

Central Bank Digital Currencies (CBDCs) and Their
Influence on Entrepreneurial Activities and Businesses

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Introduction

Many branches of economic study are poised to feel the effects of economies' increasing digitization, including monetary economics and the very nature of money. Society and the financial system face new possibilities and threats as a result of the enormous amounts of data produced by digital activity.

According to a long-standing school of thought in monetary economics, money acts as a universal "memory" of all monetary transactions, acting as both a medium of exchange and a means of coordination (e.g., Kocherlakota & Wallace 1998). The institutional foundations of money remain unexplored in this conceptualization of money, though, and they may be critically important in determining the welfare effects of money. Digital currencies provide significant threats to privacy, integrity, and competitiveness because of payment-related network effects (Rochet & Tirole, 2006) and the possibility of data proprietary usage. This setting has given birth to a significant public discussion over the impact on monetary system design from the introduction of new digital forms of central bank money.

After the issuance of real cash, the idea of central banks issuing digital forms of money for common usage follows logically. On top of that, the wholesale payment system has provided banks with access to digital versions of central bank money for decades. Yet, discussions of creating a digital central currency that regular people may access have just lately gained steam. At first, policy reports were quite careful when they were issued (see, for example, CPMI and MC 2018). The scope of the argument has expanded in recent years. Central banks have taken a more active role in response to the crypto market's ups and downs, global stablecoin initiatives like Facebook's

Diem, and the growing impact of technology on the financial sector. Instead of using the existing system as a reference point, they look forward to a time when innovation and new private forms of money have already revolutionized the monetary system. A number of central banks have started studying and, in some cases, creating their own digital currencies called central bank digital currencies (CBDCs). Over eighty-six percent of world central banks are investigating CBDCs, according to a 2020 poll, and fifty-six of those institutions had made their research and development activities known to the public by July 2021 (Auer et al. 2020, Boar & Wehrli 2021). Three central banks have already started CBDCs, and more are running experimental programs as of early 2022. Nevertheless, central banks have not yet reached a unanimous decision about the necessity of CBDC issuance.

The academic discourse on Central Bank Digital Currencies (CBDCs) is rapidly expanding, paralleling a dynamic and heated policy debate. While much attention has been given to the "reserves for all" aspect of CBDCs and their potential impact on central and commercial banks, monetary policy, and financial system stability, there is a growing focus on the wider economic effects. Noteworthy sources such as Auer & Böhme (2020, 2021), BIS (2021), Bank of Canada (2020), Bank of England (2020), ECB (2020), Kiff et al. (2020), and People's Bank of China (PBC, 2021) have contributed to this body of research. In exploring CBDCs' potential improvements in payment inclusion and efficiency, discussions extend to safeguarding data privacy, promoting competition, and ensuring payment system integrity. From an entrepreneurial perspective, CBDCs could positively impact financial inclusion, reduce transaction costs, stimulate innovation in financial services, enhance data privacy and security, and foster healthy competition by countering the influence of large tech corporations in payment networks. As the literature evolves, nuanced insights into the specific implications for entrepreneurial activities are likely to emerge.

Problem statement

The advent of Central Bank Digital Currencies (CBDCs) signifies a profound shift in the global financial landscape, presenting unprecedented opportunities and challenges for both startups and established enterprises. A comprehensive comprehension of these digital currencies, emerging as a pivotal element in the financial system, is crucial as they wield influence over economic entrepreneurship. Despite the transformative potential, a notable knowledge gap persists due to a scarcity of empirical studies examining the ramifications of CBDC introduction and widespread acceptance on the dynamics of business operations and entrepreneurial endeavors. Investigating the multifaceted effects of CBDCs, ranging from their potential to enhance operational efficiency and create novel market opportunities to the risks and obstacles that may impede entrepreneurial

growth, is essential as businesses and entrepreneurs navigate this transformative phase. This study aims to fill the void in the literature by scrutinizing the intricate interplay between CBDCs and economic entrepreneurship. The findings are anticipated to provide valuable insights, informing strategies for success and adaptation in the swiftly approaching digital financial era, ultimately shaping the landscape for entrepreneurial activities on a global scale.

Objectives

- Analyze the fundamental features of Central Bank Digital Currencies.
- Explore the potential effects of CBDC implementation on entrepreneurial activities.
- Investigate the impact of CBDCs on businesses, including sectors, financial services, and technological advancements.
- Identify challenges and risks associated with the adoption of CBDCs for entrepreneurs and businesses.
- Propose strategies or recommendations for entrepreneurs and businesses to adapt to the CBDC era.

Literature review

History of Central Bank Digital Currency Initiatives

Several monetary systems have evolved throughout the years to cater to different economic demands. Credit cards, checks, banknotes, and coins were all revolutionary in their own eras (Giannini 2011). Stablecoins, smartphone-based payment apps, mobile money (mobile money)

issued by a central bank, and CBDCs are only a few of the innovative payment technologies that have emerged in the last several decades.

To some extent, CBDCs are just the digital equivalent of fiat currency (notes, coins, etc.) and central bank settlement accounts. The central bank's digital liabilities, wholesale CBDCs, have the potential to revolutionize the way financial firms settle their disputes. A form of universally accessible digital currency, retail (or general-purpose) CBDCs would be a liability of the central bank. The concept of making digital versions of central bank funds available to the general population is not novel. So, to improve payments and lessen the need for deposit insurance, Tobin (1987, p. 172) suggested the concept of deposited money, or "a medium with the convenience of deposits and the safety of currency," to be used.

The technology behind cryptocurrencies and the possible use of distributed ledger technology (DLT) to publicly issued digital currencies has been the subject of internal investigations by numerous central banks over the last several years.⁴ Many major central banks have conducted internal tests with DLT since 2015, and the results have shown that further study is needed before it can be integrated into their payment systems. This is true for countries including Canada, the Netherlands, Singapore, and the UK. Starting in 2016, a number of central banks began conducting wholesale research on digital currencies. For the purpose of settling high-value interbank payments, a number of them concentrated on DLT.⁵ Others included central banks working together on wholesale CBDCs for international payments.⁶

The Riksbank of Sweden was the first to publish the results of their study on retail CBDCs (Sver. Riksbank 2017). Cash usage has been falling sharply in Sweden recently (Sver. Riksbank 2020), prompting the Riksbank to start a public conversation about how the public can get their hands on a payment instrument issued by the central bank. Sver. Riksbank (2020) states that this e-krona project has been developed further over time. The People's Bank of China's electronic Chinese yuan (e-CNY) is another state-of-the-art CBDC project. Several cities in China have been testing this CBDC since 2020. Through account-based interfaces, the general public and international visitors to China will have access to the e-CNY, a cash-like liability of the PBC.

In the meanwhile, the Sand Dollar, widely regarded as the first live retail CBDC, was issued in October 2020 by the Central Bank of the Bahamas. Authorized financial institutions are the ones that issue the Sand Dollar, which gives citizens access to a digital wallet that they may use using a smartphone app or a physical payment card. The debut of DCash was in March 2021, by the Eastern Caribbean Central Bank. DCash facilitates monetary transactions between individuals, as well as between consumers and businesses, and is provided by authorized financial institutions. The Nigerian Central Bank introduced eNaira in October 2021.

In the 2020s, CBDC research picked up speed. At least 68 central banks have published retail or wholesale CBDC research as of January 2022, according to Auer et al. (2020), who conducted a stocktake of all central bank publications. Some eight retail CBDC pilots are now active; these include initiatives in Sweden, South Korea, and China.⁷ At the same time, forty central banks have released studies on CBDCs for retail sale, and nineteen have announced CBDC research or development, sometimes in tandem with retail studies.

Drivers for CENTRAL BANK DIGITAL CURRENCY RESEARCH AND DEVELOPMENT

Research and development in the retail CBDC industry is motivated by both global trends and country-specific circumstances. As economies become more digital and data, especially personal data, becomes more important to the economy and the monetary system, CBDCs should be viewed in a broader framework. A number of chances to lessen information asymmetries, lower prices, and permit the development of new kinds of money present themselves as data plays an increasingly important role.⁸ However, data also bring forth new problems with competitiveness, privacy, and integrity, which the economics literature is just now starting to tackle. New private actors may swiftly dominate the monetary system as a result of money's inherent network effects, which raises major issues about competition and goes against the public interest.

Four new developments have brought these challenges to light. An increasing number of people are looking to Bitcoin and other digital currencies as an alternative to fiat currency (Carstens 2019). But cryptocurrency is more of a speculative asset than a medium of exchange. Their tremendous volatility makes them a poor choice for a medium of exchange. Many financial crimes, including ransomware attacks, money laundering, and others, use them (Foley et al. 2019, Paquet-Clouston et al. 2019). When considering Bitcoin's inefficient energy usage, it becomes clear that it lacks many redeeming public interest features. As an example, according to BIS (2021), the Bitcoin network consumes as much power as the Netherlands.

The second change is the introduction of stablecoins created by commercial companies. Stablecoins are a type of cryptocurrency that differs from others in that they are backed by assets

and thus have a more consistent value. So, the quality of the backing is directly proportional to the quality of the governance. Despite some success since its inception, the Diem project's worldwide scope was a major concern because it threatened to fragment liquidity and undermine the function of money as a tool for coordination (for more on this, see Arner et al. 2020 and Frost et al. 2020). The future of this business is uncertain when the assets of the most renowned worldwide stablecoin proposal (Diem Assoc. 2022) are sold and alternative forms of stablecoins, which support so-called decentralized finance, experience major growth. Whatever the case may be, stablecoins are really just a new version of the old monetary system as long as the alleged backing uses traditional money.

Thirdly, platform-based business models and big data are causing a stir in the financial sector, and big tech is making its way into payments. Central banks have multiple issues due to the massive amounts of personal data acquired and processed by big IT companies (BIS 2020). One difficulty is that companies with exclusive access to data tend to have more market power due to data silos that can form as a result of network effects, which also make the payment system more susceptible to concentration. Privacy and governance of data pose an additional obstacle. But there's a third goal that needs to be satisfied as well: protecting the payment system from threats like ransomware and money laundering without sacrificing data governance or competition. Therefore, the central bank, as the arbiter of the monetary system, faces a trifecta of imperatives brought about by digital innovation: safeguarding the payment system, protecting personal data, and remaining competitive (Shin 2021).

Last but not least, similar to other epidemics, the 2019 coronavirus disease (COVID-19) pandemic has sharply increased the use of digital payment technology (Saka et al. 2021). As a result of this change, central banks have been researching CBDCs more quickly in some circumstances. As an alternative to credit transfers and time-consuming and expensive checks, the idea of a "digital dollar" was mentioned in early congressional plans for a pandemic-related economic stimulus in the United States (Brett 2020).

Regardless of global trends, different governments have different motives for CBDC research and development. Beginning in 2017, the BIS Committee on Payments and Market Infrastructures surveyed the central banks' involvement in CBDC research, their reasons for doing so, and their plans for CBDC issuance. Boar and Wehrli (2021) use the survey results to demonstrate that the primary goals of CBDC research by central banks in developed economies are to increase domestic payment efficiency and boost safety and robustness. Put simply, central banks view CBDCs as a chance to mitigate digital payment security concerns, cut costs, and bolster their mandates to ensure the seamless operation of retail and wholesale payments. Research and development efforts are also motivated by a desire to ensure the financial system remains stable. This is because there is a real risk that private actors, who are not answerable to the public, may issue dominant alternatives to sovereign fiat currency. One other reason is the importance of financial inclusion, which is particularly true in EMEs. The unbanked, or people without a transaction account, are a growing problem, and several central banks see CBDCs as a way to help them.

Some studies examine central banks' revealed policy preferences as well as their claimed preferences; these studies focus on the variables that connect with real CBDC programs. Research and development of CBDCs are correlated with economic and institutional variables, which are

evaluated by Auer et al. (2020). They demonstrate that nations with a high innovation capacity (as evaluated by the World Intellectual Property Organization's innovation output score) and more digitalized economies (as indicated by, for example, mobile cellular subscriptions) have further along in their CBDC programs. In addition, they discover that studies on CBDCs in retail are further along in regions with a larger informal (shadow) economy, which is in line with the idea that CBDCs, through establishing a record of transactions, could contribute to the formalization of informal activities. Markets with more developed financial infrastructures tend to have more advanced wholesale CBDC projects since there is a stronger demand for better settlement and clearing services in these areas. Some central banks have imagined futures where they would think about issuing CBDCs, beyond only research and design concerns. These futures could involve the decline of cash usage, the rise of private stablecoins or cryptoassets, or some combination of the two (e.g., Bank Can. 2020, Bank Engl. 2020, ECB 2020).

It is evident that central banks are motivated to conduct research on CBDCs. However, this discussion has led to more basic questions about their optimality, such as the difference between public and private money and its role (e.g., Adrian & Mancini-Griffoli 2019, Bech & Garratt 2017, Brunnermeier & Niepelt 2019, Fung & Halaburda 2016, Ketterer & Andrade 2016). The necessity for central banks to react (or not) to CBDC issuance in other jurisdictions and the potential intensification of competition among global currencies could be brought about by CBDC issuance. The potential displacement of domestic currencies by digital ones is a worry that has been expressed, first in relation to cryptocurrencies and later to global stablecoins. It is more likely that the commercial juggernauts of certain digital platforms than the borders of official governments will give rise to new digital currency zones (Brunnermeier et al. 2019). Is it possible that CBDCs

face comparable scrutiny? The term "dollarization" (or "euroisation," etc.) describes the widespread usage of a foreign currency in day-to-day transactions and financial contracts by people and businesses; this tendency is well-known in many nations, especially EMEs (Levy Yeyati 2021). Would CBDCs encourage the digitalization of dollars?

Few studies have examined these facets of CBDC issuance, although there is reasonable evidence to suggest that they may be reduced. First, dollarization isn't always caused by technical differences between domestic and foreign currencies; more often, it's a result of public mistrust of the local currency, especially in light of a history of severe inflation or an underdeveloped financial industry. Secondly, there are policy instruments available to deal with these kinds of dangers. To be more specific, if CBDCs were to be designed with an account-based, identification-based approach, then cross-border use would require approval from both the issuing and receiving central banks (for more on this, see the section below). Thirdly, the dangers of currency substitution could be reduced through coordination among central banks. To avoid the foreign exchange (FX) mismatches that would occur when CBDCs are used extensively outside of their issuing country, central banks might coordinate their efforts to curb their use.¹³ Concerns like these probably won't be the main reason central banks issue CBDCs.

Has anyone thought about the possibility that CBDCs may displace the US dollar as the world's reserve currency? Both the general public and scholars studying international affairs have given this issue considerable attention (Kumar & Rosenbach 2020). Even yet, the availability of a digital version of a sovereign fiat currency is unlikely to be as important as the economic drivers of being a reserve currency on an international scale. For reserve currencies specifically, there are a number

of factors that contribute to their rise in value. These include robust capital markets that house plenty of secure assets and hedging capabilities; confidence in the currency's long-term worth and the stability of the governing system; and its usage in international trade, especially for invoicing. It seems implausible that a digital currency could replace the dollar in all these domains. Chorzempa (2021) demonstrates that domestic factors, rather than a "first mover advantage" in CBDC research and development, are the main drivers of CBDC research in countries such as the USA and China. While initiatives by other reserve currency central banks, such as the e-CNY, digital dollar, and digital euro, progress forward, this is likely to continue to be a contentious topic.

CBDC OPPORTUNITIES AND RISKS

opportunities

When compared to other digital currencies, the CBDC may have a little different structure and architecture, but it distinguishes out because to its unique issuer. Only a central bank can issue CBDCs. The interest of central banks in CBDC is driven by various motives. Many advantages of CBDC have been emphasized by its advocates, including:

- i. Resilience in payments and financial stability: A CBDC might help make a jurisdiction's payments more resilient, which would improve financial stability. It is possible that a CBDC might increase payment variety by introducing a new payment option.
- ii. Reducing systemic risks: By eliminating the need for bank deposits and facilitating direct settlement in central bank money, a CBDC might make the financial system safer for individuals, private sector enterprises, and non-bank financial institutions. As a result, payment networks would be far less vulnerable to concentrations of liquidity and credit risk. Large banks and PSPs

lose some of their systemic relevance as a result of this. On the other hand, the banks and PSPs that the central bank oversees would face direct competition from the bank. As a result, the current regulatory frameworks may come under more scrutiny.

iii) Better international money transfers: By bringing together different financial systems on a regional and international scale, a CBDC might pave the way for better international money transfers. Two ways to achieve this goal are to build worldwide payment infrastructures or to build domestic CBDCs around a common set of standards that will allow them to work together. The Bank for International Settlements (BIS) announced in September 2021 that a multi-CBDC prototype it had developed with the Bank of Thailand, Central Bank of the United Arab Emirates, People's Bank of China, and Hong Kong Monetary Authority had the potential to reduce the time it takes to complete a cross-border transaction from three to five days to less than ten seconds, while simultaneously halving the total costs of international payments. Nevertheless, significant drawbacks like as DLT's scalability problems and the absence of liquidity savings methods were pointed out.

iv. Security for buyers: Crypto's meteoric rise reflects a need for new kinds of online banking and other financial services. Many would prefer to do business in a completely borderless setting. Compared to newly created privately issued money-like instruments like stable coins, CBDC offers safer and more reliable payment services, which could protect the public from the dangers of new forms of private money.

v. Fostering innovation: Many businesses might benefit from an open CBDC platform, which would afford them the opportunity to innovate both their CBDDC-related payment services and the payment services they offer to customers.

vi. Access to banks: CBDC presents a "double-edged sword" when it comes to access to banks. To help those who aren't able to use the existing ecosystem's financial services, a retail CBDC could be launched. Users, however, would need access to the underlying tech and technical know-how, which may be out of reach for certain people. But CBDC could open up a digital payment channel for the country's underserved regions. To achieve this goal, CBDC infrastructure must be extended to underserved areas where private payment companies have failed to establish a foothold.

Influence of entrepreneurial activities

The introduction of Central Bank Digital Currencies (CBDCs) presents a complex landscape of opportunities and challenges for entrepreneurial activities. First, the potential shift of funds from traditional bank accounts to CBDCs may alter the dynamics of bank credit, impacting the ability of banks to provide new loans. This shift could pose a challenge to the traditional role of banks as intermediaries in the lending process. Understanding how this transformation affects the availability and cost of credit is crucial for entrepreneurs who often rely on bank financing for business operations and expansion. Additionally, the interest-bearing nature of CBDCs could influence individuals' decisions to keep their money in bank accounts that offer interest, thereby affecting the overall liquidity and lending capacity of banks. Entrepreneurs must navigate these changes in the financial landscape to optimize their access to capital and manage potential increases in lending costs.

The risk of economic marginalization emerges as a significant concern. The digital divide, where not everyone has equal access to technological infrastructure and technical literacy, could create disparities in CBDC utilization. Entrepreneurs operating in regions where segments of the population lack the necessary access and know-how to use CBDCs may face challenges in

reaching customers and conducting transactions. Bridging this technological gap is crucial for ensuring widespread adoption and preventing economic exclusion, emphasizing the need for entrepreneurs to consider the inclusivity of their business models in the context of evolving digital financial systems.

The technological dangers associated with CBDC systems introduce potential threats to entrepreneurial activities. Security concerns such as hacking and cybercrime could jeopardize the integrity of digital transactions and financial data. Entrepreneurs must prioritize robust cybersecurity measures to protect their businesses and customer information in this evolving digital financial landscape. Additionally, increased fraud risks in nations with low financial literacy underscore the importance of implementing secure digital payment mechanisms and educating users to safeguard against fraudulent activities.

Considerations related to data privacy, anti-money laundering (AML), and counter-terrorism financing (CFT) policies have direct implications for entrepreneurial ventures. The structure of CBDCs, whether requiring extensive data collection or enabling complete transaction anonymity, presents a delicate balance. Entrepreneurs must navigate the regulatory landscape to ensure compliance with evolving AML/CFT standards while respecting user privacy. Striking this balance is vital for entrepreneurs engaging in digital financial activities, as regulatory compliance can impact the viability and sustainability of their ventures.

The infrastructure cost associated with CBDCs introduces both opportunities and challenges for entrepreneurs. While CBDCs could potentially reduce the costs of printing physical money, entrepreneurs need to contend with the fixed and variable expenses tied to operating within the CBDC infrastructure. Developing and maintaining the necessary technological and financial infrastructure may require significant investments, impacting the cost structure of entrepreneurial

activities. Entrepreneurs must assess these infrastructure costs and weigh them against the potential benefits and efficiencies offered by CBDCs to make informed decisions about incorporating digital currencies into their business operations.

Methodology

The influence of Central Bank Digital Currencies (CBDCs) on entrepreneurial activities and firms is the subject of this study, which uses a mixed-methods approach to carefully integrate quantitative surveys and qualitative interviews. This approach is comprehensive and intended to give many players in the entrepreneurial ecosystem a more nuanced knowledge of the potential and problems that CBDCs present. The realization that while quantitative data alone can provide a broad picture, it might not provide the depth required to fully understand the complex dynamics involved in the adoption of CBDCs is what led to the choice to employ a mixed-methods strategy. On the other hand, qualitative information obtained through interviews can capture the subtleties and individual experiences that quantitative data may miss. By utilizing both techniques, this study seeks to get around the drawbacks of using only one methodology, guaranteeing a more thorough and robust investigation of the research topics.

We provide the specifics of our quantitative and qualitative research components in the sections that follow, along with the target demographics, sample plans, methods for gathering data, and methods for analysis. By using this integrated approach, we hope to shed light on the complex effects that CBDCs have on business owners and entrepreneurs, offering insightful information that will help shape successful adaption and success strategies in the increasingly digital financial sector.

Quantitative research

The quantitative phase of this research employs a robust methodology designed to gather numerical data and assess statistical patterns regarding the impact of Central Bank Digital

Currencies (CBDCs) on entrepreneurial activities and businesses. By leveraging a stratified random sampling method, this section aims to provide a comprehensive and representative overview of the quantitative aspects related to CBDC adoption within the diverse entrepreneurial landscape.

Target population

The target population for this research comprises a select group of financial professionals and experts who play pivotal roles in financial decision-making within entrepreneurial contexts. The intentional focus is on individuals with diverse backgrounds, expertise, and experiences, representing different countries to ensure a global perspective on the impact of Central Bank Digital Currencies (CBDCs). The first category includes financial professionals. This category encompasses individuals actively engaged in financial roles within entrepreneurial settings. It includes financial analysts, CFOs, financial advisors, and professionals responsible for managing financial aspects within businesses. Financial experts selected for this research possess specialized knowledge in financial matters relevant to entrepreneurial activities. These individuals may include academics, consultants, or professionals renowned for their expertise in financial decision-making.

Qualitative analysis

Quantitative analysis serves as the quantitative backbone, allowing for broad generalizations and statistical insights. However, to comprehend the intricacies of how financial professionals navigate

the complexities of CBDC adoption in entrepreneurial contexts, a qualitative lens becomes indispensable. Qualitative analysis provides a platform for participants to express their thoughts, share anecdotes, and elaborate on their experiences, contributing a qualitative layer to the overall research narrative.

Sampling

According to Blaxter et al. (2010) and Collis and Hussey (2014), the researcher primarily employed purposive sampling to identify and recruit research participants who had first-hand experience with design as a business strategy tool. In some instances, researchers employed snowball sampling to find volunteers by referring them to other, more qualified individuals inside their firm who denied having the necessary expertise. Aside from this small obstacle, the researcher encountered no problems with the sample process because all individuals approached were eager to take part in the study. A total of ten interviews were conducted. There was no prior determination of the sample size. Instead, the goal of the study was to collect enough data to draw conclusions, a phenomenon known as data saturation (Guest et al., 2006). There were a total of six in-person or virtual interviews, each of which lasted around an hour. The researcher refrained from taking notes throughout the interviews so that she could give her undivided attention to the participants' talks. Instead, the researcher videotaped the interviews with the participants' permission and transcribed them afterwards.

Qualitative data analysis

Inductive theme analysis was used to examine the interviewees' qualitative data. Supporting the study purpose of building a theory on the basis of the research results, thematic analysis is an inductive analytical approach that focuses on generating themes from the raw data (Boyatzis, 1998,

p.4). The researcher prefers a qualitative research methodology and semi-structured interviews because of their flexibility, and thematic analysis allows researchers to tailor the process to their own requirements, offering flexibility in data analysis (Boyatzis, 1998, p.4).

According to Guest et al. (2012), the data set's complex meaning may be adequately captured through the use of thematic analysis (p.11). The researcher found commonalities and differences in the participants' descriptions, thoughts, and points of view by applying thematic analysis to the collected data. According to Boyatzis (1998) and Guest et al. (2012), a theme can be either an overarching pattern of overtly stated thoughts and observations embedded in the data or an interpretation of more subtle facets of the event under study. In order to analyze and understand the data, the researcher uses the themes as a foundation. A comparison of topic frequencies, assessment of theme relationships, and identification of theme co-occurrence were all part of the data analysis in this study (Guest et al., 2012, p.10). During this process, some themes were deleted, others were combined with others to form a new overarching theme, and a handful were developed from scratch. Writing up the findings, subject by theme categorized, and developing a framework outlining the critical success elements and best practices for design adaption in business followed this step.

Ethical considerations

Before the researcher reached out to or involved any possible volunteers, the University Research Ethics Committee gave its approval for the intended study. Additionally, the University Research Ethics Committee came to a consensus on a set of principles for the ethical conduct of research, which served as a foundation for the development of this study. Before, during, and after the

interviews, the researcher took many efforts to ensure that they adhered to the guiding principles of good research ethics. Each participant received a Participant Information Sheet (which may be requested) before their interviews. The sheet explains the study's rationale, what it entails to be a part of the study, and any potential advantages or disadvantages. All individuals who took part in this study gave their informed and free permission before it began (available upon request). After their interview, participants had 10 days to decide whether or not to continue with the study, and they weren't required to provide a reason. After giving some thought to the potential consequences, the researcher reached out to each participant individually to get their permission to use their name, position, and organization in the study (available upon request). They were all in agreement that their names and positions might be disclosed. One person who took part in the study asked not to be named but rather to be referred to as an industry representative. Lastly, someone senior in each organization gave their approval for the participants to take part, as most of the questions concerned the inner workings of their respective companies. This was done in the absence of a participant who held a senior position within the organization, but this information is accessible upon request. Because of the gravity of the situation, the researcher took precautions to restrict access to the raw data and personally identifiable information gathered from the study to himself (Denscombe, 2014, p.358). To ensure the utmost confidentiality, all interview materials, including notes, recordings (which were obtained from interviewees with their agreement at the start of the interviews), and transcripts, were stored in a safe location. After the study was published, all of the raw data was erased.

Reliability

According to Collis and Hussey (2014), "the accuracy and precision of the measurement and absence of differences in the results if the research was repeated" (p.52) is what reliability is all

about. Interpretivist research presents unique challenges in producing reliable findings due to the inherent subjectivity in qualitative research methodologies and the high level of researcher engagement (Collis and Hussey, 2014, p.46-47). Theoretically, this means that researchers' identities, values, and interests shape how they gather and analyze data, which in turn means that different researchers may arrive at different conclusions (Denscombe, 2014, p.276).

Researchers should be aware of their own biases and how they may affect the results in order to prevent or at least mitigate any detrimental influence on the results' dependability. Researchers may unwittingly give more weight to viewpoints that lend credence to their existing opinions and less weight to alternatives that challenge these personal assumptions; this phenomenon is known as confirmation bias (Hallihan and Shu, 2013). The researcher made an effort to prevent confirmation bias and get credible results in this study by being forthright about how she analyzed the data, treating all data equally, and resisting the urge to modify the data (Denscombe, 2014, p.358). Another factor that helped keep researchers from being biased was talking to and consulting with the study supervisor.

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