Davision *et al.* (2004, p.68) "the researcher seldom has complete control over interventions". In contrast practitioners will always have areas where they possess a certain degree of control where they can dictate the course of a project and guide its implementation to completion. This is a major advantage as it provides bounded areas that are a rich bed for conducting research with full direct access. These bounded areas also provide protection from the risk of losing control over the environment underpinning the research (Davison *et al.*, 2004). In addition, immersed in the realities of their work, practitioners experience relevant and wicked problems that need to be solved. Due to their stubborn nature these wicked problems are a rich source for valuable research for both the academic and research community (Buchanan, 1992).

While the Practitioner Researcher is not a novel concept in itself, as literature positioning and discussing practitioners as researchers can easily be found in the areas of organisational management (Van de Ven and Johnson, 2006), healthcare (Cusick, 2000, Vincent *et al.*, 2010, Jarvis, 2000), and education (Cochran-Smith and Lytle, 2009, Rose, 2002, Dadds, 1998); it has only been very recently that the IS domain have begun to make some progress on the topic (Mathiassen and Sandberg, 2013, Taylor *et al.*, 2012). More specifically, previous to these studies the focus has been on making the researcher more relevant through methodologies such as Action Research and Design Research. In contrast, Mathiassen and Sandberg (2013) is the most explicit in its examination of the issue and provide a robust template for uncovering key insights into how a practitioner can bridge the academic/practice divide through Collaborative Practice Research. Building on this important stream of research this study explores the efforts of practitioners and their academic mentors bridging the divide through Design Research, with the aim of providing a more robust guide to becoming a Practitioner Researcher.

2.1 Design Research

Core to the study, Design Research was the process utilised by the practitioners and as a result is the lens in which their efforts in bridging the practice research divide are analysed. Table 1 provides a detailed description of the form of Design Research utilised in the study which is a simplified synthesis of its mainstream predecessors in literature. As Table 1 demonstrates, Design Research has several flavours and labels (Design Science, Design Science Research, and Action Design Research) but ultimately they all encapsulate the same four step process which is further expanded in this section. In addition, for the rest of the paper the term Design Research will relate this four step process definition.

<table>
<tr><th>Research Approach</th><th>Design Guidelines (Hevner et al., 2004)</th><th>Design Science Process (Peffers et al., 2006)</th><th>Action Design Research Process (Sein et al., 2011)</th></tr>
<tr><td rowspan="2">Problem Definition</td><td rowspan="2">Problem Relevance</td><td>Problem Motivation and Relevance</td><td rowspan="2">Problem Formulation</td></tr>
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<tr><td rowspan="2">Contributions</td><td>Research Contributions</td><td rowspan="2">Communication</td><td>Reflecting and Learning</td></tr>
<tr><td>Communication of Research</td><td>Formalization of Learning</td></tr>
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Table 1. Phases of Design Research and research approach utilised by the practitioners.

2.1.1 Problem Definition

The first step in the Design Research process is the most important step in defining the relevance of the research. As noted by March and Storey (2008) the key focus of Design Research is to improve the performance of the organisation which translates to a focus on organisational problems that are worth solving or have justifiable value (Peffers *et al.*, 2006). In addition, during this phase the need to scope the problem through a clear definition is also a requirement and making sure you spend enough time verifying you have reached the root cause. Moreover, when completing a Design Research study there needs to be a demonstration that the problem is also worth researching. This can be achieved by demonstrating the lack of existing solutions to the problem in the extant knowledge-base (March and Storey, 2008). This demonstration can come from a literature review highlighting a paucity of knowledge in the particular problem domain, or indeed a call for research on the problem. In summary the problem must be (i) well defined, (ii) worth solving from a practitioner/organisational perspective, and (iii) worth researching from an academic perspective.

2.1.2 Design and Build

During the Design and Build phase the key focus is to build an artefact to solve the defined problem. An artefact can take the form of a: (i) construct, (ii) model, (iii) method, or (iv) instantiation (March and Smith, 1995). Constructs are seen as the 'language' used to describe a problem and applying this to the data domain it could include the creation of new data mapping notations/rules in contrast to existing techniques such as Entity Relationship Diagrams. Models build on such 'languages' to represent a solution or give clarity to a problem. Within the data domain a model artefact could indeed be a data model of a solution or a problem that has not been represented before. A method on the other-hand is a process or set of steps for people to follow in order to complete a task or solve a problem. This could materialise as a method to complete anything from building a dashboard to increasing the level of data governance in an organisation. Finally, instantiations are the realisation of an artefact in its environment (March and Smith, 1995). This can be an Information System focused on solving the problem defined.

2.1.3 Evaluation

While the Problem phase sets the tone of the relevance of a Design Research study, the same can be said for the Evaluation phase in conjunction with rigour. Just as the Design and Build phase links directly back to the Problem phase, the Evaluation phase focuses on the utility, quality of the artefact developed and its impact on the defined problem (Helfert *et al.*, 2012, Hevner *et al.*, 2004). In Peffers (2006) definition of Design Research, there is a preceding step to the Evaluation phase that focuses on the act of demonstrating or implementing the artefact in solving the problem defined. The data arising from this demonstration is then evaluated to highlight how well the artefact solves the problem and if more iterations are needed. Detailing the types of evaluation Hevner (2004) lists observational, analytical, experimental, testing and descriptive. With all these methods there is a wide variety to choose from and align with their artefact and problem defined.

2.1.4 Contribution

Gregor and Hevner (2013) identify three levels of contributions ranging from: Level 1 - very specific and situated implementations of artefacts, Level 2- nascent design theory or knowledge as operational principles/architecture, Level 3 - well-developed design theory about embedded phenomena. Moreover, in developing the concept of Practice Research, Goldkuhl (2012) notes that a study that conducts a situational inquiry driven by a local problem will generate situational knowledge or a contribution to local practice. However, theorising the results and empirical data of the situational inquiry generates two other contribution types. By generalising the findings from the situational inquiry contributions to the general practice community can be made along with contributions to the scientific body of

knowledge or research community. In formatting the contributions for dissemination, Gregor and Hevner (2013) outline a template for publishing Design Research projects to research stakeholders, but in line with Goldkuhl (2012) communication of contributions can also be made to the general practice community in the form of a white paper or trade press article and to local practice in the form of internal presentations or meetings.

3 Methodology

The approach taken is a longitudinal case-study that lasted over 24 months (see Table 2 for summary). During this period three key assignments of eight were analysed (Information Supply Chain, Blueprint, and Final Project Report) which totalled over 25,000 words of data per participant. In addition, a survey was also completed by the practitioners on programme completion with the aim of supplementing their submissions with key insights about their academic journey and research capability. The survey consisted of 17 questions, which focused on aspects such as: (i) the length of time/effort put into the project, (ii) key challenges, (iii) key benefits, (iv) ratio of practical to theoretical contributions, and (v) ranking of rigour and relevance of the project. Given the limited number in the class the survey was treated as a qualitative source and was used to triangulate the data in the other sources. Finally, the practitioners engaged on a one-to-one basis with the academic mentors outside of class periods. The focus of these engagements was primarily on the Design Research project. In these discussions, all aspects of the design research methodology were covered, with particular emphasis of how they applied to the practitioners' project. These were an excellent insight into how the practitioners were progressing with the programme, but also into how they were coping with becoming a practitioner-researcher. The mentors met with all of the practitioners, which amounted to over 100 hours of one-to-one sessions and was documented in terms of written notes, pictures of white-boarding sessions and follow-up emails.

Research Activity	**Description**
Objective	To explore the bridging of the academic practitioner divide.
Approach	Case Study (April 2013 - April 2015).
Motivation	Provide more insight into how to aid the development of practitioner researchers.
Case Selection Process	Due to the authors being Directors (and academic mentors) of an applied Executive Education programme the opportunity arose to study practitioners bridging the divide.
Case Access	The authors were the academic mentors of the programme and as a result were themselves a part of the case.
Instrument	Assignments/deliverables as part of the programme along with the academic mentors were the primary instruments in the application of the data gathering techniques.
Boundary Device	The MSc/Executive Education programme.
Data Gathering Techniques	Three assignments from each practitioner, the completion of a survey at the end of the 24 months by the practitioners and participant observation from one-to-one sessions.
Data Analysis Techniques	All the data sources were analysed for common bridging actions and then classified using the Design Research process outlined.

Table 2. Case Study Research Protocol (after:(Kelliher, 2005)).

4 Context

The MSc in Data Business is an Executive Education offering that launched in March 2013. The underlying focus of the MSc is to enable its practitioners to become more data savvy and providing them with the capabilities to have new conversations within the business around data. Detailed in Figure 1, the MSc is split into two parts: Part 1 - 30 credits over six months and Part 2 – 60 credits over 12 months. Part 1 encompasses eighteen teaching days, which are scheduled in three day blocks with one block running each month. The programme is taught by a mix of local faculty and internationally recognised thought leaders, focusing on IS areas such as data modelling, agile development, innovation management and enterprise data management. At the end of Part 1 a blueprint is required in which the practitioners apply the knowledge gained throughout the programme to challenge their use of data, to highlight solid opportunities for improvement and propose a plan of action for those opportunities within a realistic timeframe.

Starting six months after the completion of Part 1, the objective of Part 2 is aligned with Part 1 but focuses on developing the practitioners' research capability in conjunction with their ability to execute data projects. In particular, the practitioners learn how to implement the applied research methodology of Design Research; their skills in literature reviews and academic writing are developed, and they are exposed to research seminars around interesting topics in the data domain. In addition, the practitioners further develop their capability to implement value driven/agile projects as they internalise the value of design thinking and data driven design. Finally, throughout Part 2 the practitioners utilise their applied research skills to solve a problem for their organisation, while also making a contribution to research, which is documented in a 16,000 word final project report and poster of the project.

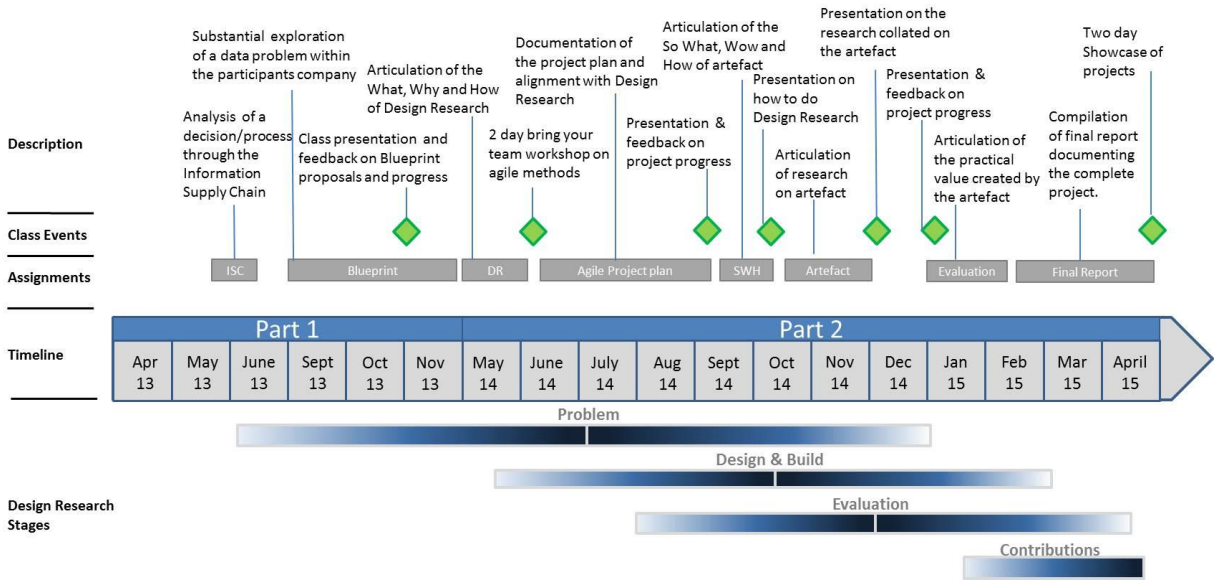

Figure 1. Timeline of Part 1 and 2 of the MSc including key events, assignments, and an aggregate view of practitioners' Design Research journey.

This paper is based on the first cohort of 18 practitioners to complete both parts of the MSc over a period of 24 months and documents their efforts as they bridged the practice-research divide.

5 Findings

5.1 Problem Definition

The most extensive phase of each of the Design Research projects was the Problem Definition phase. While the Problem phase spanned both Part 1 and 2, during Part 1 of the programme the practitioners' first exposure to the problem identification and definition process is through an assignment in which they are asked to analyse a decision/process using a framework developed by the academic mentors. As part of their analysis, they were also asked to identify a key pain point within the process/decision and propose a solution. While giving the practitioners a structure to describe the process/decision it highlighted their difficulty in effectively communicating the context of a problem in a manner that could be easily understood by people outside of their domain. As noted by some practitioners it gave them the opportunity to gain an insight into the operations of their organisation that they would not have explored before. It also highlighted the long-term benefit of taking more time to see the extent of problems they experience regularly and do a more complete investigation or reflection on the situation. Giving support to the practitioners' pre and post assignment submission, the academic mentors challenged their understanding of the problem and potential solution(s). Feedback was also given as to the clarity, which again challenged the problems/solutions outlined. As well as supporting the practitioners at the start of their Design Research journey, the academic mentors also got an insight into organisations which would not have been possible without the practitioners. Such was the sensitivity of some of the insights that NDA's were requested.

At the end of Part 1, each of the practitioners had to complete a Blueprint which documented a more detailed exploration of the problems they had identified from different aspects. During this process the practitioners used techniques such as the Six Honest Serving Men (What, Why, When, Where, Who, and How) (Kipling, 1902) to clearly communicate their problem but also to go beyond identifying symptoms of the problem and instead locate the root cause or the crux of the problem. The amount of time spent in clearly defining the problem had a significant impact on the practitioners. This bridging point was such a key behavioural change that they began to implement it in their daily routines. For instance, the awareness that a clear problem definition is vital to developing an effective solution is common sense, yet the time and resource pressure put on practitioners force them to *"dive into action mode"* at a very early stage. As a result of the Design Research process a key behavioural change stated by the practitioners revolved around spending more time on the problem, using techniques like the Six Honest Serving Men (Kipling, 1902) in all different situations (eg meetings), not settling with the first solution, or resisting the tendency to act too early. In addition, while the practitioners were coming to terms with the wickedness of their problems, it was evident that reluctance in calling out the problem was experienced by a significant proportion of the practitioners. Given the complicated and sensitive nature of wicked problems, such reluctance was understandable as the project was intertwined with their job/livelihood and pursuing a project that called out problems that involved other members of their organisation was sometimes felt as being inappropriate. Coming from their "ivory-tower", this was something that the academic mentors had to be cognisant of while still enabling the practitioners to proceed with the problem in a positive fashion for both the practitioner and their organisation.

5.2 Design and Build

Once the practitioners had a problem clearly defined their focus moved to designing and building an artefact to solve the problem. In all, there were five types of artefacts that included: analytical models, dashboards, frameworks, maturity models and data models. The areas which these artefacts covered included: customer service, logistics, operations, product management, and sales. While designing and building their artefacts the practitioners leveraged the research databases and range of expertise available through the programme to complement their strengths in their respective domains. In addition,

during this phase a two-day "Agile Envisioning Workshop" provided the practitioners an opportunity to bring their team and start the planning and design of the artefact. However, one of the key bridging actions that the practitioners undertook was the documentation and reflection of their efforts as they went through the whole Design Research process but in particular the Design and Build stage. Outside assignments which did act as one form of documentation, the practitioners recorded interviews and workshops, took photos of artefact designs resulting from collaborations, created a timeline of the whole project and also developed visuals representing specific aspects of their journey. An example of the last type of documentation one practitioner visualised the "relative significance of IT systems, data structures, and organisational structure" throughout the project. This is an indicator of the type of documentation that was achieved and goes well beyond standard practitioner documentation of a Gantt chart for projects. In addition, it highlights the amount of reflection that went into the documentation of these efforts. Moreover, during the Design and Build (iterative) phases, a key issue for the practitioners was the definition of an artefact. At the start of the process there was the assumption that the artefact had to be a fully tested/functional/delivered piece of software. However, as they began to internalise the spirit of Design Thinking and Design Research they realised that artefacts could be as simple as a diagram especially in early iterations. Such simplicity of the artefact form enabled them to keep their focus on solving a problem rather than building an artefact. In addition, it provided a platform to have new conversations with people in their organisation and also enabled the practitioners to value the concept of iterating and failing fast.

While delivering projects is a core skill of practitioners the ability to complete and document rigorous research is a key capability of academics. A component of this capability is adhering to the guidelines of research methodologies. However, this is not a priority for practitioners and the different forms of Design/Action research only served to confuse their efforts as they utilised Design Research within their projects. One of the key issues for practitioners was the definition of an iteration and its relationship to an agile cycle/sprint/iteration. As a result, the academics focused on simplifying the Design Research process for ease of use in a practitioner setting. For instance, in defining an iteration a rule was built to say that an iteration could not be completed without an evaluation. This meant that as part of the agile process there could have been many agile sprints/cycles focused on building components of the artefact without a formal evaluation, thus no completed Design Research iteration. Through the documentation of the practitioners and the facilitation of Design Research by the academics a common understanding of how the project methodology of Agile aligned with the Design Research was reached.

5.3 Evaluation

Like all the other phases of Design Research the practitioners found the evaluation a challenge. As noted by one of the practitioners "*the biggest challenge was around rigour of research and evaluation of artefact*". However, the benefit of evaluations was well recognised as one practitioner stated "*constant evaluation and feedback helped keep the project on track*" while another noted the evaluation "*brought great rigour to the question of artefact contribution*". The first quote highlights the practical benefit of the evaluation iterations yet the second quote focus more on the research aspect. During the evaluation of the artefact all impacts were recorded be they directly or indirectly related to the artefact or problem defined. This bridging action aided the practitioners in documenting their primary but also secondary contributions from their work. For instance, as part of the evaluation the practitioners recorded their use of Design Research from their individual perspective which resulted in secondary contributions around Design Research being part of all the studies. While the academics encouraged the recording of all types of learnings the practitioners also focused on evaluating the business value of what they had achieved. Again while some of the evaluations were direct and real some were more indirect. For instance, during the Evaluation phase one practitioner noted the postponing of a €500,000 project due to the work done on the artefact. Even though this is not a major academic learning it did give business credence to their activities. Such credence was also demonstrated in the Showcase when

the Managing Director of a large multinational (from which a proportion of practitioners were employed) publically highlighted the relevance of research the practitioners had achieved based on the business value identified in their evaluations. This focus on business value also provided a basis and focus for their final contributions. Finally, through the accumulation of learnings that resulted from the Evaluation phase after each iteration, both the practitioners and the academic mentors built up an understanding of how to best exploit the experimental side of Design Research to provide valuable learnings and impact to the organisation. This shared understanding fed back into proceeding Design, Build and Evaluation phases making the process more efficient after each iteration.

5.4 Contribution

Making a contribution to research is a task far removed from a practitioners' skill set and this group was not an exception. In defining their contribution to research the practitioners utilised Webster and Watson's concept centric matrix to enable them to appreciate themes within the literature, abstract the problem, identify gaps, develop solid arguments to support the value of the study from an academic perspective and justify the contributions made throughout. Table 3 provides a sample of contributions of research from the group that was taken from their Applied Research Project. Moreover, the practitioners detailed the contribution to their individual organisations (a local contribution) and went on to generalise the contribution to the wider practitioner community. In focusing on contributions from the practitioners' projects, the academics had to ensure that the local contribution to the organisation was of primary importance. This differs from a direct pursuit of research contributions to the potential impairment of organisational impact. Table 4 demonstrates the result of the practitioners focused efforts as they made significant organisational impacts. However, it must also be noted that from the survey data of the practitioners, a large majority felt they had much more practical than research contributions. Yet, one of the world's leading research and advisory organisations have invited two of the practitioners to publish their research. In addition, seven of the practitioners have signed up to a paper writing workshop (facilitated by the academic mentors) and are aiming to submit to an international academic data orientated conference in early 2016. Throughout the process of detailing the contributions both the practitioners and academic mentors built an understanding of how to communicate the complexity of work done while keeping it simple enough for potentially interested parties to understand. Such interested parties would include senior management within the local domain, practitioners outside of organisation and academics. As a result, different techniques in balancing the complexity and simplicity are needed in each case.

Contribution to Research
The project has discovered that there are a range of behaviours prevalent in sales organisations that need to be carefully considered when attempting to implement a data-driven initiative.
The scorecard created whilst perhaps of more granular a level to that of (Hoberman, 2005) could be considered as complementary to it and may be of value to other researchers working on data model artefacts.
A worked example of how analytics models can be built in Sales environments a gap identified.
Bridging of data modelling, design thinking, agile development and six sigma techniques.
Extension of Ward et al (Ward *et al.*, 2008) Business Case Framework into a canvas.
Fulfilment of a call for dashboards to be developed through design research (Yigitbasioglu and Velcu, 2012).
Organisational mindfulness (Weick and Sutcliffe, 2011) is a useful lens for examining End-User-Computing.

Table 3. Examples of contributions to research from the Design Research projects.

Contribution to Practice
Local: Major increase in efficiency of spare parts management (estimate in the millions of euros). Guide to transitioning other organisational datasets from the legacy architecture. **General:** Insight in to the transition from legacy data architecture.
Local: 72% of the new business created (€1.7m) directly linked to the artefact. **General:** Created a blueprint of Critical Success Factors to now act as a template for all future customer sales engagement model deployments.
Local: Real saving of €426k. **General:** Uncovered the cultural issues and symptoms which caused bad decision making within a procurement department.
Local: Marginal reduction in customer churn. **General:** Insight into the use of customer engagement as key factor in customer retention.
Local: Create awareness of data collection concerns. **General:** Ability to measure and compare of data collection maturity levels of EU financial regulators.
Local: Estimated savings of €700k through productivity improvements. **General:** Developed a conceptual Operations cockpit of daily operations on one page; interest to BI developers
Local: Increased operational decision making capability. Dashboard foundation for other Business Units. **General:** How to Guide for Dashboard Design & Implementation.

Table 4. Examples of contributions to practice from the Design Research projects.

6 Discussion and Conclusion

The primary aim of the study was to explore how 18 practitioners bridged the gap between research and practice. What was found was that the bridge between research and practice is not a one-way system in which practitioners become more research orientated. By facilitating the journey for the prospective Practitioner Researchers, the academic mentors themselves became Practitioner Researchers and just as the practitioners had to undertake bridging actions to solve their problems using research, the academic mentors also undertook bridging actions to understand the problem domain to align their research skills/knowledge and make it more relevant. In addition, a key aspect of these bridging actions was the role of Design Research in not just acting as a research protocol to follow but a platform for developing a shared understanding between the academics and practitioners.

Summarised in Table 5, the bridging actions undertaken by the practitioners and academics are listed for each phase of the Design Research process. More importantly, the shared understanding that is built by both parties is also explicitly detailed. This aspect of shared understanding is also evident and closely in-line with the Mathiassen and Sandberg (2013) paper. While the title of that paper suggests that Anna (Sandberg) alone completed bridging actions to cross the practice-research divide to become a practitioner-researcher, the body of the paper details how Lars (Mathiassen) had to also undertake some bridging actions in understanding the context and help in solving the problems identified. However, this paper explicitly calls out these bridging actions which can be very easily overlooked as well as the need to create a shared understanding. Moreover, while completing the study it became immediately evident (in the context of the case) that bridging the practice research divide is very difficult to achieve if you don't have someone meeting you in the middle and developing a shared understanding. Academics would not have the access or domain knowledge to identify or uncover problem root causes. While practitioners would not have the research knowledge to develop scientific contributions.

	Practitioner Bridging Actions	Shared Understanding	Academic Bridging Actions
Problem	Utilised academic frameworks to get an integrated picture of their operations and identify problems.	Through engagement over the populated frameworks both parties created a shared understanding of the local environment and how to record it accurately.	Internalised and then challenged the status quo of the local contexts as well as the problems highlighted.
	Went beyond superficial root cause analysis to do rigorous deep dives into the problem.	Understanding into the idiosyncratic nature local wicked problems and the sensitivities of highlighting them.	Facilitated the calling out of wicked problems in an unbiased fashion with respect to the local context and practitioner's role.
Design and Build	Documented, the development and implementation of research artefacts, using academic knowledge and rigorous processes.	Through the documentation of efforts an understanding was built between the alignment of research and practitioner methodologies, namely: agile development and Design Research.	Built an understanding of Design Research to better suit its utilisation by practitioners in their local context.
Evaluation	Conducted evaluations and recorded the impact of the artefacts directly and indirectly related to the problem.	Through the iteration and understanding of how to fully exploit experimentation and learning was gained	Utilised evaluation frameworks to highlight the business value of the artefact as well as the learnings from the research process.
Contribution	Used academic literature and abstracted local problems to a more general class. Also articulated both local and general contributions to practice and research.	Through working on the contributions a shared understanding on how to communicate the complexity of the project in a form that is easily understood by interested parties.	Aimed the focus on firstly providing benefit to the local context and then aided the articulation of contributions in the form of general knowledge.

Table 5. Bridging actions by both practitioners and academics that formed a common understanding of practice research.

Further analysing the bridging points a number of key capabilities need to be developed by prospective Practitioner Researchers. These include:

The ability to make sense of both organisational and research contexts – sense-making is a key task when it comes to developing a clear insight into the operations of an organisation or prior research on a topic. Through the use of frameworks that provide a basis for engagement and understanding, it is possible to get a clear picture of how a department/organisation works. This is true for practitioners who often fail to understand their surroundings as well as external academics. Making sense of research contexts can be achieved by using such tools as the Concept Centric Matrix (Webster and Watson, 2002), which again is a tool to be used by the academic as well as the practitioner in their journey to becoming a Practitioner Researcher.

The ability to experiment and learn from iterative development – the ability to build an artefact that is focused on solving a problem is a core capability for the Practitioner Researcher. Moreover, the ability to learn from the iterative nature of the process is essential. This would involve key evaluation and documentation skills throughout the entire process.

The ability to challenge the status quo and call out problems/opportunities – as a Practitioner Researcher you need to be able challenge the way an organisation operates. Given the sensitivity organi-

sations may have to highlighting their problems, Practitioner Researchers need to have the courage to call out problems and to do so in a positive fashion.

The ability to balance complexity and simplicity when engaging with stakeholders – an ability to communicate effectively with stakeholders throughout the process will depend on the Practitioner Researchers' capability at balancing the complexity of what they have done with the need to make it simple enough for people to understand.

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