

## WORKING PAPER

### **Big Data, Big Capabilities:**

### **Navigating Big Data journeys to develop the professionals of the future**

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This working paper is based on [the ICAS report](#) we have recently published.

## **Abstract**

This working paper explores the critical digital capabilities required by senior finance professionals to harness Big Data effectively. Utilising a qualitative research methodology, including semi-structured interviews and workshops with finance professionals across medium-sized UK organisations, this study identifies the varying levels of Big Data utilisation (low, medium, high) and outlines the key enablers and barriers to acquiring digital capabilities in finance. Our findings reveal a spectrum of Big Data adoption, from nascent to advanced, each with distinct challenges and opportunities. The paper contributes to the literature by offering a nuanced understanding of digital skill requirements in the finance sector, emphasising the need for a strategic approach to Big Data integration. Implications for practitioners and suggestions for future research are also discussed.

**Keywords:** big data, big data capabilities, senior managers, directors, accounting, finance and businesses

## **1. Introduction**

In an era characterised by rapid technological evolution, the finance profession stands at a crossroads. The advent of Big Data has introduced both unprecedented opportunities and challenges for senior professionals. The ability to effectively harness digital capabilities has become a crucial determinant of success in this landscape. Yet, despite its significance, a comprehensive understanding of these digital capabilities and the journey toward Big Data integration remains underexplored.

Digital capabilities in business management extend beyond mere technological proficiency; they encompass a holistic approach to data, integrating analytical insights into strategic decision-making processes. For senior professionals such as directors or senior managers, mastering these capabilities is not optional but essential to navigating the complexities of Big Data. It ensures not only the optimisation of financial operations but also the strategic alignment of finance with overarching organisational goals.

This working paper aims to:

- Illuminate the digital capabilities essential for senior finance professionals in the context of Big Data.
- Examine the progression of Big Data adoption within finance departments across medium-sized organisations.
- Identify enablers and barriers to developing and leveraging these digital capabilities.
- Provide a roadmap for finance professionals and their organisations to effectively integrate Big Data into their strategic framework.

By mapping the terrain of digital capabilities in finance, this paper seeks to bridge the gap between technological potential and practical application, offering valuable insights for both practitioners and academics in the field.

## **2. Literature Review**

### **2.1 Big Data in Business Management: An Overview**

Big Data are high-volume, high-velocity and high-variety information assets that demand cost-effective, innovative forms of information processing, enabling enhanced insight, decision-making, and process automation (Gartner, no date). To be considered “big”, data must be characterised by at least one of the following 3Vs: Volume, Variety and Velocity. The concept of Big Data has permeated the financial sector, promising transformative impacts on decision-making and strategic planning. Big Data, characterised by its volume, velocity, variety, and veracity, offers unprecedented opportunities for financial insights and innovation. Recent studies underscore the importance of Big Data in enhancing financial reporting, risk management, customer understanding, and market trend analysis (Merendino et al., 2018; Sarkar et al., 2021). However, the integration of Big Data into finance functions requires more than access to large datasets; it necessitates a comprehensive set of digital capabilities.

### **2.2 Digital Capabilities for Senior Professionals**

At the organisational level, Big Data (BD) capabilities refer to the proficiency to gather, process, safeguard, and scrutinise extensive datasets, ultimately furnishing decision-makers with pertinent insights. Within the realm of accounting, BD capabilities are broadly categorised into hard (technical) and soft skills.

Hard capabilities encompass competencies in data management, which include a grasp of data ethics, along with the skills for data extraction, preparation, reconciliation, and cleansing. Data modelling, leveraging various technological tools and analytics, data visualisation, financial management to ensure data consistency, and the coding for analytical procedures also fall under

this category. A crucial aspect of hard capabilities is the focus on data quality management—evaluating data's accuracy, reliability, and trustworthiness (Deniswara, Handoko, and Mulyawan, 2020). This evaluation necessitates a robust 'human capital' infrastructure comprising individuals with the requisite experience and technical expertise to handle and interpret data effectively. Such specialised roles are pivotal in enabling finance professionals to derive and rely on data-driven insights (La Torre et al., 2018).

Equally critical, albeit less technical, are soft BD capabilities, which include a comprehensive understanding of BD's applications and its strategic benefits, ensuring finance professionals can assume a governance role over BD utilisation and analysis (Meadows et al., 2022). These capabilities extend to fostering relationships across various organisational teams. Given BD's inherent complexity, senior finance professionals must engage collaboratively with peers across different departments, enhancing collective efficacy (Deniswara, Handoko, and Mulyawan, 2020). Business systems thinking, a vital soft skill, involves making decisions through a systematic and holistic lens, an approach echoed by Bhimani and Willcocks (2014) and further supported by Sarkar et al. (2021), who advocate for an integrated mindset essential for harnessing BD's full potential. Additionally, effective communication stands as a cornerstone soft capability, facilitating clear and impactful dialogues with accounting colleagues and broader organisational staff. Recent discourse consolidates these communicative and analytical skills under the concept of a 'data analytics mindset,' emphasising the criticality of a comprehensive understanding of BD and analytics. This includes posing pertinent questions, engaging in effective dialogue, and employing a holistic analytical perspective, underscoring the foundational role of both hard and soft skills in the accounting profession's adaptation and leverage of BD (Dzuranin, Geerts, and Lenk, 2023).

### **2.3 Technology, Organisation, Environment Framework**

The Technology, Organisation and Environment (TOE) framework (Tornatzky and Fleischer, 1990) describes the dimensions that influence the process of adoption of BD. The Technology context describes the internal and external technologies an organisation can use. The Organisational context includes the resources and characteristics of an organisation. The Environmental context refers to the structure, the type and the features of the industry, competitors and policy-makers. Finally, another factor influencing the adoption of BD is the perspective of the Individual. The Individual context includes the beliefs, attitudes and behaviours of individual managers or directors towards technology or BD acceptance. The TOE framework, as initially introduced and subsequently modified for IT adoption research and business management studies, offers an effective analytical tool for examining the uptake and integration of Big Data initiatives and investments. This framework is grounded in robust theoretical foundations and presents consistent support from empirical evidence showing its applicability to big data in the business management and accounting field. However, the specific factors identified within the technological, organisational, and environmental contexts might differ among studies.

Research indicates a significant gap between possessing digital capabilities and applying them effectively within finance functions (Dzuranin, Geerts, & Lenk, 2023). This gap suggests the need for a deeper exploration of the pathways through which finance professionals can transition from capability acquisition to practical application, particularly in medium-sized organisations where resources may be more constrained.

### **3. Methodology**

#### **3.1 Research Design**

This study adopts a qualitative research design to explore the digital capabilities required by senior finance professionals for effective Big Data integration. The choice of a qualitative approach facilitates a deeper understanding of the complexities and nuances associated with developing and leveraging digital capabilities in the context of finance.

### **3.2 Participants and Data Collection**

The study engaged 35 senior finance professionals from medium-sized UK organisations across various industries. Participants were selected through purposive sampling to ensure a diverse representation of experiences with Big Data. This participant cohort was comprised of directors holding pivotal roles in their respective firms, including Chief Financial Officers (CFOs), Finance Directors, Heads of Finance, and other senior positions that entail significant decision-making responsibilities pertaining to financial strategy and data management. These professionals were sourced from a variety of industries, including but not limited to technology, manufacturing, healthcare, and financial services, ensuring a rich cross-sectoral analysis. Data were collected through semi-structured interviews and interactive workshops, allowing participants to share their insights, challenges, and strategies related to Big Data capabilities.

In particular, each interview was structured to unfold in two parts:

***Personal and Organisational Background:*** Informants provided an overview of their career trajectory, emphasising their experiences with digital transformation and Big Data investments. They detailed their organisation's current stage in the Big Data adoption lifecycle, the specific industry challenges faced, and the digital infrastructure in place to support Big Data analytics.

***Digital Capabilities and Experiences:*** Discussions delved into the hard and soft digital capabilities the informants and their teams possess or lack, the training and development paths pursued to acquire such skills, and the strategic importance of Big Data in their decision-making processes. Informants were encouraged to share specific instances where

Big Data analytics significantly impacted financial strategies, operational efficiencies, or market competitiveness.

The workshops, held as follow-up to the interviews, provided a collaborative space for participants to validate findings, engage in peer learning, and collectively explore solutions to common barriers identified in the digital transformation journey. These sessions facilitated a dynamic exchange of ideas, strategies, and best practices, enriching the data collection process with communal insights and shared challenges across different organisational contexts.

To ensure a comprehensive understanding of each informant's insights, the interviews and workshops were recorded with consent, transcribed verbatim, and anonymised to protect confidentiality. This approach allowed for an in-depth analysis of the qualitative data, enabling a nuanced exploration of the digital capabilities required by finance professionals to leverage Big Data effectively.

### **3.3 Data Analysis**

Data from interviews and workshops were analysed using thematic analysis; a method well-suited for identifying, analysing, and reporting patterns within data (Bell, Bryman and Harley, 2019). This approach enabled the extraction of key themes related to the development and application of digital capabilities in finance. NVivo software facilitated the organisation and analysis of the qualitative data, ensuring a systematic and comprehensive examination of participant narratives.

In particular, utilising NVivo, a leading qualitative data analysis software, the research team engaged in a rigorous coding process. This began with open coding, identifying and labelling key concepts and themes as they naturally emerged from the data. This iterative process facilitated the organisation of data into meaningful clusters that reflect the complex realities



and nuances of integrating Big Data capabilities within finance functions and the organisation as a whole.

Following the initial coding phase, the team moved towards axial coding, where codes were further examined and grouped into broader themes. This involved identifying patterns, relationships, and disparities among the codes, allowing for the construction of a thematic framework that captures the key dimensions of digital capabilities in the finance sector.

To ensure the reliability and validity of the analysis, the research team engaged in a validation process, cross-referencing themes and findings with existing literature on big data capabilities in the business management and accounting field. This step also involved revisiting the original transcripts to confirm that the themes accurately represent the informants' perspectives. Where necessary, themes were refined or redefined to better capture the essence of the data.

The final phase of the analysis involved synthesising the thematic findings to draw out key insights and interpretations. This synthesis was aimed at answering the research questions, addressing the study's objectives, and highlighting the implications of digital capability development for senior finance professionals. Through this interpretive lens, the research team was able to construct a comprehensive narrative that not only reflects the current state of digital capabilities in the finance sector but also charts a path forward for organisations navigating the complexities of digital transformation.

#### **4. Findings**

The findings from the interviews and workshops reveal a nuanced landscape of digital capability development among senior finance professionals across medium-sized UK organisations. These findings are organised into three main themes: levels of Big Data

utilisation, enablers of digital capability acquisition, and barriers to effective Big Data integration.

#### **4.1 Levels of Big Data Utilization**

The study identified three distinct levels of Big Data utilisation among participating organisations, categorised as low, medium, and high. We summarise the use cases using the four dimensions of Technology, Individual, Organisation and Environment (introduced earlier).

##### **4.1.1 Low Level of Big Data Use**

Organisations at this level are in the early stages of exploring Big Data's potential. Senior professionals here express concerns about data overload and lack of the infrastructure to manage and analyse Big Data effectively. The focus remains on traditional data management practices, with minimal integration of advanced analytics.

##### **Technology**

The CFO felt that the first challenge of BD is the overwhelming volume of data points; senior accountants and finance professionals do not necessarily know how to address the issue of data volume:

*...the biggest challenge, not just here, but I think in previous businesses as well, is just, a) the sheer volume of information that's collected within a business and b) the consistency of that information across the business.*

An additional drawback which can prevent the finance team from fully adopting BD is the lack of data consistency across the different functional areas or teams. In the CFO's experience, different datasets were not brought together, i.e. there was no centralised repository to collect, store and process data in the organisation. As a result, he was sceptical about the real value of BD:

*One of the biggest challenges everywhere is to make sure the data is consistent across, not just different departments, but different databases, etc....*

## **Organisational**

BD were not widely used by the finance team or the rest of the organisation, because of scepticism about its validity and usefulness. As a result, the CFO advised that to make progress with BD, an organisation should ‘start small’, i.e. making gradual investments in datasets, training, and even new staff members:

*... the best option is to introduce it [Big Data] somewhere in a small way ... I think there's power to sitting in a meeting with a bit of paper that has got factual, clear, precise information that's understandable to people in that area, and if the person beside you doesn't have a similar bit of paper, they're going to feel pretty silly and will quickly want to get up to the same level of clarity.*

‘Starting small’ also means that the finance team should meet periodically with the IT team, and other teams across the organisation to discuss the data that the organisation already holds, which information can be extrapolated from existing datasets, and how to solve common business challenges using BD:

## **Environment**

The CFO felt that the collection of data from external sources represented a challenge that senior accountants and finance professionals may not currently have the capacity to fully address:

*I would think of Big Data as being information on the customers and how we gather, collect that and maximise the benefit of having that information. So, there's that aspect of it, which is an ongoing struggle...*

## **Individual**

The CFO reported that his CEO was sceptical about using BD to inform strategic decisions:

*...[the CEO has] no interest in the information, and little interest actually in the data that was produced ... it was ... 'are we making money?', 'is that customer profitable?' etc. Just did not have the appetite...*

The CFO challenged his CEO's position, feeling that decision-making based on BD could bring benefits:

*...we should at least have a respect for that, and know that it's going to be right ninety percent of the time, as opposed to just going with a gut feel... it's senior management that drive that.*

### **Summary of Low Level of Big Data Use**

- Tackle issues related to the abundance of data, its quality, and uniformity throughout the organisation.
- Convince essential stakeholders of the significance and practical benefits of Big Data.
- Starting Small means initiating big data investments on a modest scale, fostering collaboration beyond departmental barriers.
- Overcome obstacles associated with external or unstructured data and the tendency to depend on instinctive judgments.

#### **4.1.2 Medium Level of Big Data Use**

These organisations have begun to integrate Big Data into their operations but face challenges in fully leveraging its potential. Finance teams and other departments experiment with Big Data analytics for specific projects but lack a cohesive strategy for widespread adoption. There is a recognition of the need for more advanced digital capabilities but uncertainty about how to develop them.

## **Technology**

The CFO explained that his company used ‘traditional’ software (mainly spreadsheets) to analyse data; despite having an appetite for data, the finance team had limited capacity in terms of complex data analysis:

*We use very much Excel as a business, so in that sense we probably are a wee bit limited in terms of some of the analysis we do. We do have a small team of business analysts within the business and they use a combination of Excel and [name of software] to do that analysis. But I would say it's still very embryonic ... One of the issues we do have by using the tools that we've got is getting good quality information out to our teams quicker, faster.*

## **Organisational**

The CFO pointed out that investments in BD in the finance and accounting functional area are rarely considered to be essential to the running of the business:

*... finance is probably the bit that's the least thought of when it comes to these investments ... when we make the business case for these investments, there's not any great thought to whether finance benefits or not, but if there's a knock-on benefit to finance, then that's great, they get an extra benefit from that, but it's not really the main thrust of the business case.*

The CFO's observation highlights a significant challenge within many organisations: the underestimation of BD investments' impact on finance and accounting departments. Despite the pivotal role of these departments in steering and sustaining business operations, their needs and potential gains from BD investments often take a backseat in strategic considerations. There is a common oversight in business case development, where the direct benefits to finance functions are not the primary focus. This perspective suggests a potential area for reevaluation, advocating for a more inclusive approach in recognising the value that BD initiatives can bring to finance and accounting beyond the unintended benefits.

## **Environmental**

A key issue raised was the need for trust in the data source, hence the quality of the data:

*... one of the issues I see with data is the quality of the inputs, and how you're collecting the data. For example, in our business, we rely on people collecting data about customers at the point they start to deal with customers or doing research on customers. If they don't believe there's value in that for them, or value in that for the business, the quality of the data you get in is tainted, and to some extent then your trust ... the lack of the outputs become tainted as well.*

The CFO was curious about exploring new analysis, trends and opportunities with data specialists. However, he also recognised the importance of leadership from the C-suite regarding BD, noting in particular that the CEO should be a driver of organisational change regarding BD. He pointed out that the finance and accounting community is able to provide unbiased interpretation of findings from data analysis; the finance team can meet the need for someone who can interpret and analyse the data in an unbiased way, while looking at the business internally and externally:

### **Individual**

The CFO had a curious and inquisitive approach to BD, i.e. trying to understand how BD can improve the performance of the finance and accounting team. For BD to be used effectively in decision-making, the finance team need to be able to communicate effectively and work well with other functional areas. Although the CFO was curious about the benefits of BD, he acknowledged that the finance team did not currently have sufficient involvement with other teams:

*...it's down to the finance people to demonstrate their value to the business and, by doing that, they get involved more. If you stay in your box and just do what you're doing, then frankly people won't get you involved because they don't see you as a 'value add', they just see you as an overhead.*

### **Summary of Medium Level of Big Data Use**

- Explore avenues for the finance team to advance beyond conventional tools like spreadsheets; this team can enhance its influence as a champion of Big Data within the organization in collaboration with the IT department and other groups.
- Amplify the influence of the CFO and the finance team in advocating for Big Data utilisation throughout the company.
- Advocate for the finance team's expertise in providing adept and impartial analysis and interpretation of data, particularly concerning the assessment of new, external, or unstructured data sources.

#### **4.1.3 High Level of Big Data Use**

At this level, organisations have established a strong foundation for Big Data utilisation. Senior professionals are well-versed in digital capabilities and use Big Data analytics as a strategic tool for decision-making. These organisations exhibit a culture that values data-driven insights and has invested in the necessary technology and skills development to support Big Data initiatives.

#### **Technology**

The company had chosen to do very little outsourcing of tasks such as data collection or analysis; they had built BD capabilities in-house, across the whole organisation:

*...we're building that capability ourselves. So, from a finance perspective, we have capability on the team for things like [name of software] and data analytics, but it's not just a finance function, it's a business function. We use [name of software] to pull in all of our data ... it allows one source of truth...*

The CFO was constantly driven by curiosity about what new BD can offer to the finance team. The value of BD comes from looking forward, as opposed to the month-end accounts that analyse historical data:

### **Organisational**

An organisation should develop a data culture based on value creation; reports can be used to generate greater insight via BD. Data can be valuable in predicting what is about to happen; accountants should be challenged to be curious about what BD can bring to the creation of valuable reports:

*.. as accountants, how many reports have we produced that people never look at, and it has to add value. So, the culture within the business to ... be curious and scratch at the surface of the data and ... challenge the accountants in particular, but across the business, to come up with reports that actually create value and ... give you good insights. And often it's the smallest thing that piques interest, and in the board reports that we do, six pages of our board report is purely data. We're driven by data ... data's crucial to us to start predicting what's coming around the corner.*

Experimentation and flexible approaches with new data and technologies can open up innovative and thought-provoking pathways for the business.

### **Environmental**

The CFO was passionate about the potential value of a strong capability in BD, for example to help the company to understand its environment and its customers' needs. This can lead to opportunities to build the business and increase customer satisfaction and loyalty:

*It [BD] allows us to know what the customers want. So, it's a builder of revenue. It allows us to target customers in a way that we know their habits ... we will offer new things, we will give them new technologies ...*



## **Individual**

The CFO argued that senior professionals need to be curious about BD, and not afraid of its potential power and benefits for their organisations. They should be able to help the senior management team and the finance team to become more comfortable with the use of BD. They need to put together the right team, which includes IT experts, for BD to thrive in their organisations and to enable the creation of value via BD:

*I think first and foremost is: be curious, don't be scared of the data, be curious and actually find out what it can do for you, and I think that's really important. Some of the senior guys in my team, I had to get them comfortable with my push for automation and data, because they were quite nervous about it, but now they've embraced it, they get it.*

The senior management team has to become inquisitive, has to be challenged to 'dig deep' into the data and ask questions about why some numbers are the way they are, and how improvements can be made.

## **Summary of High Level of Big Data Use**

- Concentrate on developing competencies internally, resorting to outsourcing only when necessary.
- Encourage the senior team to collaborate on Big Data initiatives and cultivate an interest in discovering its potential benefits.
- Embrace an organisational culture that values data, where Big Data is recognised as a valuable asset.
- Foster chances for senior staff to experience Big Data directly and understand its impact.

**The following table summarises the three cases**

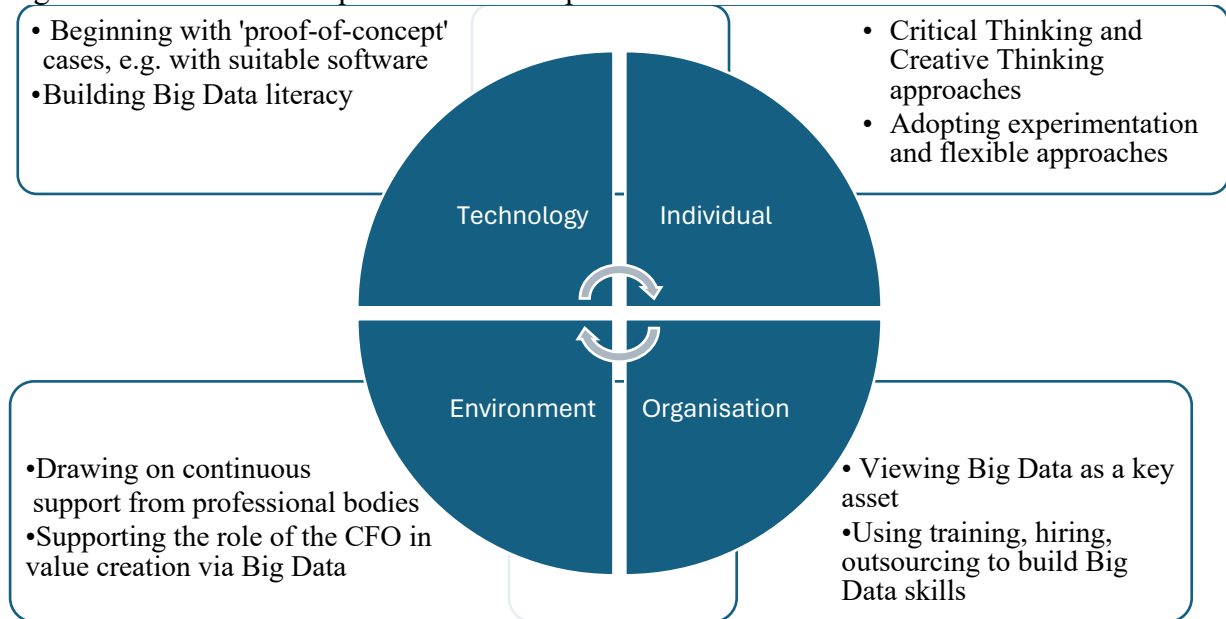
Table 1 – Summary of the three cases

	<b>1<sup>st</sup> Case</b>	<b>2<sup>nd</sup> Case</b>	<b>3<sup>rd</sup> Case</b>
<b>Level of Big Data use</b>	Low	Medium	High
<b>Big data are</b>	A challenge and a cost	An area for further exploration and potential investment	A key priority area for significant strategic investments
<b>Technology</b>	Concerns include ‘data overload’ and a lack of data consistency across the organisation.	The IT team is viewed as the driver of BD; the finance team has a modest role, but cross-functional working is necessary.  Software use is mainly ‘traditional’ e.g. spreadsheets.	Use of BD is driven by a strategic and forward-looking approach.  Significant collection and analysis of data is undertaken in-house.
<b>Individual</b>	Scepticism is expressed about BD. Reliance on ‘gut feelings’ rather than data, on many occasions.	Curious/inquisitive approach to BD. Good skills required in order to address difficulties in persuading senior colleagues.	C-suite works together on BD, demonstrates curiosity in exploring what it can offer, and is convinced of its potential value.
<b>Organisation</b>	Questioning whether BD are useful. Recognition of need to ‘start small’ to overcome concerns.	Preliminary collaborations between the finance team, the IT team and across the organisation. Need for finance team to demonstrate its value/role with regard to BD.	Strong ‘Big Data culture’ across the organisation, e.g. valuable real-time reporting to support decision-making. Willingness to accept a ‘trial-and-error’ approach to new BD initiatives.
<b>Environment</b>	Concern that collecting external data is challenging. Little explicit acknowledgement of the role of BD in exploring the firm’s external environment.	Lack of trust in external data. Identifying the role of the finance /accounting community in providing unbiased interpretation of Big Data analytics.	Extensive use of BD to provide strategic understanding of customers, competitors, etc.

## 4.2 Enablers of Digital Capability Acquisition

The second set of findings refers to the enablers that senior professionals highlighted as the most common and prominent in their experience, based on their various BD journeys (Figure 1).

Figure 1 – Enablers of acquisition of BD capabilities



### 4.2.1 Technology

**Beginning with “proof-of-concept” cases: starting with small steps involving modest BD investment.** Specific ‘proof-of-concept’ cases can be used to establish BD viability and value, before scaling up into wider applications as appropriate. Those senior professionals with little experience or knowledge of BD preferred to initiate a change by making modest investments in infrastructure, such as appropriate software. By designing and implementing a proof-of-concept case, senior professionals can address the challenges related to the overwhelming volume of data; small steps can be taken to gauge the potential value of the new initiative, guarantee data consistency across the organisation, and initiate greater cross-functional working, e.g. improving connections with the IT function, or establishing a digital ‘committee’. This approach indicates that these companies feel that they are at the beginning of a journey

with regard to the acquisition of BD capabilities. In some cases, they ‘start small’ due to fear of a cognitive overload of data and information:

*...get the right resource in place. Start with it on a small scale in an area where there’s well defined information, such as finance, and start to produce information. CFO/Company P*

**“Building Big Data literacy”:** promoting a good level of awareness of the potential of BD, across the organisation. As senior professionals are typically involved in finance or management accounting using ‘traditional’ financial data, they are in a good position to identify new opportunities to leverage BD. The participants felt that the opportunities and benefits arising from BD are currently not discussed to a satisfactory degree in their organisations. Building BD literacy means bringing the core functions of the finance team, such as reporting, data analysis, planning and forecasting, to a new level by leveraging innovative types of data and analysis. Senior accountants and finance professionals can use their digital literacy to inform the organisational strategy and to support the finance team in employing non-traditional methods of accounting such as real-time access, data analytics and data visualisation:

*I was drawing the link between digital literacy and identity, and that actually learning this stuff quite often involves a change in how you see yourself. Head of Digital/Company U*

#### **4.2.2 Individual**

**“Adopting Critical Thinking and Creative Thinking approaches”:** enabling the use of BD within the top finance and accounting team. The participants argued that using a combination of critical and creative thinking is the most appropriate way to understand patterns and gain insights from BD. Critical thinking involves questioning data and information to make better decisions. Moreover, the adoption of creative thinking can make BD more impactful, e.g., by matching data with other sources of information to gain new insights. Creative thinking evolves by actively engaging with colleagues to bring together existing ideas into a new configuration, hence developing new insights:

*You have to be much more agile and willing to experiment and help people, and be seen as a kind of partner in all of that. So, it's quite a big shift and it's quite a challenge to really well accepted models. CEO/Company F*

**“Adopting experimentation and flexible approaches”:** seen as key to unleashing the potential of BD and to confirming ‘proof-of-concept’ cases. This can represent a big shift for senior professionals, requiring them to leave behind well-accepted models and adopt new ways of working. A trial-and-error approach can initially appear costly for the organisation; during an experimentation phase, mistakes and adjustments will inevitably be made. Participants argued that organisations, or board members, should not measure the success of a BD investment in the short term, as costs, time and effort are likely to outweigh the immediate benefits; there is a need to focus on the potential long-term benefits of new initiatives:

*...so, let's try, if it doesn't work, I've made a mistake and then I will improve from it, really good learning and listening to their team and the other teams. Finance Director/Company C*

#### **4.2.3 Organisation**

**“Viewing BD as a key asset” can lead to transformational change in the organisation.** BD are not recognised as an asset in current reporting; the accounting standard IAS-38 on intangible assets (IFRS, 2022) does not currently allow BD to be capitalised. However, some participants argued that BD should be viewed as an intangible asset. This suggests that even medium-sized organisations should explore the use of a wider set of key performance indicators and measures to assist accountants, senior finance professionals, and the wider management team in shifting their perspective regarding the potential value of BD. Larger organisations should consider adopting alternative forms of reporting (integrated reporting<sup>1</sup>, for instance) where the CFO and CIO calculate a true and fair view of BD and the extent to which it can generate probable future economic benefits:

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<sup>1</sup> Integrated Reporting is a more holistic form of reporting that addresses limitations of current reports and develops long-term business strategies. (ICAS, 2015)

*It's an intangible asset. But it's probably the most valuable asset that the organisation now has. So, unless you understand that every further step is going to be wrong. CFO/Company V*

**“Using training, hiring, and outsourcing to build BD skills” and facilitate the acquisition of BD capabilities.** The participants felt that traditional training, such as workshops and master classes, may not work well for all senior accountants and finance professionals, because they are at different stages of the BD journey. The participants argued that if BD collection, analysis and interpretation are left to (traditional) accountants, the potential benefits of BD may not be maximised. As a result, the finance team needs experts in data; this can be achieved through training existing staff members, hiring accountants with a background in or knowledge of data analytics, or outsourcing data collection and analysis:

*There is a whole department set up for training, so management meets to discuss what needs to be done... if Big Data is identified as something that awareness has to be created on, training has to be delivered on, and it's handed over to the training department, that could be carried out and fed back to the finance officer. Head of Finance/Company AC*

Other participants pointed to the need to outsource elements of data collection and analysis:

*...outsourcing to Big Data specialists. The whole workplace is going very specialist at the moment... specialists in that field will create companies, they'll come together.... And then maybe outsource that entire function. Corporate Finance Manager/Company L*

There is the appetite to assemble stakeholders and sponsors who will then support the acquisition of BD capabilities for finance professionals by allowing the time and resource within the organisation rather than simply reverting to traditional methods and information sources.

#### **4.2.4 Environment**

##### **“Drawing on continuous support from professional bodies”.**

Some participants argued that training in BD for senior professionals should be mandatory because opportunities to upskill or reskill may otherwise be missed. The participants also identified a need for bespoke learning and development activities, based on an ‘ecosystem approach’ where they can learn from each other and from external parties with relevant expertise. An ecosystem approach provides tools and mechanisms for learning, exchanging practices, mutual development, sharing diagnostics and supporting each other.

Many participants agreed that it would be beneficial if accountancy bodies collaborated to accelerate the pace of education on BD. They believed that the enabler is when accountancy bodies share their learning and experience, encouraging collaboration across the whole sector or profession. Although the accountancy bodies were acknowledged to be not-for-profit organisations with limited resources, it was felt that collaborations and sharing of BD knowledge could be powerful enablers to unlocking the acquisition of BD capabilities for senior finance professionals and accountants:

*...the professional bodies, accountancy institutes have a role to play ...the role of the professional bodies is very important in terms of advancing the profession and advancing the understanding of what accountants do and should be doing. So, I think the advocacy and support that professional bodies do has to increase in this space. Finance Director/Company R*

**“Supporting the role of the CFO in value creation via Big Data”:** Participants felt that many senior professionals are still operating under an ‘old paradigm’ where financial ratios and financial reports to shareholders are the key basis of performance improvement and success. To acquire BD capabilities, senior accountants and finance professionals should be supported in adopting more comprehensive and collaborative approaches. External institutions, such as accountancy and independent bodies, can support the role of the CFO in value creation via BD by enabling collaborations between organisations. The use of BD should encourage senior professionals to create and strengthen channels for information sharing and insights. Having a value creation agenda via BD can help senior professionals identify opportunities and recognise challenges relating to organisational strategy:

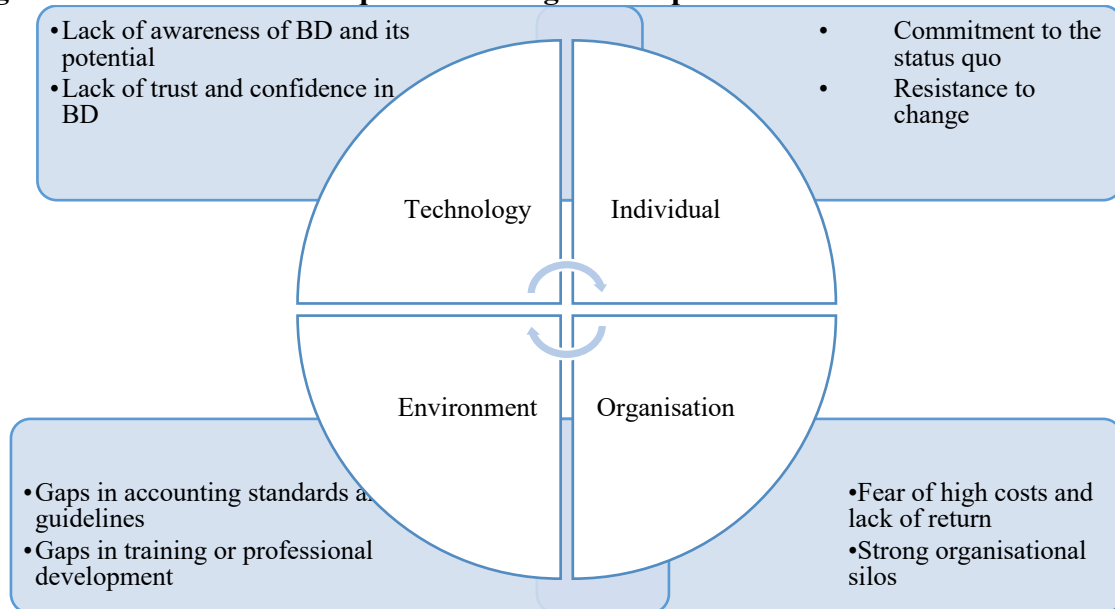
*I've been challenging the education directors ... to collaborate. You need to work together; otherwise, we're going to lose the battle. Head of Finance/Company AC*

#### **4.3 Barriers to the acquisition of Big Data capabilities**

The third and last set of findings refers to the barriers to the acquisition of BD capabilities that are again related to the four dimensions of Technology, Individual, Organisation and

Environment. By understanding and overcoming such obstacles, senior professionals can develop strategies to address gaps in BD capabilities (Figure 2).

**Figure 2 – Barriers to the acquisition of Big Data capabilities**



#### 4.3.1 Technology

**“Lack of awareness of BD and its potential”:** plays a big part in whether and how senior professionals want to invest in BD learning, infrastructure and upskilling. Senior finance professionals and accountants are not always aware of the benefits of BD, or are not sufficiently interested in how BD can help improve the profession:

*When people are planning to make investments in capability to use Big Data or whatever, they need to start with why, what am I doing it for? Is it better decision making? Is it better understanding? Is it better...what is it? Because otherwise I'm going to invest five million pounds in some Big Data warehouse, and then no one's ever going to use it, and so it's a classic 'start with why' type thing, isn't it, of being clear what the purpose is for the development of the capability. Finance Director/Company K*

**“Lack of trust and confidence in BD”:** a fear of a lack of reliability and trustworthiness of BD. Specifically, a lack of trust and confidence can take a number of different forms:



- *lack of trust in the types of data*, due to past confidence in more traditional forms of financial data (such as equity, income and expenses) rather than ‘newer’ forms of data from external sources, or unstructured data such as CCTV, images, social media, etc.
- *lack of trust in ‘new’ forms of data analysis*, either because it is conducted by a team outside the finance team, or because it differs from more traditional forms of financial data analysis, for example requiring new or more sophisticated software and/or types of analysis.
- *lack of trust in the findings*. The findings may differ from those obtained with more traditional methods, or may challenge ‘gut feelings’.

#### 4.3.2 Individual

**“Commitment to the status quo”**: some senior financial professionals and accountants found it challenging to contemplate changes to the current structure of the finance team, to their roles or to the set of skills acquired through their careers. Some felt that finance is a “back-office function” that prepares reports, and that no change to this was really required:

*In certain organisations ... things are not going to change, the status quo won't change unless there's a driver from outside. Finance Director/Company R*

**“Resistance to change”**: some senior finance professionals and accountants are not ready to commit to new approaches to decision-making. Their knowledge and consolidated experiences prompt them to follow what they already know:

*...where I'm not seeing that willingness to commit is, they've not used it before, it's not the done thing, it's very much a change from the status quo. Finance Director/Company G*

#### 4.3.3 Organisation

**“Fear of high costs and lack of returns”**: BD are viewed as expensive and requiring significant investment. Some senior finance professionals/accountants indicated a fear of investing considerable sums of money in BD infrastructure, which may not yield the forecasted

return on investment. They argued that high costs are associated with storing, managing and processing BD. If the organisation is not willing to adopt a ‘trial-and-error’ approach (as discussed above) to demonstrate the benefits of BD, such fears can prevent senior finance professionals and accountants from investing in BD and the associated capabilities:

*The reason people ignore Big Data is because [name of a senior colleague] gives me a spec to write something, and I fall off my chair, and the board says we’re not spending that, it’s not a case of no value, it takes a lot to run Big Data, it’s an expensive business. Finance Director/Company A*

**“Strong organisational silos”**: the finance function sometimes works in isolation, or without sufficient liaison with other departments such as operations, marketing and IT. If data are not shared across the organisation, the finance team may not even have access to any centralised data repository where data are stored, processed and managed for the organisation. The finance team may not collaborate sufficiently with the IT team, or with data analysts who have the technical skills to process the BD the finance team needs:

*...you have to be working as part of the business with other functions in order to play in the Big Data space. This is not something you can do in isolation, in a silo as a finance and accounting team. Finance Director/Company N*

#### 4.3.4 Environment

**“Gaps in accounting standards and guidelines”**: accounting standards and guidelines do not necessarily fully accommodate the fast-changing BD phenomenon. Some participants argued that accounting standards and procedures were outdated, or no longer adequately reflected current practice, especially in supporting the development of BD capabilities:

*...we have created so many accounting standards .. that actually don’t keep track with how the world really works. The data was created with different definitions, it’s like there is nobody setting the standard for this. CFO/Company V*

**“Gaps in training or professional development”**: some senior accountants and finance professionals suggested that the current training and development offerings from accountancy bodies are of great value and importance to the profession. However, they pointed out that professionals may attend training only when it is mandatory, and not necessarily to acquire

new BD capabilities. It was felt that there is room for a bespoke approach to improving the acquisition of BD capabilities:

*...the accountancy training is just ...it's very mechanical, and you're not training those capabilities around forward looking, uncertainty, judgement, communication, team, all of the sort of things ... is the training too narrow? Finance Director/Company K*

## 5. Discussion

The research highlights a spectrum of Big Data utilisation among medium-sized UK organisations, reflecting a varied landscape of digital maturity. This aligns with previous studies emphasising the transformative potential of Big Data in enhancing decision-making and strategic planning in finance (Merendino et al., 2018; Sarkar et al., 2021). However, the transition from traditional data management practices to a more sophisticated, data-driven approach requires not just technical skills but a cultural shift within the organisation.

**Key enablers** identified in this study, such as structured training and leadership support, are critical in bridging the gap between the potential of Big Data and its actual application in finance functions. This echoes the literature's call for a more holistic approach to developing digital capabilities, where soft skills such as data literacy and cross-functional collaboration are as valued as technical proficiency (Deniswara Handoko & Mulyawan, 2020). The emphasis on leadership vision underscores the role of finance professionals not just as data analysts but as strategic partners in business innovation.

**The barriers** to effective Big Data integration, including resistance to change and resource constraints, reflect underlying challenges in the broader adoption of digital technologies in finance. This resonates with studies highlighting the reluctance among some finance professionals to adopt new technologies due to fear of the unknown or a perceived lack of immediate return on investment (Dzuranin, Geerts, & Lenk, 2023). Addressing these barriers

requires a concerted effort to foster a culture of innovation, where experimentation and continuous learning are encouraged and supported.

## **6. Implications for Practice and Future Research**

For senior professionals and their organisations, these findings offer a roadmap for navigating the digital transformation journey. Emphasizing the development of both hard and soft digital capabilities, fostering a supportive leadership environment, and encouraging collaboration across functions emerge as key strategies for leveraging Big Data effectively.

Future research should explore the long-term impact of digital capability development on organisational performance and competitiveness. Additionally, investigating the role of emerging technologies, such as artificial intelligence and machine learning, in enhancing Big Data analytics in finance presents a promising avenue for further inquiry.

This working paper embarked on an exploration of the digital capabilities required by senior professionals to effectively harness the potential of Big Data within medium-sized UK organisations. Through qualitative research, encompassing interviews and workshops, we uncovered a spectrum of Big Data utilisation levels and identified critical enablers and barriers that influence the acquisition and application of digital capabilities in the finance domain.

The journey towards digital transformation in organisations is characterised by diverse experiences with Big Data, from nascent to advanced stages of integration. The development of digital capabilities is not solely about acquiring technical skills; it necessitates a broader cultural shift towards valuing data-driven insights and promoting cross-functional collaboration. Leadership support, structured training programs, and a proactive approach to overcoming traditional resistance and resource constraints emerged as pivotal in navigating this transformation.

## 6.1 Implications and Recommendations

For senior professionals and their organisations, the findings highlight the importance of adopting a strategic approach to digital capability development. Key recommendations include:

- **Invest in Comprehensive Training:** Develop tailored training programs that enhance both hard and soft digital capabilities, ensuring finance professionals are equipped to leverage Big Data effectively.
- **Foster a Culture of Innovation:** Senior leadership must champion a shift towards a more agile, data-centric organisational culture, encouraging experimentation and learning from failure.
- **Promote Cross-Functional Collaboration:** Establish mechanisms for collaboration between finance, IT, and other departments to facilitate the sharing of insights and foster a holistic understanding of Big Data's potential.
- **Address Barriers Proactively:** Recognize and tackle resistance to change through transparent communication, demonstrating the tangible benefits of Big Data integration.

## 6.2 Future Research Directions

This study lays the groundwork for further inquiry into the evolving role of finance in the digital era. Future research could delve into the impact of emerging technologies, like artificial intelligence and blockchain, on the finance function and explore the longitudinal effects of digital capability development on organisational success. Additionally, comparative studies across different organisational sizes and sectors could provide deeper insights into the universality and specificity of the challenges and strategies associated with Big Data in finance.

As the finance profession continues to navigate the complexities of the digital landscape, the findings of this paper highlight a clear imperative: embracing digital capabilities is not optional but essential. By strategically developing these capabilities, finance professionals can not only enhance their decision-making processes but also contribute to the strategic growth and resilience of their organisations in an increasingly data-driven world.

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