A Review of Mixed Methods, Pragmatism and Abduction Techniques

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Abstract: The purpose of this paper is to propose that mixed methods research is complementary to traditional qualitative or quantitative research, also that pragmatism is an attractive philosophical partner for mixed methods. A key feature of mixed methods research is its methodological pluralism that can lead to superior research. The research question is whether ‘pragmatism’ as a philosophical choice to combine positivism and interpretivism can lead to an appreciation of ‘what works’ in practice? (Tashakkori & Teddlie, 2010). The paper posits that pragmatism supports the use of different research methods and that a continuous cycle of inductive, deductive and where appropriate, abductive reasoning, produces useful knowledge and serves as a rationale for rigorous research. Firstly, the so called “paradigm wars” of quantitative or qualitative analysis are briefly reviewed; and the tenets of pragmatism are explained. A comparison is made of the different approaches and the value of applying abduction techniques to ‘surprising facts or puzzles’. Secondly, the literature regarding the ubiquity of abduction techniques is explored. Third, two recent empirical case studies in the airline and engineering sectors are summarised. Abductive thinking was key to explaining empirical phenomenon relating to competition, and in particular how leading UK and German multinationals developed different approaches to outsourcing. Finally, in conclusion, mixed methods were found to combine numerical and cognitive reasoning that led to a ‘best answer’ to data that otherwise could not be adequately explained. Furthermore, the application of different approaches can lead to research and subsequent management decisions that reflect both the interplay of social and scientific aspects of the world today.

Keywords: mixed methods, pragmatism, paradigm wars, abduction, empirical phenomenon, case studies

1. Introduction

This paper focuses on mixed methods and the extent to which a combination of different approaches can lead to better research and subsequent management decisions reflecting both the social and scientific aspects of today’s world. The overall purpose of the paper is to argue that mixed methods deserves consideration, and may be especially attractive as a choice to relatively new researchers with an open mind as to how to tackle a particular problem, especially in the fields of social science, business and management studies.

Firstly, a comparison is made of different, perhaps traditional research approaches, and the value of applying ideas such as pragmatism and abduction techniques that are less well known to surprising facts or puzzles. Secondly, the literature regarding the ubiquity of abduction techniques is explored. Third, two recent case studies are summarised where abduction thinking was key to explaining empirical phenomenon relating to competition in the airline and engineering sectors; and how UK and German multinationals developed different approaches to outsourcing in the same sector. In conclusion, mixed methods were found to combine numerical and cognitive reasoning that led to a ‘best answer’ to data that otherwise could not be adequately explained.

2. Mixed methods - choices

Evidence of growth in the use of mixed methods research has in a wide range of academic fields notably social sciences and business management (Tashakkori & Teddlie, 2010). In 2007, SAGE launched a Journal of Mixed Methods Research. There have been arguments about the relative merits of paradigm choices drawn from quantitative versus qualitative methods, positivism versus interpretivism, and whether it was naive (or worse) to mix or attempt to use techniques drawn from paradigm extremes. Terms such as pragmatism and abduction have also now become more widespread in their use. Researchers, perhaps those more recently qualified, have been able to employ both deductive and inductive analysis in the same research study. The mixed methods approach to research provides researchers with the ability to design a single research study that answers questions regarding the nature of phenomenon from a participant’s point of view as well as the relationship between measurable variables (Williams, 2007). Supporters of mixed methods promote doing ‘what seems to work’ to investigate, predict, explore, describe and understand the phenomenon. That
quantitative and qualitative research approaches are not only compatible but also complimentary, underpins the need for continued research studies that deploy mixed methods (Johnson & Onwuegbuzie, 2004; Tashakkori & Teddlie, 2010). Fig 1 below is both popular and helpful in making choices regarding research philosophy, approach, method, strategy, time horizon and subsequent techniques (Saunders & Thornhill, 2012).

Figure 1: Research Onion adapted from ref: Saunders, Lewis & Thornhill (2012)

2.1 Deductive and Inductive approaches

The approach selected has traditionally been either inductive reasoning where a series of specific observations lead the researcher to a general conclusion that may be true (Dudovskiy, 2016); or deductive reasoning that starts with a hypothesis or general rule that is then tested with data, and only if found to be true leads to a specific conclusion. See Fig 2.

Deductive versus Inductive approach

- **Deductive** reasoning works from the more general to the more specific.

  Sometimes this is informally called a “top-down” approach. We might begin with thinking up a theory about our topic of interest. We then narrow that down into more specific hypotheses that we can test. We narrow down even further when we collect observations to address the hypotheses. This ultimately leads us to be able to test the hypotheses with specific data - a confirmation (or not) of our original theories.

- **Inductive** reasoning works the other way, moving from specific observations to broader generalizations and theories.

  Informally, we sometimes call this a “bottom up” approach. In inductive reasoning, we begin with specific observations and measures, begin to detect patterns and regularities, formulate some tentative hypotheses that we can explore, and finally end up developing some general conclusions or theories.

Figure 2: Paradigm War 1 – comparing deductive and inductive approaches
1.2 Combination of approaches - Abduction

However, there is a third choice of approach. Abductive reasoning also referred to as ‘abductive approach’, is set to address weaknesses associated with both deductive and inductive approaches (see 3. Literature Review below). Abductive reasoning, follows a pragmatist perspective, taking incomplete (or ‘messy’) observations from experience and reality that may then lead to a best prediction of the truth, and perhaps even to a new theory. At the same time, it has to be clarified that abductive reasoning is similar to deductive and inductive approaches in so far as it is applied to make logical inferences and construct theories. With the abductive approach, the research process starts with ‘surprising facts’ or ‘puzzles’ and is then devoted to their explanation (Kovács & Spens, 2005). A researcher may encounter an empirical phenomenon that cannot be explained by the existing range of theories. The researcher then seeks to choose the ‘best’ answer from among many alternatives in order to explain the ‘surprising facts’ or ‘puzzles’ identified at the start of the research process. Both numerical and cognitive reasoning may be combined. See Fig.3 below.

**Figure 3:** The best of both? – Abduction. Ref: adapted from Kovács & Spens, K.M (2005)

Table 1 below illustrates the major differences between deductive, inductive and abductive research approaches in terms of logic, generalisation, use of data and theory. Further detail is provided in the literature review. While the choice of method should be led by the research question(s) the role of the researcher also changes. For example, hopefully detached and impartial with quantitative methods and able to be objective. Whereas with qualitative methods the researcher tends to be more involved on a personal basis and hence likely to be empathetic.

**Table 1:** Comparative approaches ref: Dudovskiy (2016)

<table>
<thead>
<tr>
<th></th>
<th>Deduction</th>
<th>Induction</th>
<th>Abduction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Logic</strong></td>
<td>In a deductive inference, when the premises are true, the conclusion must also be true.</td>
<td>In an inductive inference, known premises are used to generate untested conclusions.</td>
<td>In an abductive inference, known premises are used to generate testable conclusions.</td>
</tr>
<tr>
<td><strong>From/To</strong></td>
<td>Generalise from the general to the specific.</td>
<td>Generalise from the specific to the general.</td>
<td>Generalise from the interactions between the specific and the general.</td>
</tr>
<tr>
<td><strong>Use of data</strong></td>
<td>Data collection is used to evaluate propositions or hypotheses related to an existing theory.</td>
<td>Data collection is used to explore a phenomenon, identify themes and patterns and create a conceptual framework.</td>
<td>Data collection is used to explore a phenomenon, identify themes and patterns, locate these in a conceptual framework and test this through subsequent data collection and so forth.</td>
</tr>
<tr>
<td><strong>Theory</strong></td>
<td>Theory falsification or verification.</td>
<td>Theory generation and building.</td>
<td>Theory generation or modification; incorporating existing theory where appropriate, to build new theory or modify existing theory.</td>
</tr>
</tbody>
</table>
2.1 Could better decisions result?

Data collection, analysis and the understanding of research should lead not only to further effective research but also enable managers to take better decisions. Davenport (2009) argues that adopting multiple perspectives, leads to better decisions and robust conclusions, typically overcoming bias and weakness from single method approaches, see Fig 4. It is also important to know when a particular decision approach does not apply. For example, analytics is not a good fit when you have to make a really fast decision. Almost all quantitative models, even predictive ones, are based on past data, so if your experience or intuition tells you that the past is no longer a good guide to the present and future, you’ll want to employ other decision tools, or at least create some new data and analyses.

Multiple Perspectives Yield Better Results

Critical to balance decision tools with human intuition & judgement
- Don’t use models without understanding them
- Make assumptions clear
- Keep track and manage the models in use
- Cultivate human backup
- Understand the context e.g. analytics not good if a fast decision is needed. Most predictive models are based on past data so is the past a guide to the future?
- Triangulate results – check from different perspectives with different data....

By combining multiple observers, theories, methods, and empirical materials, researchers can hope to overcome the weakness or intrinsic biases and the problems that come from single method, single-observer and single-theory studies.

Figure 4: Better research leads to improved decisions and results. Ref: Davenport (2009)

3. Literature review

A brief review of mixed methods, the debate regarding quantitative and or qualitative analysis, along with pragmatism follows; as will examples of combining inductive, deductive and abductive approaches. Deductive reasoning can be criticized for a lack of clarity in terms of how to select the theory to be tested via formulating hypotheses. Inductive reasoning, on the other hand, has been criticised because “no amount of empirical data will necessarily enable theory-building” (Saunders, Lewis & Thornhill, 2012). Abductive reasoning, can address some of the weaknesses traditionally associated with deductive and inductive approaches (Dudovskiy, 2016) by adopting a pragmatist perspective.

3.1 Mixed methods and pragmatism

Feilzer (2010) argues for the practical relevance of pragmatism as a research paradigm through the example of crime scenes, criminal data and interpretation in court that not only uses both quantitative and qualitative research methods but also exploits the inherent duality of the data analysed. Thus, Feilzer aims to make the case that pragmatism supports the use of a mix of different research methods as well as various modes of analysis combined with a continuous cycle of abductive reasoning. Dudovskiy (2018) suggests that either or both observable phenomena and subjective meanings can provide acceptable knowledge that is dependent upon the research question. Johnson and Onwuegbuzie (2004) present mixed methods research as complementary to traditional qualitative and quantitative research, and pragmatism as offering an attractive philosophical partner for mixed methods research. They briefly review the paradigm “wars” and incompatibility thesis, and show some commonalities between quantitative and qualitative research. Williams (2007) proposes that researchers collect or analyse not only numerical data for quantitative research, but also narrative data for qualitative research in to address the research question(s). The mixed methods approach to research is regarded as an extension to rather than a replacement for quantitative and qualitative approaches (Johnson & Onwuegbuzie, 2004). The goal for researchers using the mixed methods approach to research is to draw from both the strengths and to minimize the weaknesses of a more traditional single approach.
3.2 Quantitative and qualitative comparisons and the ‘paradigm war’

There are many differences and research role differences between the two methods for example quantitative research is deductive while qualitative research is inductive, see Table 2.

Table 2: Paradigm war 2 - quantitative versus qualitative approach

http://www.gifted.uconn.edu/siegle/research/Qualitative/qualquan.htm

<table>
<thead>
<tr>
<th>Quantitative Mode</th>
<th>Qualitative Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assumptions</strong></td>
<td><strong>Assumptions</strong></td>
</tr>
<tr>
<td>Objective reality</td>
<td>Social construction</td>
</tr>
<tr>
<td>Variables can be identified and relationships measured</td>
<td>Variables are complex, difficult to measure</td>
</tr>
<tr>
<td>Outsider’s viewpoint</td>
<td>Insider’s viewpoint</td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>Generalise</td>
<td>Context</td>
</tr>
<tr>
<td>Predict</td>
<td>Interpret</td>
</tr>
<tr>
<td>Causal explanation</td>
<td>Understand actor’s perspective</td>
</tr>
<tr>
<td><strong>Approach</strong></td>
<td><strong>Approach</strong></td>
</tr>
<tr>
<td>Begin with hypothesis and theory</td>
<td>End with hypothesis and grounded theory</td>
</tr>
<tr>
<td>Use formal instruments</td>
<td>Researcher as instrument</td>
</tr>
<tr>
<td>Experimentation</td>
<td>Inductive</td>
</tr>
<tr>
<td>Deductive</td>
<td>Search for patterns</td>
</tr>
<tr>
<td>Seeks consensus, the norm</td>
<td>Seek pluralism, complexity</td>
</tr>
<tr>
<td>Abstract language write-up</td>
<td>Descriptive write-up</td>
</tr>
</tbody>
</table>

Lincoln and Guba (1985) believe that quantitative and qualitative research are incompatible, while Patton (1990) thinks that an open-minded researcher should be able to combine both of the research methods. Different research methods allow us to understand different aspects of the world but researchers may conform to the methodology that is most related to their view of the world. These paradigms have totally different assumptions on the nature of the world, deploying different procedures and instruments to gather data (Table 2). Qualitative research is seen as naturalistic as it follows human behaviour. Qualitative methods directs the type of research questions and methods chosen. It has been suggested that a researcher must pick which paradigm they choose to use, as this paradigm will dictate which research question and methods that they will use in the study; but this statement has been challenged by Goetz and LeCompte (1984) where they think it is not useful to put simple dichotomies on research models. On balance, there seems to be little reason why research methods cannot be combined to produce a more accurate and descriptive study increasing the quality of the research.

3.3 Abduction techniques

This approach has some links to grounded theory and was first popularised by Charles Sanders Peirce (1903) an American philosopher, logician, mathematician, and scientist, who developed thinking on pragmatism.

Mabsout (2015) has argued that a constantly changing social reality means economic theories, even if correct today, need to be constantly revised, updated, or abandoned. To maintain an up-to-date understanding of its subject matter, economists have to continuously assess their theories even those that appear to be empirically corroborated. Economics could gain from a method that describes and is capable of generating novel explanatory hypotheses. A pessimistic view on the existence of such a method was famously articulated by Karl Popper (see Mabsout) in The Logic of Scientific Discovery. He wrote ‘there is no such a thing as a logical method of having ideas or a logical reconstruction of this process.’ Popper is known for his rejection of the classical Inductivist views on the scientific method, in favour of empirical falsification: A theory in the empirical sciences can never be proven, but it can be falsified, meaning that it can and should be scrutinized by decisive experiments. Herbert Simon responded to Popper and argued the opposite, namely, that there is a model of discovery and its name is abduction (see Mabsout). Hence the topic is contested. Mitchell (2015) and Reichertz (2004) have referred to abduction as a knowledge-extending means of drawing an inference, as distinct from the normal logical conclusion based upon either purely deduction or induction. The idea that abduction can lead to rule governed and replicable knowledge that is increasingly popular in social science. “Just what does Peirce’s concept of abductive reasoning comprise?” Chiasson (2001) questioned Peirce use of the terms “abduction” and "retroduction" interchangeably. Chiasson posited that if modern researchers refer to a
deliberate form of overarching methodology incorporating abduction, deduction, and induction; then finding a “best” solution could become a teachable skill.

Chong (1994) proposes that while abduction and deduction are the conceptual understanding of a phenomena, induction is the quantitative verification. At the stage of abduction, the goal is to explore the data, find out a pattern, and suggest a plausible hypothesis with the use of proper categories; deduction is to build a logical and testable hypothesis based upon other plausible premises; and induction is the approximation towards the truth in order to fix our beliefs for further inquiry.

- Abduction is not symbolic logic but critical thinking
- Abduction is not Popperian falsification but hypothesis generation.
- Abduction is not hasty judgment but proper categorization.

Chong further offers this elegant summary: as abduction creates, deduction explicates, and induction verifies.

3.3.1 Examples - the ubiquity of abduction thinking and approaches

Douven (2017) in the Stanford Encyclopaedia of Philosophy suggests a number of examples that demonstrate the variety of applications for abductive thinking. Philosophers as well as psychologists tend to agree that abduction is frequently employed (perhaps without appreciation) in everyday, routine reasoning:

- Our trust in other people’s testimony, which has been said to rest on abductive reasoning is one example. This may well be correct, although one does not normally seem to be aware of any abductive reasoning going on in one’s mind.
- Similarly, the role of abduction in linguistics where it has been argued that decoding utterances is a matter of inferring the best explanation of why someone said what he or she said in the context in which the utterance was made.
- Scientists have argued that abduction is a cornerstone of scientific methodology referring to abduction as “the inference that makes science.” Two examples of this application include:
  - When it was discovered that the orbit of Uranus, one of the seven planets known at the beginning of the nineteenth century, departed from its predicted orbit (on the basis of Isaac Newton’s theory of universal gravitation); then the assumption was made that there were no further planets in the solar system. Two astronomers, Adams and Leverrier suggested independently, that there was an eighth, as yet undiscovered planet and that this provided the best explanation of Uranus’ deviating orbit. Neptune, was discovered shortly after.
  - Secondly, discovery of the electron by the English physicist Thomson. He conducted experiments on cathode rays to determine whether they were streams of charged particles. The conclusion that cathode rays consist of negatively charged particles does not follow logically from the reported experimental results, nor could Thomson draw on any relevant statistical data. Nevertheless, he correctly assumed that this was the best and only plausible explanation.
- Abduction is said to be the predominant mode of reasoning in medical diagnosis: physicians tend to go for the hypothesis that best explains the patient’s symptoms.
- Finally, abduction plays a central role in philosophical debates on so-called under determination arguments. Under determination arguments generally start from the premise that a number of given hypotheses are empirically equivalent, which their authors take to mean that the evidence is unable to favour one of them over the other.

4. Case Study example of the application of abduction-based research methodology: outsourcing and offshore decisions.

The overall aim of this research was to examine the extent to which the offshoring and outsourcing strategies of German and UK based multinational corporations (MNCs) were embedded in the institutional contexts of their respective home countries, and in particular the extent to which this can be explained by the varieties of capitalism perspective (Mitchell, 2015). The topic was of interest because many years of teaching executive MBA students at Business School had left the researcher with an impression that UK and German multinationals tackled similar case studies and problems in a rather different way. Furthermore, the use of outsourcing had increased dramatically in the US and UK while German multinationals were continuing to grow globally through controlled offshore expansion while resisting outsourcing. Existing theories did not
adequately explain these differences which run deeper than cultural factors as HQ location and practice had a significant impact on the way overseas subsidiaries behaved.

4.1 Interview protocol

It was intended to develop comparative case studies that mix empirical data with pragmatism to critically compare and contrast the experiences of competitors in each of the UK and Germany. Interviews with senior executives in both headquarters and regional / divisional offices were a prime source of data as they were the key decision and policy makers. It was envisaged that the interview responses ought to be more insightful as a result. Reichertz (2010) suggests that there is a risk that in bringing order to chaotic data collected in interviews, and then fitting that data into a typology, inappropriate analysis will result. In this context, ‘chaotic’ reflects the assimilation of views from different interviewees, in different business units and /or companies that are expressed over time. Some order and mitigation is achieved by targeting senior managers and following the same questions. Interviewees requested that they be anonymised.

4.1.1 Research Questions

The aim was to explore how businesses decide whether to expand and locate offshore for market growth and development reasons or to take advantage of lower costs than are available in their current configuration. For the participating organisations:

1. What experience do you / the organisation have of either outsourcing / offshoring? or
2. Establishing overseas subsidiaries?

This gave rise to a number of sub – questions:

- What was the decision – making process?
- How are the feasibility / cost-benefit studies prepared?
- Did pilot studies take place and how were they tested?
- What consultations / discussions took place with trade unions / works council, at what stage – and what was the outcome?
- If work has moved then has the nature of the work changed i.e. becomes more complex / greater added value – and how has that influenced the cost-benefit case?
- How has the delivery time to market or have the supply chains and distribution channels changed – are there local suppliers, additional storage facilities?
- Has the strategy changed or been revised – and why?
- What lessons have been learnt?

Having tested the questionnaire with early interviews the research questions were then modified as:

RQ1      What are the differences in the geographical, functional and temporal patterns of outsourcing and offshoring?
RQ2      How far do mechanisms such as ownership, control, coordination and the degree of autonomy differ?
RQ3      How is this reflected in divergent international divisions of labour regarding the employment of indigenous or ex-pat managers?
RQ4      To what extent do preferences for cultural proximity affect location?
RQ5      What is the influence of trade unions in the process of outsourcing and offshoring and how is this reflected in the structuring of the firms’ labour markets?
RQ6      What evidence is there, and why of a reversal in policy – re-shoring?

4.2 Access and respondents

Contacts were initially made through the researcher’s personal network who then recommended subsequent interviewees. A ‘snowball’ sampling technique was used. This is a non-probability sampling technique used to identify potential interviewees through referral when subjects would otherwise be hard to locate. The two engineering businesses in Germany and the UK had a specific headquarters, whereas the two airlines have a
number of major offices representing different parts of the business. Candidates were selected to represent both strategy development and policy making as well as line management and implementation at an operational site level.

4.3 Underlying theory and approach

Theoretical framework is primarily assessed through the ‘varieties of capitalism (VoC)’ perspective, Hall and Soskice (2001). Additional relevant economic theory was drawn from ‘global production networks (GPNs)’, Coe, Dicken and Hess (2008). and the ‘resource-based view of the firm (RBV)’, Barney (1991). Institutional effects / embeddedness the influence of actors, decisions and policies, social structures and resource scarcity acting as constraints also needed to be addressed, Granovetter (1985), Grabher (1993), Hess (2004) et al. Two comparative case studies were developed for the Airline sector and the Engineering sector. In each case a leading UK and German company were compared and contrasted. The overall approach is summarised in Table 3 below using the format established earlier in Fig.1. A brief outline is included below of the methodology, the initial hypothesis and the subsequent findings based on the use of induction, deduction and abduction analysis. The resulting propositions were then further explored to develop conclusions.

Table 3: Selected Combination of Approaches ref: Mitchell, 2018 (adapted from Saunders)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Philosophy</td>
<td>Pragmatism – combining positivism and interpretivism.</td>
</tr>
<tr>
<td>2. Approach</td>
<td>A combination of deductive and inductive. Abduction will also be deployed.</td>
</tr>
<tr>
<td>3. Strategy</td>
<td>Multiple case studies that are paired by sector with multinational corporations MNCs who are significant market players. To support the case studies some additional secondary data and / or research of archive material will be required to triangulate the findings.</td>
</tr>
<tr>
<td>4. Choice</td>
<td>Multi-method Qualitative plus some Quantitative (financial reports, employees, fleet size, factories etc).</td>
</tr>
<tr>
<td>5. Time horizon</td>
<td>Cross sectional with some historical perspective to current time.</td>
</tr>
<tr>
<td>6. Techniques &amp; procedure</td>
<td>Semi structured interviews, recorded transcripts, analysis using a mixture of quantitative and (mostly) qualitative techniques, supplemented with additional secondary data collection.</td>
</tr>
</tbody>
</table>

The core underlying theory is known as Varieties of Capital (VoC) and the starting proposition here is that UK and German headquartered firms will behave differently largely in accordance with national characteristics and constraints. While a number of the ideas embedded in this theoretical concept have been criticised it is felt that the theory as a whole is sufficiently compelling that it can be central to our understanding of why German and UK companies compete and behave in rather different ways.

The UK is widely regarded as a ‘Liberal Market Economy’, while Germany is best characterised as a ‘Coordinated Market Economy’. Hall and Soskice (2001) further suggest that countries with a high stock market profile tend to offer less labour protection (e.g. LME) than CMEs (e.g. Germany) where the agencies and institutions will adapt differently to sudden changes or shock thus leading to different corporate strategies, levels of innovation, employment practices and income distribution.

It is suggested that a UK company is likely to be dominated by a CEO with strong performance incentives linked to share price. The UK model is largely shareholder driven and regulated by the equity market that has dispersed ownership. The labour relations system implies that bargaining is typically at the level of the firm, union membership is not compulsory and that a formal voice influencing corporate decision-making would be unusual. Inter-firm relations are more likely to be competitive then collaborative. Employment is of general rather than specialist skills. Corporate policies will favour deregulation and seek to reduce tax. However, German companies, are governed by non-market institutions where ownership is in the hands of long-term strategic actors with multiple links. There is a corporatist system of employee representation giving formal participation rights at both plant and company level. Also, there is a dual company board system with the Vorstand reviewing day-to-day running of the business and the Aufsichtsrat (supervisory) board addressing strategic decisions, capital investment, mergers and dividend policy. A German company is typically
characterised by consensus decision making balanced by multiple goals, and strong representation of employees (through works council etc.) who could block, or moderate the pace of corporate change. Hence it is stakeholder driven. The emphasis is on strategic interplay, differentiated niche production and the acquisition of industry relevant skills through apprenticeships. See Fig 5 below for how the research aims, the literature and the underlying theory are linked to form a conceptual framework and typology suitable for data analysis. The research questions relating to differences in approach and choice of location, ownership and coordination, employment practice, cultural proximity is set out in column 1 of Table 4. The approach and relevant dimensions in columns 2 and 3. Columns 4 and 5 summarise the hypothesis for how UK (LME) as opposed to German (CME) multinational companies would answer the questions.

Figure 5: Linking the aim, theory and taxonomy for a conceptual framework ref: Mitchell, 2015
Through the application of abduction techniques, it is hoped to develop a series of propositions from the findings that in turn can help to develop conclusions. Abduction is essentially a search for some meaningful rules that will offer a valid explanation, while removing what is surprising about the facts. This results in a set of predictions (could also be regarded as a hypothesis). Three steps were followed:

Step 1: Develop a novel conceptual framework based on a taxonomy of criteria that help to explain outsourcing and offshoring behaviour (Table 4 above). This ‘abduction’ provides a focus, to commence research and testing and is a useable re-construction of the predicted outputs from the research (the hypothesis).

Step 2: Derive predictions from the hypothesis (deductions) these are where the researcher reflects upon answers to the interview questions for the airlines case study and for the engineering case study (see Tables 5 & 6).

Step 3: Search for evidence that will verify the assumptions ( inductions) that are the propositions summarised in Table 7 below. These propositions are the further developed and lead to Conclusions.

4.4 Data collection

Fourteen interviews (including follow-up meetings) with senior executives, responsible for policy and strategic decisions were held over two phases with the case study companies. The interviews were held with business units from the four companies in the UK, Germany, India, Poland and the Czech Republic. The relatively small sample of interviews was not considered a limitation as the same questions were asked of executives with a high level of seniority, experience and involvement with outsourcing / offshoring policy.

Tables 5 and 6 represent an initial analysis of the interview data. The headings of focus, approach and issues were cross-checked against each of the six research questions and the predictions shown in Table 4 for LME (the UK airline and engineering business) and similarly, the CME (the German airline and engineering multinationals). Differences between the two sectors were also examined. Repeat interviews were then held with each of the four partner companies, with follow-up questions probing factors that were not totally clear, and further data required.
Table 5: Summary of initial findings in the transport sector.
Focus, Approach and Issues – Airlines  Ref: Mitchell, 2015

<table>
<thead>
<tr>
<th>UK</th>
<th>Germany</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus</td>
<td>Non-core processes / activities and business processes may initially be outsourced and moved offshore. Strategic partnerships and diverse business, free to trade with third parties. Airline maintenance, as above, but restructure alongside major productivity improvement studies. Reverse outsourcing when capacity is freed. Catering – single source then prepared to multi-source once lessons learnt.</td>
</tr>
<tr>
<td>Approach</td>
<td>Internally contract driven led by procurement. Cost cutting is key – but may be material rather than labour cost dependent so location independent. Willing to develop and spin off the business. Spread risk with different providers. Major concern over high pension costs and number of full time employees. Use open book accounting and will exploit tax incentives.</td>
</tr>
<tr>
<td>Issues</td>
<td>Productivity improvements – free up capacity so can reverse decisions to outsource when appropriate. Best value / cost of service Maintain control but encourage suppliers to add value – loose / tight control. Procurement / Contract led with specialist legal, HR, Finance support as required.</td>
</tr>
</tbody>
</table>

Table 6: Summary of initial findings in the engineering sector.

<table>
<thead>
<tr>
<th>UK</th>
<th>Germany</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus</td>
<td>Start off with basic cost cutting and outsourcing – become more ambitious with offshoring. The aim is to improve return on sales and survival.</td>
</tr>
<tr>
<td>Approach</td>
<td>Grow through partnership, alliances and then acquisition. Integrate to gain further cost reductions and then revisit outsourcing offshore. A continuous drive. Seek external consulting help when appropriate.</td>
</tr>
<tr>
<td>Issues</td>
<td>Shift from cost reduction to value add, efficiency and service delivery. Care taken with choice of preferred country destination for relative ease of working / cultural fit for offshore activity. Careful monitoring and reporting of actual v target performance. Politics, local policies and fiscal breaks all play a part but may be time limited. Have to work hard to recruit good people – even in a recession.</td>
</tr>
</tbody>
</table>

4.5 Linking findings to propositions

From the findings and analysis, a detailed comparison of Table 4 with the ‘actual’ results was undertaken following a process of abduction, deduction and induction to derive propositions as in column three of Table 7 below. In developing two case studies, abduction thinking was key to explaining the empirical phenomenon relating to competition in the airline and engineering sectors; and in particular how UK and German
multinationals developed different approaches to outsourcing. The first two columns summarise the key findings for the two cases (questions 1-4 only as examples) the third column is a resulting proposition for the two cases combined. Each proposition in Table 7 (abridged) was summarised, verified or otherwise, by repeated iterative searches of the interview and secondary data, consistent with the abduction process and finally extended as an evidence-based conclusion. This included noting contradictions and idiosyncrasies.

As a final check on the methodology and the ‘robustness’ of the findings, a further series of interviews were held with Swiss and US based MNCs with subsidiaries in China. The China based operating companies again held practices and followed corporate polices from their Swiss and US headquarters that conformed to CME and LME principles as in the core case study participant organisations. This supported the findings from comparing UK and German multinationals.

Table 7: Development of propositions ref: Mitchell,2018

<table>
<thead>
<tr>
<th>Case Study 1 - Airlines</th>
<th>Case Study 2 - Engineering</th>
<th>Proposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Motivation – is primarily cost in UK with a focus on outsourcing support or back-office processes. In Germany while cost is significant it is not given the same over-riding priority; more concerned with central coordination of shared activities (e.g. Krakow) that can then be replicated around the world.</td>
<td>1. Motivation – outsource non-core activity locally in the UK, offshore to China and India (less keen). For German company offshore but retain ownership in a range of key international markets. Long-term development of embedded software products (India) and new platforms (Czech Rep). Driven by local expertise as well as cost.</td>
<td>1. Cost control is a key consideration in both sectors with UK and German companies. Coordination from HQ and a replication of shared services is important for both the German airline and the engineering company. Market development and local expertise is also important for the German engineering business. Both sectors seem to be consistent with the country VoC hypothesis.</td>
</tr>
<tr>
<td>2. Ownership – willingness to offshore and outsource in UK, reluctance to offshore by the German company who wish to retain ownership but at a lower cost.</td>
<td>2. Ownership – UK flexible with an initial willingness to offshore and outsource, only retaining control following a loss of IP. Reluctance to outsource in Germany contact with OEM through HQ.</td>
<td>2. In both sector cases, the UK companies were open to outsourcing and progressive offshoring; they were also flexible and prepared to divest, start joint ventures or acquire when circumstances changed. Reluctance to outsource from both German companies but willing to take lower costs from moving offshore if control is retained. Outsourcing in Germany however, remains on the agenda as further productivity improvements are demanded. Recent evidence of outsourcing IT systems at Lufthansa to IBM.</td>
</tr>
<tr>
<td>3. Control &amp; Coordination – both outsource and move offshore from UK a significant role played by Procurement and contract management. In Germany tight control from HQ.</td>
<td>3. Control &amp; Coordination – shareholder value a priority in UK, retaining control as an offshore subsidiary is important in Germany.</td>
<td>3. Procurement and Contracts drive the operational changes in the UK airline. Performance measures and SLAs are regarded as part of achieving budget in UK but the business is left alone to meet targets. German operations, are more constrained and have fewer ‘degrees of freedom’ they must consult with HQ on delivery.</td>
</tr>
<tr>
<td>4. Degree of autonomy – relatively loose in UK, high autonomy and flexible, tight in Germany but relaxes with trust over time and preference to near-shore.</td>
<td>4. Degree of autonomy – relatively loose in UK. Tight central control of design in Germany also close budget monitoring.</td>
<td>4. As suggested above – consistent with LME (loose) and CME (tight) styles for the UK and Germany respectively.</td>
</tr>
</tbody>
</table>
5. Conclusion

For this case study research, mixed methods applying abductive thinking was found to combine numerical and cognitive reasoning that led to a ‘best answer’ to data that otherwise could not always be adequately explained and contained a number of ambiguities. The predictions were largely found to be accurate, with UK and German based companies, in both sectors, conforming to LME and CME models respectively; some characteristics were nuanced.

- A process of abduction, deduction and induction helped to derive the propositions in column three of Table 7.
- Abduction thinking was key to explaining competition in the airline and engineering sectors; and in particular how UK companies were prepared to outsource and monitor operations closely, while German companies retained control through offshore subsidiaries. Abduction also enabled a rigorous search of the data, testing ideas, checking and trying to understand differences in interview responses under a variety of differing circumstances; in short what actually happened in practice and the reasons why.
- The detailed findings were found to be of practical use to managers in complex multinationals developing and implementing their strategy, also in understanding why their own organisation as opposed to an international competitor follow rather different paths given similar industry challenges.
- For students, researchers and academics the conceptual framework and taxonomy developed during this mixed method research proved to be a useful template for predicting how organisations might operate in practice and pulled together differing theoretical constructs.

The purpose of this paper was to propose that mixed methods research is complementary to traditional qualitative or quantitative research, also that pragmatism is an attractive philosophical partner for mixed methods. A key feature of mixed methods research is that methodological pluralism can lead to superior research. The research question of whether ‘pragmatism’ as a philosophical choice to combine positivism and interpretivism can lead to an appreciation of ‘what works’ in practice, has been addressed through multiple case studies of complex MNC’s. It is hoped that this will encourage further research and more papers deploying mixed methods techniques. Researchers, especially those at PhD or early post doctorate level should not feel constrained by traditional paradigms of research methods, although they may need to invest some time persuading their supervisors of the value of mixed methods.

References

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A Review of Factors and Activities Contributing to Proficient Academic Business Researchers

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Abstract: The role of academic faculty is research, teaching, and service. In an environment that requires research, there appears to be little published discussion of the scholarly activity conducted by proficient researchers. There are few researched and published papers on researcher’s activities and habits to conduct research. The lack of research on the activities of researchers leads to the practice of research viewed as mysticism. An exhaustive search of research into the factors and scholarly activities of academic business researchers is presented in this paper to understand what researchers do to generate and produce research. The review is intended to capture current ‘best research practice’, as guidance for developing researchers who are themselves seeking to become established. A framework of factors and activities impacting on the tertiary institute researcher is developed, and journal papers are reviewed. The review indicates that researchers are influenced by daily activities, personal characteristics, career stages, and institutional environments. A number of environmental factors appear to affect productivity of researchers and personal qualities of researchers are also found to be important. Career, time allocation, and performance assessment impacts are discussed.

Keywords: Academic development, research, university, significant research, publication

1. Introduction

Tertiary institutions of universities and institutes of technology undertake teaching and research and there are increasing pressures on tertiary institutions and academics to carry out research. The role of academic faculty is research, teaching, and service. The most common emphasis in institutions is an emphasis on research (Terpstra, & Honoree, 2009). Various countries have assessments of research outputs such as the Research Assessment Exercise (RAE) in the UK and the succeeding Research Excellence Framework (RAF) or the Performance Based Research Fund (PBRF) in New Zealand. Research may also be required by tertiary institutions for funding and accreditation requirements.

The assessment exercises provide pressure to research and make research performance a salient issue. The performance of the institution is rated and ranked based upon these performance assessments. As the research of an institution is made up of the outputs of the members within them, pressure to research is also placed on individuals. For a discussion of the increasing publication requirements of researchers see Megel (1987), and Cresswell (1990), or more recently Read, Rama, and Raghunandan (1998).

Pressures for research performance with assessments such as PBRF is also considered to have behavioural consequences on researchers. Boston, Mischewski, and Smyth (2005) expect behavioural implications of human resource management, management of time by staff, and changes on the teaching research nexus. The use of the RAE suggests that academics adjust their allocation of time between research and teaching, place importance of supervising research students, while teaching and administrative duties receive less importance (Boston, Mischewski, & Smyth, 2005). Ashcroft (2006) studied 15 academics and found that the research assessment of PBRF increased academic anxiety. The daily stress of academics has increased, and now academics depend on personal abilities of managing multiple roles, technological competence, and communication in a variety of languages (Marginson, 2000).

The lack of research on the activities of researchers leads to the practice of research viewed as mysticism. In addition, the path to the role of professoriate can be misunderstood so the socialisation process may lead to failures (Lee-Partridge, 2007). The road of socialisation and de-mystification of research may involve a process of enculturation to obtain the tacit knowledge (Boyle, & Boice, 1998). Successful researchers have academic values and attitudes derived from specific socialization experiences (Bland, & Schmitz, 1986). Just as there has been a move to make tacit knowledge of teaching explicit for early career academics (Sandretto, Kane, & Heath, 2002) there exists a justification to make tacit knowledge of research explicit for academics.
There has been an argument for academic developers to reassess their relationship to research and to put research centre stage for academics (Brew, 2002). There is a claim that academic developers and discipline academics are similar and that academic developers are academics and is part of the higher education discipline (Bath, & Smith, 2004). The argument has been extended by suggesting that the profession of academic development, of research and teaching, might advance in the future by aiming for academic status using more research active staff to contribute to the knowledge base (Harland, & Staniforthb, 2003). Benefits could accrue if the academic development profession were also located within the already recognised research field of higher education (Harland, & Staniforth, 2003). There has been a growing importance of inquiry into higher education and to be considered seriously academic developers must become credible researchers (Brew, 2002).

There are few researched and published papers on researcher’s activities and habits to conduct research. There is support that distinction between successful and less successful research performance is due to four factors: research activities, mentoring, local networks, and scholarly habits (Hekelman, Zyzanski, & Flocke, 1995). And then only two of those factors, research activities and scholarly habits, are required to identify successful from less successful researchers (Hekelman, Zyzanski, & Flocke, 1995).

An extensive search for literature on activities of researchers failed to find papers that verify or confirm required habits or activities to be successful. Through perseverance the author continued a search and after five years, including the assistance of libraries and three research leaders, literature on researchers’ activities was found. A glance at the reference sections of these research papers identifies the sections as much smaller than research papers of more established research fields. The low number of references confirms the lack of previous research on activities and actions of researchers.

The results of the literature search eventually provided sufficient material to examine. There appears to be research using various data collection methods though the research also appears fragmented. Some disciplines appear to have more substantiated research than others. For example, Bland and Ruffin (1992) review the discipline of medicine. Thirteen characteristics of productive researchers have been found in medical research (Bland & Schmitz, 1986). These characteristics were parsimoniously narrowed to eight that include research skills, motivation, adequate research time, multiple projects, networks, orientation, supportive departments, and in depth knowledge of a research subject (Hekelman, Zyzanski, & Flocke, 1995).

This review is intended to capture current ‘best research practice’ of proficient business researchers. A review of the literature on researcher’s activities is intended to make these issues more aware to researchers and institutions, to make the findings more accessible to researchers, new or experienced, that want to develop their research profile or framework, to research leaders, and to heads of departments that want to gain the greatest return for their investment. This paper acknowledges the resources available for researchers and the differences among business disciplines impacting on research, before the paper suggests a theoretical model of factors and activities impacting proficiency of researchers. This paper then uses the scant, though existing literature to support and substantiate the theoretical model.

2. Resources

There are textbooks that provide suggestions as to what should be done to conduct research. Many of the textbooks describe research methods and state the research process as a straight forward approach of identifying the topic and research question, developing a framework and method, collecting data, and presenting results. These textbooks fail to illustrate the complex dynamics and demands on individuals while conducting research within an academic environment.

Textbooks frequently fail to provide the detail of the researchers activities used to achieve the findings. There are some textbooks that do provides suggestions, for example see Blaxter, Hughes, and Tight (2001), Boyer (1997), and Davidson and Lunt (2000). The suggestions contained within the textbooks are rarely substantiated or supported with peer reviewed journal publications.

Literature, such as journal publications, that do discuss research activity mainly discuss the research process or journal submission process. The research process is depicted as a logical systematic process without
practical hindrances, while the journal submission process depicts the changes required to write effectively, omit errors, and provide papers that journal reviewers will accept. For examples of these see Campbell (1995), De Lange (2005), and Draft (1995).

Some literature provides anecdotal descriptions of the issues encountered with research. For examples of these see Frost and Stablein (1992), Humphrey and Lee (2004), and Perry (2002).

Much of the knowledge of what is required to be proficient remains unpublished and of tacit knowledge. Only a few academics are proficient within a few years of first appointment. Other academics take some time to learn the activities and coping mechanisms of the lecturer and researcher role.

2.1 Previous Research

Much discussion of research tends to examine research output, suggestions for obtaining publication, analysis of journal quality and rankings, and analysis of institution rankings.

Research papers oftenanalyse outputs of journal papers and use the quantity or quality of journal papers as a measure of performance. The New Zealand PBRF assessment exacerbates this issue with 70% of an evidence portfolio evaluation based on research outputs. The results of a ranking analysis alters perceptions of those journals, researchers, departments, or ranked institutions. The perception of low ranked researchers in the RAE results are viewed negatively and researchers from departments with higher rankings perceived other departments skeptically (Broadhead & Howard, 1998).

Other literature makes suggestions for obtaining publication and advising what changes need to be made to papers once the paper (and therefore research) has been done. These suggestions include editing, revising, and journal submission issues.

There is a plethora of published and unpublished research on attempts to rank journals and establish ‘quality’ of particular journals. These articles are useful to indicate what journals should be submitted to and this type of research is therefore linked to the research stated above regarding research output and suggestions for obtaining publication.

Research output of journal article publications is also used to rank institutions. The PBRF assessment is an example of institution rankings.

This current literature review attempts to identify inputs in reference to the factors and activities that contribute to proficient researchers. The aim is to take the emphasis away from outputs and closer to the transformation process of what researchers must do to provide research.

2.2 Variation Among Business Disciplines

A glance at the various disciplines indicates that some disciplines do not provide as much output as others. Even within business, outputs of the disciplines vary. Accounting publications tend to be less per researcher compared to those of finance, management, and marketing (Swanson, 2004; Tower, Desai, Carson, & Cheng, 2005). Some business disciplines publish 1.4 to 2.4 times more than the accounting discipline (Swanson, 2004). In addition, disciplines that rank writing below teaching or reading tend to be less research productive (Giles, 1989).

A review of the PBRF or RAE results also shows that disciplines within business differ. The accounting discipline tends to be ranked lower than other disciplines in the PBRF results of 2003 and 2006. Discipline area and university have been found to significantly affect research outputs (Lewis, & Ross, 2007). Varying disciplines may also place different amount of emphasis on research (Bowen, & Schuster, 1986; Leslie, 2002), and different institutions may place different amount of emphasis on research.

Institutions may be research or teaching focused and as such emphasise research differently. Universities tend to be more research than student centred (Elen, Lindblom-Ylanne, & Clement, 2007). Institutions without doctoral or masters programs tend to have less publications (Read, Rama, & Raghunandan, 1998). The differences in research publications have been attributed to the different emphasis placed on teaching and research. The academic reward systems traditionally emphasise scholarly research over teaching performance.
There is a common belief that doctoral granting institutions emphasise research over teaching and bachelor granting institutions emphasise teaching (Alsup, Holland, & Jacobs, 1988). There also appears to be differences in the perceptions of staff at doctoral and nondoctoral granting institutions (Alsup, Holland, & Jacobs, 1988). Doctoral granting institutions rank availability of resources for research productivity higher than non doctoral granting institutions. These results highlight the condition that organisations may require a unique mix of resources (Alsup, Holland, & Jacobs, 1988). In addition, an organisation’s uniqueness may not be recognised and resources not provided where required, as a perception gap may exist between administrators and faculty (Alsup, Holland, & Jacobs, 1988).

There are indications that pressure on academics to provide research outputs changes what a researcher chooses to publish and where they choose to publish (See Talib, 2000, & Christensen, Finger, & Latham, 2002). New scholars use journals outside their specialist discipline as publication outlets. The place of journal publication also changes (Singh, & Remenyi, 2016). Christensen, Finger, and Latham (2002) find that new accounting scholars commonly use non-accounting journals as publication outlets rather than accounting journals. Accounting researchers clearly chose the publication outlet. More established researchers also chose publication outlets, as Lange, O’Connell, Matthews, & Sangster (2010) found that esteemed American journals were being sought. As publication outlets are distinctively different, the research, including research topic must match the intent of the journal, otherwise the researcher risks journal article rejection, a call that is repeatedly reported by journal editors. So a researcher chooses the publication outlet and thereby also chooses the topic.

As described above, the institution, discipline, and topic interest area is an important influence on research proficiency. The next section further explains the framework of influences on business researchers, and draws upon other research where there has been a lack of literature.

### 2.3 Framework of Factors and Activities

Chow and Harrison (2002) provide a framework of the accounting education process. The framework, in addition to drawing upon the literature, has been adapted here to compose a framework of factors and activities involved by the academic researcher. That framework is in figure 1.

![Figure 1: Framework of factors impacting on research](image-url)

The diagram in figure 1 specifies the factors and pressures within the academic environment that impact on research. The researcher is held centre as researchers are the individuals that carry out the activity of research. The pertinent factors impinging on the research include those of the environment that the researcher is in, including the institute, the particular profession, and the teaching domain of the students and what is taught. There is support that research productivity can be greatly influenced by the environment,
especially if there is insufficient time or research time is unprotected (Perkoff, 1986; Hekelman, Zyzanski, & Flocke, 1995). The environment impacts and controls a researcher’s productivity (Lee, Ognibene, & Schwartz, 1991). Overreaching the researchers’ environment is the macro factors of policy that may be economic, government, and other technological.

Each of the factors above may be influential, to different extents, on the researcher. Of importance is also the recognition that there are external and internal factors. While the environment may be external and out of control of the researcher, there are also internal factors particular to the individual.

For this paper, peer reviewed scholarly journals are considered the benchmark for valid and reliable results of research. For this reason, this paper draws upon research that has collected data on business researchers and published in academic journals. The literature is reviewed in this paper to determine the existence of the framework presented above. The next section begins with a review of defining proficiency before describing the themes of career, potential, publication, and assessment as drawn out by the literature.

3. **Substantiated Factors of Research Proficiency**

This paper now discusses the factors of the framework that have been substantiated in the existing literature.

Researchers have attempted calculations at the average number of papers produced per year. That average has been calculated as high as one journal paper per year. Though the figure has also been calculated as low as 0.49 (Tower et al., 2005), as low as 0.37 (Durden, Wilkinson, & Wilkinson, 1999), and even as low as 0.16 (Zivney, Bertin, & Gavin, 1995). Hekelman, Zyzanski, and Flocke (1995) have considered the productive and successful researcher as producing two or more publications over a year.

The calculated statistics obtained in the research of output activity has been averaged over a number of researchers, many of which do not research at all. Only a few researchers are proficient. Thus, the output of many is far lower. The result is that much research is conducted by only a small subset of researchers (Durden et al., 1999). Only 17% of academics have been found to publish in the ‘top’ journals (Beattie, & Goodacre, 2004). Over a two year period, 65% of academic staff published no articles (Beattie & Goodacre, 2004). Over a career, only 50% of academic staff published one or more articles (Zivney, Bertin, & Gavin, 1995). See also Hasselback, Reinsten, and Schwan (2000).

Those with a PhD, higher academic level, and in smaller departments appear to provide greater research output (Tower, et al. 2005). Those with doctorates publish more than those without doctorates (Tower, et al. 2005; Beattie & Goodacre, 2004; Giles, 1989), possibly due to the learning that takes place while undertaking a doctorate, or possibly from selection bias of those who undertake a doctorate are those that want to pursue research.

Academic level and publications are found to be correlated (Tower, et al. 2005; Beattie & Goodacre, 2004) with seniority providing more research outputs of humanities, sciences, and social sciences in Australia, New Zealand, and the UK (Lewis, & Ross, 2011). Lecturers average around half a publication a year, senior lecturers and above were found to average more than one publication a year, and professors publish the greatest number of papers (Tower, et al. 2005). The different amount of productivity across the academic levels does not appear to be due to differing amounts of resource availability (Alsup, Holland, & Jacobs, 1988). Faculty perceptions of resource availability across academic levels remain consistent with no significant differences (Alsup, Holland, & Jacobs, 1988).

To a lesser extent, males tend to publish more than females (Tower, et al., 2005). And the average age of academics, responding to questions of their research, is 40 (Cargile & Bublitz, 1986), though the productive research faculty are older than less productive faculty (Giles, 1989).

A survey that asked scholars what contributed to ‘success’ in research publication was found to provide a number of meaningful factors (Chow & Harrison, 1998). Those factors included; supportive colleagues, time strictly for research, access to computers and databases, supportive research environment, financial and other support, doctoral assistants, mentors or leaders, and library resources. A survey of university staff, undertaken by Cargile and Bublitz (1986), provides additional factors of research; reduced teaching load (class and
preparatory time), access to computers and databases, colleagues research abilities, high quality graduate students, and reduced committee assignments. Computer access requirements are confirmed by Giles (1989) that finds productive research faculty have high word processor use. However, these studies were conducted over three decades ago and now computer access would seem a prerequisite for the role. Students are used to co-author with and provide further outputs. An archival search of outputs shows the salience of this approach. In addition, graduate students are also used for teaching assistants, thus providing teaching resource and time for researchers to spend researching.

Perceptions of resource availability in academic institutions have also been studied and the lowest scores are technical writing assistance, travel for data collection, and teaching or research assistants (Alsup, Holland, & Jacobs, 1988). Other resources important to faculty staff include travel support, fewer preparations to teach, research and grading assistance, provision of blocks of research time, secretarial support services, and editorial assistance (Ostrowski, 1986). Now a few years on, resources do not appear to be an issue. The provision for resources is given.

Influential researchers have been asked to describe their idea generation processes (Chow & Harrison, 2002). There were three categories of the results: following and critically looking at the literature, keeping abreast of real world issues, and working with colleagues. Following the literature is a way to generate ideas and develop multiple papers. By keeping abreast of real world issues, topical ideas are identified and theory and practice can coalesce. Working with colleagues includes peers, students, and co-authors. The interactions lead to new ideas, facilitate new ideas, and leads to directions previously unanticipated.

Another way to interact with peers is to provide output. A means of providing output could be in the form of support or research groups that provides gains for scholars to be able to cope with research demands and assists skill development (Murray, & MacKay, 1998). Collaborative networks and mentorship contribute to developing researchers (Crisp, Swerissen, & Ducklet, 2000; Kirchmeyer, 2005; Worrall, 2016).

Research groups provide benefits of critique and ideas that contribute to the academic debate and rigor of the research. Output could also be in the form of conferences. A scholarly habit of participation that develops productivity includes presenting papers, committee participation, and committee leadership (Hekelman, Zyzanski, & Flocke, 1995). Academics have also found conferences crucial for valuable teaching and research (Curtis & Matthewman, 2005). For a greater discussion of the advantages and disadvantages of conferences, contact the author for a separate review.

3.1 Career Life Cycle

Chow and Harrison (1998) find that personal attributes and skills of researchers are important determinants of research productivity. The development of higher level skills and ability is referred to as research capacity (Frontera, Fuhrer, Jetter, Chan, Cooper, & Duncan, 2005). Much of the skills and attributes can be developed with training. Education and training of individuals leads to the attainment and development of skills required of researchers. The attainment of skills required for research is considered a focus of graduate level courses and that development then culminates with the completion of a doctorate. Thus, education and training are important to a research career. Little research has gone into the impact education has on research success or on the characteristics and personality required for a researcher.

Also, ability provides access to top doctoral programs that then determine productivity (Maranto & Streuly, 1994). Qualifications obtained from the ‘right’ institutions with the ‘right’ supervisors provide greater opportunities. If the institution is prestigious, the member has a greater chance of being employed at institutions and with positions with greater resource availability. Supervisors are also able to provide contacts to those doctoral students who will go on to find positions at academic institutions. Researchers are seen to contribute to the career of students. Students as future academics attending institutions are discussed more theoretically in Kirchmeyer (2005).

A common conception of obtaining a PhD is the affect of publication shortly after doctoral attainment. Within the years that follow thesis completion, academics convert some of their thesis chapters into separate papers for journal submissions. Newly graduated doctorates then have a number of papers ready to be reworked and polished to attain journal publication at the beginning of an academic research career. The publications resulting from graduate study is referred to as the dissertation effect (Zivney, Bertin, & Gavin, 1995).
Maranto and Streuly (1994) also refer to productivity and research impacts later in a career. Later productivity can be identified from early career productivity. The productivity appears to be a result of establishing productive writing behaviours early in the career (Boice, 1992; Boice & Jones, 1984; Cresswell, 1985; Reskin, 1977). Those who write daily with regular scheduled sessions produced more writing and more new ideas than those who waited for the moment (Krashen, 1990). Writing is an important aspect of research and even a method of inquiry (Richardson & Adams St Pierre, 2005).

However, there are factors hindering new faculty members obtaining research productivity and good writing behaviours. The environment and conditions of new faculty members encourage procrastination and distress (Boice, 1989). Low research assessment scores are also demotivating (Boston, Mischewski, & Smyth, 2005). Procrastination occurs from faculty waiting until the mood is right for writing (Giles, 1989). If researchers are able to overcome these issues early, productivity arises. Typically the research productive faculty member only has a moderate anxiety about writing, though the major limiting factor of writing is the lack of time (Giles, 1989).

In some institutions tenure may not be provided to an individual faculty member until the member has shown results. Results are usually in the form of providing a suitable number of research outputs. There exists a view that once faculty pass the probationary period or attain tenure, research activity or output dissipates (See Swanson, 2004; Zivney, Bertin, & Gavin, 1995; Talib, 2000; Talib, 2002). The incentive to provide outputs no longer exists once tenure is reached. This view of productivity is referred to as the tenure effect and views motivation of researchers as externally determined. However, there is disagreement on the existence of the tenured effect (see Lane, Ray, & Glennon, 1990; Levitan & Ray, 1992; Hancock, Lane, Ray, & Glennon, 1992). One argument refuting the existence of a tenure effect is the factor of time affecting productivity (Chen, Gupta, & Hoshower, 2006). Time spent in academia is considered to reduce research productivity, through means of extra requirements on faculty. Additionally, the inner motivation of individuals enjoying research exists with or without tenure.

3.2 Importance of Choosing Potential

Academics perceive published research ahead of teaching, politics, and service as a determinant of promotion, tenure, and salary (Cargile & Bublitz, 1986). This perception is not surprising given that reward systems traditionally emphasise research (Reinstein, & Lander, 1993). Though, research may be seen as an extra burden to faculty at non doctoral granting institutions (Cargile & Bublitz, 1986). However, academics who write “have no more free time or no fewer commitments than colleagues who do not write” (Boice & Jones, 1984, p. 567). Those who write make time. Faculty that have high research productivity allocate more time to research activities (Hancock, Lane, Ray, & Glennon, 1992; Lane, Ray, & Glennon, 1990; Chen, Gupta, & Hoshower, 2006).

A limiting factor of research proficiency is the amount of time devoted to other activities such as teaching. Over preparation time for teaching tends to reduce time availability for research and this is common among new faculty (Boice, 1992). Though, faculty with outstanding teaching do not necessary differ in research publications with those without an outstanding teaching record (Baker III, Bates, Garback-Kopman, & McEldowney, 1998). Moderating the time spent preparing lectures improves both teaching and research (Boice, 1992; Boice, 1993). Thus proficient research is not necessarily at the expense of outstanding teaching, but can be at the expense of extended teaching preparation time. In New Zealand, the generally accepted norm for the role of an academic is 40:40:20 teaching: research: service (Bright, 2012), though this is not the same for everyone. The impact of assessments or evaluations such as RAE or PBRF on researchers’ time needs further investigation.

How productive researchers make time is not certain. Especially in situations where the workload is increasing for academics (Hancock, Marriot, & Duff, 2015) and an increased tension between research and teaching (Billot, 2010). Academics find the double roles of teaching and research workload difficult (Hancock, Marriot, & Duff, 2015; Teichler & Arimoto, 2014; Shin & Cummings, 2014; Curtis & Matthewman, 2005). Time could be made by working more within a week, or working more efficiently. Summers (1972) argues the latter suggesting that the teaching professor that is expected to research must use teaching to provide material for research.
Personal motivation is positively related with output (Blackburn, Bieber, Lawrence, & Trauvetter, 1991). Faculty who rate extrinsic and intrinsic rewards equally important provide higher research productivity than those who do not (Chen, Gupta, & Hoshower, 2006). Though, intrinsic motivators are perceived by researchers as more important than extrinsic rewards in motivating faculty for productive research (Bailey, 1994). Though when faculty are disaggregated into tenure, untenured faculty are motivated by extrinsic rewards, while tenured faculty are motivated by intrinsic rewards. Punishment for lack of writing has also been studied that indicates greater productivity, but less efficiency (Krashen, 1990).

A quote from Chow and Harrison (1998, p. 181) describes a proficient researcher as:

A person who has sought and obtained rigorous training in methodological and writing skills... gaining access to support resources (both colleagues and physical), this person has a strong work ethic and a very strong desire to succeed. He/she is highly dedicated to his/her work and persists and perseveres.

The quote above indicates that research requires skill and ability, dominated by writing skills. The researcher also requires resources including interactions with colleagues, is highly motivated from extrinsic an intrinsic rewards, and much time is put into research.

3.3 Impact of Performance Assessment

PBRF in New Zealand has now been around since 2003 and has now become a part of the university and academic life. Academics know that if they want to stay in the university, they have to respond to the call for research productivity. Most academics, as indicated with low research outputs (Beattie & Goodacre, 2004; Zivney, Bertin, & Gavin, 1995; Hasselback, Reinsten, & Schwan, 2000), are not necessarily motivated to do more research and feel the increase in pressure to provide research. They would probably prefer the previous environment but now the call for research productivity is something that academics have now come to terms with and live with. Though this state of accepting increased pressure of New Zealand researchers to research differs to the hostile state of academic staff towards the RAE exercise in 2001 (Harley, 2002).

PBRF and other research assessment exercises places an emphasis on research, so employment selection of researchers is eminent, consistent with Lange, O’Connell, Matthews, and Sangster (2010). Research performance impacts on staff positions and tenure. A lack of research jeopardises a position, as was also evident from a study of the RAE (Henkel, 1999). A study of the ERA in Australia found inactive researchers were given voluntary redundancies or had increased teaching workloads (Lange, O’Connell, Matthews, & Sangster, 2010). The increased emphasis on performance of research and evaluation increases stress levels. The finding of increased pressure from research is consistent with other findings (Marginson, 2015; Broadhead, & Howard, 1998; Curtis & Matthewman, 2005) of increased anxiety, stress, and workload.

4. Conclusion

This paper has attempted to provide a framework for the factors that influence academics to provide research and then identify research that has substantiated those factors. A review of the literature indicates that the framework has not been completely researched and many factors remain unverified. Other ‘best practices’ still require further investigation.

The results of this review indicate that a researcher is knowledgeable and has skill levels. The skill levels are developed in training and knowledge is developed over time to the point that the researcher has a good track record. The result is that the academic researcher is typically older than non researchers.

‘Non-productive’ time needs to be built into academic timetables to allow for reading and writing time. In addition, to reading and writing, the results of these activities require interaction with colleagues. As faculty at large or small institutions, including doctoral and non doctoral granting institutions, need to interact with peers, this has major limitations on particular academic institutions. Some academic institutions may need to use other means of interacting so that collaborations, mentorships, or groups may be useful.
Students play an important component at institutions and in particular, students contribute to the research environment. However, some Institutes of Technology and Polytechnics (ITPs) would be at a disadvantage compared to universities as they do not offer doctoral programs. Much research compares doctoral and non doctoral (bachelor) granting institutions. Though, in some instances some ITPs do not offer doctorates or bachelor qualifications. These limitations for particular institutions imply that those institutions may not be as proficient unless particular requirements of those unique institutions are considered.

Much of the character of a researcher is not only in the training or career of a person, but the personal, or emotional qualities of perseverance and internal reward ratings of individuals. Proficient individuals rate research as important as teaching or other obligations and as such, their behaviours and activities reflect that rating. Proficient researchers thereby devote time to reading and writing as part of their role. Much of the factors of proficient researchers are in the individuals themselves and are difficult to emulate so institutions need to be vigilant when hiring and granting tenure to faculty.

References


Exploring Complementarities of Productive IT use through Methodological Complementarism

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Abstract: Factors affecting productivity and particularly IT-enabled productivity increase have been and still remain the major concern for many business sectors. While previously researchers investigated what factors and their complementary relationships affect organizational productivity, organizational economists came to the conclusion that an organization cannot be regarded anymore as a black box since it is not an organization per se that conducts the very work but its resources with the basic elements being a single worker and a single IT system. Currently, it is proposed that we understand organizational internal mechanisms and their functioning for productivity through the lens of complementarity theory and maintain that when factors are synchronized correctly they can bring significant productivity increase. Identification of the complementarity factors and their synchronization bring, however, a major challenge for research methodology. Unlike conventional studies where a few variables independent of each other cause a reaction to dependent variables, in the context of complementarities, the assumption is closer to the real-world experiences where a set of factors interact with each other to affect one or several dependent variables. The present paper addresses this difficulty of researching complementary factors for an individual knowledge worker and their productivity. The approach taken here is to use multiple and different research methods in a complementary manner, so that the results from each study of the same kind of phenomenon uncover new insights that cannot be derived from any such single study. The results from this multi-method approach demonstrate new insights into the interplay between the studied factors that condition the productivity of knowledge workers and show the importance of analysing a complex phenomenon with complementary research methods.

Keywords: complementarity systems approach, individual IT-enabled productivity, knowledge worker, methodological complementarism, online experiment, quasi-randomized field experiment

1. Introduction

Today's modern organizations prioritize the challenge of improving productivity and researchers continuously searching for new factors, their combinations and methods that may lead organizations to productivity improvement (Bender et al., 2018; Singh, Burgess and Heap, 2016). The more IT systems become available to support a specific kind of work process; the more challenges emerge for how these technologies can be used in a more efficient way. While researchers previously studied productivity of organization in its market, currently a number of attempts are being made to unpack the black box of an organization and understand its mechanisms (Gibbons and Roberts, 2013). The main argument for this exploration is that it is not an organization that conducts operations but a knowledge worker and an IT system that are basic elements of an organizational workstream (Palvalin, Lönnqvist and Vuolle, 2013; Pyöriä, 2005).

Productivity of a knowledge worker and IT use is currently discussed in line with the debates about the productivity paradox (Aral, Brynjolfsson and van Alstyne, 2012; Jain and Kanungo, 2013; 2016) originally described by Robert Solow (Solow, 1987). The exploration of this paradox led to the conclusion that when certain complementary factors are matched correctly they can create a synergy and thus increase productivity significantly (Brynjolfsson and Milgrom, 2013; Cardona, Kretschmer and Strobel, 2013; Sabherwal and Jeyaraj, 2015; Schryen, 2013). For an individual knowledge worker two pioneering studies concluded that productivity increase from IT use may require complementarities such as a work process (Athey and Stern, 2002; Autor, Levy and Murnane, 2003), while a more recent study demonstrates that these complementary factors may have a contingent relationship (Aral, Brynjolfsson and van Alstyne, 2012).

The limited insights into individual knowledge worker productivity are explained by difficulties in demonstrating productivity gains from a narrow system of complementary factors and difficulties in IT complementarities’ management (Ennen and Richter, 2010). In contrast, we study the effect of a set of complementarities on individual productivity in a particular situation when an IT system that is aligned with...
the work process is used and we compare productivity data with a situation where a not aligned IT system is used. This is investigated empirically here by applying an experimental approach when an artificially created situation involves a manipulation of certain conditions relevant to the outcome (Mingers, 2003). Moreover, the use of such an experimental approach in studying IT and complementarity impacts is strongly supported by recent researchers (Camerer and Weber, 2013; Gupta, 2014; Gupta, Kannan and Sanyal, 2018). Studying complementarities is challenging as, unlike conventional studies with few variables, where independent variables are assumed independent of each other and offering a linear cause-effect relation to the dependent variables, the complementarity approach recognizes the complexity of reality where a set of factors interact with each other to generate effects on dependent variables. These challenges demand specific requirements in the research approach for studying complementary mechanisms. To overcome these limitations the approach taken here is to use a systems approach of the complementarity theory (Ennen and Richter, 2010) and a multiple and different research method (a longitudinal quasi-randomized field experiment and a web-based online experiment) in a complementary manner. In this way, the research results from each study of the same kind of phenomenon bring several insights that cannot be derived from any single study (Bazeley, 2015; Bentahar and Cameron, 2015). As a result, complementary factors that condition knowledge worker productivity are investigated here with several research methods that complement each other.

This paper presents methodological insights from two parallel and differently designed experimental studies. These studies were conducted independently to investigate configurations of complementary factors that influence individual IT-enabled productivity of knowledge workers both before and after the introduction and use of aligned IT systems. We stress, however, that we do not discuss the detailed settings and findings of each study although we provide some background and results for each study. Rather our main focus is on the key methodological insights obtained from two studies. Taken together, the two studies demonstrate (i) the support for the complementarity theory and its systems approach for IT-enabled productivity for an individual knowledge worker, (ii) that further research is needed to understand the effect of a worker’s cognitive style interactions with complementary factors investigated here on individual productivity, (iii) that granularity and learning effects are central to the understanding of productivity. Thus, the design of future experiments should explore in more detail a learning curve before and after an aligned IT system is used, (iv) that a mandatory context of IT use might provide better access to individuals with both adaptive and innovative cognitive styles than a voluntary working environment. Therefore, this paper seeks to show the complementary effect gained from two different research methods used to study the same kind of phenomenon. By comparing the results obtained from both studies, new insights are gained that are not provided by individual studies on their own.

The rest of this paper is structured as follows: The first sections present the theoretical background underlying formulated complementarity set-ups. Following that, a description of the research methodology and the obtained results are presented. Finally, a summary of the methodological insights, key contributions and future research directions concludes the paper.

2. Theoretical background

In an organization, factors can have an independent, substitutive or complementary relationship (Parmigiani and Mitchell, 2009). An independent relationship occurs when a change in one factor does not affect the value of another factor. A substitution relationship exists when a change in one factor diminishes the value of another factor. A complementarity relationship emerges when a change in one factor increases the value of another factor. In this study, we use the complementarity theory (Milgrom and Roberts, 1990; 1995) which states that, in order to increase productivity, there is a need to allocate a number of factors in a system in a particular manner so that each factor enlarges the value of another factor.

The complementarity theory has two investigative approaches (Ennen and Richter, 2010). The main distinctive feature between these two approaches is that while the interactive approach studies the nature of the factors which potentially are complementary, the systems approach explores effects of the entire system of multiple factors on productivity. In our research, we take the systems approach of the complementarity theory and study the impact of complementarity set-ups on individual productivity in a situation where a more aligned with the work process IT system is introduced and used in a company. An aligned IT system is defined as that which offers information and information-processing functionality that is adjusted and tuned to support specific work activities within a specific kind of work process.
While the systems approach allows the investigation of a system of factors that together can significantly increase productivity, this approach imposes some methodological difficulties. For example, it is unclear how to design studies to explore complementary factors for an individual so as to increase IT-enabled productivity and what design is most appropriate. By applying the systems approach it is also difficult to isolate what complementarities are critically important. This would require multiple runs with many configurations, which is often impossible in real life settings. This also imposes a need for longitudinal studies to demonstrate causality directions, rather than only correlations. Our approach in dealing with these uncertainties is to combine different yet complementary methodological approaches since it has been emphasized that: “The complementarity among the methods permits researchers to clarify, explicate and to apprehend some levels of analysis different from the object of research. Thus, the objective is not to corroborate the results, but to apprehend a supplementary facet of reality” (Bentahar and Cameron, 2015, p. 7). Studying the same phenomenon using two different experimental methods not only helps us to uncover new configurations of complementary factors but also provides us with new methodological insights that neither of these two approaches could offer alone.

3. Formulated complementarity set-ups

To overcome limitations from previous individual level studies (Aral, Brynjolfsson and van Alstyne, 2012; Athey and Stern, 2002; Autor, Levy and Murnane, 2003), we applied the systems approach of the complementarity theory. This assumes that studying the interaction between multiple complementary factors may demonstrate a superior productivity increase rather than exploring only a limited number of factors (Ennen and Richter, 2010). In this study, we developed two complementarity set-ups aligned with adaptive-innovative cognitive style, including training and education, incentive and decision-making modes and tested individual productivity both before and after the introduction and use of a more aligned work process IT system. The development of complementarity set-ups is presented below in more detail.

In general, individual productivity of a knowledge worker is conceived as a function of a single worker, IT tool used by the worker, a task conducted and contextual settings of the worker, i.e. processes that govern the interactions among the individual, task and IT tool in order to complete tasks (Hopp, Iravani and Liu, 2009). Therefore, based on these premises and the systems approach of complementarity theory, we formulated two complementarity set-ups in which the following factors fit each other in a particular manner: adaptive/innovative cognitive style (as human cognition is the main act of information processing by a knowledge worker) (Kirton, 1976; 2003), the structural complexity of the operational process (MacCormack, Verganti and Iansiti, 2001; Weber and Wild, 2005), training activities, incentives, and decision-making structure (Amabile, 1996; Baer, Oldham and Cummings, 2003; Bloom and van Reenen, 2011; Ryan and Deci, 2000; Sense, 2007). These factors were linked together into one greater system of factors that complemented each other, in which each factor was assumed to hold a binary value set. This provided a foundation for the formulation of the two key complementarity set-ups that were subjected to empirical tests (Table 1).

Table 1: Summary of predicting complementarity factors and their value range

<table>
<thead>
<tr>
<th>Predicting complementarity set-ups and factors</th>
<th>Value range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complementarity set-up</td>
<td>Stable</td>
</tr>
<tr>
<td>Cognitive style</td>
<td>Adaptive</td>
</tr>
<tr>
<td>Work process</td>
<td>Stiff</td>
</tr>
<tr>
<td>Training mode</td>
<td>Push</td>
</tr>
<tr>
<td>Motivation mode</td>
<td>Exogenous</td>
</tr>
<tr>
<td>Decision-making mode</td>
<td>High centralization</td>
</tr>
</tbody>
</table>

Therefore, we expect that (i) individuals with adaptive cognitive style generate higher productivity when matched with a ‘stable’ complementarity set-up that includes a stiff operating process, push mode training in work technology, exogenous incentives, and centralized decision-making compared to other configurations of these factors when a more aligned IT system is used. In contrast, we expect that (ii) individuals with innovative cognitive style generate higher productivity when matched with a ‘dynamic’ complementarity set-up that includes a flexible operating process, a combination of minor upfront mandatory training with optional on-demand training in work technology, endogenous incentives, and decentralized decision-making compared to
other configurations of these factors when a more aligned IT system is used. Our contribution to the complementarity literature is that, by applying the systems approach of complementarity theory, we propose new configurations of complementary factors that have been established and explored independently by other studies mentioned in this section.

4. Methodology

Although recent studies gathered some knowledge on potential complementary factors that can affect individual productivity, we still do not know how to study these complementary factors for an individual. For example, previous studies on the relationships between IT complementarities and individual worker productivity applied the survey approach (Aral, Brynjolfsson and van Alstyne, 2012; Athey and Stern, 2002; Autor, Levy and Murnane, 2003) and demonstrated mixed results. These heterogeneous results can be explained by challenges in studying complementarities and their effect. For example, in conventional studies independent variables are assumed independent of each other and offer a linear cause-effect relation to the dependent variables. The complementarity approach recognises the complexity of reality where a set of factors interact with each other to generate effects on dependent variables. These challenges demand specific requirements for a research approach in studying complementary mechanisms.

Studying the effect of complementarities on outcome variable requires identification of causation rather than correlation, and thus calls for longitudinal experimental studies (Hassett and Paavilainen-Msntymski, 2013). Field experimental approach is also proposed by organizational economic literature to clearly quantify the effect of complementarities on performance indicators (Camerer and Weber, 2013). Although longitudinal experimental studies are preferable to identify a causal effect of treatment on outcome variables, they can imply low temporal resolution and thus changes in such patterns as learning effect (Womer, 1984) may not be visible. Moreover, since we investigate complementary factors of an individual’s cognitive style, where one of the styles is innovative which implies a great need of autonomy and voluntary behaviour rather than imposed norms, the research method must be able to recognize such needs. Therefore, there is a need to use experimental methods that can address these requirements in a more detailed manner (Camerer and Weber, 2013; Gupta, 2014; Gupta, Kannan and Sanyal, 2018). In general, two requirements (causality and granularity) clearly demonstrate that the use of a multi-method research approach can be beneficial in order to demonstrate the effect of complementarities on outcome variables. Studying the effect of the system of complementarities requires different empirical contexts to demonstrate whether the system is contextually dependent. This means that the same system has to be tested in different empirical contexts, in our case in different information-intensive occupations, in order to claim that the complementarity system may be generalised and thus can be used to increase individual productivity of knowledge workers.

In this paper, the research strategy was based on two independent studies: a longitudinal quasi-randomized field experiment (Study A) in which we investigated the operational productivity of sales representatives and an online experiment of software programmer productivity (Study B). The choice of research methodology and its rationale is as follows: Firstly, since we needed to study whether changes in operational set-ups cause productivity differences owing to different configurations of complementary factors, the experimental design was appropriate for testing the formulated complementarity set-ups. Secondly, in order to study the impact of IT use on individual productivity it was necessary to capture productivity data over a period of time and to take into account the time-lag effect on productivity gains from IT use (Brynjolfsson, 1993; Devaraj and Kohli, 2003). Therefore, a longitudinal research approach is important when studying complementarities of productive IT use to demonstrate their effect over time. These two premises form a foundation for the longitudinal field experiment. This type of experiment enables analysis of a targeted phenomenon in its natural setting without artificially introducing confounding variables as well as capturing the effect of intervention over time (Hassett and Paavilainen-Msntymski, 2013). Thirdly, in addition to the time-lag effect, we needed to provide better control over complementarities and their impact on IT-enabled productivity that could be achieved by conducting well-controlled laboratory experiments. However, recent online experiments have become even more popular than laboratory experiments, since they reduce the influence of experimenters’ expectations on participants’ behaviour, provide access to wider populations, and increase the uniformity of the experimental procedure across participants (Reips, 2002; Wolfe, 2017). Therefore, both a longitudinal field experiment and a well-controlled online experiment responded to the complementarity set-ups tested in this research. Finally, we chose two information-intensive professions – sales representatives and software programmers – as appropriate examples of knowledge workers (North and Gueldenberg, 2011). These workers require cognitive
skills to process information which is an input and output of the production process and use expressly designed IT systems as their main production tool. Thus, two independent studies are appropriate for in-depth exploration of complementarity configurations, because we can identify whether the emerged patterns in one study are confirmed in the other, and as a result, can expect stable results. The set-up characterization of Study A and Study B is presented in Table 2.

Table 2: Set-up characterization of Study A and Study B

<table>
<thead>
<tr>
<th>Key characteristics</th>
<th>Study A</th>
<th>Study B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of study</td>
<td>Longitudinal quasi-randomized field experiment</td>
<td>Web-based online experiment</td>
</tr>
<tr>
<td>Focus</td>
<td>Productivity of sales representatives</td>
<td>Productivity of software programmers</td>
</tr>
<tr>
<td>Data collected</td>
<td>Data were collected over a period of 5.5 years: January 2012 – June 2017 (9 quarters pre-change and 13 quarters post-change)</td>
<td>The online experiment was available online for 4 months (October 2015 – January 2016)</td>
</tr>
<tr>
<td>Context</td>
<td>Nordic affiliate of a global pharmaceutical corporation</td>
<td>Dedicated website for experiment; subjects recruited globally through online staffing firms</td>
</tr>
<tr>
<td>Metric</td>
<td>Number of sales calls and products sold in relation to the duration of time worked by an individual</td>
<td>Programming time and quality (completeness and correctness) of the product developed</td>
</tr>
<tr>
<td>Subject participation</td>
<td>Mandatory participation as part of regular work tasks</td>
<td>Voluntary participation incentivized with minor payment</td>
</tr>
<tr>
<td>No. of subjects investigated</td>
<td>91 of which 31 were innovators and 60 are adaptors</td>
<td>113, of which 110 were innovators and 3 were adaptors</td>
</tr>
</tbody>
</table>
| Study design        | 4-factor configurations distributed over 16 business units (4 products; 4 counties):
  Design 1: no change; control group
  Design 2: an aligned IT system only
  Design 3: an aligned IT system, new sales process
  Design 4: all factors; an aligned IT system, new process, training and education mode, incentives, and decision-making authority
| Study design        | 3 sessions/assignments for software programming for each subject. Session 1: simple IT-tool support
  Session 2: advanced IT-tool support and all factors
  Session 3: advanced IT-tool support and all factors
| Data analysis method | Difference-in-difference                                               | Repeated measures analysis of variance                                  |
| Study deviation      | Subjects’ allocation did not allow us to identify productivity of adaptors in ‘dynamic’ and innovators in ‘stable’ complementarity set-ups | The study succeeded in attracting mostly innovators                     |

Study A was conducted in a Nordic affiliate of a global pharmaceutical company that is among the top 50 largest life-science corporations in the world. The affiliate received a new sales-support IT system that was designed to facilitate sales representatives’ daily work at the end of April 2014. This IT system was installed in the company with four different designs (operational–organizational configurations of complementary factors) to study their impact on individual productivity of sales representatives. These four designs were allocated to a four-by-four operational structure (with four different products, A, B, C, and D, and four different markets, Denmark, Finland, Norway, and Sweden) to neutralize the influence of the product as well as the market over sales performance. Participants in the first group (Design 1) acted as a control group and operated in a way the whole company operated prior to the introduction of the aligned IT system. Participants in the second group (Design 2) received the aligned IT system, yet remained in the same operational set-up as prior to the change. Participants in the third group (Design 3) received the aligned IT system together with a new and specific type of sales process (sales representatives were not obliged to follow all operational steps in the new process). In the fourth group (Design 4), the ‘full’ or comprehensive set of IT complementarities was assumed, based on the developed complementarity set-ups. Productivity data (the number of sales calls and products sold relative to the length of time worked by an individual) were collected for every quarter over a period of 5.5 years (9 quarters before and 13 quarters after the introduction of the aligned IT system).

In Study B, we used a dedicated website to test whether a set of matched complementary factors can actually affect productivity in relation to adaptive-innovative cognitive style when a more aligned IT system was implemented and used. We expected that adaptors rather than innovators would have productivity advantages when a more aligned IT system is used together with a ‘stable’ complementarity set-up. In contrast to adaptors, we expected that innovators would gain productivity advantages when a more aligned IT system is used together with a ‘dynamic’ complementarity set-up. The experiment consisted of three sessions/assignments. In the first session, in order to establish a benchmark, participants developed a software
application using a text editor, which represents an existing IT system in a company. In the second session, an advanced IT system, Cloud9, an online integrated development environment that provides comprehensive facilities for software development introduced in a synchronized manner with both cognitive styles and complementarity set-ups. The third session was designed to consider a learning-curve effect (McLeod et al., 2008; Womer, 1984). This session also included the advanced IT tool and complementarities of the second session. Each session had identical time frames (approximately 20 minutes to 1 hour) and a slight variation of assignments, yet with an equal level of complexity. The time taken by the subjects to complete each session was used to characterize a quantitative dimension of the productivity metric. In addition, as a measure of productivity, we used completeness (how many of the functional requirements were completed) and correctness (how well the functional requirements were implemented) of the application developed to evaluate the quality of the developed product.

5. Results

Table 3 summarizes the characterization of the key results from both studies that together offer insights into the methodology of the investigated phenomenon about complementarities and IT-enabled productivity.

<table>
<thead>
<tr>
<th>Key characteristics</th>
<th>Study A</th>
<th>Study B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study results</td>
<td>Design 1: no productivity change Design 2: decreased productivity Design 3: decreased productivity Design 4: increased productivity</td>
<td>Session 1: Innovators in a ‘dynamic’ context worked faster yet generated lower quality of the product developed, while innovators in a ‘stable’ context worked slower yet generated higher quality of the product. Session 2: Innovators involved in a ‘dynamic’ context had a greater change in completion time when they learned an aligned IT system. Session 3: Innovators involved in a ‘dynamic’ context set-up learned an aligned IT system faster than those innovators involved in a ‘stable’ context.</td>
</tr>
<tr>
<td>Key conclusions</td>
<td>Synchronization of complementarities conditions productivity of knowledge workers. There is a learning effect from the changes made for productivity gains that takes no longer than 3 months</td>
<td>In the first and third sessions, innovators involved in a ‘dynamic’ context worked faster, yet with significantly lower quality than those innovators involved in a ‘stable’ context. A learning effect is achieved in the second and third sessions. However, the study suggests that the learning effect has just started.</td>
</tr>
<tr>
<td>Key methodological insights</td>
<td>Complementarity set-ups might have both positive and negative productivity impacts. With productivity data provided on a quarterly basis, it is difficult to identify the learning effects of the adoption of an aligned IT system and work practices. Further research is needed to understand how the productivity of individuals with different cognitive styles is affected by non-matched complementarity set-ups</td>
<td>Future research has to consider whether a work environment is mandatory or voluntary to collect data on individuals with both cognitive styles. More sessions of the experiment are needed to achieve saturation in productivity scores before and after use of a more aligned IT system is stabilized. Both performance metrics (time and quality) have to be monitored closely to understand the impact of complementarity set-ups</td>
</tr>
</tbody>
</table>

In Study A, the final sample for the analysis comprised 91 participants located almost equally in each design. The average age was 39 years old and most participants had a Master’s degree (52%) and Bachelor’s degree (42%). On average, participants had 5 years’ experience in the company, 7 years’ experience in sales and 10 years’ experience in the sales industry. By using Kirton’s inventory of adoption-innovation (Kirton, 1976), we identified that of 91 subjects 31 were innovators and 60 were adaptors and in particular in Design 4, of 27 subjects 7 were innovators and 20 adaptors. In this study, we expected that sales representatives involved in Design 4 with a full set of complementarities would generate greater productivity than sales representatives involved in Design 1 without operational change, Design 2 with structured partial change, and Design 3 with semi-structured partial change. Consistent with our expectation, the obtained results in Study A showed a positive and statistically significant effect of complementarities on individual IT-enabled productivity of sales representatives. In particular, the results indicated that the productivity of sales representatives involved in the design with the full complementarity set-up increased significantly after the implementation of changes compared to the productivity of sales representatives involved in designs with no or only partial complementarity set-ups. In addition, our results showed that when the more aligned IT system was used without complementarities, the opposite (negative) effect could occur. Moreover, the results showed that limited or incorrectly assumed complementarity factors might negatively affect individual IT-enabled productivity. These results are in line with those of previous studies (Poon, Davis and Choi, 2009; Roberts,
2007) which demonstrated that some configurations of factors might generate positive performance while others might generate negative performance. Moreover, the study demonstrated that the learning effect from the changes made for productivity gains is not more than 3 months.

In Study B, we were able to collect data only for software programmers with innovative cognitive style. Of 113 participants that completed the experiment, only 3 have had an adaptive cognitive style and were excluded from the analysis. The majority of participants were from Europe (47%), Asia (23%) and North America (14%). Most of the participants (80%) were of male gender with an average age of 28 years old. The largest number of participants had a Bachelor’s degree (39.8%), up to five (34.1%) and ten years of programming experience (30.7%). In Study B, the results showed that when completing the first session with a less aligned IT system, time scores were significantly different for innovators who were involved in ‘stable’ and ‘dynamic’ complementarity set-ups (42 minutes vs. 33 minutes, \( p = 0.009 \)). Quality scores were significantly different for innovators involved in ‘stable’ and ‘dynamic’ complementarity set-ups (77% vs. 63%, \( p = 0.006 \)). When completing the second session with a more aligned IT system, time scores increased for both groups. However, average session completion time increased by 7 minutes (16%) for innovators involved in a ‘stable’ complementarity set-up and by 18 (54%) minutes for innovators involved in a ‘dynamic’ complementarity set-up compared to the baseline. Nonetheless, the difference between time scores for both groups of participants became insignificant. Quality scores remained similar to the first session and the difference between these scores was statistically significant (75% vs. 62%, \( p = 0.002 \) respectively). The results demonstrate that, in comparison to the second session, time scores in the third session decreased for the participants involved in both complementarity set-ups. The average session completion time decreased by 2 minutes (4%) for innovators involved in a ‘stable’ complementarity set-up and by 6 minutes (12%) for innovators involved in a ‘dynamic’ complementarity set-up. Quality scores did not change significantly in comparison to the second assignment (73% vs. 61%, respectively, \( p = 0.032 \)). Overall, besides the results that demonstrate how individual productivity of innovators differs in relation to complementarities, the study offers several insights into the design of similar experiments.

6. **Methodological insights**

In order to generate insights into the same target phenomenon, in our case complementarities of productive IT use, two very different research approaches have been applied. Below, we summarize the key methodological insights from both studies taken together, which may be considered by future research in the field of complementarities and individual IT-enabled productivity (Table 4).

<table>
<thead>
<tr>
<th>Insights</th>
<th>Description</th>
<th>Future research</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Complementarity systems approach and complementary multiple experimental studies</strong></td>
<td>Both studies demonstrate strong support for the systems approach of the complementarity theory by studying the same phenomenon with multiple complementary experimental studies</td>
<td>Further research could address the challenge of studying complementarities by applying multiple and complementary research methods</td>
</tr>
<tr>
<td><strong>Productivity of individuals involved in complementarity set-ups matched with inappropriate cognitive style</strong></td>
<td>While in a longitudinal field experiment, we were not able to test productivity of adaptors and innovators involved in inappropriate complementarity set-up due to practical reasons, online experiment demonstrates that innovators involved in ‘stable’ and ‘dynamic’ set-ups demonstrate different productivity</td>
<td>More research is needed to investigate how complementarity set-ups that are matched with inappropriate cognitive style affect individual productivity</td>
</tr>
<tr>
<td><strong>Granularity and learning effect</strong></td>
<td>The longitudinal study has low resolution while a long-time span and the opposite is for the online experiment. Therefore, these two methods produce different granularity of knowledge of the complementarity mechanisms</td>
<td>Future research should extend the experimental design to multiple runs before and after a more aligned IT system is used and consider granularity of knowledge when designing studies to understand learning patterns and times required to reach stabilization of IT system use</td>
</tr>
<tr>
<td><strong>Cognitive style and mandatory/voluntary work environment</strong></td>
<td>Voluntary work environment attracted individuals mostly with innovative cognitive style</td>
<td>Future research should take into consideration that mandatory context of IT use might provide better access to individuals with both adaptive and innovative cognitive style</td>
</tr>
</tbody>
</table>

Firstly, the results obtained from Study A showed that complementarities introduced together with a more aligned IT system positively affected the productivity of employees. The results from Study B demonstrated that individuals with innovative cognitive style performed differently in different complementarity set-ups
(stable vs. dynamic). These results provide strong support for the systems approach of complementarity theory (Ennen and Richter, 2010) which investigates the impact of a system of multiple factors on performance outcomes. In addition, these results add new and unique configurations of complementary factors for individual IT-enabled productivity studies (Athey and Stern, 2002; Autor, Levy and Murnane, 2003). Thus, two complementary experimental methods are shown to be an appropriate strategy to validate the results and the same strategy can be used in further research to address the challenge of studying the impact of complementarity set-ups on individual productivity.

Secondly, Study A showed that the productivity of a particular cognitive style increased in a particular complementarity set-up, that is, adaptors in a ‘stable’ complementarity set-up and innovators in a ‘dynamic’ complementarity set-up. However, Study A did not show whether a cognitive style could perform differently in the non-matched complementarity set-up, all else being equal. In Study B, innovators involved in a ‘dynamic’ complementarity set-up spent, on average, much less time performing the first assignment. However, on average, the quality was higher for applications developed by innovators involved in a ‘stable’ complementarity set-up. The manner in which both groups of participants learned a more aligned IT system was also quite different. Innovators involved in a ‘dynamic’ complementarity set-up had a greater change in completion time when learning to use the more aligned IT system first. However, the learning pattern was lower than that of innovators involved in a ‘stable’ complementarity set-up. These results demonstrate that more research is needed to understand how complementarity set-ups that are matched with inappropriate cognitive style affect individual productivity. The proposed complementarity set-ups in this study can further be validated in studying different groups of knowledge worker by combining complementary experimental studies.

Thirdly, both studies demonstrate that granularity of the data of the studied phenomenon can play a significant role in the obtained results. In Study A, the granularity of the data was low since individual productivity data was collected every quarter. This low granularity did not show where learning effects take place. In Study B, the granularity of the data was high and thus we can only demonstrate that the learning effect has just started. Thus, a research design that is in between the two studies may be appropriate. For example, although the data in Study A showed that it took around 3 months for individuals to learn the aligned IT system, this study did not show exactly how individuals with different cognitive styles learned and mastered this IT system. At the same time, Study B demonstrated that a learning effect was achieved from two sessions using the aligned IT system. However, the study demonstrated that the learning effect had only just emerged. Therefore, the results from both studies taken jointly showed that the learning effect of the aligned IT system requires more than two sessions, but less than 3 months daily use. Overall, future experimental research should consider the granularity of the obtained data to understand how the learning effect is achieved.

Fourthly, the two studies show jointly that there seems to be an important interaction factor that the initial research model does not take into account, namely the interaction between the cognitive style of knowledge worker and the work environment. Our results demonstrate that the work environment that is more dynamic and voluntary manifests a higher association with an innovative cognitive style than with an adaptive one. For example, Study A was conducted in real work settings, meaning that knowledge workers had to partake in the study, as it was part of their conventional work and employment. On the other hand, in Study B, participation in the experiment was voluntary. This voluntary-based approach merely attracted individuals with innovative cognitive style. One plausible conclusion is that, in order to study both cognitive styles in the same context, a mandatory context has to be used, as voluntary participation might fail to attract both cognitive styles. On the other hand, an online environment as a working environment could mostly attract individuals with innovative cognitive style, rather than individuals with adaptive cognitive style. For example, internet-based jobs are characterized as temporary and rapidly changing (Sadler, Robertson and Kan, 2009), which is more suitable for innovative individuals. This association between cognitive style and working environment seems to match findings from previous studies (Chilton, Hardgrave and Armstrong, 2005; Kirton, 2003), suggesting that a rapidly changing environment requires individuals with an innovative cognitive style. Nonetheless, more research is needed, since online work environments have not been researched extensively. All this shows the value of methodological complementarity used here. Clearly employing any single methodological approach, like the two mentioned here, would not provide these insights.

In summary, our empirical investigation demonstrated that, in order to explore complementarities and their effect on IT-enabled productivity, complementary multiple research designs are required to address the
limitations of each design alone. For example, although we were able to take into account the effect of complementarities on IT-enabled productivity over time in the first study, data collected quarterly did not allow us to identify the learning effects of adopting and using the aligned IT system. On the other hand, in the second study we collected data from only three sessions (two of which were related to use of an aligned IT system), which was not enough to identify the learning effect. Therefore, since more tests are required to establish saturation with less aligned IT systems as well as more aligned IT systems, a time-series design of the experiment would be appropriate. This design would enable the assessment of productivity before and after the introduction of an aligned IT system and would lead to the identification of the existence of complementarity effects on IT-enabled productivity within a temporal sequence of events.

7. Discussion and conclusion

While researchers in IS discipline report significant advances in economic experiments due to the widespread use of recent technologies and information-intensive organizations (Gupta, 2014; Gupta, Kannan and Sanyal, 2018), researchers in organizational economics call for organizational experiments to understand what factors affect economic performance (Camerer and Weber, 2013). Recently the idea that a set of complementary factors when synchronized correctly can reinforce each other and significantly increase IT-enabled productivity received special attention, yet it is less certain how to study these complementary factors for an individual. The research of complementary factors and their effect on productivity is challenging because, unlike conventional studies where independent variables are assumed independent of each other and have a linear cause-effect relation to the dependent variables, the complementarity approach recognises that a set of factors interact with each other to generate effects on dependent variables. Although simple experiments have obvious advantages and a high value of control, field experiments are considered as powerful complements in considering organizational reality and establishing the generalisation of the results. The complementarity between multiple methods allows researchers to understand an additional and different facet of reality rather than a simple comparison of results (Bentahar and Cameron, 2015). All this demonstrates that multiple experimental studies to investigate the same phenomenon have the power to provide new theoretical and methodological insights rather than a single experiment.

By conducting two complementary studies (a longitudinal quasi-randomized field experiment and online experiment) we not only provide important theoretical implications into the studied phenomenon but also gained additional and unique methodological insights that can be used by researchers who plan to conduct similar studies that no other experimental study could provide alone. Firstly, together our two studies have important implications for the systems approach of the complementarity theory (Ennen and Richter, 2010) by confirming that when a work process, training and education, incentive, and decision-making modes are matched with appropriate adaptive-innovative cognitive style, productivity of an individual can be increased significantly. Secondly, a longitudinal study has a low resolution yet a long-time span while the opposite is true for the online experiment and thus, these two studies provide different granularity of knowledge of the complementarity mechanisms. This confirms a need to use multiple methods to address the challenge of investigating complementarities. This different granularity helped us to demonstrate that future experimental studies should be designed in a way to analyse the differences between adaptors and innovators with regard to complementarity set-ups in learning patterns (McLeod et al., 2008) and times required to reach stabilization of IT system use. Thirdly, the results from both studies jointly demonstrate that a mandatory context of IT use might provide better access to individuals with both adaptive and innovative cognitive styles than a voluntary working environment. Finally, both studies demonstrate that more detailed research is needed to understand how the productivity of individuals differs when inappropriate cognitive styles are included in complementarity set-ups. Overall, our findings show the importance of analysing complex phenomenon with multiple, different, and complementary research designs, as each design has inherent conditions with opportunities and limitations to reveal characteristics about the phenomenon being investigated.

Despite the contribution we have made, this research is subject to certain inherent limitations that may be addressed by future research. For example, we used only one instrument for measuring individual cognitive style (adaptive-innovative), because it is a well-explored, elaborated and well-tested categorization of human cognitive styles that provides a good fit with the remaining factors and responds to current organizational needs to adapt and innovate in order to remain successful. Future research may use other instruments for assessing cognitive style and formulate other complementarity set-ups. Although we used a longitudinal quasi-randomized field experiment and an online experiment, a laboratory experiment with multiple runs may
provide high control over circumstances and greater internal validity. Finally, in order to increase generalisation, the formulated complementarity set-ups may be tested with other information-intensive occupations such as journalists, architects, recruiters or accountants.

References


Establishing Typologies for Diverging Career Paths through the Life Course: A Comparison of two Methods

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Abstract: Discussions on policy and management initiatives to facilitate individuals throughout working careers take place without sufficient insight into how career paths are changing, how these changes are related to a modernization of life course biographies, and whether this leads to increased labour market transitions. This paper asks how new, flexible labour market patterns can best be analyzed using an empirical, quantitative approach. The data used are from the career module of the Panel Study of Belgian Households (PSBH). This module, completed by almost 4500 respondents consists of retrospective questions tracing lengthy and even entire working life histories. To establish any changes in career patterns over such extended periods of time, we compare two evolving methodologies: Optimal Matching Analysis (OMA) and Latent Class Regression Analysis (LCA). The analyses demonstrate that both methods show promising potential in discerning working life typologies and analyzing sequence trajectories. However, particularities of the methods demonstrate that not all research questions are suitable for each method. The OMA methodology is appropriate when the analysis concentrates on the labour market statuses and is well equipped to make clear and interpretable differentiations if there is relative stability in career paths during the period of observation but not if careers become less stable. Latent Class has the strength of adopting covariates in the clustering allowing for more historically connected types than the other methodology. The clustering is denser and the technique allows for more detailed model fitting controls than OMA. However, when incorporating covariates in a typology, the possibilities of using the typology in later, causal, analyses is somewhat reduced.

Keywords: careers, life course, optimal matching analysis, sequence analysis, cluster analysis

1. Introduction

The latest resurgence of interest for life course frameworks for career research (Eliason, Mortimer, and Vuolo, 2015; McMunn et al, 2015) Robette, Bry, and Lelièvre, 2015) is, for the most part based on the assumption that career patterns are changing due to influences of modern life course biographies. In this manner, deviating from a standard career path is increasingly becoming an option for individuals to combine paid labour with other important life domains. These career detours emerge in diverse labour forms such as part-time jobs, temporary working hour reductions, and labour force time-outs, and are used by individuals to alleviate conflicting time demands throughout careers, especially during the rush hour of working life. Although the classic career path of steady, full-time employment is still the standard, there are grounds for assuming that an increase in the number of career types is occurring under influence of the de-standardization of life course biographies (Pavlopoulos et al, 2014). Are standard full-time working careers becoming less the norm? Is there evidence of an increase in career types exhibiting more transitions from, to, and within different states of activity in the labour market? This exploratory paper asks “How are careers trajectories developing under influence of modern life course biographies?”

As an exploratory paper, we search for evidence of the destandardization of life course biographies as characterized by changing career types and in doing so, we take one step back in the research cycle to assess just what the appropriate instrument is to answer this question. Pavalko, (2015) finds the new methods of sequence analyses essential to applying life course frameworks. Van Wissen (2002) applied the life course framework to organisations using longitudinal analysis of firm demography. According to Hoffman (2015), studies which focus on temporary variations are more short-term oriented. Looking into within person change, and this is the focus of our research, has a long-term focus. The aim of this paper is to evaluate two developing exploratory methods to cluster an individual career path. With the increased availability of longitudinal data, and this is especially the case with register data, the search for appropriate techniques to analyze long data

series has intensified. In career research, longitudinal data can give insight into the development of careers. With the resulting typologies, further analyses can throw light on the life course analysis of career trajectories.

We use the Belgian labour market as a case study for two reasons. First, because the Belgian labour market has a long history of women’s labour participation and life course-oriented labour market policy, and secondly because of a unique dataset surveyed among Belgian households covering career histories of more than 4400 individuals. Using this dataset, two techniques are compared: Optimal Matching Analysis (OMA and Latent Class (LCA) regression analysis. The choice for these two methods is because of the increase in their range of applications (Halpin, 2010; Bray, Lanza and Xianming, 2014).

The organization of this paper is as follows. In section 2 life course theory is explained in relation to career trajectories and our hypotheses are formulated. Section 3 presents the data and provides a description of the two methods of analysis. In section 4, the typologies resulting from the analyses using the two methods are compared. In section 5 the typologies are analyzed using a cohort perspective for insight into whether the established career types are new and certain career paths on the decline. Section 6 discusses the implications and the last section (7) summarizes the findings and draws conclusions.

2. Life course theory and its relation to careers

Elder (1998) wrote of social trajectories of work, education, and family that individuals follow throughout their lives. As individuals make their way along these paths, they experience major life events or transitions (leaving school, marriage, the birth of a child). Whether one is able to choose one’s path and transitions depends on the possibilities or lack of which available in the social, cultural, and economic environment. According to theoretical insights the process of individualization – where personal choice prevails in the organization of life course biographies – will result in a diversification of life course patterns, the so-called de-standardization of the life course (du Bois-Reymond, 1998; Giddens, 1991). Within these life course patterns, paid labour takes a central but no longer automatically predominant position. The more traditional careers from the breadwinner model (Lewis, 2003; Trappe et al, 2015) of previous generations are losing ground as an increasing number of women enter and remain active participants in the labour market. Since their entrance onto the labour market, women have been the pioneers of intermittent careers and irregular career paths, a factor seen by many social scientists as contributing to earnings inequality (Light and Ureta, 1995; Mertens et al., 1995; Mincer and Ofeck, 1982; Mincer and Polachek, 1974). These irregular career paths create new requirements for combining work with other important life domains such as care, training, and leisure. This is particularly true during the period in the life course when work (through career building) and home (in raising a family) are experienced as conflicting demands in households (Groot and Breedveld, 2004; Lewis, 2006; Moen and Smith, 1986). It is particularly these changes in career paths that are of interest for this paper.

In order to answer our research question, we cluster our data using two techniques to develop career typologies. We then use these to check the historical reality of life course related processes (individualization, emancipation). If a typology is being used in a life course perspective, in what way does it manage to capture already defined historical trends? We use three main developments (Lewis, 2001; 2006) to evaluate the typologies against:

- The breadwinner model dominating from 1950 until the late eighties
- Women re-entering the Belgian labour market in the seventies
- Part-time regulations introduced on the Belgian labour market in the nineties used more by female employees.

Each of these trends has been described recurrently in the literature (Cunningham, 2008; Jansen et al, 2009; McDonald, 2000; Trappe, 2015). We translate these trends into three empirical hypotheses:

1. Older male cohorts should show non-transitional full-time labour. Older female cohorts should show non-transitional non-participation.
2. Female cohorts born between 1950-1959 should be the first to show a labour market (re)entrance.
3. Male and female cohorts born 1960 and later should be more prominently present in career types characterized by part-time labour. This should be more so for women than for men.
3. Data and methods

We start this section with a description of the data used and a general description of the techniques we compare. The aim is to give the reader a non-technical introduction to the philosophy behind the technique and a broad idea of how to use the technique with career sequences.

3.1 The PSBH career module data

The data used for this research is from the Panel Study on Belgian Households (PSBH), a survey originating in 1992 with annual waves following the original 4439 randomly selected households counting 11000 individual members. The survey is conducted using face-to-face interviews. Respondents are adults in private households (16 years or older). All of Belgium is covered with an achieved sample size of 4439 households and a response rate between 85 and 93 percent. The sampling frame is the Postcode Address File of the National Registration Office.

In the 2002 wave of the panel, a special module on careers was included. It was completed by 4453 respondents answering questions on the entire career path starting with the moment that their initial schooling was completed or terminated to their retirement from active labour participation. The PSBH is sampled from the entire Belgian population known to the postal registry, which means that the population is broader than only the population of working age. There are obvious drawbacks to using retrospective data, especially when the survey questions are covering such lengthy periods of time (Manzoni et al, 2010). However, the career module is designed using questions that carefully guide respondents to register their periods of labour participation, inactivity, unemployment, schooling, etc., using major life course events as their historical markers (i.e. marriage, birth of children, etc.).

3.2 Using Optimal Matching Analysis (OMA) to capture career patterns

The first method for analyzing career patterns is Optimal Matching Analysis (OMA) which has its roots in molecular biology and more specifically DNA research. Optimal Matching Algorithms were used to recognize patterns in the DNA and protein sequences. The technique calculates for each pair of sequences how much the second sequence differs from the first. A predefined maximum number of mutations are established whereby those sequences requiring more than that maximum number fall into a new category. The adaptation for the social sciences was pioneered by Abbott (Abbott and Hrycak, 1990).

In terms of our analysis, the employment status of a respondent measured at each point in time forms one sequence that is analyzed as a career path. This is a logical approach to the data because we would like to determine whether there is observable evidence of changing career patterns. A transition is a move from one labour market state to another. Persons who are studying and have not yet entered the labour market are not included. Only one labour market status is possible per year assessed by registering the labour market status for which the most time during that year is spent.

The dependent variable employment status is a nominal variable with nine categories: unemployment, unpaid activity, inactivity due to sickness or handicap, study/training, new part-time job, part-time job, new full-time job, full-time job, and pension.

The OMA technique is based on a number of assumptions that are inherent in the structure of the data. A timeline is assumed with multiple points of measurement t1, t2, ..., tn. The variable X is measured at every point in time, which results in a range of observations. In this manner, a sequence of observations of variable X at time t is made. This range represents the course or career path for that respondent over the points of measurement of the variable.

The distance between sequence one (respondent 1) and sequence two (respondent 2) is calculated using a transformation measure. This shows the ‘cost’ of transforming sequence 1 into sequence 2. The transformation is made by inserting, deleting, or substituting elements. Each step entails transformation costs with a deletion or an insertion equalling 1 and a substitution equalling 2. The lower the transformation costs, the more similar the sequences are. This results in a distance or dissimilarity matrix. The matrix is used to establish when the maximum distance has been reached. Once the distance matrix is calculated, the sequences are organized into career typologies using cluster analysis, grouping similar cases (Chan, 1995).
3.3 Latent class analysis for identifying career patterns

Unlike the previous method, Latent Class regression Analysis is from the family of latent structure models (Vermunt, 2004). Latent means that the analysis is directed to look for similarities that are not obvious or immediately discernible. For instance, in much the same way that a factor analysis can establish underlying dimensions that group similar survey questions, latent class establishes underlying similarities in scores, with the aid of covariates to identify like groups.

There are no assumptions concerning the measurement level; both indicator and latent variables can be nominal (Vermunt, 2004). This enables multivariate regression analysis using a nominal dependent variable. This is also important for discerning career patterns as no hierarchy is entered in the model concerning career paths. Determining the correct number of classes in the model is essential because using too many classes makes for an unstable model, while too few classes does injustice to the variety in the data. This is achieved with the help of the log-likelihood values, the BIC (Basic Information Criterion) values and the number of parameters in the estimated models. It is also important to keep an eye on the classification errors which show the rate of incorrect predictions. Latent Class Analysis allows for two types of control variables to be added to the model, predictors or explanatory variables, and covariates for descriptive distributions. The dependent variable is the nominal variable; labour market status with seven categories: schooling, unemployment, nonparticipation, disability, pension, full-time work, and part-time work.

Drawing on our theoretical model, a number of assumptions are now entered in the model. Especially important is how labour patterns are influenced during particular life course stages. Included in the model as an explanatory variable (predictor) is the variable age entered with three categories to reflect major life course stages: younger than 30 years of age, 30 to 49 years of age (time squeeze), and fifty and older. Further, two variables are added as inactive (non-explanatory) covariates to distinguish how personal characteristics are distributed over the classes: gender, cohort. A total of 4453 cases are included in the analysis. The log-likelihood (LL) decreases as the number of classes increase. Two parameters are essential in discerning the best number of latent classes for the model. The first is the BIC (Basic Information Criterion) a parameter derived from the log-likelihood. The second is the classification error that shows the error rate for predicting the class for each respondent. It is necessary to attain a balance between the simplest model and the model that allows for the greatest variety. As long as the BIC value decreases and the classification error does not get too high, increasing the number of classes is justified.

4. Typologies

After this general introduction of the techniques, we now present the results of the analyses. Both techniques lead to a typological description of the career trajectories of the respondents. The software merely produces a clustering of careers in types, clusters or classes. As researchers, we had the task to interpret the clusters and name them.

It becomes clear that the techniques do not lead to the same number of clusters. The OMA leads to an optimum of 17 clusters for which we heavily leaned on our theoretical model. OMA does not cope well with duration. Some cases were directed to a different cluster simply due to longer durations in labour market states. Whereas based on the content of their career path they belonged in another cluster. This is where the theoretical framework was essential for achieving an optimum of clusters. The LCA solution produced 11 classes. From Table 1 we omitted the class “Students”. This class was present in both techniques, clustering young respondents who had not yet entered the labour market. Since our aim was to compare career trajectories, we decided not to include them in further analyses. A second remark concerns the total N in the LCA typology. The OMA typology has been estimated using weighted panel data. The LCA typology shows unweighted results.

**Table 1: Overview of OMA and LCA career-typologies and univariate distribution**

<table>
<thead>
<tr>
<th>OMA</th>
<th>%</th>
<th>N</th>
<th>LCA</th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stable entrant</td>
<td>7.71</td>
<td>329</td>
<td>Standard career</td>
<td>28.74</td>
<td>1280</td>
</tr>
<tr>
<td>Less stable entrant</td>
<td>7.43</td>
<td>317</td>
<td>Early retirement</td>
<td>26.78</td>
<td>1193</td>
</tr>
<tr>
<td>Job hopper</td>
<td>4.12</td>
<td>176</td>
<td>Redundancy</td>
<td>8.10</td>
<td>361</td>
</tr>
<tr>
<td>Stable full-time</td>
<td>19.99</td>
<td>853</td>
<td>Homemaker</td>
<td>6.96</td>
<td>310</td>
</tr>
<tr>
<td>Transitional full-time</td>
<td>11.86</td>
<td>506</td>
<td>The bridge</td>
<td>6.15</td>
<td>274</td>
</tr>
</tbody>
</table>

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OMA typology

The career module includes respondents who began their career as far back as 1931 making a maximum number of 72 measurements possible (1931-2002). There are also respondents who have only just begun their careers with no more than one or two employment status measurements. A total of 4268 respondents have been included in the analysis resulting in a total of 16 identifiable patterns, which again can be reduced to six major content steered grouping types: [the recently former students (1), the short full-time career (2,3,4), the employment career (5,6,7,8), the career breakers (9,10,11,12) and the completed careers (13,14,15,16)]. To simplify the description, each of the 16 career types has been numbered for which a brief explanation of each of the 16 types will now be given.

1. Stable entrant - This group has only recently joined the labour market actively. This initial entrance has been without any noticeable problems. The majority of this group has found a full-time job rather quickly; others have started their career in a part-time position. The number of transitions is limited to a maximum of one; this is often a transition from one job to the next.

2. Less stable entrant - Although this group has participated a bit longer and working in full-time jobs has a central position, many of these respondents have changed jobs already a few times. Others have exchanged periods of full-time work with periods of unemployment or part-time labour.

3. Job hopper - These respondents change regularly both their jobs and their employment status. Job-hopping is the central theme here. Many of the transitions are from full-time jobs to new full-time positions, but by the very tendency to change so often, the image is one of an unstable career pattern.

4. Stable full-time - These respondents fulfil the transitional career image in which full-time work is the common denominator. Full-time employment is carried out for longer periods and in the same job. Some of these individuals change occasionally; others make the transition to another employment status.

5. Transitional full-time - Just as the previous type, here too, working full-time is dominant with the main difference being that these respondents have a less stable career path. In this group, job transitions are more common. Furthermore, full-time career periods are interspersed with short periods of unemployment, part-time employment, unpaid activity or even periods of illness.

6. Stable part-time - These are the real part-time employees displaying a very stable pattern of part-time employment and only a few transitions.

7. Unstable part-time - This group is quite similar to the previous groups but has a much less stable career path. Although part-time work is the predominant pattern here, it is interchanged with periods of full-time work, unemployment or unpaid labour.

8. Stable nonparticipation - The career path for this group is predominantly unpaid labour revealing quite a stable pattern.

9. Unstable nonparticipation - This group also demonstrates a predominant pattern of unpaid activity but their pattern is much less stable, reflecting periods of nonparticipation interspersed with other kinds of employment such as regular full-time employment and unemployment.

10. Unemployed - These respondents have been unemployed for the major part of their career.

11. Sickness or handicap - These careers are characterized by long periods of illness and disability.
12. Atypical career - A typical atypical career path is characterized by periods of unemployment, unpaid activity, training, and illness and is as diverse as can be imagined. These respondents have experienced just about everything.

13. Insecure career - The insecure career path shows periods of employment that are often interrupted for shorter and longer periods of unemployment and unpaid activity.

14. Standard career - These respondents have followed the traditional career path. After a stable full-time career with few or even no transitions, they retire from the labour market.

15. Transitional full-time – retirement - These respondents have also worked almost their entire career in full-time positions, ending their careers with retirement. Contrary to the previous group, however, they have a more transitional career in which they have changed employment status a few times for periods of unpaid labour, illness or even a period of unemployment.

16. Atypical longer career – retirement - This last group has had a less traditional career considering that periods of full-time employment are not necessarily the main ingredient. Career detours are also dominant in their working life prior to their exit from the labour market for retirement.

LCA typology
The program establishes classes in the analysis in a particular order, and class size gets progressively smaller as the class number rises. The numbers assigned by the program will not be changed. The first task at hand is distinguishing the relevant career types resulting from the analysis using the 11-class model results. Different from the first methodology, LCA allows for the introduction of an age variable. In the table each of the eleven classes are shown with the most common labour market status per age category. By entering an age category as an explanatory variable into the analysis, it is possible to capture life course patterns during the career path that give a more dynamic view of how labour market patterns evolve during careers and throughout life course stages. The resulting eleven career types are now briefly described.

1. Standard career - Class one is the largest, with 29 percent of the population. Individuals belonging to this class are full-time workers throughout their career. The career length is also standard as these types continue working full-time until the actual retirement age.

2. Early retirement - The second type distinguished consists of 27 percent of the population. These are full-time employees who, for the most part, exit the labour market somewhere around age 50 for early retirement. There is no part-time work observed, no unemployment, and only a small (two percent) likelihood of not participating in the labour market during the early years of the career (younger than 30 years of age), probably due to a longer initial educational period.

3. Redundancy - This group is significantly smaller compared to the first two, and consists of only eight percent of the population. They are full-time workers throughout the first two life course stages. Unemployment is the shadow side of this type. It lurks during all the life course stages (10% during the first two stages). At age 50, the unemployment rate of this type jumps to 36%.

4. Homemaker - This group includes seven percent of the population. Only one-fifth of this class starts working full-time before exiting the labour force as nonparticipants. The rest of the group members are the traditional homemakers who do not participate in any form of paid labour during their potential working lives.

5. Bridge group – Three quarters of this class works full-time throughout the first two life course stages with one quarter working part-time. During the last working life phase, one quarter remains working full-time, one quarter remains working part-time and the other half is a mixture of early retirement or disability creating a bridge during this last working phase before retirement age.

6. Part-time career - This class works either full-time or part-time until they are 30 years of age. At this phase, they all switch to working part-time, but do so consistently until reaching retirement age.

7. Career of unemployment - This class is almost five percent of the population. This group is unemployed from the starting point to the end of their career. It is a relatively large group that never effectively enters and participates in the labour market.

8. Well set - The first stage of these classes’ working career is either working full-time or nonparticipation. This type represents more than four percent of the population. The second life course stage is nonparticipation. These individuals have exited the labour market as homemakers. For the last phase of their career they opt for early retirement which would indicate that their spouse is somewhat older or has also arranged for early retirement.

9. Midlife career - This group, consisting of more than three percent of the population, starts its career in the midlife phase. The first period is spent by almost half of the group not participating. By the
second life course phase, three quarters of them are working full-time, although six percent can be found in schooling. Just over forty percent is working full-time during the last phase, with the rest already eased into early retirement.

10. Burn-out - This class literally burns itself out. The first life course phase they work full-time. By the time they are 30, half is working full-time and the other half is on disability. By the age of 50, three-fourths of this group is on disability and one-fourth has opted for early retirement.

11. Multi-tasking - This class exhibits great diversity throughout the career. The first phase is either full-time work, nonparticipation or part-time work. At age 30, more than half as opted for part-time work, most likely to accommodate their responsibilities at home. At age 50, they either continue working part-time, exit the labour market as nonparticipants, have taken early retirement, are on disability, or receive unemployment insurance.

5. Comparison of OMA and LCA as career clustering techniques

In the second part of this article, we look more closely to the results of the methods. The aim of the subsequent analyses is attaining insight in the applicability of the techniques in career research. Technically, there is no superiority question vis-à-vis on either of the techniques. Both have been tested extensively and they both have their weaknesses and technical particularities (see previous). We want to compare the results with future analyses in mind. The central research question then becomes: If these typologies are the basis for subsequent analyses, which one is preferable for what kind of analysis?

5.1 OMA career types by gender and cohort

The aim of the subsequent analysis is to verify the three central hypotheses on the descriptive results in Table 1. We start with the classic patterns: the male-breadwinner model whereby men have continual full-time careers and a majority of women exhibit a predominance of nonparticipation. We find an underrepresentation of women in cluster 4 (stable full-time) and cluster 5 (transitional full-time). Here, more men demonstrate careers and a majority of women exhibit a predominance of nonparticipation. We find an underrepresentation of women in cluster 4 (stable full-time) and cluster 5 (transitional full-time). Here, more men demonstrate careers and a majority of women exhibit a predominance of nonparticipation. We find an underrepresentation of women in cluster 4 (stable full-time) and cluster 5 (transitional full-time). Here, more men demonstrate careers and a majority of women exhibit a predominance of nonparticipation.

Table 2: OMA career typology: female and male career patterns by birth cohort (percentages)

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
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<td>Short full-time careers</td>
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<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
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<td>8.0</td>
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<td>0.0</td>
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<td>0.3</td>
<td>7.2</td>
<td>48.2</td>
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<td>3.0</td>
<td>17.0</td>
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<td>3.5</td>
<td>17.1</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Stable full-time</td>
<td>16.2</td>
<td>9.4</td>
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<tr>
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<td>5.1</td>
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<td>8.1</td>
<td>3.6</td>
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<td></td>
</tr>
<tr>
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<td>39.5</td>
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<tr>
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<td>1.6</td>
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<tr>
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<td>14 Standard career</td>
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<td>22.3</td>
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<td>15 Transitional full-time – pension</td>
<td>2.8</td>
<td>9.5</td>
<td>7.2</td>
<td>2.5</td>
<td>0.3</td>
<td>0.0</td>
<td>0.0</td>
<td>59</td>
</tr>
<tr>
<td>16 Atypical longer career – pension</td>
<td>1.7</td>
<td>10.0</td>
<td>2.1</td>
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<td>0.0</td>
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<td>0.0</td>
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<td>302</td>
<td>408</td>
<td>474</td>
<td>326</td>
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</table>
The second hypothesis is the female re-entry in the labour market. We hypothesized this evolution should be clearly visible from the 1950-59 cohort onwards. It is difficult to interpret this hypothesis since the 1940-49 cohort starts to retire at the moment of the data collection (2002). There seems a clear break between the clearly visible from the 1950-59 cohort onwards. It is difficult to interpret this hypothesis since the 1940-49 cohort demonstrates atypical career paths. This is an indication of the introduction of periods of unemployment in the career paths. Here, we see an influence of the 1970s oil crisis and the high unemployment rates during the 1980s. The 1960-69 and the 1970 cohort is clearly experiencing this influence as demonstrated in their career patterns.

Now, we look at patterns of part-time careers. If we look at male part-time working patterns, we clearly observe the quasi-total absence (0.4 % overall) in part-time regimes. Only women work part-time (about 8.5 % overall). If we look at the division of part-time labour along cohorts, we find no evidence of an increase in part-time work. Furthermore, the 1940-49 and the 1950-59 cohorts show patterns of part-time work as well. The only shift in the 1960-69 cohort is in the stability of part-time work. This is the first cohort where a large share of the women who work part-time succeed in maintaining part-time jobs for a longer period of time. A more particular trend in the 1960-69 cohort is the appearance of uncertainty. A larger share (especially of women) in this cohort demonstrates atypical career paths. This is an indication of the introduction of periods of unemployment in the career paths. Here, we see an influence of the 1970s oil crisis and the high unemployment rates during the 1980s. The 1960-69 and the 1970 cohort is clearly experiencing this influence as demonstrated in their career patterns.

Table 3: Latent Class career typology: female and male career patterns by birth cohort (percentages)

<table>
<thead>
<tr>
<th>Type</th>
<th>Total</th>
<th>&lt;1930</th>
<th>1930-39</th>
<th>1940-49</th>
<th>1950-59</th>
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<th>&gt;1970</th>
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<td>Male</td>
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<td></td>
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<tr>
<td>1 Stable entrant</td>
<td>12.8</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.4</td>
<td>1.0</td>
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<tr>
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<td>0.0</td>
<td>0.0</td>
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<td>1.5</td>
<td>23.6</td>
<td>18.7</td>
<td>152</td>
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<tr>
<td>3 Job hoppers</td>
<td>2.8</td>
<td>0.0</td>
<td>0.0</td>
<td>0.3</td>
<td>0.7</td>
<td>8.7</td>
<td>4.3</td>
<td>51</td>
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<td>Longer labour careers</td>
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<td></td>
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<td>4 Stable full-time</td>
<td>27.9</td>
<td>3.3</td>
<td>6.9</td>
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<td>53.3</td>
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<td>28.5</td>
<td>39.4</td>
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<tr>
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<td>0.5</td>
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<td>7 Unstable part-time</td>
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<td>0.0</td>
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</tr>
<tr>
<td>8 Stable nonparticipation</td>
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<td>0.0</td>
<td>0.0</td>
<td>0.2</td>
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<tr>
<td>9 Unstable nonparticipation</td>
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<td>0.0</td>
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<td>0.0</td>
<td>0.3</td>
<td>0.0</td>
<td>1</td>
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<tr>
<td>10 Unemployment</td>
<td>1.2</td>
<td>0.6</td>
<td>0.0</td>
<td>0.0</td>
<td>0.3</td>
<td>0.7</td>
<td>5.9</td>
<td>22</td>
</tr>
<tr>
<td>11 Sickness or handicap</td>
<td>2.0</td>
<td>1.0</td>
<td>4.5</td>
<td>5.2</td>
<td>1.6</td>
<td>0.2</td>
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<td>Atypical career paths</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>12 Atypical career path</td>
<td>2.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.5</td>
<td>4.7</td>
<td>6.9</td>
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<tr>
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<td>1.1</td>
<td>1.8</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>14 Standard career</td>
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<td>0.0</td>
<td>0.0</td>
<td>279</td>
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<td>15 Transitional full-time – pension</td>
<td>9.9</td>
<td>31.4</td>
<td>37.0</td>
<td>8.5</td>
<td>0.0</td>
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<tr>
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<td>0.2</td>
<td>1.4</td>
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<td>0.0</td>
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</tr>
<tr>
<td>Total (N males)</td>
<td>230</td>
<td>227</td>
<td>301</td>
<td>392</td>
<td>408</td>
<td>271</td>
<td>1829</td>
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</tbody>
</table>

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Table 3: Latent Class career typology: female and male career patterns by birth cohort (percentages)
What can be said about the resulting typologies regarding their gender and cohort distribution? The most obvious statement concerning the gender distribution is the fact that women are so much more diverse than men in their labour market patterns. Coupling this with the information we now have regarding the cohort distribution, we can say that this phenomenon is only increasing with each new generation of women. Only two of the classes are predominantly male (1 and 2). Six classes are predominantly female (5, 6, 7, 8, 9 and 11). Three classes are more or less evenly distributed by gender (3, 4, and 10).

Regarding the first breadwinner’s hypothesis we observe a clear male dominance of the first two standard careers of working full-time (class two opting for early retirement) and class one (working through to retirement age) are still very strong although, it is especially older cohorts that are dominant (particularly in early retirement) in this career type. Men work standard careers until they reach retirement age (40%), or if lucky can retire early (39%), or if unlucky are phased out (9%). Men are totally absent from the traditional career of homemaker, the merry widow, and the multi-tasking, and almost absent (only 1%) from the part-time career. LCA also distinguishes approximately 13 percent of women adhering to a traditional career of homemaker. This is not in accordance with the OMA results (which was 19%).

The second hypothesis concerns women’s labour re-entry patterns. The midlife career typifies this phenomenon. The hypothesis stated that this should be evident among the 1950-1959 cohort onward. However, contrary to what was expected, LCA clearly demonstrates that the mid-life career women are from the oldest cohorts. Ten and eleven percent of the oldest female cohorts rejoined the labour force in this manner. The cohorts of 1950 and later are predominantly standard full-time careers (40%). Even the 1940-1949 cohort demonstrates a tendency towards standard career types (30%).

The third hypothesis assumes a rise in part-time working patterns. This is clearly evident starting with the 1940-1949 cohort onward. Part-time is also evident in the bridge career type. Here older female cohorts implement part-time work as a way to ease into retirement. In this manner, LCA provided a valuable differentiation in part-time working patterns established in the cohort analysis. Older cohorts use part-time as bridge from work to retirement and younger female cohorts are using part-time as an essential instrument in their work-life balance, an option not available in the past.

6. Discussion

The first observation we need to make is that both techniques could handle the panel data without notable difficulties. In terms of ease of use, LCA is clearly the most accessible technique. OMA requires a two step procedure of calculating a distance matrix and using the matrix in cluster analysis. LCA involves a one-step
procedure whereby both the BIC-measure and the classification error allow for easy model comparison and selection.

OMA clearly showed highly transitional patterns in the research population. Each of the five career type groups identified by this technique revealed one or more highly transitional career paths. Because OMA assesses distance on the basis of labour market status, the stable careers are clearly differentiated from transitional careers. Furthermore, it is important to note that OMA has the tendency to appoint similar patterns that differ in length to different clusters. The five large groups of career types can be differentiated by the length of the career. The reason for this is that the deletion costs for the period that there is no labour market state is, in the case of the shorter career greater. In this manner the distances between two similar careers that only differ in length, is quite a bit more. Using our theoretical framework, we did correct for these inconsistencies by merging those clusters that were similar and only differed in length. This was only possible because a large portion of the careers is relatively stable and OMA differentiates well between stable careers.

A problem with the OMA method in layman’s terms is that whether a transition is made from full-time employment to part-time employment at the beginning or at the height of a career, the costs are the same. Another problem with the OMA method is that a transition is equal to any other transition. In this manner, the transaction costs for transitions to unemployment are equal to transitions from unemployment to employment. This method does not allow for hierarchical levels or values. Another important result is the homogeneity of the clusters. Here we find a noticeable difference with the LCA methodology. OMA has more clusters than LCA but the respondents are distributed more homogeneously across the different types. The LCA typology shows a large proportion of people in the first two clusters while number decrease rapidly in the other categories. As a result the more compact typology of LCA may show a stronger typology but loses at the same time a detailed view on the data.

However, the LCA method does use a quite different technology compared to OMA. It is not a simple subtraction, addition or replacement, but LCA allows finer tuning as well as the introduction of covariates to the model. An important plus to LCA was the use of an explanatory variable for the three major life course stages. This added a dynamic dimension to the model where OMA is more static; providing results only for where a person was at that moment. LCA exposed the different labour patterns that were effectively occurring during a particular life course stage.

7. Conclusion

Both the OMA and the Latent Class established a growth in part-time work among younger, female-dominated cohorts, which establishes that part-time work is also a growing phenomenon on the Belgian labour market. Nonparticipation is decreasing as a labour market option in Belgium. The LCA established an increase in the career type of perpetual unemployment, particularly among younger females. This type of career will no doubt continue to be a part of a dynamic market economy. The persistence of the unemployment period within this career type was rather alarming. It would seem that young individuals (three quarters of this class was female) who do not make a successful entry onto the labour market are in danger of remaining unemployed for the duration of their potential working life.

The analysis of sequences has already proved to be a useful methodology to get a grip on career trajectories (Scherer, 2001). Thus far, the OMA methodology was the most dominant in this type of analyses, despite the criticism (Levine, 2000, Wu, 2000). In this paper, we compared the OMA methodology with the LCA technique. The results show that both techniques have their merit in analyzing sequence trajectories. At the same time, particularities of the methods show that not all research questions are suitable for each method or, not all methods are appropriate for every research question. The OMA methodology is clearly appropriate when the analysis concentrates on the statuses themselves. It is because there is relative stability in career paths that OMA is so well equipped to make clear and interpretable differentiations. If careers do become less stable, OMA will not be a useful methodological tool. In conclusion, the LCA methodology starts with a different perspective on sequences. It has the strength of adopting covariates in the clustering allowing for more historically connected types than the other methodology. The clustering is denser and the technique allows for more detailed model fitting controls than OMA. But the strength can also be a weakness. When incorporating covariates in a typology, the possibilities of using the typology in later, causal, analyses is reduced. All interaction effects need to be tested within the LCA framework which lessens the opportunities to use the
typology in a different context. The classic OMA method and LCA clustering methods provide promising results in the longitudinal analysis of career trajectories. Both have a strong potential for exploratory longitudinal analysis.

References


Researching Organisational Change in Higher Education: A Holistic Tripartite Approach

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Abstract: In the UK context, it is important to acknowledge that there are multiple change drivers in Higher Education Institutions (HEIs) that result in a proliferation of foci. Gornitzka (1999) and Allen (2003) suggest that the distinctiveness of governance, professional autonomy and the tradition of academic freedom in HEIs should be reflected in change processes, and therefore traditional frameworks for change could be adapted in an attempt to research and manage change. This paper explores how theoretical and practical tools for managing and researching change can be integrated in order to support change, whilst reflecting on the methods used. The journey of the authors towards the development of a holistic framework for researching and supporting change in Higher Education (HE), with a focus on two HEIs, is explored. The synergies of Lean Management (Wincel and Krull, 2013), Appreciative Inquiry (Cooperrider and Srivastva 1987), and Participatory Action Research (Greenwood et al, 1993) are examined through three stages of practice-based fieldwork to establish their positioning within a holistic tripartite framework for researching and supporting organizational change. The benefits and challenges of this framework are discussed with attention to the importance of future research to provide more evidence of the impact of this framework.

Keywords: Appreciative Inquiry, Organisational Change, Lean Management, World café, Story-telling, Participative Action Research.

1. Introduction

The purpose of this paper is to unpack the development of a holistic framework for researching and supporting change in the UK Higher Education (HE) context. There have been three stages of research undertaken in which we demonstrate the incremental development of the framework. Each research stage allowed the research team to enhance their understanding of the Appreciative Inquiry (Cooperrider and Srivastva 1987), Participative Action Research (Greenwood et al, 1993) and its integration with progressive Lean organisational change tools (Wincel and Krull, 2013). Whilst there is a vast array of literature, providing theoretical underpinning of the many change theories and models, it has been recognized that existing prescriptive and often generic models of change are not readily adaptable for application within the dynamic Higher Education context (Gornitzka, 1999). This paper explores Lean Management as a change theory with associated change models because of its fundamental focus on people, process and culture, and potential to create synergies with appreciate inquiry and participative action research.

2. Literature Review

The field of research into organizational change in Higher Education Institutions (HEIs) is relatively under-developed, and has been largely focused on case studies of individual institutions (Bleiklie 2014). The distinctiveness of HE Institutions when compared with corporate organisations is highlighted in their roles of societal transformation and educating future leaders in a global context (Stephens and Graham 2010; Radnor and Osborne 2013; Hoover and Harder 2015; Farrington 1994). Methods of effecting change in HE have been attempted in individual cases, and some of these have been investigated by researchers, but a clear research framework set in the distinctive culture of HE remains to be designed. This review will investigate the existing literature surrounding methods for researching change in HE, in an attempt to surface useful approaches and their potential challenges.

Organisational change in the current climate of globalisation, engendering fast-paced technological advances, international competitiveness, mergers, environmental concerns, individualism and other drivers is a topic of concern for modern managers and academics (Aaltio-Marjosola 1994; Branson 2008; Hoover and Harder...
This has been accompanied by an unprecedented rise in the development of theories and frameworks for managing organizational change (Cummings and Brocklesby 1997). This dynamic, and at times ambiguous, environment has led to scepticism about the possibility of planning for long term results and suggested a need for new theoretical and methodological paradigms (Aaltio-Marjosola 1994), particularly in public services and HE institutions (Lane 1987).

HEIs in the UK have a long-standing and distinctive culture, and even the more ‘modern’ post-1992 HE Institutions can be slow to evolve when outside forces dictate change (Stephens and Graham 2010). A need for reconsidering traditional HE governance and management structures and processes has been recognised in light of the dramatic changes throughout HE worldwide (Allen 2003; Baker and Baldwin 2015) including:

- new teaching approaches and technology (Baker and Baldwin 2015),
- evolving national and regional policies on HE (Chmutova and Andriichenko 2017),
- ‘student as consumer’ discourse (Griffioen and de Jong 2017)
- environmental and sustainability concerns (Hoover and Harder 2015), and
- the requirement to engage with businesses to meet upcoming demands for the labour and skills market along with the need to justify the market value of a degree (Vaira 2004).

In the UK context, it is important to acknowledge that there are multiple change drivers in HEIs which result in proliferation of foci including education, research and business engagement/knowledge exchange/consultancy. Hence, Allen (2003) highlights that HEIs are in fact ‘symbiotic communities’ which rely on collegiality. The reasons for and effects of changes in HE is therefore not the same as those felt by commercial and manufacturing organizations, and it has been suggested that recent pressures to become more ‘business-like’ fragments HE faculties and alienates academics (Allen 2003). Arguably, HE institutions must be responsive to societal and business needs in order to survive (Radnor and Osborne 2013).

In this dynamic context, HEI culture is prone to management challenges, particularly in terms of inter-departmental barriers to meaningful communication. There is a recognised need for greater accountability in all HE institutions (Vaira 2004) which has led to increased processes, procedures and paperwork (Morley 1997; Adserias et al 2017). Allen (2003) emphasizes that a culture of rules and procedures (bureaucracy) is continuing to create conflict and paperwork. Gornitzka (1999) suggested that the distinctiveness of governance, professional autonomy and the tradition of academic freedom in HE institutions should be reflected in change processes, and therefore traditional frameworks for change could be adapted in an attempt to manage change within HEIs.

In our study we investigated the literature around change in HEIs and have noted that the Lean Management approach to continuous improvement has had traction in HE (and the wider public sector) for a number of years (Thirkell & Ashman, 2014; Svensson, Antony, Ba-Essa, Bakhsh & Albiwi, 2015). The use of Lean (progressive management) as a continuous approach to organisational improvement, developed from the Toyota Production System, is an approach to leading, thinking, improving and managing in a way which focuses on respect for people, reduction of waste, efficiency, value and cost effectiveness, and has been highly successful in manufacturing and mass production organizations (Womack, Jones and Roos, 1990; Radnor and Osborne, 2013). Hines and Lethbridge (2008) observed the establishment of the Lean value system in a university, and while some of the concepts were noted to be useful, for example in purchasing and administrative tasks, the authors found that in an academic environment some of the Lean concepts, for example seeing students as clients or viewing accepted support systems as non-value-adding, were problematic. In the existing research into Lean in public services, such as healthcare and government, it has been noted that in adapting Lean to suit non-manufacturing organizations, some of the core principles were lost (Radnor and Boaden 2008; Radnor 2009; Burgess and Radnor 2013). There is also a danger of an organization becoming ‘too Lean’, where it is starved for resources and innovation (Radnor and Boaden 2004). Radnor and Boaden (2008) also highlighted the challenges of understanding and respecting people, or individual journeys within the institution; which processes might be applicable for Lean tools; and longer-term sustainability of the system within the institutional culture. In order to address these Lean implementation challenges in the dynamic HE environment, this paper is informed by the the lean framework for change suggested by Wincel and Krull (2013) which focuses on the three key areas of People, Process and Culture. in
qualitative studies like those included in this paper, Hoover and Harder (2015) highlight that these areas emerge most strongly.

One approach for developing a rich understanding of people, processes and culture, and for opening new possibilities for organizational understanding is Appreciative Inquiry or AI (Grieten et al 2018). An Appreciative Inquiry prompted by an asset focused question or statement supports the discovery, the inquiry and the narration of the organization’s ‘life-giving- stories’ (Cooperrider and Srivastva 1987). Bushe and Kassam (2005) suggest that the transformative potential of appreciative inquiry rests on two important qualities; firstly, a focus on changing how people think instead of what people do, and secondly, a focus on supporting self organising (improvisational) change processes that flow from new ideas. Many change management models tend to be applied prescriptively, which are arguably negative instigators that may solve problems but do not normally create long term resilience, innovation or positive development (Grieten et al 2018). AI was first discussed in a paper in 1986 as a new concept for organizational theory which proposed to maximise benefits for all members of organizations (Srivastva and Cooperrider 1986). Applications of AI have storytelling and narrative at their core and include application to organizational development (Mantel & Ludema,2000), change management (Bushe, 2013; Ryan, Soven, Smither, Sullivan & van Buskirk, 1999), and evaluation (Jacobsgaard, 2003). As an action research approach which focuses on co-operative and participative inquiry, AI gives positive attention to the strengths in any situation and the best outcomes (AI Commons 2018). AI is not a deficit-orientated approach (Grieten et al 2018) which Cooperrider and Whitney (1999; 2005) suggest may become a degenerative spiral. This is not to say the deficit based/ problem solving approach is not valid - future work to develop this approach to build frameworks to combine asset and deficit approaches to organizational improvement is needed.

The core principles of AI include (Fitzgerald et al 2001; AI Commons 2018; Grieten et al 2018; The Centre for AI 2018):

- **The constructionist principle** – that reality as we know it is partly dependent on our perceptions and personal experiences.
- **The simultaneity principle** – change begins the moment we ask a question.
- **The poetic principle** – creating our world can drive endless learning.
- **The anticipatory principle** – that hopeful anticipation creates positive action and transformation. And lastly,
- **The positive principle** – that positive questions lead to optimistic momentum and amplification

These principles have been amended more recently to include themes of free choice, wholeness, and the transforming power of narrative (AI Commons 2018).

The original ‘4D’ stages of the process for managing change through AI were joined by another, a first and critical stage: Definition (Fitzgerald et al 2001), where the parameters of research and the focus of the enquiry is defined. Next, Discovery, building a database which collects the impressions of organization members in order to uncover participants’ experiences. The Dream stage envisions best case scenarios from the past. The fourth stage, Design, creates positive affirmations which identify and share key positive organizational facets. Finally, Deliver (sometimes referred to as Destiny) is the stage where groups work on implementing the themes from the above phases into action plans. The stages are not discrete or separate, they may begin before previous stages are considered complete and re-thinking previous stages is encouraged (Fitzgerald et al 2001; AI Commons 2018).

Cooperrider and Avital (2004) however, rightly draw attention to the practice-based nature of AI and highlight the limited focus on the role of AI in enriching scholarly approaches to inquiry. Critics of AI (Fitzgerald et al 2001, Rogers and Fraser 2003) also claim that it is so focused on the positive (Dick, 2004) which skews outcomes and fails to address real problems. Rogers and Fraser (2003) suggest that people who prefer to plan for the worst case scenario or a singular effective strategy might experience anxiety when faced with an entirely optimistic paradigm for envisioning organizational development, and what they see as unrealistic expectations for transformation. Others claim that that AI is more focused on affirmative‘group hugs’ and positive thinking than hard data (Fitzgerald et al 2001). Further, Pratt (2002, p. 119) emphasizes ‘the need to honour the multiple and undivided realities of human experience in organizations’, while Reason (2000) queries the‘danger of ignoring the shadow’. Rogers and Fraser (2003, p. 77) explore whether AI encourages
‘unrealistic and dysfunctional perceptions, attitudes, and behaviour’. Notwithstanding this critique, case studies have evidenced AI to be a feasible approach (Rogers and Fraser 2003), which is data driven and effective in a wide variety of organizational settings and sectors (Fitzgerald et al 2001). The perceived imbalance towards optimism is a search for the strengths, rather than weaknesses, and in no way ignores negatives. Positive thinking aims to hold on to affirmative discourse, and is a useful technique for individuals, but AI differs as discourse is constantly re-created by the collective (Fitzgerald et al 2001), and positive outcomes can be generated particularly in situations where long term change is desirable (Rogers and Fraser 2003).

In response to these critiques, Grant and Humphries (2006) suggest the integration of Appreciative Inquiry and Critical Theory which they define as Critical Appreciative Processes (CAPs). Although they appear as opposing paradigms, both appreciative inquiry and critical theory share a common research objective - their commitment to emancipatory change and growth- researchers in both paradigms ultimately seek to encourage and facilitate ‘human flourishing’ (Reason & Bradbury, 2001). One key aspect of Critical Appreciative Processes is the acknowledgement and understanding of the distribution of power and how this impacts on change processes for both the individuals (participants) and the researcher. Both also follow social constructionist epistemology, which uncovers the meanings behind language and highlights reflection as a crucial element of change research (Grant and Humphries 2006). This balances risks associated with uncritical optimism and an unconscious acceptance of power imbalances which may be critiqued in AI, harnessing engagement and empowering those on diverse levels of the organizational hierarchy. Therefore, CAPs inform our approach to researching change.

In the academic literature, organizational change and stories are strongly embedded in the anthropological tradition, as opposed to the often prescriptive organizational change literature. Stories, which are at the core of the AI approach and can support the uncovering of people, process and culture areas of Lean management in a changing context, can have an important impact on the decision making process (Boje 1991). In fact, the very process of change can be seen as a story that can be cathartic and inspirational (Maas 2012).

Storytelling has been applied as a research method to make sense of complex organizational change (Boje and Strevel, 2016; Boje, 1991, 1994; Gabriel 1991, 1995; Gabriel and Connell, 2010; Anderson, 2005; Beech and Johnson, 2005; Heracleous and Barrett, 2001; Humphreys and Brown, 2002). Storytelling, myths and metaphors continue to be part of the drive for creativity in research methods (Kara, 2015). Campbell (1964) described the four functions of stories as experiencing, explaining, validating and prescribing. These four functions are helpful to bear in mind in researching organizational situations, where social order is experienced and maintained similarly to that in other group settings (Kendall and Kendall 2012). These scholars have shown that a focus on stories in terms of emotions, ambiguities, omissions, silences, unusual constructs, i.e. what is missing and not told, is as important as the narrative provided. The storytelling approach may pose ethical challenges, when one considers the potential hegemonic power of organizational leaders and the possibility that employees might replicate persuasive discourses around existing organizational culture without really generating any meaningful new data (Dolan and Bao 2012). Many case studies where storytelling has been used have legitimised the history and vision of organisations, as told by managers and those in power (Allen 2003). Some critics have argued that stories do not constitute rigorous research, and have no claim to the positivist ‘truth’ (Brown et al 2009). However, reflection around the functioning of an organization through storytelling can be an emancipatory process, as Tate, Brendel and Chou’s (2016) research suggested. In a UK hospital setting, the use of storytelling and a focus on emotion discovered what changes were required, creating a community which developed new policies and created positive change (Bate 2004). When groups engage through storytelling, the shared understanding has the capacity to break down barriers to meaningful collaboration during change (Dee & Leisyte, 2017), and emotional issues which sometimes hamper change initiatives can be fully addressed and navigated, creating a paradigm shift for success (McKinnon 2008)

The literature has confirmed the value of integrating two key approaches for investigating organizational change in the HE environment. Lean management is not a ‘one-off’ approach for organizational change and fundamentally takes account of people, process and culture. This can be complemented by Appreciative Inquiry that focuses on gaining a holistic understanding of organizational environment and participant perspectives through narratives and stories. The acknowledgement of CAPs which introduce critical theory to the AI approach allows the researcher to acknowledge and address the power influences in the people, process and culture areas, which could be missed otherwise. These two approaches focus on the practice of change but for the researcher, it is argued that there must be a third area that recognizes the importance of
the philosophy and practice of research in the organizational context. Thus supporting the researcher to create a tool, which has multiple impacts including organizational understanding, organizational improvement/development or change decisions for implementation, and collection of depth of data that supports researcher in making sense of dynamic organizations in the short, medium and longer-term.

3. Our Research Approach

The epistemological framework informing this research is ‘social constructionism’ which is an interpretive framework whereby individual meanings are formed through interaction with others (Creswell, 2013). Any social research which aims to be meaningful should collect data around context, providing a ‘thick description’ to enrich understanding (Geertz 1973). Our research approach within this context, is participatory action research (PAR); “Participatory action research is a form of action research in which professional social researchers operate as full collaborators with members of organizations in studying and transforming those organizations. It is an ongoing organizational learning process, a research approach that emphasizes co-learning, participation and organizational transformation” (Greenwood et al, 1993. P175). PAR also brings together action and reflection, theory and practice and is focused on the flourishing of individuals and communities (Reason & Bradbury, 2001; Greenwood et al, 1993). Cameron (2007), argues that the ‘liberatory’ potential of PAR can occur when PAR is conducted for and with organizations, e.g. Street and Meister’s (2004) study of a participatory approach to implementing change in a small business. Some of the critiques are aimed at PAR as an approach or relate to specific tensions experienced by researchers in the field. Bartunekl (1993) suggests these include: Theoretical contribution (); the challenge of providing precision descriptions of the collaborative practices actually involved in interventions and the mediating mechanisms; the emphasis on participants as co-researchers suggests their ability to contribute to local knowledge and scholarly outcomes. There is also the potential impact of the researcher becoming less objective as an ‘insider’. We argue that as our research is in the HEI context and the research team works within HEI institutions, that there is more likely to be an acceptance and ability to engage in both practical and scholarly discussion which aids a more in-depth situational understanding.


This research project, collects data through three stages - each stage delivering method(s) based on the learning from the literature review and the previous research stage. Each stage had a specific organizational change focus around improvement that included aspects of people, process and culture. Two post-1992 Universities that form part of the Lean in Higher Education Network participated in this research, in order to respect anonymity they will be referred to as HEI1 and HEI2.

Stage 1: HEI1; Group participation; two specific events exploring NSS improvement and experiences of change in HE; World Café method

Stage 2: HEI1; Individual participation; exploring what makes staff ‘Brilliant’; AAR interactive interview method

Stage 3: HEI2; Community participation; exploring what is going well in the organization; AI coupled with core Lean Management tools

These three stages are discussed below.

4. Undertaking Research into Change in HEIs

Stage 1:
The authors first experienced AI through the work of Dewar & Macbride (2014), who adapted AI as an ethos to enhance patient care within the NHS. Intrigued by the findings, the authors became interested in exploring AI and specifically the impact it could have in understanding factors that influence organisational change in HE. This section will discuss the research journey undertaken by the authors.
In the UK the National Student Survey (NSS), is used to assess the student experience of eligible final year students across a number of categories, ending with a question that asks students to assess their overall satisfaction with their course. As competition increases across the sector the importance of the NSS results in driving league table performance is well documented. Whilst the NSS does provide a useful mechanism to drive improvement and measure impact (Cheng & Marsh 2010), it can also create adversarial undercurrents that damage internal relationships within institutions (Farquharson et al, 2015). This is often the result of established organisational performance routines focused on deficit approaches, singling out poor performances in the NSS and directing effort towards finding the cause of the problem, in the hope that this will point towards finding the solution.

Using the NSS data at HEI1 to identify academic staff to participate in the inquiry, to ‘discover’ what works. Invites were sent to potential participants explaining the appreciative approach and the reasons they had been selected based on their involvement in programmes which had performed well in the NSS. In total 15 participants from four faculties agreed to take part and were asked to attend for a two-hour celebration and inquiry event.

After an introduction to AI and the 4D model, participants were given the opportunity to explore their professional practice in relation to their success in the NSS. This followed the AI principles of discovering what works and sharing these insights in informal gatherings. The participants were asked to work in pairs and discuss their key strengths and attributes which they considered to be the most important in the context of creating a positive student experience.

Initially some participants admitted to being uncomfortable with taking credit for strong NSS performance and emphasized the importance of the wider team. This was addressed often by peers who provided reassurance the insights being shared were inspiring and needed to be published more widely.

The researchers and participants found the event to be energized and fun, the group connected and shared their experiences openly, everyone was engaged and supportive. The researchers experienced at first hand the generative qualities of an appreciative inquiry into ‘what gives life to organisations when they are most alive’ (Cooperrider et al 1987).

The learning for the authors included developing confidence in using an appreciatively focused inquiry, and experiencing the positive engagement of participants. The authors were initially concerned that misconceptions around AI ignoring problems and that focusing on the positive aspects of organisational life would be considered overly optimistic, which could result in participants being reluctant to engage with the method.

**World Café Event**

Having experienced the willingness of participants to embrace positively framed questions, an opportunity arose to host a table at an HE Sector World Café Event. This allowed a further exploration in asking positively framed questions. The authors once again anticipated that some participants would demonstrate preferences to focus on problems and could find the positive framing of the question challenging (Rogers and Fraser, 2003), however, whilst this preference was observed initially, as the group discussion developed all participants were willing to tell their story of “what happens on a good day in HE?”

The theme of the World Café, was ‘transformational change’ within a HE context, and invited a number of staff involved in supporting change from across a number of institutions to attend and take part in an exploration of their experiences of change within HE. Around 45 people took part and were asked to participate in a question set by each table host, and after a period of time to move to another table, until they had visited and contributed to the discussion on each table.

The authors will continue with the World Café format as part of the developing AI method, and full data collection and analysis will be undertaken after a number of other similar events have taken place. The initial outcomes and reaction to the question for the majority of participants immediately initiated storytelling and descriptive recounting of what happened on a good day. This led to the sharing of specific examples of projects, initiatives and organisational norms, ceremonies and community activity which were considered to be a force for good.
The discoveries could be themed as follows:

- activity which brought the staff and students together, engendered a sense of fulfilment to staff
- responding to a positively framed question tended to increase the focus on the student outcomes rather than the impact of change activity on staff;
- face to face interaction often resulted in a good result in terms of getting other staff to ‘buy-in’ to changes;
- a day free of minor annoyances was productive and conducive to high stake conversations.

Stage 2:
HEI1 has been running the You’re Brilliant Awards for more than 6 years. This award initiative is run and owned by the Student Union at HEI1 and gives students the opportunity to nominate a member of staff from any part of the university for an award if they feel they have experienced service excellence. The authors decided to undertake research focused around which behaviours, actions or attitudes result in staff being nominated for You’re Brilliant Awards. Drawing on the existing ‘You’re Brilliant Award’ information as a base, this research sought to focus on the ‘discovery’ aspect of Ai. The project looked at this from a staff perspective, exploring the perspectives of those who had been nominated and extracting stories from them around what they believe makes them ‘brilliant’. The proposed outcome of this project was to set out a framework of staff attitudes and behaviours which could enhance interactions with students.

The overarching approach taken to this research was ‘Appreciative Action Research’ (AAR). AAR was seen as particularly useful as it embraces differences in the kinds of dynamics at play when people are discovering, elevating, and extending strengths. From an ethical perspective it also avoids stereotypical answers through supporting participants to tell ‘their’ stories rather than answering inflexible or structured interview questions. The foundation of the AAR approach for this research is co-creation of narrative touch points - ‘emotion words’ and ‘scenarios’ from a participant perspective. In this context the interviewer takes on a ‘facilitator’ role, allowing a ‘participant-led’ approach rather than a ‘subject-based’ approach to the research. The Touch-Point technique interview structure is explained as below:

- Participants will first be asked to select three “touch-points” that they feel best describe the reason for the nomination. Touch-points are provided on cards in the packs and there is also the option for participants to make their own touch-point.
- Participants will select the touchpoint they wish to discuss first and will then select words from the pack (e.g. creative, powerless, connected, atmosphere) to describe it, thinking about the You’re Brilliant nomination. They should select five words, at least one should be positive and one negative.
- A photograph will be taken of the touchpoint with words including the participant/researcher number for analysis.
- Using the words selected, participants will be guided to discuss what they feel was important in the You’re Brilliant Award nomination and what made the interaction excellent.
- Once the first touch-point has been discussed, the process (steps 2 – 4 above) will be repeated for each of the other touch-points.

The discussions were recorded with the participants consent in order that they could be transcribed for thematic analysis in NVIVO. A purposive sample was taken from the database of all staff who had received a You’re Brilliant Award in the past 2 years. These staff were from a range of different faculties and central teams, job roles and levels across HEI1. The research approach did not intend on being representative, but instead focused on gaining the most detail around which attitudes or behaviours make staff ‘brilliant’.

There were a number of challenges to using this type of approach.

- Balancing active listening, note-taking and probing whilst on the participants story-telling journey
- Ambiguity was still prevalent as the scenarios and words used to elicit participant discussion were broad. The facilitator needed to be skilled enough to recognise where stories became tangential and where they added value.
• Maintaining open attitudes and patience towards participants which allow their meanings to emerge from their stories.
• Temptation to go into coaching/mentoring mode – the researchers as facilitators had to ensure that they did not get overly involved in trying to make suggestions or resolve any issues which arose during the interviews, as this could result in a modification of participant perspectives or stories around their experiences.
• Building trust and confidence in a new technique – The team ensured that they had attended a session delivered by an external expert prior to using the approach and conducted several pilot interviews using the method, which was then proceeded by reflexive sharing on our experiences of using the method.
• Keeping to time is difficult because of openness of method.

Participants’ reflections on this approach were positive:

“It was good having specific points to talk about, I found it quite challenging having to choose emotions that linked to the topic but it got me to explore it in more depth” (Participant A1)

“The touch point process breaks down the topic you are exploring and makes it easier to discuss in greater detail. It gets you to really think about how and why you were feeling a certain way.” (Participant B1)

Learning and Practice Points:
There were a number of very positive outcomes from this piece of research as below:

• Enlightenment for both the organisation and the individual
• Longer lasting positive impact – harnessing engagement.
• Uplifting and empowering for all involved.
• Has to be developed over time – so the purpose is clear and the team prepare for this.
• Be prepared for ambiguity - don’t always know where the story is going when approach is participant-led.
• Researchers need confidence to adapt and leave the participant feeling it was a good experience.
• Interpretive – the impact of subjectivity allows researchers to embrace the participants’ preconceptions, diversity and context.
• Touchpoints approach allowed some structure to be introduced in order to support participants in focusing their minds on excellent interactions with students.

Notwithstanding this, it was also clear to the research team that this method alone could not address the complexities of the HE environment or context. The focus of the research was on individuals only, and the researcher then makes decisions about what is useful from the interview data. It could be argued that this removes the opportunity for the participants to develop the framework of attitudes/behaviours and thus authentic ‘meaning making’ for the wider organisation is not evidenced from using this method. Thus, the research team, worked on developing another approach which provided greater opportunity for groups to make sense of their environment and support meaning making for organisational change.

Stage 3:
Our third case explores the introduction of AI concepts to an existing transformation and continuous improvement initiative set up with the intention of promoting lean and process improvement methods within HEI2. Participants involved in the in-house Lean Practitioners course, as a learning community, were given training in the development of an AI based on the ‘4D’ model and encouraged to adopt a strength based philosophy to organisational improvement.

Participants were asked to brainstorm ‘what is going well’ capturing the outputs on sticky notes, these notes were then mapped and sorted using tools traditionally associated with lean process improvement methods, such as an ‘Ishikawa diagram’ (fish bone). A prioritisation matrix was then completed to establish the key areas of strength within the organisation that could be further developed as real improvement projects in HEI2.
Improvement methods, often adapted within Higher Education, such as, classical forms of lean have tended to focus on the ‘hard’ aspects of process, eradication of waste and team based problem solving. The discussion within the lean practitioner group highlighted their propensity to focus on the ‘softer skills’ of leadership, including emotions and respect for people.

The introduction of AI into the Lean Practitioners course will continue to be evaluated and initial findings suggest that AI can be complimentary to improvement methods that seek to improve and streamline processes.

**Learning and Practice Points:**

- Cycles of learning and thinking are helpful in AI
- Importance of interactive lean tools and visual representations to support creative thinking
- Be prepared for people to drop into problem solving mode
- Assign roles within groups to provide focus on outcomes (Raporteur, Time keeper, Faciliator)
- Ensure all colleagues have their voice heard
- Check assumptions made in any narratives or stories offered by participants
- Importance of flexibility to work with participants in their context
- Developing a cause and effect diagram is as powerful method for finding possible causes of what is going well, as well as surfacing problems.
- Having the courage to ‘give it a go’.

**5. Creating a Research Framework**

This paper has explored the dynamic terrain of HE in order to develop a framework which is flexible in supporting change within organizations, and effective in collecting research data which helps the researcher and participants to make sense of the organisational change context (illustrated in Diagram 1). The three key areas taking center stage in our framework have obvious synergies through their multiple angled considerations of the critical lean management areas of people, process and culture. A key factor which supports success in utilizing this framework is its usability for participants, practitioners, and academics. It also retains a fluidity which allows participants to be fully involved, ensuring individual, group and/or community voice is not only recognized but developed positively to engender organizational change. It is this holistic, and inclusive approach that could impact on deep change in HE organisations. The authors recognize that this is only the first step in their research journey and that there is significant further future work to be done in fully testing the framework practically and evaluating the impact.

**Diagram 1: Holistic Tripartite Framework for Organisational Change Research**
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Abstract: Nickel mining commenced in New Caledonia in 1868 and continues to be the major business activity of that region. Traditionally the mining sector has polarized New Caledonian society via a complex mix of economic, cultural and environmental issues. In 1999 the New Caledonian and French governments initiated a future-focused program of “rééquilibrage” or rebalancing of opportunities for the New Caledonian indigenous Kanak people. “Rééquilibrage” aims to create a new identity for all New Caledonians – an identity that builds upon the multicultural mix of modern New Caledonia. A critical component of this rebalancing is the commencement of a major new world-class nickel mining venture at Koniambo (in the Kanak Northern Province) in 2014 and this venture is majority Kanak owned and operated. The literature confirms that no published review of how New Caledonians view this venture has been completed since its opening. Such a review is important because New Caledonians must vote on 4/11/2018 on the issue of independence from France. Discourses are ways of representing the world – the processes, relations and structures of the social world, that is, the thoughts, feelings, and beliefs of people. This research centres upon the contemporary social beliefs, i.e. the social discourses that circulate in relation to the Koniambo project. The investigation of these discourses must ensure that all stake-holder voices are represented accurately, that the investigation is not simply a one-dimensional “cost/benefit analysis”, and that the amplitude of the voice does not dictate its relative importance within the overall discourse ensemble. This research fits within sociology, and within this domain, the research uses the following empirical investigative approaches: actor-network theory, historiography and critical discourse analysis (for core data analysis). Actor-network theory facilitates the identification of stakeholder relationships within New Caledonian society, regardless of how subtle or transient the relationships may be. In this sense, actor-network theory produces a maximised intersection of the Koniambo project across New Caledonian social life. Historiography provides the vital context that describes the social structures and social practices in which social beliefs are formed and constantly evolve. It is not possible to fully describe these beliefs unless we have a comprehensive, longitudinal appreciation of this overall context. Finally, critical discourse analysis is utilised to unpack fully the beliefs that are identified. Discourse analysis utilises the results from the historiography and actor-network theory research components to unpack the expressed opinions and beliefs and even policies that link stakeholder entities. In this manner the project results will be most representative of the current discourses concerning a flagship project of “rééquilibrage”.

Keywords: New Caledonia, nickel mining, critical discourse analysis

1. Introduction

New Caledonia (1200 kilometres east of Australia) is a special collectivity of France that was granted special status as a result of the Nouméa Accord in 1998. The Nouméa Accord provides for a New Caledonian citizenship (with existing French citizenship), a gradual transfer of power to New Caledonia itself over the subsequent 15 to 20 year period (France continues to control military issues, foreign policy, immigration, police, and currency matters, and finally a referendum on the issue of full independence from France to be held by the end of 2018. The population of 268,767 comprises approximately 40% Kanak (the indigenous population), 28% European descendants and 32% Polynesian and Asian migrant inhabitants (ISEE, 2014). New Caledonia has three provinces: Northern Province (mostly Kanak of 60,000), Southern Province (the European and business hub centring on the capital Nouméa with 180,000 inhabitants) and Loyalty Islands (small Kanak tribal population of 30,000). The GDP of New Caledonia in 2014 was 9 billion US dollars, the fourth largest economy in Oceania after Australia, New Zealand and Hawaii. GDP per capita was $36,376 in 2014, lower than that of Australia and Hawaii but higher than that of New Zealand (ISEE, 2014). However, New Caledonia is a highly assisted economy in that France's financial transfers into the country are its highest revenue stream (surpassing mining revenues) and the gap between imports and exports is growing every year.

In 1853 New Caledonia was proclaimed a French colony because firstly, France required a Pacific presence to accord with its 19th century geopolitical strategy, and secondly France needed a new penal colony. From the 1860s until the end of transportations in 1897 approximately 22,000 criminals and political prisoners were sent to the colony. In 1864 nickel was discovered in the colony and mining began, however the Kanak were excluded from all aspects of the French economy in the colony. The first Kanak uprising in 1878 cost many
French and Kanak lives (Stanley, 1989). Economic and social deprivation for the Kanak was institutionalized in 1887 with the Code de l’Indigenat. This Code introduced state (not tribal) control within native reserve areas, forbade Kanak entry into the capital city of Nouméa, and facilitated nearly 90 percent of land in the colony to be transferred to colonists and the administration (Bensa et al, 1998). The Code de l’Indigenat was abolished in 1946 when France dropped the term “colony” and granted citizenship to the Kanak as part of a United Nations sponsored global decolonization plan. However, unlike in many African and Indochina French colonies, this did not lead to independence.

The term “Kanak” emerged in the independence protests of the 1970s and was significantly defined by the leader of the independence movement, Jean-Marie Tjibaou (Fisher, 2014; Chappell, 2013). However, use of the term “Kanak” in a fully collective, unitary state sense implies a solid national framework and a common interest that overrides the diversity of chiefdoms, clans, territories and languages that make up the current reality (Bensa et al, 1998). Between 1976 and 1988, there occurred periods of serious violence (IEOM, 2010) between the Kanak separatists and the French authorities, culminating in April/May 1988 with significant loss of life on the tiny island of Ouvéa. Subsequently, the June 1988 Matignon Agreement introduced a decade of stability and dialogue leading to the signing of the Nouméa Accord on the 5th May 1998.

As part of the Nouméa Accord, in 1999 the New Caledonian and French governments initiated a future-focused program of “rééquilibrage” or rebalancing of economic and social opportunities for the Kanak. “Rééquilibrage” is a very ambitious program which aims to create a new identity of multiculturalism and inclusivity for all New Caledonians. A critical component is the commencement of a major new world-class nickel mining venture (a 7 billion US dollar investment) at Koniambo (in the Northern Province) in 2014 and this venture is majority Kanak owned (51%) and operated. The literature confirms that no published review of the societal impact of this venture has been completed since its opening. Such a review is even more important when it is noted that New Caledonians will vote by the end of 2018 in a referendum on the issue of independence from France. New Caledonia may now be considered as an imagined political community (Lassila, 2016), one visualized by those who may never meet each other but who are totally committed to the idea (Anderson, 1991). An important question for all stakeholders (internal and external) in New Caledonia is what influence Koniambo contributes to “rééquilibrage” and a multicultural, inclusive society for all citizens. This is the principal research goal for this paper: “What views and even ideologies shape the public discourse on Koniambo?” The principal research methodology used will be critical discourse analysis (CDA).

This paper will unfold in the following structure. Following this introduction, the paper will present a comprehensive discussion of the research methodological framework deployed within the research. Following that methodology, a context (of the New Caledonian mining sector) will be presented. The critical discourse analysis researcher must fully appreciate the context in which discourses are produced and then analysed (van Dijk, 1998). Finally, the paper will conclude with a very brief coverage of a small sample of the discourses that have been identified and analysed to date.

2. Research Methodology

This research fits within sociology, and within this domain, the research uses the following investigative approaches: actor-network theory (to scope the research project, to identify relationships and entities), historiography (to establish the overall context that frames the social structures and social practices in which the discourses evolve), and finally critical discourse analysis (used to unpack the full meaning of the discourse, which “voices” are heard, which “voices” are suppressed). Actor-network theory facilitates the identification and selection of a specific entities (and networks/relationships of entities) regardless of the relative profile of the entity or the transect of their presence within the overall network. This allows for the identified entities and networks to represent a maximised intersection across New Caledonian life. The actor-network theory therefore is the basis for identifying the primary data sources (policy statements, press releases, and interviews) that form the basis of the texts used in the discourse analysis component of this research. Historiography is used to most accurately describe the context (social structures and social practices) in which the identified groups and relationships have forged their opinions, their ideologies - their discourses. Therefore historiography provides the secondary data sources within this research project. Historiography provides the social structure outline and social practice detail on a sufficiently longitudinal basis to ensure that discourses may then be unpacked and described most accurately. These social structure and social practice descriptions are essentially the detailed history of colonisation in New Caledonia, including an analysis of the mining sector.
in terms of its operation and social impact within New Caledonia society. Finally, critical discourse analysis facilitates the operational data analysis of the primary data sources, that is, of the expressed views, thoughts, feelings, and beliefs of people that link to this mining sector and Koniambo in particular. In this manner the project results will be most representative of the current social perceptions of the Koniambo project. This framework is represented in Figure 1 below.

### Figure 1: Overview of research methodology

#### 2.1 Actor-network theory

As outlined earlier, this research is predicated upon the successful identification of the differing discourses (to the Koniambo project) that emanate from the overall set of all supporters, critics and outright opponents of that project. This then requires the comprehensive identification of all voices in that set. This research uses actor-network theory to identify this set of voices, and most importantly, to facilitate an understanding of the social relations operating between/among this set of voices.

**Actor-network theory** treats social relations, including power and organization, as network effects. The theory posits that networks are materially heterogeneous and that actors/agents, texts, devices and artifacts are all generated in, form part of, and are essential to, the networks of the social. All constituent components should be analyzed in the same terms and in full measure, to characterize the ways in which materials join together to produce institutional and organizational patterns in social dynamics (Law, 1999). At the heart of actor-network theory is the concept of the heterogeneous network. This concept is that the social is “nothing other than patterned network of heterogeneous materials ... people, machines, animals, texts, money, architectures”. (Law, 1999).

Operationalizing actor-network theory requires that a researcher must explore how actors and organizations order or translate within a network. Translation specifically describes how actors and organizations “mobilize, juxtapose, and hold together the bits and pieces out of which they are composed; how they are sometimes able to prevent those bits and pieces from following their own inclinations and making off” (Law, 1999). Operationalizing actor-network theory also requires actor-network research explore multiple forms of communications within a system, with a strongly longitudinal focus such as favored by the Annales School of History with its insistence on the “longue durée” (Braudel, 1975). The Annales School is a group of historians associated with a style of historiography developed by French historians in the 20th century to stress long-term social history. Fernand Braudel was the dominant leader of the Annales School in the 1950s and 1960s and has been considered one of the greatest of the modern historians who have emphasized the role of large-scale socioeconomic factors in the making and writing of history. Actor-network exploration in this research is via critical discourse analysis which firstly requires the construction of a detailed discourse context via historiography.

Actor-network theory, as it is deployed in this research, draws heavily from the very important heuristics outlined by Leah Horowitz (2012, 807) – that is, the identification of (actor-network) strategic alliances. Strategic alliances are essential to goal attainment, particularly where the goal-seeker(s) does not have a significant power base. Individuals and groups often choose to pursue common aims, thus maximizing possibly
scant resources. This then produces “discourse coalitions” or shared beliefs on a particular issue, even in situations where the coalition members are from different socio-cultural, economic and political groupings. It is also possible that strategic alliances quickly evolve to reflect “power differentials” and “partnership dissonance” that cause some coalition members/groups to be excluded completely or marginalized within the coalition – either transiently or permanently. Actor-network theory provides useful concepts within this research to analyse relationships among the voices expressed (i.e. the discourse coalitions) in relation to Koniambo.

To summarize, Actor-network theory provides the ‘tool-box’ for the identification of all relationships within the Koniambo superset, and subsequently it is these relationships that produce the primary data sources which in turn contain the discourses for analysis, that is for an appreciation of the full set of social dynamics concerning Koniambo (see Figure 1).

2.2 Historiography

Historiography is defined as "the study of the way history has been and is written — the history of historical writing... When you study 'historiography' you do not study the events of the past directly, but the changing interpretations of those events in the works of individual historians." (Furay et al, 1988). Stone (1979) states: “More and more of the 'new historians' are now trying to discover what was going on inside people's heads in the past, and what it was like to live in the past, questions which inevitably lead back to the narrative.” Consequently, in recent decades the traditional diplomatic, economic and political lens used by historians is being replaced by a social and cultural analysis. Historiography is used in this research project to describe the context in which discourses are produced, circulated and evolved. Historiography in this research focuses mainly on the secondary data sources that describe all relevant events, that is the relevant context. Context is defined as the mentally represented structure of those properties of the social situation that are relevant for the production or comprehension of discourse (Duranti et al, 1992; van Dijk, 1998) — that is, context describes the social structures and social practices in which discourses are expressed. Context must be fully understood for successful critical discourse analysis (van Dijk 1998).

To summarize, the discourse coalitions of actor-network theory, combined with the understanding of social structures and social practices – the relevant data sources (both primary and secondary) contain discourses. It is these discourses that are then unpacked and fully understood in our final research stage (see Figure 1).

2.3 Critical discourse analysis (CDA)

The research methodology used in this thesis is Critical Discourse Analysis (CDA). This methodology builds fundamentally on the social science research methodology of discourse analysis. Consequently, this section will firstly discuss discourse analysis, and then outline how certain social science theorists, including Norman Fairclough, have extended discourse analysis and created critical discourse analysis (CDA). This section will conclude by providing a summarized description of Fairclough’s CDA approach (2003).

Discourse analysis is a social science research methodology that draws on a number of academic traditions (Mills 1997, Howarth 2000). Within discourse analysis, the work of Michel Foucault is fundamental because he is considered most concerned with analysing the power relations and the context of social relations associated with discourses (Gare 1995). In his works The Order of Things (1970) and The Archaeology of Knowledge (1972) Foucault considered discourses, not simply as texts, but as “practices which systematically form the objects of which they speak” (Foucault 1972, 49) and “historically specific systems of meaning which form the identities of subjects and objects” (Foucault 1972, 49). Very late in his life in 1984, Foucault commented on his own use of the word “discourse” when he wrote:

“I believe I have in fact added to its meanings: treating it sometimes as the general domain of all statements, sometimes as an individualizable group of statements, and sometimes as a regulated practice that accounts for a number of statements.”

Discourse analysis for Foucault is the analysis of the domain of ‘statements’ – that is, of texts, and of utterances as constituent elements of texts. However, that does not mean a concern with detailed analysis of texts – the concern is more a matter of discerning the rules that ‘govern’ bodies of texts and utterances. This assessment of Foucault’s discourse definition and research approach are discussed in the analyses of Chris
Weedon (1987) and Gary Kendall and Gary Wickham (1999), and are concisely stated by Alec McHoul and Wendy Grace (1993, 26) as:

“Foucault thinks of discourse (or discourses) in terms of bodies of knowledge. His use of the concept moves it away from something to do with language (in the sense of linguistics system or grammar) and closer towards the concept of discipline. ... Fundamentally, then Foucault’s idea of discourse shows the historically specific relations between disciplines (defined as bodies of knowledge) and disciplinary practices (forms of social control and social possibility)”

Critical Discourse Analysis (CDA) fundamentally builds upon the work of Foucault by applying his rich set of theoretical hypotheses not only to social theory but also to language analysis (Fairclough 1992, 56; Hastings 1998, 195). During the past several years, CDA has attracted considerable attention within social science research, usually as an approach to language which is concerned with the critique of relations of power and ideology in society at large (O’Regan and Betzel, 2016, 282). Fairclough (2003, 124) summarizes the strong link between discourse and text as follows:

“I see discourses as ways of representing aspects of the world – the processes, relations and structures of the material world, the ‘mental world’ of thoughts, feelings, beliefs and so forth, and the social world ... in any text we are likely to find many different representations of aspects of the world ... The relationships between different discourses are one element of the relationships between different people – they may complement one another, compete with one another, one can dominate others, and so forth.”

The Fairclough CDA textual approach (Fairclough 2003, 191 – 194), can be described as the “close study of language in use” (Taylor, 2001). CDA is concerned with studying meaning, and it studies meaning where it occurs, that is, in language and in text. Consequently, the inter-relationships of language, discourse, text and discourse analysis must be understood.

Language can be regarded as a set of signs, which are part of the system for generating subjects, objects, and worlds (Shapiro, 1984; Silverstein, 2004). Language is social, a series of collective codes and conventions through which things (objects, subjects, material realities) are given meaning and endowed with particular identities. Language is not just a simple system of concepts referring to things and phenomena directly, but rather it is a social system that follows its own logic and this logic constitutes peoples’ reality. We say that language does not explain the world as much as language produces the world.

The concept of discourse captures how this production happens. The term discourse is used in a broad number of ways in the social sciences. Discourse “means anything from a historical monument, a lieu de mémoire, a policy, a political strategy, narratives in a restricted or broad sense of the term, text, talk, a speech, topic-related conversations, to language per se” (Wodak et al, 2009). Discourse is “language use in speech and writing – as a form of ‘social practice’...discourse is socially constitutive as well as socially conditioned – it constitutes situations, objects of knowledge, and the social identities of relationships between people and groups of people...discursive practices may have major ideological effects – that is, they can help produce and reproduce unequal power relations between (for instance) social classes, women and men, and ethnic/cultural majorities and minorities through the ways in which they represent things and position people”(Fairclough et al, 1997). Societies construct and attach meaning to the surrounding material world - this is the construction of discourses. A discourse is a system of producing a set of statements and practices that, by entering into institutions and appearing like normal, constructs the reality of its subjects and maintains a degree of regularity in a set of social relations. Discourses are both structured and relational. They are structured in the sense that they produce a field of intelligibility within the social realm. They are relational in the sense that this structure has no fixity, centre, or permanence. Discourses are open-ended and incomplete – that is, emergent. A discourse is always shifting, a given discourse is always arbitrary and contingent. There is always space for contestation, which provides further analytical opportunities for researchers. Discourses are systems of meaning-production that enable all of us to make sense of the world.

Text may be understood as anything that carries the discourse (e.g., images, performances). CDA uses text as a vehicle for understanding social, political and cultural phenomena. It is important to note that text itself is not the object of study. Discourse analysts tend to interrogate the ways in which specific systems of meaning-
production (often called representations) have been generated, circulated, internalized, and/or resisted. These representations can be put forward repeatedly and become a set of statements and practices through which language becomes institutionalized and “normalized” over time. CDA involves showing the affinities and differences between representations in order to demonstrate whether they belong to the same discourse. In overview, CDA follows a simple structure: (1) identify the discourse, (2) delimit the discourse to a wide but manageable range of sources and timeframes, (3) identify the representations that comprise the discourse, and finally (4) explore change, uncover layering and reveal the most complete meaning within the discourse. Critical discourse analysis is predominantly qualitative NOT quantitative and significantly traces back to Michel Foucault who understood discourses as constituting the objects of which people speak. Indeed Foucault (1972) asserted that it is important that scholars analyze discourses by “no longer treating discourses as a group of signs but as practices that systematically form the objects of which they speak”. Consequently CDA scholars often reject the notion that knowledge is separate from the social realm and rather see knowledge as constitutive of reality.

Within this research project, the critical discourse analysis is conducted as described in the CDA Framework (Fairclough, 2003). The CDA Framework considers that all texts are written from a specific viewpoint and comprise two main discourse structures: internal relations and external relations.

- Internal relations are how the vocabulary and grammar are used in a text. This structure is further expanded into “three types of meaning” (Fairclough, 2003): the categories of action, representation and identification. Action describes the text format, such as interrogative, declarative, persuasive or implicative. Representation involves the descriptions of people, places and actions. Identification relates to the representations used by the text authors to get the overall picture of the intent of the text. The interplay of action, representation and identification “brings a social perspective into the heart and fine detail of the text (Fairclough, 2003).
- External relations comprise the social effects and personal beliefs of the text authors. This is at the heart of CDA because “we can unlock the ideologies and recover the social meanings expressed in discourse” (Teo, 2000). Fairclough subsets the external relations into three categories: social events, social practices and social structures. Social events comprise actions that have been taken and are a function of social factors (the social events analyzed in this research are corporate announcements from Koniambo and group articles). Social practices are actions taken in social situations (examples are critical essays, historical reflections, community discussions). Social structures are described a “very abstract entities” (Fairclough, 2003) and can be understood to be the overall edifices in which the social practices take place (e.g., democratic political systems, tribal hierarchies, religious organizations).

3. Discourse Context - Mining in New Caledonia

The nickel mining sector in New Caledonia has been a defining economic, environmental, cultural and political issue in the country since French colonisation first occurred in 1853 and significantly touches all aspects of New Caledonian daily life (Le Meur, 2015a). Nickel is first discovered in New Caledonia in 1864. Nickel today is very heavily in demand in the manufacture of stainless steels, and is also used in many sectors of the economy such as home appliances, automobiles, building and aeronautics. Nickel demand will inevitably increase with emerging technologies also requiring the mineral, for example electric cars are recharged using nickel-cadmium batteries. The metal is also used in certain coins, e.g., in the one and two Euro coins). In the mid to late eighteenth century, the fledgling New Caledonian mining industry needs a workforce but the French colonists are too few in number. The Kanaks are excluded from mining and also deplore the exploitation of the land which is culturally considered to be one of the abodes of the ancestors. In 1891 convicts from the prison camps are used to expand mining activities. From 1878 onwards, thousands of workers from Asia, Europe and Polynesia arrive on a contract basis in New Caledonia and in 1923 the colony numbers approximately 14535 Asian workers (three quarters of miners). This practice ends in 1946 but the influx will ultimately make the Kanak a minority in their own land. More settlers arrive and commence mining and some, for example John Higginson (1839-1905), Louis Ballande (1817-1882), Lucien Bernheim (1856-1917) and Henri Lafleur (1902-1974) will spectacularly succeed, creating immense personal wealth and powerful New Caledonian (caldoche) family dynasties with profound political implications for the territory.
From the start of the twentieth century, mining in New Caledonia experiences several major phases (Pelletier, 1990):

Until the 1920’s, nickel mining is totally manual. The 1950s are marked by the mechanization of mining operations, the creation of an export stream, and the commencement of profound environmental damage.

Between 1963 and 1972, New Caledonia has exceptional prosperity due to the explosion of nickel demand triggered by the Vietnam War. The nickel boom also creates a second huge inflow of new arrivals with approximately 35,000 immigrants, mostly metropolitan French, joining the colony. The Kanak still do not benefit from the boom because of cultural obstacles and a lack of trade training. In 1972 nickel prices collapse and major environmental damage in New Caledonia becomes evident. The recession continues into the late 90s.

The market is normalized in 1999. The period after 2000 has seen an upsurge in nickel processing capacity with the establishment of two new plants, Goro in the Southern Province and Koniambo in the Northern Province. Goro is a Brazilian corporate investment (Vale, 2012) and provides very little direct local employment (2004/2006 some 4000 Filipino technicians arrive in the colony). Koniambo, however, has majority Kanak ownership (51%) and provides considerable Kanak employment and trade-training. Koniambo is a high-quality nickel deposit that will facilitate a long-term, low-cost operation (Risenborough, 2013).

Today, New Caledonia ranks fourth among the world’s nickel producers and has approximately 15% of the world’s nickel reserves and its economy remains heavily dependent upon nickel production.

The social structures and social practices at the heart of the nickel mining history of New Caledonia show clearly that the industry has historically produced clear winners and very many socio-economic victims. These social structures and social practices must be centrally considered when we unpack and attempt to fully appreciate the discourses of Koniambo as expressed from the viewpoint of all stakeholder relationships.

4. Discourses Identified and Analysed – a Small Sample

This research has identified and analyzed several discourses that relate to the “rééquilibrage” project of Koniambo. All identified discourses have evolved within a certain social structure, and within certain social practices – and this context a texturing parameter in the highly summarized discussions below. The following small sample comprises: autchtonie, économie assistée and propriété foncière.

Autochtonie: The French word “autochtonie” means the identity of an indigenous person, that is, identity in the sense of “self” or “identity”. “Autochtonie” was initially a United Nations discourse in which indigenous populations were recognized as “champions” of biodiversity (Blaser et al, 2004). In New Caledonia, the principal Kanak political group FLNKS (Front de Liberation Nationale et Socialiste) used autochtonie to primarily publicize the Kanak struggle to the world. However, with the Noumea agreement (1998), the Kanak population was formally recognized and nickel became the new centre to the FLNKS’s political strategy – culminating in the Koniambo mine. However a new Kanak group (le Comité autochtone de gestion des resources naturelles (CAUGERN) is challenging the FLNKS logic (and therefore Koniambo). CAUGERN asserts that there is no guarantee that Kanak mining ownership will be maintained because nickel has long benefited both France and the foreign multinationals and this situation is very unlikely to change. CAUGERN also draws upon the long-term suspicion of nickel mining and its negative impact on the natural world which is so central in the Kanak value system. As an alternative, CAUGERN wants a direct taxation on all mining revenues. This tax revenue would be payable to the Kanaks alone and would not form any part of general revenues for the country. CAUGERN declares that this is not simply a claim for revenue. It is a political strategy, on the grounds of autochtonie, to re-value and reconstruct Kanak identity even in a context where they are not sovereign (Harper, 2008). Autochtonie is a catch-cry for a strategy that is designed to leverage the Kanak position of “first people”, and guarantee to them a share of New Caledonia’s mineral wealth regardless of who is running the country or who owns the mines.

Économie Assistée: In English, this terms means a supported economy and it is this discourse that profoundly shapes modern public opinion in New Caledonia (across all ethnic groups). The discourse,
“économie assistée”, is very prominent in many of the public texts analysed in this research project and reflects widespread socio-economic and cultural beliefs in New Caledonia. The term “économie assistée” traces back to a seminal work titled "Économie assistée et changement social en Nouvelle-Calédonie" (Freyss, 1995). Le Meur (2015) states: “This book became a mainspring of recent literature on the topic of mining in New Caledonia.” Freyss used a socio-economic approach to analyse daily life in New Caledonia and also the process of social change within the Kanak community (both urban and provincial). Freyss maintained that this overall system of “assisted economy” is the result of a French political calculation that wanted to place New Caledonia in a state of dependency to end all calls for independence. The nickel boom of 69 – 72 created a massive need for labour, and the French government responded with a surge of immigration that caused the Kanaks to become a numerical minority in their own country. During the subsequent long recession period, the French government significantly increased public funding transfers into New Caledonia and these transfers also served as a substitute for growth and made the territory even more dependent on France. In his work, Freyss also claims that Kanak social values do not map well to western capitalism. Freyss asserts that the Kanak place a high priority (in both time and energy) into the maintenance of their complex networks of family and tribal relationships, and this focus runs contrary to a conventional western focus on work and business interests. Secondly, Freyss states that Kanak culture does not prioritise the individual accumulation of wealth – it is the “customary norms of good living” (tribal needs) which define the average social level of needs for the Kanak.

Propriété foncière: This French terms, in English, means land ownership. It continues to be a prominent discourse in New Caledonian society.

In New Caledonia indigenous value-systems, land ownership forms the basis of cultural identities and social positions. Land ownership does not mediate financial wealth and therefore it does not fit within a Western capitalist discourse. Land ownership to the Kanak does not mean monetary value, but rather "prestige", which is defined as the right to be respected by peers, and also the right to "symbolic capital" in terms of constructing family names that link to land or a place of dwelling. In Kanak societies, this prestige and symbolic capital are acquired as a result of being a member of a clan among the first to arrive in a place. This, in turn, confers a right to make any decision related to the use of the land, and the right to construct family names that link to the land. Consequently, the Kanak view of land ownership has clashed with the traditional French capitalist-shaped law of property (imposed in New Caledonia since colonization in the nineteenth century).

The significance of this long-term discourse is perhaps best illustrated by a social practice relating to the establishment of the Koniambo mine (Horowitz, 2003). In 1983, the inhabitants of Oundjo (Northern Province) had claim (under Kanak customary practice) to the Pinjen Peninsula (an area in the region of the Northern Province in which Koniambo is situated), which belonged at the time (under French property law) to a multinational agricultural company. Shortly after, in accordance with French law, the members of several clans in Oundjo formed a Group of Economic Interest (GIE), that is to say a juridical entity that can receive the title of property. (We must remember that the Kanak population is first divided into tribes, then into clans within these tribes). In 1989, this GIE received the title to Pinjen Peninsula. Subsequently, the traditional owners of the peninsula (six clans, four of whom are residents of Oundjo) transferred the rights of these lands to the GIE through a customary procedure. The traditional owners, however, continue to retain certain rights on this peninsula. For example, they continue to be the only ones able to name their children after the peninsula.

In 1999, the mining company Falconbridge (later replaced in the Koniambo project by Xstrata) sought and obtained permission from the traditional owners (not the GIE) to conduct a feasibility study for the construction of a plant in Pinjen. This is now the Koniambo complex with a billion dollar (US) capitalised value). Predictably the GIE protested and subsequently blocked access to the peninsula. In response, the customary landowners began to occupy the land so that the mining company could continue the study. Following these actions, the atmosphere deteriorated considerably within the overall tribe of Oundjo. As a result the customary landowners of Pinjen have lost much of their symbolic authority within their own indigenous communities.
5. Conclusion

This paper has described how a combination of social science research methodologies has been used to investigate the discourses (the beliefs) relating to a billion-dollar business entity at the centre of a complex societal reconfiguration (rééquilibrage) in New Caledonia. The paper has shown that social beliefs must be identified across all relevant strata of society and not just from within the prominent, obvious stakeholders. For this purpose, this research has deployed actor-network theory. The paper has also shown that social beliefs (discourses) develop – and continue to develop - over time and space. Therefore this research has used historiography to build a longitudinal, detailed description of the social structures and social practices that form the context for this ongoing belief/discourse development. In this manner, the researcher may better appreciate the subtle nuances of these beliefs, how the beliefs continue to be textured and changed, how different voices represented in the beliefs come to the foreground – or lapse into the background, and how the beliefs contribute to power relations and social cohesion.

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Editorial for EJBRM Volume 16 Issue 3

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Editorial by the Editor: Ann Brown

The research process is complex, involving many conceptually different steps. For business and social science researchers there are a large range of research methodologies available and this toolkit is expanding every time a new type of problem generates a research question. The identification of a suitable problem for research along with the most appropriate research method can be a challenge involving a high level of creativity, whereas applying a chosen method must follow accepted and well defined rules. Adrian French (A review of Factors and Activities Contributing to proficient Academic Business Researchers) gives us an interesting review of the research carried on researchers themselves, to show some of the factors that motivate us as individual researchers to work on this most challenging of activities.

The remaining five papers present and assess their methodologies through application to a fascinating range of cases. Hence all papers include empirical analysis. The cases include - comparison of outsourcing strategies between engineering firms with Headquarters in UK and German (Mitchell); obtaining productivity gains in Knowledge Work through IT for sales representatives and software engineers (Pashkevich and Haftor); identifying career path patterns in Belgian households (Roman, Mortelmans and Heylan); Organisational change in 2 UK Higher Education Institutions (Farquharson, Sinha and Clarke) and the beliefs held by an indigenous group in relation to a major industrial development in their lands (Clutterbuck).

But perhaps the most outstanding feature of all these paper is the use of multiple research methodologies by:

- Combining more than one method in sequence and/or iterating between them using the results to inform the next step
- Applying more than one method in parallel to create alternative views of the data

Three of the papers combine several methods in sequence. This is the classic approach of Mixed Methods as the paper by Mitchell (A review of Mixed methods, Pragmatism and Abduction Techniques) explains. Farquharson et al (Researching Organisational Change in Higher Education: A Holistic Tripartite Approach) combine Lean management ideas, Appreciative Enquiry and Participatory Action Research to make sense of organisational change in the HE sector. Clutterbuck (Investigating the Social beliefs that Attach to indigenous Mining in New Caledonia) shows how the combination of Actor-Network theory, Historicity and Discourse Analysis can give an extraordinary insight into the perceptions of stakeholders living in and governing New Caledonia, who have been subjected to the traumatic changes that mining has wrought in this island.

Pashkevich and Haftor (Exploring Complementarities of productive IT use through Methodological Complementarism) and Roman et al (Establishing Typologies for Diverging Career Paths through the Life Course: A Comparison of two Methods) took a different path. In each paper two types of method have been applied in parallel. These alternative approaches can be seen to complement each other in producing differing but equally valid and useful insights.