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Illuminating a methodological pathway for doctor of business administration researchers: Utilizing case studies and mixed methods for applied research

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ABSTRACT

There has been a significant growth in Doctor of Business Administration (DBA) programs and applied business research in recent times. Whilst a range of approaches and methods can be used in DBA and applied business research, this paper seeks to add depth of understanding to the use of the mixed methods approach within case study research designs. These can be used in a complementary fashion with a mixed methods approach being used to collect data within a case study design. However, the adoption of a mixed method case study research design has failed to keep pace with the growth of DBA research in the UK and commentary as to the value, application, and implications of adopting a case study research design and mixed methods is currently lacking. Therefore, building and presenting a robust justification and rationale as to their adoption in applied business research has been cited as a major challenge for DBA and novice researchers. This paper addresses this lacuna by providing commentary as to the value, key decisions, and implications of adopting a case study research design and mixed methods to conduct applied business research and reviews current application in practice, to support DBA candidates and novice researchers to make informed research decisions.

1. Introduction

The Doctor of Philosophy (PhD) has traditionally served as a gateway for entry into academia (Jones, 2018) and is largely focused on developing and contributing to theory, rather than applied research which seeks to inform practice (Park, 2007). During the past decade there has been a proliferation of professional doctorates in a range of disciplines including architecture, business, education, health sciences, humanities, law, and psychology (Bourner et al., 2001), which seek to not only contribute to theory but also to provide new knowledge for the workplace and contribute to practice (Wildy et al., 2015). Such a focus makes professional doctorates more applied and therefore the research is within a professional discipline and candidates are supervised within a professional context (Powell & Long, 2005). Bourner et al. (2001) reviewed the differences between professional doctorates and PhDs in the UK and concluded that the main differences existed in the research focus, research topic and career focus. Professional doctorate candidates often focus their research on issues and challenges within their own working lives, rather than based on issues solely identified in the literature and need to contribute to both knowledge and practice. These

differences support professional doctorate graduates to be ‘researching professionals’, whilst the PhD programs seek to develop ‘professional researchers’ (Bourner et al., 2001).

The Doctor of Business Administration (DBA) degree is the most common professional research degree in the business and management discipline, targeted at practicing managers that seek to develop their professional practice (Hay & Samra-Fredericks, 2019). The prevalence and popularity of the DBA grew in the 1990’s, partly due to criticisms leveled at the relevance of business PhD programs to the business world (Banerjee & Morley, 2013). The emergence of the DBA offered the opportunity to address and reduce the ‘theory-practice’ gap in business and management research and doctoral study in business schools (Bartunek & McKenzie, 2017). In general, DBA candidates address practical real-life business situations over a shorter term whilst PhD candidates generally address more abstract ideas to contribute to knowledge over a longer period. Whilst, the focus of DBA research is commonly more practical, it does not always require an intervention of practice and the business problem to be addressed can be framed differently. It is against this backdrop that DBA programs have proliferated and are now offered worldwide, becoming particularly common in institutions in Australia,

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Europe, and North America (Rigg et al., 2021). Whilst, the number of institutions offering DBA programs changes, a search of UK institution websites found that forty-six institutions offered a DBA course. Individual institutions had variations in the thesis topics of graduates and the topics of research which could be supported, largely aligning with their faculty expertise. As the DBA is a professional doctorate aimed at mid-career practitioners, the age profile of DBA cohorts tends to be older and at a different stage of their personal and professional lives, when compared to PhD cohorts (Stoten, 2022).

Evidence suggests that the demand and popularity for DBA programs will continue to grow, supported by the demand for research qualified employees within the knowledge economy (Kortt et al., 2016; Kot & Hendel, 2012). The key differentiating feature of a DBA is the applied nature of the research conducted, however, there is less consensus as to what is taught within a DBA program, but all programs tend to provide research methods and methodology training to help support professionals make the transition to conducting academic research (Hay, 2021; Rigg et al., 2021).

Whilst those enrolled in DBA programs are normally experienced executives and managers, evidence suggests that more support and guidance is often required during the transition from the taught phase to the research phase than in traditional PhD programs (Wallace et al., 2015). This is in line with similar research which suggests that candidates find research methodology and methods a challenging subject to master due to its potentially complex, technical, and theoretical nature (Ball & Pelco, 2006; Bell, 2016). Therefore, candidates benefit from support linking research methods and methodology to practice (Bell, 2016; Van der Rijst et al., 2013).

To accomplish the requirement of achieving a practical contribution, DBA candidates are commonly required to adopt methodologies and methods which support applied research. To support the development of projects which can achieve a practical contribution, it is common for candidates to start by considering problems and issues around them, for which they can provide researched suggestions and recommendations, rather than building research questions after a thorough literature review which exposes gaps in the literature. This can lead to projects where the researcher might start with limited underpinning literature but greater understanding of what they practically want to achieve. This can lead to research problems being fuzzy and complex and the researcher not clear of the links between concepts at the outset. Such an issue centric process can fit neatly with a case study research design, where the research can be formed around a phenomenon within a particular case or set of cases.

Applied research is commonly undertaken in organizations and industries related to the candidate, where the research is seeking to develop particularistic knowledge which can inform action for a particular business. Research topics which support practice within a limited scope or organization are also regularly chosen as they can support the career development and aspirations of DBA candidates and can satisfy employers who frequently fund employees to undertake a DBA program (Kortt et al., 2016). To support this need, there is sometimes a desire to focus the scope of research using a case study research design and employ a methodology and methods which can achieve a mix of objectivity and subjectivity, to support business planning, forecasting and decision making, which the adoption of mixed methods is ideally suited to achieve (Miller & Cameron, 2011).

However, despite the potential benefits of a mixed methods case study research design, the utilization of such a design is relatively rare in UK DBA research. A systematic search of the British Library's Ethos platform, a repository for DBA theses awarded by UK institutions, found that whilst approximately 30% of DBA research awarded over the ten-year period of 2012 and 2021 adopted a case study research design, only just over 2% of theses adopted a mixed methods case study research design during this period. A summary of the number of DBA theses, the number adopting a case study research design and the number adopting a mixed methods case study research design is presented in Table 1.

Table 1

Number of DBA theses and the adoption of a mixed methods case study research design.

Year	Number of DBA Theses	Number of DBA Theses Adopting a Case Study Research Design	Number of DBA Theses Adopting a Mixed Methods Case Study Research Design
2021	150	40	2
2020	159	46	3
2019	154	32	1
2018	126	39	3
2017	126	30	2
2016	110	32	2
2015	106	38	8
2014	74	28	1
2013	69	31	0
2012	56	20	2
Total	1130	336	24

A perception that adopting a mixed methods research design is challenging, could partly explain the limited adoption of such an approach within DBA research. Further it has been identified within the literature that the transition to be an effective DBA researcher can be challenging (Wallace et al., 2015) and whilst there is clarity in terms of the requirement of DBA research, it is less clear what methodology and methods are appropriate for a professional doctorate candidate to adopt to apply theory and achieve both contributions to theory and practice. A need to support candidates to link research methods and methodology to practice has been highlighted to ensure effective applied research (Bell, 2016; Van der Rijst et al., 2013). However, a dearth of commentary that explain and links the effective use of mixed methods and research designs has been identified in an applied business research setting, compared to other social science settings (Miller & Cameron, 2011). Therefore, a common major challenge for novice researchers and DBA candidates is to navigate the arguments for the use and application of research designs and methods to justify its suitability within an applied business setting (Bell, 2016; Miller & Cameron, 2011). This paper addresses the paucity of commentary which discusses the suitability of methodology and methods which can be utilized to support applied business research by discussing the potential application and suitability of case study research and mixed methods, which can be used in a complementary manner with mixed methods data being collected within a case study research design. This commentary contributes by outlining some of the arguments as to when and why a case study research design and the adoption of mixed methods, are suitable for utilizing in applied business research, as well as important considerations and the implications of adopting these approaches. This seeks to inform and support future applied business and DBA researchers to navigate the tricky landscape of utilizing mixed methods within a case study, in the hope that such research approaches and the potential value and benefits that they bring will become more commonplace within the research community.

Whilst this paper discusses and extols the virtues of a case study and mixed method research design and the value of bringing them together, it is important to acknowledge that no research design is superior, but rather needs to be aligned and justified in the context of the research and the aim of the research. As there are multiple approaches and pathways to complete DBA research, it is up to the researcher to select the most appropriate path to achieve their research aim. To do this, it is important that they have a detailed understanding in terms of both breadth and depth, of the different potential research approaches and pathways. This paper seeks to provide an in-depth commentary to help develop researchers' understanding of a mixed method approach within a case-based research design, to enable them to make an informed decision as to the appropriateness of potentially adopting such a research pathway.

2. Application and implications of a case study research design in applied business research

2.1. Defining a case study research design

Costley and Armsby (2007) identified that, whilst a wide range of research designs were used within professional doctorate research, a case study design was the most popular, followed by action research, ethnography, and survey designs. However, there was some variation in students' understanding of case studies and ambiguity as to their methodological positioning and value (Costley & Armsby, 2007). Indeed, there is no universally accepted definition of a case study, but definitions within the literature agree on many of the key elements. One of the most cited definitions of a case study is provided by Yin (2017, p. 23), who defines a case study as, "an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used". Building on this definition, Denscombe (2021) suggests that case study research focuses on one (or just a few) instances of a particular phenomenon with a view to providing an in-depth account of events, relationships, experiences, or processes occurring in that instance. These two definitions imply key points to choosing case study as an approach to research. Firstly, case study is a research strategy, methodology or design, rather than a method to collect data (Hartley, 2006; Saunders et al., 2019; Stake, 1995; Yin, 2011, 2017). Secondly, case study research is inseparable from context and as such can be particularly valuable for gaining insights in context (Yin, 2011, 2017). Whilst all research is bound by its context, it can be challenging to distinguish the impact of context on certain phenomena. The particularistic nature of case study research, which focuses on either one or a few cases in-depth, has the potential to allow a depth of study, which can unearth an understanding of both a given phenomenon and the unique context of each case. This can help to support layering and linkage between the context and phenomenon to aid the development of an interpretation of the linkage and the integration between the phenomenon and context. Additionally, case study research does not generalize research results beyond the context in which the research was conducted and can be suitable where it is challenging to objectively identify the influence of the context on the results. Therefore, whilst case study research can be limited in its scope and ability to understand macro and general context, it can offer value when looking at organizational level context.

Lastly, the intention of the researcher is to study the occurring problem in some depth using multiple sources of evidence and multiple perspectives to generate a diverse set of evidence. This makes case study research particularly efficacious at addressing research questions interested in understanding "how" or "why", as these types of questions are normally directed towards an in-depth understanding of the research problem (phenomenon).

Within DBA and applied business research there is potential overlap between a case study research design and an action research design. Both an action research and case study research design are highly focused on a specific organization or set of organizations, however, where they differ is that action research, by definition, is about researching an intervention (Gummesson, 2000; Robson, 2011), thus it can be distinguished from other research designs that are non-interventionist, such as a case study. Action research is distinguishable in terms of its purpose and the positioning of intervention in research. Action research seeks to position intervention and change centrally within a project, with the impact and influence of the intervention being researched. Whilst the findings from a case study research design might lead to recommendations for change, the change is not the central focus of the research. This has led to Stringer (2014) suggesting that action research is research in action, whilst a case study could be considered as researching for action. Action research and case studies has stemmed from different roots, with action research being rooted in

action science, behavioral science, and experiential learning (Argyris, 1993; Argyris & Schön, 1978). Whilst many of the seminal works in relation to action research and case study research design (e.g., Saunders et al., 2019; Stringer 2014; Yin, 2017) identify these research designs as distinct, a few scholars seek to place them together in a complementary fashion. However, this is normally done by presenting only one research design and the term case study relating to a focus on a case, rather than being a case study research design. For example, Schlüter (2018) refers to performing a case study in an action research design. In line with the seminal work in the field and most of the research methods literature making a distinction between action research and case study research designs, rather than seeing them as complementary with the possibility to adopt two research designs simultaneously for one component or stage of research, in this paper we adopt the view that case studies are non-interventionist.

2.2. The value of case study research design for DBA and applied business research

Case study research can be particularly valuable and appropriate for DBA and applied business researchers who are seeking to develop recommendations or solutions based on issues and challenges they face in their own work contexts, as it supports in-depth investigation into a particular phenomenon or problem within a specific real-life context. Such real-world issues and challenges can be difficult to separate from their context, therefore the boundaries between the context and phenomenon are not always clear. It has been suggested that in such situations case study research is useful as it does not seek to detach the research problem from the context within which the research project is taking place (Hartley, 2006; Yin, 2011, 2017). In case study research the researcher needs to recognize that the phenomenon may be impacted or be influenced by the organizational context leading to the development of knowledge that is embedded within the context. Therefore, the specific context within which a specific problem exists is a key consideration within the research and should not be undervalued or ignored (Warren & Bell, 2022). This makes case study a particularly useful approach where the problem that is investigated by the researcher is entangled within the context and where the boundaries between the problem and the context are unclear, at least at the start of the research.

Yin (2017) suggests that case studies can be utilized to effectively research decisions, programs, implementation processes, and organizational change. Such scope aligns well with the issues and challenges that DBA and applied business researchers are regularly seeking to research, such as issues around implementing new products and practices, starting and developing new or existing operations, managing change, and making informed evidence-based decisions. Case studies provide the opportunity to provide an in-depth understanding and assessment of the research problem and then offer congruent recommendations by investigating the problem or phenomenon and providing an account of what is happening, which is much more than a story about the problem or a description of an event or situation. It is about a systematic collection of evidence and understanding of the unique facets of the organizational context within which the problem exists so that the researcher can show how these facets affect the problem. Indeed, undertaking case studies in business can be motivational, inspiring, and illustrative of business practice (Siggelkow, 2007), and can offer the potential to explore the limits of theory when seeking to solve business problems (Oliva, 2019).

To achieve the depth of understanding sought within case studies, in-depth data related to the research problem is commonly required. Achieving access to such in-depth and potentially sensitive data can be challenging for researchers, however, practice-based DBA researchers can be well placed in terms of access. In cases where access to the required data is feasible, case studies can support in-depth and particularistic research which can support a practical contribution and recommendations.

2.3. Points to consider when planning to adopt a case study design

Whilst case study research can be a valuable and effective choice for DBA and applied business researchers, there are several decisions that need to be made when deciding to utilize a case study research design. Important decisions need to be made by the researcher as to the unit of analysis, how many cases will be researched, over how long the case will be researched and what perspectives and methods will be used collect the empirical data.

When adopting a case study research design, one of the first decisions to be made is defining what exactly will be studied (Stake, 1995), which will determine the unit of analysis within the case study. Defining the “case” which can be a person, event, location, process, organization, or phenomenon is an important decision, followed by decisions around what will be studied and what will not be studied. In this way, the boundaries of the case can be established which leads to focusing on the “unit of analysis”, followed by decisions around the types of evidence needed and how those evidence will be generated. These decisions are important as commonly the boundaries between a phenomenon and its context are not well defined (Yin, 2017). The research context plays a key role in case study research; however, it is important to be able to delineate the phenomena from the context (Warren & Bell, 2022). The organizational context where the research project is taking place is important, firstly, because it influences and impacts the phenomenon itself, and secondly, by analysing the phenomenon and the process within the specific context leads to illumination of both the practical issues and the theoretical issues being studied (Hartley, 2006). Therefore, the choice of a case study research design needs to be made by taking into consideration the value and uniqueness of the case and the context itself, followed by considerations around the access to a case and the participants.

The number of cases which will be researched within a project needs to be considered and justified, by the researcher. In many instances, a DBA research project that looks at investigating a problem within a specific context leads to choosing a single case within a single organization. However, the researcher can potentially choose to research multiple cases, if the research aim and the research questions are seeking to compare and/or contrast findings, or look for similarities and differences between cases. Since the case study research design offers the opportunity to study a case in some depth, using multiple cases may add another level of complexity and practicality around the access to multiple cases and the participants based possibly in several different organizations.

Another decision which needs to be made before undertaking case study research involves the period of time over which the research will take place. Case study research can be conducted at one point in time or longitudinally. Case study research can be particularly useful when the study is carried over a prolonged period. This approach is mostly useful in situations where a researcher studies topics about programs, organizational change, or the implementation of processes. Such a longitudinal approach enables the researcher to account for what, how and why something is happening, by studying issues as they develop, practices change, and new ones become established, and participants’ perceptions evolve over time in view of the new practices within the context where the issues exist. This aligns well with one of the major strengths of the case study research, which is that it allows the researcher to focus on a specific event or situation and identify the various interactive processes involved. However, conducting multiple case studies longitudinally can be particularly challenging, so if the aim of the research is to compare and contrast cases, a decision might be made to drop the longitudinal element. Case studies can be conducted looking at past events, by discussing historical processes, developments, and changes, but such designs can potentially be open to issues such as recall bias and self-reflection bias, occurring from hindsight (Hawkins & Hastie, 1990).

One of the central tenets of case study research is the inclusion of multiple perspectives to study the phenomenon. This allows that the

phenomenon is investigated through multiple angles, therefore the value here is placed on the quality of the participants rather than the quantity. DBA and applied business researchers need to decide who are the most valuable participants to collect data from and what value they can add to the research in achieving the research aim and answering the research questions. Having clarity as to what information will be sought, and from where and whom the required insight and perspectives can be obtained, can help to focus and guide the data collection and analysis process.

Another implication of choosing case study research is related to the fact that whilst a characteristic of case studies is multiple sources of evidence, the data collection methods are not prescribed (Yin, 2017). Therefore, it is left to the researcher to decide which data collection methods to use within a case study research design. In essence, a case study research design acts like a wrapper where the researcher needs to select the most suitable data collection methods based on achieving the proposed research aim. The choice of data collection methods needs to be appropriate to the problem or phenomenon under study and to its context. Organizational problems and issues are often multifaceted therefore DBA and applied researchers often use a variety of methods to access data from a range of different sources, and gather multiple perspectives from different participants, in order to provide an in depth understanding of the problem within its context. Case studies designs can often adopt a range of data collection methods within them, including multiple qualitative or quantitative, or a mix of qualitative and quantitative methods. Mixing qualitative and quantitative data can potentially increase the depth and width of perspectives and is becoming increasingly common in applied business research (Miller & Cameron, 2011). Adopting a case study research design does not stipulate the type of data or data collection methods which should be used. Therefore, it allows the researcher to select the type of data and the methods which are most appropriate to collect data to achieve the research aim and answer the research questions. Whilst this can be seen as an advantage on the one hand, on the other hand this can be seen as a disadvantage of a case study approach as the researcher still needs to determine and justify the data collection methods which will be used; and using mixed or multiple methods can be time-consuming and potentially require a range of analytical skills.

2.4. Methodological and research implications of a case study research design

There are several implications arising from adopting a case study research design within DBA and applied business research. These include limits to the potential generalizability of the results, and thus commonly a focus on the transferability of the results instead; and the decision as to the data collection methods still needing to be made.

Whilst one of the benefits of employing a case study research design is the depth of data coming from multiple sources of evidence from multiple perspectives, which is particularly appropriate for studying a phenomenon and the interaction of factors and events happening within a specific context, often over a long period of time. This does however, increase the particularistic nature of the research, thus potentially reducing its generalizability to other organizations, processes, and contexts etc. Denscombe (2021) argues that the extent to which findings from the case study can be generalized to other examples depends on how far the case study example is similar to others of its type. Whilst Bassey (1981) suggests that the value of case study research comes from the relatability and transferability, rather than generalizability. The value of case studies in terms of transferability is further underlined by Denscombe (2021), who highlights that case study research works by illuminating the general by looking at the particular. A case study research design does not dictate the data collection methods, but rather multiple sources of evidence and multiple perspectives should be collected, which provides flexibility for the researcher. Such flexibility can be helpful when researching fuzzy and complex business problems

but increases the need for DBA and applied business researchers to decide whether to adopt a mix of qualitative and quantitative methods or utilize several qualitative or quantitative methods. In the light of limited commentary as to the effective use of mixed methods and their increasing application in DBA and applied business research, the value of mixed methods, key decisions and methodological implications for applied business research will now be explored and unpacked.

3. Application and implications of mixed methods in applied business research

3.1. The value of mixed methods for DBA and applied business research

Mixed methods data collection is increasingly common in DBA and applied business research, and its applicability and growth in application is likely to continue to increase, despite a paucity of commentary and discussion as to its potential use (Miller & Cameron, 2011). Many academics who are involved in the teaching and supervision of DBA candidates are open to the use of mixed methods, however, they are still often uncertain themselves about some issues when applying such an approach (Miller & Cameron, 2011). Proponents of mixed methods advocate the potential of this approach to offer both the advantages of quantitative and qualitative data. This can offer benefits to DBA researchers seeking to undertake applied business research.

It is common practice within industry to support decision making through quantification, such as forecasting and projections. Such a process is normally focused on profit, revenue, costs, or other key metrics, which businesses seek to influence. This can lead DBA researchers to consider projects with a quantitative component, as it can satisfy the needs and expectations of colleagues and employers, who often support projects either financially or in terms of time, or access to data. However, purely quantitative projects seeking generalizations supported by a large dataset to allow statistical analysis, can become theoretical, rather than supporting the development of specific practices, actions, or recommendation for an individual organization. Mixing methods can potentially bridge this void, by providing some quantification and generalization, which business managers are comfortable with, whilst also providing depth and understanding of context to support the development of particularistic recommendations which can underpin a contribution to practice, which the researcher or researched business can action. Effective mixed methods can balance the need for objectivity and subjectivity with the desires and requirements of different stakeholders.

Business problems often involve numerous actors and therefore different lenses, viewpoints, and perspectives can be helpful in researching solutions. As different actors and units within a business or business process commonly have a different focus and potentially different objectives and targets, what they are interested in can differ. Therefore, employing either quantitative or qualitative data can fail to offer a well-rounded perspective of some business problems by excluding some perspectives. Mixed methods can potentially help to close this gap and provide a fuller picture of business problems and support applied business research.

It is common for the business challenges and problems researched within DBA projects to be fuzzy during their initial identification, therefore the research problem and the underlying issues and challenges can evolve during the research process. Employing a monomethod design utilizing a single stage of data collection, can fail to capture such evolution and therefore potentially not fully address and provide solutions to the problem.

There are potential personal benefits of conducting mixed methods research within a DBA. Many executives decide to undertake a DBA program for the personal development benefits (Kortt et al., 2016). Conducting mixed methods research can help researchers to develop competencies and skills in both quantitative statistical analysis and in the analysis and interpretation of qualitative data, which can be

valuable skills in the repertoire of senior management.

3.2. Points to consider when planning to adopt mixed methods

Proponents of mixed methods posit that adopting the collection of both quantitative and qualitative data in a research design can increase the validity, generalizability, and the depth of the results. However, others highlight it can be more challenging as contradictions can start to emerge between the underpinning philosophy and research design (Easterby-Smith et al., 2018). A lack of clarity and focus can also emerge and the good intentions of including more data and perspectives can become detrimental to the research project (Lowe, 2010). To mitigate this, it is important to plan carefully and understand the options available and their influence on the research process. As with any piece of research, it is essential to understand before collecting the data, how the data will be used to achieve the research aim and answer the research questions. For example, one method may be used to answer some of the research questions, whilst the other method may be used to answer the remaining questions.

Alternatively, the data may be integrated to answer the questions. Determining this will lead to more clarity at the data analysis stage and will help to determine the dominance and sequencing of each method. The selection of the methods and their role and dominance within the research will be influenced by the level of objectivity or subjectivity required, and whether one method alone can achieve the research aim. If both quantitative and qualitative data are required, the sequencing relates to whether one data collection method precedes the other, and if so, which one. A multitude of mixed methods research designs are identified in the literature, for example Tashakkori and Teddlie (2003) identify and review around 35 potential mixed methods designs. But before going into this level of detail, it is essential to determine the suitability and sequencing of mixed methods and the methodological implications, which is the focus of this commentary.

The use of a concurrent mixed methods research design means that the collections of quantitative and qualitative data are independent; thus, one type of data is not informing the collection of the other. Collecting both types of data at the same time allows the researcher to complete their data collection more quickly. Concurrent mixed methods designs are effective at triangulating data to see if the findings from the two types of data lead to the same conclusion, which can demonstrate validity, and potentially extend generalizability (Wilson, 2014). This trait makes concurrent research designs particularly effective for evaluation research, where multiple types of data can be analyzed to come to an overall evaluation and conclusion of a process or phenomena.

However, concurrent mixed methods research designs have limitations when the research problem is fuzzy and evolves as the researcher follows the research path, which is sometimes the case in applied DBA research, and when the researcher wants to drill down further into the problem based on initial results. This limits their applicability in research where understanding and knowledge are developed during the research process, which is often a starting point in applied research, as the researcher first needs to understand the problem before exploring how they can deal with it.

In sequential mixed methods research designs, the researcher engages in two stages of data collection, which occur consecutively. This approach allows the researcher to analyze the first set of data and have that analysis inform the second stage. This can help the researcher when the research problem might be fuzzy and can direct the researcher where they should turn their focus. Sequential research designs are efficacious if one of the methods seeks to inform the next stage of the data collection (Schmidt et al., 2021). The first stage of the research can involve either qualitative or quantitative research depending on the focus of the research questions. In applied DBA research the researcher might want to test a proposition, which could be achieved effectively through quantitative data and then explore this result further using qualitative data which offers more depth. Alternatively, the researcher could utilize

the methods the other way around, first seeking to explore a process and phenomena using qualitative data and then seek to test and generalize results using quantitative data. The sequencing decision of mixed methods has philosophical implications which will now be discussed.

3.3. Methodological and research implications of mixed methods research

Research philosophies can be viewed as a continuum with, the polar ends advocating for either quantitative or qualitative data based on their view of the world. This leads to philosophies located more centrally on the philosophical spectrum being the strongest advocates for the use of mixed methods. Two research philosophies regularly selected to underpin mixed methods research, due to their sympathetic views as to the view of mixing methods, are pragmatism and realism.

A pragmatist research philosophy allows for permutations in one's epistemology, ontology, and axiology (Saunders et al., 2019). Pragmatists focus on data that suits the overall research aim and problem statement. It is thus an appropriate philosophy for researchers seeking to combine methods (Morgan, 2007). Pragmatism has three key principles, an emphasis on actionable knowledge, acknowledgement of the linkage to experience, and research being an experiential process (Kelly & Cordeiro, 2020). The principle of actionable knowledge commonly draws applied DBA researchers to this philosophy; however, it is important to consider the wider implications of this philosophy and how it relates to the application of mixed methods. A researcher utilizing a pragmatic approach can combine many data points and recognize the research participants' experiences. Researchers often employ pragmatism when performing research that results in applied and practical

Table 2

Review of DBA theses adopting a mixed methods case study research design published in the British library (2019–2021).

Thesis Title	Author	Awarding Institute	Year	Number of Case Studies	Rationale for Case Study Design	Type of Data Collection Methods	Data Collection Instrument	Rationale for Data Collection Methods
A moderating effect of leadership and innovation on the relationship between product development, diversification and market development with the business growth performance of mature organizations: critical instance case study of a flavour business of food industry in Malaysia	Kok Chung Siew	University of Wales Trinity Saint David	2021	Single case study	Specific interactions from a real case.	Sequential mixed methods: qualitative followed by quantitative.	Email interviews and survey.	Testing the hypothesized theoretical framework.
What shapes cross-border merger and acquisition negotiations in the automotive industry?	Yadvinder Rana	Heriot-Watt University	2021	Multiple case study	Provide access to real-world. Appropriate for answering factual questions - "what", "how".	Sequential mixed methods: qualitative followed by quantitative.	Experiment (negotiation simulation) and pre and post simulation survey.	Characterization of real-world situations.
Retaining patient-centered skilled professionals in turbulent context: A case study of Lebanese private hospitals	Zoya Mollayess	Nottingham Trent University	2020	Multiple case study	Complex topic studied in its context and take into account the real-world context.	Concurrent mixed methods: quantitative followed by qualitative.	Survey and semi-structured interviews and archival records.	Triangulation. Evidence can be collected from multiple sources.
Revealing knowledge workers' tacit knowledge usage in the product development department of an automotive manufacturer	René Schmidt	University of Worcester	2020	Single case study	The focus on contextualization between the phenomenon and its related boundaries in its natural setting. Gain a rich and holistic understanding of the phenomenon.	Sequential mixed methods: quantitative followed by qualitative.	Content analysis of documents and semi-structured interviews.	Increased the depth of exploration of the phenomenon.
Can range in information technology boost innovation in a mature industry? A case study of a work-oriented social media platform for innovative ideas and solutions in a large upstream oil & gas enterprise	Andrew Nobbay	Nottingham Trent University	2020	Single case study	Suited to where there are complex questions that are not easily answered through non-contextualized data analysis.	Sequential mixed methods: qualitative followed by quantitative.	Semi-structured interviews and survey.	Viewing issues from multiple perspectives to enhance the depth and breadth of the work. Contextualizing of information. Developing a more complete understanding of phenomena through triangulation.
Succeeding in the global academic ranking challenge: Strategy and practice at the university level	Diane Gibson	University of Bath	2019	Single case study	Case study allows a wide range of evidence capture and analysis procedure. A case study design can be informed by both quantitative and qualitative research techniques.	Sequential mixed methods: quantitative followed by qualitative.	A quantitative longitudinal analysis of global rankings tables and interviews and document analysis.	The choice of methods driven by the research question. Opportunities for triangulation.

benefits (Morgan, 2014). Pragmatism thus effectively supports research that examines an organization's performance or a process (Kelly & Cordeiro, 2020). A researcher looking for practical and actionable results should not default to pragmatism, however, and should adopt the best from the range of research philosophies that can produce such outcomes.

Realism also supports mixed methods research designs. Although, pragmatism and realism's beginning and end points differ (Allmark & Machaczek, 2018). Realism perceives the world through an outside and objective reality. It examines how this reality impacts behaviors and social interpretations in ways not always understood by participants (Saunders et al., 2019). Realists thus pursue some level of objectivity while still recognizing the value and role of qualitative data to achieve subjective questioning to effectively understand social behaviors and interactions. This approach to research recognizes the depth and context with which qualitative methods enrich objective and generalizable quantitative research outcomes. Realism can therefore potentially be argued to effectively underpin research using sequential mixed methods wherein each research phase plays a specific role within the whole research design to achieve a desired level of objectivity and subjectivity. However, adopting a realist philosophy is not a precursor to utilizing sequential mixed methods, as both realism and pragmatism are paradigms comfortable using mixed methods. It can be argued that pragmatism is driven by a focus of obtaining the most appropriate data to achieve the research aim, whilst realism is more concerned with ensuring both objectivity and subjectivity is achieved where appropriate within the aim of the research.

3.4. Application of mixed method case study research design in DBA research

To understand the pathways of application and rationale in practice of DBA researchers who adopted a mixed method case study research design, the six theses identified in the British Library to use such an approach in the last three years were analyzed. The analysis considered the rationale for adopting a case study, the mixed methods used and the rationale, and the number of cases studied. The analysis of the six theses can be found in Table 2.

Four authors adopted single case study design, while two authors adopted multiple case study design. The key rationale for adopting a case study design included from the opportunity to obtain real-world data through gaining a deep understanding of a particular phenomenon in its context to answering factual questions such as "what" and "how". Most authors were particularly attracted to use case study design for their research as it allowed them to study complex issues and situations and allowed them to collect a wide range of evidence from multiple sources using quantitative and qualitative techniques. Five of the six authors adopted sequential mixed methods, while one of them adopted concurrent mixed methods. Three of the authors who adopted sequential mixed methods preferred the use of qualitative methods before quantitative methods, while the other two authors started with the collection of quantitative data followed by qualitative data. Whilst the authors of the theses found value in adopting mixed methods, most paid only limited attention to debates on the merits of quantitative versus qualitative research. Their choice was driven by their research question and the flexibility that case study design offers to include both quantitative and qualitative research techniques for the collection of multiple data from multiple sources which was often underpinned with the adoption of pragmatism as the underlying research paradigm. With most of the theses adopting sequential mixed methods and the majority of the these underpinned by pragmatism, it would suggest that data collection decisions were largely driven by the research question, rather than philosophical judgments and a desire to achieve objectivity balanced against the need for subjective understanding of social behaviors, perception, experiences, and interactions. This could be a reflection on the applied nature of DBA projects, where emphasis may be

placed more on outcome and findings, rather than the philosophical views and assumptions underpinning the research phenomenon. This has the potential to influence the decision-making process and rationale for methodological decisions. A key reason for choosing mixed methods that become evident from the review of the thesis was related to the term of triangulation. Most authors argued that this is a key strength as the opportunities for triangulation (collecting evidence from multiple sources with multiple methods) are enhanced (Bryman, 2007) and the robustness of research findings and their validity strengthened (Doyle et al., 2016).

4. Conclusion

Whilst there has been growth in the number of UK institutions offering DBA programs and a corresponding growth in the number of DBA theses published, there remains limited uptake in the adoption of mixed method case study research designs. This could be related to a dearth of commentary as to the effective utilization of a mixed method approach within case study research designs, in an applied business and DBA research setting (Miller & Cameron, 2011). Navigating the different arguments to construct a robust justification for using them within applied business research has been presented as a particular challenge for novice and DBA researchers (Miller & Cameron, 2011). This paper has sought to fill this lacuna and reduce this practical challenge by discussing the potential value of case study and mixed method research designs, as well as the important decisions and implications that DBA and applied business researchers need to be aware of, to make informed methodological decisions.

This paper has identified and discussed some of the benefits of adopting mixed methods within a case study research design for DBA and applied business research. The starting point of DBA and applied business research is to determine the research aim and problem and understand how solving it will contribute to practice and theory, and then develop a methodology and research design which can effectively achieve the research aim and solve the research problem. However, a case study research design and a mixed methods approach to the collection of data can be particularly suitable for DBA and applied business research due to their ability to provide multiple perspectives to research and the in-depth investigation of a particular phenomenon, supporting particularistic and actionable knowledge. The ability for case studies to support research in relation to its context, can also support research problems where the boundaries between the context and the phenomenon is blurred, which is often the case in DBA and applied business research. When seeking to address practical business problems, ensuring that the context is considered can help to increase the value of the results and recommendations, although at the potential expense of generalizability. When using a case study research design the researcher needs to take important decisions as to the focus and unit of analysis, the number of cases that will be studied, and over what period the cases will be studied. Utilizing a case study research design does not prescribe the data collection methods or the type of data which should be collected, so the researcher still needs to make and justify these decisions.

The inclusion of elements of quantification afforded by quantitative data, whilst also exploring a business problem through qualitative narratives, can fit well with a business and executive audience who seek some degree of objectivity in the business decision making. Mixed methods can also support the inclusion of multiple perspectives from multiple sources of evidence, considering different metrics and performance indicators. When conducting mixed methods research the researcher needs to consider and decide on the ordering and sequencing of the data collection methods and the philosophical implications. When developing and building a research design for DBA and applied business research it is essential for the researcher to be reflexive and reflective when considering what approaches could achieve the research aim.

From reviewing current application and rationale for the adoption of a mixed methods case study research design within DBA theses, common

rationale includes collecting a wide range of evidence in the form of quantitative and qualitative data from numerous sources and a desire to triangulate findings. Pragmatism was the most common philosophy chosen, suggesting emphasis on finding appropriate data to solve the research problem. Although some theses underpinned their mixed methods case study research design with realism and identified and justified the role and importance of both objectivity and subjectivity within their research. It is important for DBA and applied business researchers not to default to pragmatism (Bell et al., 2022), hiding behind a veil of seeking solutions to practice, as most research seeks to offer some practical value in terms of outcomes and recommendations, but be able to justify their decisions based on outcomes and be able to demonstrate alignment and justify each stage of the research process.

Finally, whilst this paper has focused on discussing the application of mixed methods within a case study research design in depth, a range of data collection approaches can be used within a case study design, as a case study research design acts like a wrapper which allows the selection of a range of potential data collection method. Therefore, the researcher needs to select data collection methods based on the suitability of achieving the proposed research aim which can include both traditional and innovative methods such as computational methods. To explore the full range of potential methods which can be used within case studies, it is recommended that additional literature is consulted to develop a broad understanding of these.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRedit authorship contribution statement

Robin Bell: Conceptualization, Writing – original draft, Writing – review & editing. **Vessela Warren:** Conceptualization, Writing – original draft, Writing – review & editing.

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