Navigating the Productivity Paradox:

Strategic Insights from Chief Information Officers

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Abstract

The productivity paradox, characterised by the disconnect between rising ICT investments and stagnant productivity gains, remains a significant challenge for organisations. This report shifts the debate from theoretical discussions to the organisational realities faced by Chief Information Officers (CIOs), focusing on their role in balancing efficiency, productivity, and compliance, addressing C-suite misalignment, and navigating technological determinism. Through in-depth interviews with CIOs, we found that productivity is often conflated with efficiency, resulting in a focus on short-term gains rather than long-term innovation and value creation. Misalignment within the C-suite, particularly with the Chief Executive Officer (CEO) and Chief Financial Officer (CFO), further complicates efforts to leverage ICT effectively. Limited technical understanding among executives can hinder strategic alignment, and budget control mechanisms can restrict cross-functional ICT initiatives. However, effective collaboration between CIOs and CFOs—centred on joint planning and aligning financial and technological objectives—can significantly enhance productivity and resource allocation.

Additionally, CIOs stress that successful ICT implementation requires robust change management, employee engagement, and continuous improvement, yet these aspects are often underfunded or overlooked. To fully harness the potential of ICT investments, CIOs must navigate the complexities of aligning technology with business strategy, ensuring compliance, fostering cross-functional collaboration, and managing cultural expectations. Balancing efficiency and productivity, fostering an entrepreneurial mindset, and breaking down organisational silos are essential for achieving sustainable productivity gains.

The report concludes with a comprehensive set of practical recommendations aimed at business leaders and organisations to enhance productivity through strategic leadership and effective technology investments.

Exploring the productivity paradox

When you tune into conversations with business leaders, consultants, and economists, they abound with the business and economic potential of new technologies.

Repetitive daily tasks can be automated, potentially streamlining processes and diminishing the need for manual intervention. Tools such as video conferencing, project management software, and collaboration platforms can enhance communication and coordination among teams, fostering quicker decision-making and project execution. AI-driven chatbots and virtual assistants can provide personalised customer support around the clock, enhancing customer satisfaction and loyalty. Large Language Models (LLMs) can assist in contract analysis, compliance monitoring, and other legal and regulatory tasks. Cloud-based services offer scalable and on-demand resources, minimising the necessity for substantial upfront investment in Information and Communication Technology (ICT) infrastructure and potentially enabling organisations to scale their operations more efficiently. Improved digital interactions with customers through online platforms, mobile apps, and chatbots aims at elevating the overall customer experience, hoping for increased customer retention and positive word of mouth (Prentice and Nguyen, 2020).

The potential benefits appear vast. Yet, it is puzzling to note there has not been a significant upturn in productivity since the mid-2000s despite all these potential opportunities (Coyle, 2023). Economists call this phenomenon *the productivity paradox*.

Most economic studies adopt the view that measurement issues underlie the productivity paradox. It is widely assumed that the lag in productivity gains can be explained by the time required to accurately measure and recognise the benefits of digital investments, a perspective prominently argued by economists such as Chad Syverson (2017). This report, however, posits that a closer examination of organisational reality is needed to understand the productivity paradox. We suggest that digital investments necessitate considerable time and effort before yielding tangible productivity improvements. In this context, effort refers to the integration and optimisation of new technologies, the training of employees, and the adaptation of workflows and business processes.

Motivated by earlier research from Penney and Pendrill (2022), which emphasises the importance of firms actively discussing productivity, our goal is to identify barriers to productivity improvement and formulate strategies for the seamless integration and effective use of technology to achieve business success. By doing so, we aim to provide actionable insights that help organisations overcome productivity challenges and leverage technology effectively.

The productivity paradox

The productivity paradox refers to a perplexing observation in business process analysis; despite increasing investment in information technology, the productivity of individuals and organisations is not increasing accordingly. This phenomenon was supported by empirical evidence from the 1970s to the early 1990s, which was counterintuitive given the expected

productivity gains from ICT investments. Historically, investments in mechanisation and automation yielded a three to four percent return on productivity, but with ICT, this rate dropped to only one percent (Goldin et al., 2021).

Today, the productivity paradox remains a prominent issue with businesses grappling with the impact of digital technology on organisational growth. The persistent disconnect between rapid technological innovation and its limited impact on economic growth underscores the ongoing relevance of the productivity paradox.

Economists have analysed this paradox and offered various explanations. One perspective suggests that contemporary digital innovations hold less inherent value compared to earlier breakthroughs like electricity (Gordon, 2016). Another viewpoint posits that the slower adoption of new technologies by businesses and consumers reflects a typical delay due to the complexities of modern technology (Brynjolfsson et al., 2021). Additionally, inaccuracies in measuring inputs and output at different time during the technology cycle may contribute to underestimating the productivity benefits of digital technologies (ONS 2016; Abdirahman et al., 2022; Abdirahman et al., 2017).

While debates about the productivity paradox are characterised by lively debates, the empirical evidence is that there is a group of companies that are experiencing sluggish productivity growth, lower than the previous trend. These productivity 'laggards' struggle to match the performance of leading companies, let alone close the gap with them.

Productivity gaps between the most productive global firms (the "frontier" firms) and the rest have been widening. From 2003 to 2020, productivity in the top-performing frontier firms grew by over 50% in manufacturing and more than 67% in services, on average across countries and industries. In contrast, the productivity of less productive firms (the "laggards") increased by less than 5% during the same period (OECD, 2024).

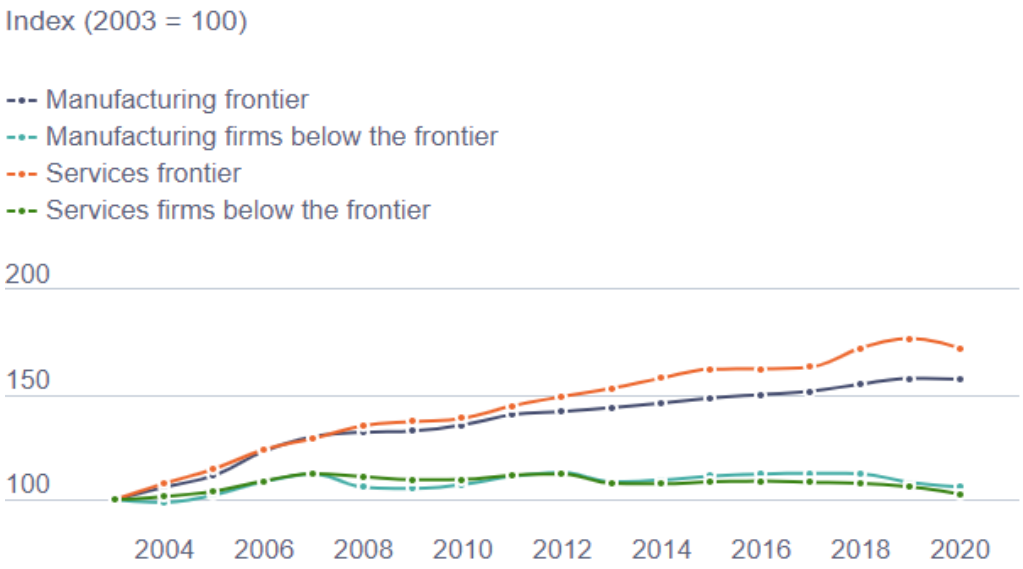

Figure 1 Productivity divergence between firms at the global frontier and the rest

Additionally, it has been noted that the technology diffusion from highly productive leaders to the laggards has experienced a recent slowing down (OECD, 2020). This suggests a continual

lengthening of the technology diffusion curve, where organisations outside of the leading cohort are encountering challenges in keeping pace with innovation. Some researchers attribute this phenomenon to management failures. For instance, Nicholas Bloom et al. (2012) have demonstrated that deficiencies in management processes and practices significantly contribute to the prevalence of low productivity among manufacturing companies. Also, they observed that technology is utilised more efficiently by well-managed firms, while Schneebacher (2021) noted a surge in online sales among better-managed UK companies during the pandemic.

The importance of productivity

A country's average level of living standards and quality of life depend to a large extent on its ability to increase productivity, measured by output per worker or overall efficiency in the use of resources such as labour, capital and technology for sustainable and inclusive growth (Coyle et al., 2023). Consequently, organisations and companies that optimise their productivity not only benefit themselves but also make a positive contribution to society as a whole.

Productivity metrics may vary across the public, private and not-for-profit sectors of the economy, but the benefits to organisations are universal. These benefits include the mobilisation of resources for investment, increased competitiveness, job creation, higher wages, competitive prices for consumers and greater value creation. For society as a whole, productivity gains strengthen the performance of regions and communities and lead to better infrastructure, education and healthcare (Coyle et al., 2023).

Global productivity growth/slowdown

Over the past 25 years, there has been significant growth in global productivity, primarily propelled by China and India. This surge has empowered many emerging regions and economies to narrow the gap with advanced economies in terms of living standards. Notably, China has made substantial strides, elevating its output per worker from $6,000 to over $40,000 through internal reforms and global integration efforts. Similarly, Central and Eastern Europe have experienced noteworthy progress, doubling their economic output per worker to over $80,000, particularly through integration with Western Europe. The primary driver across all regions has been the increase in capital per hour, contributing to 70 to 80 percent of total productivity growth in most areas (McKinsey, 2024, Van Ark and Pilat, 2024).

However, the global financial crisis (GFC) of 2007/2008 exacerbated the ongoing slowdown in productivity growth in advanced economies and halted the positive momentum in emerging markets. Prior to the GFC, productivity growth in advanced economies had already decelerated, dropping from an average of 2.2 percent per annum between 1997 and 2002 to 1.6 percent between 2002 and 2007. Subsequently, it declined to less than one percent, persisting for over a decade in North America, Western Europe, and advanced Asia post-GFC. Although the United States witnessed a slight recovery in productivity growth in the years leading up to the COVID-19 pandemic, the rates were insufficient to signify a new acceleration path for the economy (van Ark et al., 2024).

The deceleration in productivity growth in the UK, particularly over the past 15 years, is notably concerning amid rising costs, labour shortages, tepid demand, and the imperative to transition to a zero-carbon economy. After at least two decades of sluggish productivity growth, the UK has witnessed a widening of its productivity gap relative to some peers in leading economies, including Germany and the United States (Coyle et al., 2023).

Recent data from the Office for National Statistics (ONS) indicates that growth in inflation-adjusted GDP (gross domestic product) per hour worked averaged 1.6 percent annually from the late 1990s to the late 2000s (1998-2008). However, it declined to approximately 0.3 percent per year in the subsequent period (2008-2019). The COVID-19 pandemic dealt a severe blow to productivity in early 2020, triggering volatility as numerous companies faced closures followed by reopening phases. Although the average level of productivity has rebounded to pre-pandemic levels, the growth rate remains sluggish, with forecasts indicating a slight dip into negative territory in 2022 (ONS 2024).

Understanding productivity

The term "productivity" has a rich history, dating back to Quesnay's work in 1766 in the Journal de l'Agriculture. Since then, it has been utilised across various contexts, particularly within economic systems. Scientists have underscored productivity as a fundamental outcome in economic production activities (Singh et al., 2000).

Productivity is a multi-faceted phenomenon. The straightforward measure of average Gross Domestic Product (GDP) per working hour is widely utilised by economists, policymakers, and the media to inform the policy debate on the productivity slowdown. Productivity offers a powerful means to gauge the vitality of an economy. However, this macroeconomic measure does not reveal the intricacies of how productivity impacts firms, individuals, and local communities. Only by comprehending the nuances of productivity in various contexts can we engage in an informed national and broader debate on enhancing the UK’s productivity performance for the benefit of all, thereby making it a key driver of inclusive growth.

A more comprehensive understanding of productivity is provided by The Productivity Institute (2024):

Productivity is about how we turn our resources into outcomes for firms, people and places. The resources are associated with workers and the hours they work but also includes investments in skills, machines, infrastructure, digital capabilities, and organisational knowledge.

Productivity is crucial not only for a nation's economy but also for the success of individual firms. Enhanced productivity enables firms to expand their market share or increase profitability. Companies can leverage productivity gains to offer consumers lower prices or to develop superior products and services. Firms with higher productivity are better positioned to offer improved wages to employees, provide greater returns to investors, and accelerate innovation and investment in activities that further enhance productivity.

Thus, although there is a general agreement on the importance of productivity for business performance and competitiveness, research indicates that it often takes a back seat to other business priorities. This seems to be particularly the case in small and medium-sized enterprises (SMEs) where discussions about productivity often do not take place. Service-oriented companies and public and third sector organisations also seem to struggle with the complexity of the concept. Consequently, productivity often gets neglected in corporate strategies, despite its potential to contribute to sustainable business growth and value creation in the medium and long term.

The inability to effectively integrate productivity into the business strategy can be attributed to several factors. Our review of the literature indicates similar findings to Tangen (2005), namely that: a) those who use the term 'productivity' rarely provide a definition of it; b) there is a lack of awareness of the different interpretations of the term and the implications of this disparity; c) both conceptual and mathematical definitions and approaches exist.

Conceptual definitions elucidate the meaning of the concept and foster a shared understanding within an organisation, aiding in the formation of strategic goals. Conversely, mathematical definitions serve as the foundation for productivity measurements and focus on enhancements rather than conceptual explanations. However, translating conceptual definitions into mathematical constructs can be challenging, often necessitating trade-offs, which may result in mathematical definitions reflecting only partial aspects of the true essence of productivity.

Moreover, the interpretation of productivity varies depending on the context. Managers' strategic perspective on productivity often diverges from the operational viewpoint of employees. There are also varying perspectives within the executive team itself: the Chief Executive Officer (CEO) may have a different understanding of productivity compared to the Chief Marketing Officer (CMO), complicating practical management efforts.

These difficulties in explicitly defining the term mean that when companies measure productivity, they often focus on specific physical efficiency metrics, such as output per employee or the number of minutes per call in a customer service department. When firms attempt to measure productivity at an organisation-wide level, they commonly employ basic monetary measures, such as sales revenue over expenditures or sales revenue per employee.

These simple metrics serve as proxies for the productivity concept but differ in key aspects. For knowledge-based organisations in particular, measuring productivity is a challenge, especially since distinguishing between the quantity, price, and quality of output is not always straightforward or feasible for what are essentially intangibles outputs. For instance, in a software development firm measuring the productivity of programmers cannot be achieved solely based on assessing total lines of code written, as this does not account for code quality or problem-solving efficiency. Similarly, in research institutions, the impact and quality of research outputs such as publications or patents are difficult to quantify in simple monetary terms. In consultancy services, the value provided to clients through strategic advice and problem resolution often defies straightforward measurement by traditional productivity metrics.

In addition to the previously provided definition, we stress that productivity encompasses the complete process from budget allocation to input utilisation, output generation, and outcomes.

It's crucial to address all three dimensions: budget efficiency (budget to turn into inputs/resources), organisational productivity (budget to turn into inputs/resources), and effectiveness (outputs to outcomes).

Each day, we witness the outcomes of only implementing a part of the productivity chain. For example, when companies invest in cutting-edge machinery to enhance production efficiency but overlook adequate employee training, leading to underutilisation of the equipment.

Therefore, disregarding any aspect of the process can result in unforeseen outcomes. We contend that companies should not prioritise one dimension over another but rather comprehend that all three dimensions must be taken into account to attain substantial results efficiently.

Exploring the productivity paradox: perspectives from Chief Information Officers

Our research explores the productivity paradox within organisations from the perspectives of Chief Information Officers (CIOs). The CIOs' perspective for exploring the productivity paradox within organisations is crucial because CIOs are the organisational actors responsible for developing ICT strategy, governing ICT architecture and infrastructure, and strategically deciding on technology investments, activities that are typically seen as fundamental in organisational pursuits of increased productivity.

Who are Chief Information Officers?

The role of the Chief Information Officer[1] (CIO) within organisations fundamentally embodies the senior executive responsible for establishing ICT strategy and overseeing ICT infrastructure. Since its inception in the early 1980s, the CIO title has now been solidified as the highest-ranking ICT/IT executive, representing a vital member of the organisation's C-suite.

The history of CIOs can be traced back to the mainframe era in the 1950s/1960s, specifically to the computer technicians who were responsible for managing 'centralised' Electronic Data Processing (EDP) units. Since the application of EDPs were mostly finance related, EDP managers at the time reported into the finance function (Merten and Severance, 1981).

By the 1970s, EDP managers inherited a new title of IT manager (preceding title to the CIO), which was accompanied with additional responsibilities such as developing IT projects to time and budget, operating existing IT efficiently, and addressing personnel issues (Ross and Feeny, 1999).

The breakthrough of 'decentralised' personal computing in the mid-1980s resulted in two major business needs. First, personal computers allowed more people in different parts of an organisation to work independently, so businesses had to find better ways for different teams to work together and share new ideas. Second, as more people started using computers, businesses needed new ways to manage and support all this new technology, creating new IT practices to handle this growing use of computers. As a result of these inflections, IT managers were increasingly asked by chief executives to support strategic discussions at C-level, which saw the birth of the Chief Information Officer as a new management role (Synnott and Gruber, 1981).

In addition to existing intranet systems, EDIs, and ERPs, the 1990s was characterised by the emergence of the public internet, e-commerce, and other outbound-facing applications supported by the internet. This required CIOs to broaden their skills base, and to transform their roles to managers who were capable of driving intranet or internet technologies as implementations that yielded business value during the dot-com boom.

The dot-com collapse in the 2000s brought new challenges for CIOs. ICT projects had high failure rates, infrastructural complexity of new technologies hindered organisations' agility, and ICT outsourcing yielded mixed results. Although these challenges began to fuel discourses at

[1] May also be known by titles such as IT Director, Vice President of IT, later also Chief Digital Officer, or similar.

the time that questioned the value of the CIO in the organisations (Ross and Weill, 2002), the reality was that most organisations would have collapsed without their ICT systems and the existing governance around them. CIOs during this time received an increasing strategic role, seeing them prompt their organisations to alter business processes and strategies through effective use of ICT (Chun and Mooney, 2009). The rise of Enterprise Resource Planning (ERP) systems further expanded their responsibilities, requiring them to implement large-scale, integrated on-premise platforms.

The 2010s marked a significant shift, with CIOs becoming more outwardly focused, leading larger teams, and being deeply involved in shaping business strategy. They translated business objectives into technology roadmaps and spearheaded digital transformation initiatives, managing emerging technologies like the Internet of Things (IoT) and 5G (fifth generation of cellular networks). Today's CIOs are leaders who harness technology to create value, drive innovation, and contribute significantly to their organisations' success. Their responsibilities now encompass ensuring ICT operational excellence, driving innovation and digital transformation, managing cybersecurity risks, aligning technology initiatives with business goals, leveraging data and AI for competitive advantage, and collaborating closely with other C-suite executives. The COVID-19 pandemic further underscored their strategic importance, highlighting their role in enabling remote work and digital business models.

To thrive in their roles, today’s CIOs must possess a diverse skill set that extends beyond technical knowledge. They need strong communication and relationship-building abilities, business acumen and strategic thinking, change management and leadership skills, understanding of emerging technologies, particularly AI and cloud computing, and expertise in risk management and cybersecurity (Adaramoye, 2022). This diverse skill set allows modern CIOs to serve as influential advisors, guiding organisations through complex ICT landscapes and leveraging technology to address business needs and gain competitive advantages (Bendig et al., 2022; IDG, 2020).

There are two things that become evident from this genealogical exploration of the CIO role. First, the CIO role has transformed from a purely technical position to a strategic business leadership role over the past four decades. Second, this historical change and evolution of the CIO role has been in reaction to the ever-changing technological, organisational, and societal contexts and demands.

This constantly changing technological, organisational, and societal context equally warrants continuous adaptation from organisations to maintain or improve productivity through learning and innovation. At the helm of this organisational adaptation efforts are CIOs, who are charged with strategically leading their organisations in orchestrating investments in new technologies and innovations for the pursuit of gains in organisational productivity. Strategic leadership for CIOs involves developing and implementing technology-centric and business-centric ICT strategies, leveraging emerging technologies, and engaging in business aspects to enhance organisational benefits (Ding et al., 2014). It is in this regard that CIOs serve as valuable collaborators in exploring and resolving the factors contributing to the Productivity Paradox in organisational settings.

Selection of interview partners

Our selection of CIOs was intentional and targeted, focusing on those from "digital immigrant" organisations—companies established and successful before the digital economy emerged. These organisations, from traditional industries like retail, construction, and financial services, built their success on pre-digital business models and strategies. However, with the rapid advancement of technology, they now face significant challenges as they compete with digitally “native” companies whose operations and revenue streams have been inherently digital from their beginnings.

We specifically selected CIOs from these digital immigrant companies because they are ideal candidates for evaluating the productivity paradox. Their shift into the digital economy has been fuelled by substantial investments in technology, making their experiences particularly valuable in understanding how these investments impact productivity as they navigate the complexities of digital transformation.

It is important to note that while this report primarily focuses on the role of the CIO, our interviewees also include individuals holding titles such as IT Director, Chief Technology Officer (CTO), and Chief Digital Officer (CDO). This inclusion is both intentional and necessary. In many organisations, the responsibilities associated with these roles frequently overlap, and the titles are sometimes used interchangeably, reflecting the dynamic and evolving nature of technology leadership in the digital era.

To ensure a comprehensive and representative selection of interviewees, we have established three specific criteria for their inclusion (Adaramoye, 2022):

1. Interviewees must be the most senior ICT executive or manager within their organisation and no more than two reporting levels removed from the CEO (i.e., reporting directly to the CEO or one of their direct reports).
2. Interviewees bear responsibility for procuring and maintaining ICT infrastructure and for aligning ICT strategies with the organisation’s business objectives.
3. Interviewees were employed by large, established organisations (with 250 employees or more)

In summary, while the title ‘CIO’ is traditionally linked with a specific leadership position, it is, in fact, an umbrella term that covers a range of senior ICT and digital leadership roles. Individuals bearing titles such as ICT Director, CTO, or CDO can be considered within the CIO domain if they fulfil key criteria, including strategic oversight of ICT functions, alignment of technology with business objectives, and leadership in digital innovation.

The table below provides an overview of our interview partners.

No	Job Title	Sector
1	IT Director	Insurance
2	Director IT	Construction
3	Chief Technology and Product Officer	Veterinary Solutions
4	Director - Technology & Ecommerce	Retail
5	Chief Technology Innovation Officer	Financial Services
6	Head of Technology	Real Estate
7	Chief Technology and Information Officer	Financial Services
8	Chief Information Officer	Insurance
9	Chief Information Officer	Insurance
10	Chief Product and Technology Officer	Financial Services
11	Executive Director	Construction
12	Chief Information Officer	Energy
13	Chief Digital Officer	Agriculture

The organisational reality of the productivity paradox

The CIO's role: balancing efficiency, productivity, and compliance

In our interviews, it became apparent that for the majority of CIOs, the concept of productivity held significant meaning, albeit different from the traditional economic definition. Most CIOs closely associated productivity with efficiency, frequently referencing phrases such as "enhancing efficiency", "operating efficiently", or "implementing streamlined processes" when asked about their understanding of the concept.

Early in our discussions, it became evident that CIOs primarily associated productivity as achieving goals with minimal resources, time, or labour, assuming this approach enhances productivity.

I was reflecting when you were talking about productivity, because we tend to talk more about efficiency... which isn't quite the same thing... cost reduction is a big one... what kind of automation can you put in place to reduce the number of licenses, etc... all the operations teams are very interested in cost cutting, right? Improving your margins regardless... (IT Director, Insurance).

They elaborated that optimising efficiency typically pertains to specific processes or activities within a system, streamlining tasks or workflows to minimise waste and cut costs. Consequently, CIOs often blurred the lines between efficiency and productivity due to their conceptual overlap.

Efficiency indeed stands as a cornerstone of productivity, maximising resource output and contributing to heightened productivity levels. Both efficiency and productivity aim to enhance business performance and competitiveness, to increase for example profitability or market share.

However, it is crucial to maintain a nuanced perspective: Efficiency typically relates to how resources (inputs) are utilised to accomplish specific tasks or objectives (outputs). Essentially, efficiency focuses on executing tasks correctly and optimising the process. On the other hand, productivity considers the complete journey from a specified budget to the intended outcomes. Alongside efficiency, effectiveness holds significant importance in this context, referring to the realisation of the intended results or objectives. In essence, productivity entails accomplishing the correct tasks and prioritising the overall outcomes achieved.

While it may seem trivial, the distinction between outputs and outcomes holds significant importance in the day-to-day operations of organisations. Let's illustrate this with an example from a software development project: One of the outputs of such a project might be completing the coding phase, ensuring that all lines of code are written according to project requirements. This represents a tangible deliverable achieved by the team during the project. However, the outcome of the project extends beyond mere completion of coding tasks. It encompasses the successful launch of the software application to the market and its acceptance by users. This broader outcome reflects the real-world impact and value of the project, including factors like user satisfaction, market penetration, and revenue generation.

By focusing solely on the input-output relationship (efficiency) and neglecting outcomes, there's a risk of misaligning project objectives. Teams may prioritise completing tasks without

considering their contribution to broader business goals, resulting in an incomplete assessment of project success. Simply completing coding tasks also does not ensure that the software meets user requirements or achieves business objectives. Without considering outcomes, staff may overlook crucial factors like user satisfaction and market impact, leading to unrealistic expectations for project success. This can result in disappointment if the software falls short of broader goals like user adoption and revenue generation. Neglecting outcomes may further cause teams to miss valuable insights into what works and what doesn't in achieving project objectives, hampering their ability to adapt and improve processes for future projects.

Additionally, in essence, efficiency drives are often focused on using fewer resources to do as much or even more than before. This may create concerns about jobs and workforce wellbeing as well as depletion of other resources, including nature and the environment. In contrast, an outcomes-oriented approach may be more focused on a reallocation of tasks and a redeployment of people to create more business value.

In short, the danger of using the terms ‘efficiency’ and ‘productivity’ interchangeably is that it oversimplifies the complex relationship between inputs, outputs and outcomes. When organisations treat these terms as synonymous, they may prioritise short-term efficiency improvements without considering the broader impact on overall performance and long-term sustainability. Therefore, organisations need to differentiate between efficiency and productivity, and recognise that while efficiency constitutes one aspect of productivity, true productivity encompasses both efficiency and effectiveness in fulfilling business objectives.

We assume that the prevalent preference for efficiency over productivity among CIOs stems from several factors, many of which are externally imposed.

Firstly, efficiency enhancements typically revolve around quantifiable metrics like time savings, cost reduction, or resource optimisation, offering tangible results that facilitate straightforward evaluation and communication of managerial efforts. Moreover, efficiency enhancements often yield visible and immediate benefits, fostering a direct linkage between actions taken and results achieved, enabling managers to justify the initiatives and enhance stakeholder communication effectively. Further, efficiency improvements frequently yield instant results, making them appealing to managers striving for quick wins or seeking to fulfil short-term performance objectives. Conversely, productivity enhancements may necessitate prolonged investment and organisational adaptation, posing challenges in terms of management approval, implementation and sustainability.

It is therefore no surprise that CIOs frequently cite call centres as an example of where productivity gains are tangible and measurable:

The only place where that I would say that gets used frequently is when you're talking about call centres and call centre systems because productivity is an ongoing KPI in terms of call performance and customer chat performance (Director - Technology & Ecommerce, Retail).

While it's reasonable to prioritise efficiency over productivity given the above-mentioned challenges, we pondered whether this focus might actually exacerbate the issue at hand.

As previously mentioned, efficiency constitutes a crucial component of productivity and holds significant importance. Nonetheless, we perceive the risk that exclusively prioritising efficiency

or conflating productivity with efficiency could detrimentally impact a company's capacity for innovation and, consequently, hinder the exploitation of the productivity potential inherent in information technologies. This risk stems from prioritising short-term gains, adopting risk-averse behaviours, allocating resources predominantly towards optimising existing processes rather than investing in research, development, or experimentation, and fostering an efficiency-driven culture resistant to change. From our interviews, these factors manifest in some CIOs' organisations. For instance, during our discussion with an executive director at a property management firm, they mentioned that only about ten percent of their work involves innovative or disruptive thinking and actions. Others noted that prioritising "quick results" and "short-term goals" might result in insufficient attention and resources being allocated to innovation that requires long-term vision. This could constrain the organisation's ability to explore novel concepts, experiment with innovative approaches, or adapt to evolving circumstances, ultimately impacting long-term competitiveness and sustainability.

In particular, the CIOs highlighted the challenge of balancing day-to-day operational requirements with the need to pause and think about potential future paths. Or, in other words, the forward-looking stance on innovation often clashed with the imperative to uphold streamlined processes for internal efficiency. This core tension between short-term and long-term perspectives manifested in several underlying dynamics: Proactivity versus reactivity, structure versus autonomy, and predictability versus uncertainty. Those CIOs who engaged in innovation initiatives addressed the tensions between these conflicting processes by temporally segregating them, allocating periods for focusing on efficiency followed by periods of emphasis and investment in innovation, by conducting "mini pilots" or "iterative explorations". These approaches enabled CIOs to simultaneously explore novel opportunities while maintaining a level of control. For instance, pilot projects were undertaken within defined timeframes to assess their potential integration into the organisation's core operations at a later stage.

Looking ahead, this temporally segregation is expected to become increasingly challenging. A forward-thinking approach to innovation in a landscape of continuous technological change will require CIOs very likely to make trade-offs between leveraging organisational ICT and exploring the ICT market. This trade-off is especially significant for "digital immigrant" organisations compared to "digital natives." For digital natives, the utilisation of ICT often equals a customer-focused strategy, inherently tied to innovation. However, for digital immigrants, this requires an adjustment—a cultural shift that makes the balancing act between ICT utilisation and exploration much harder.

Focusing solely on utilisation may diminish the likelihood of innovation and technical foresight, while exclusively prioritising exploration risks neglecting technology within the organisation. To mitigate this, it is crucial for organisations to ensure they have the necessary personnel, such as CTOs or heads of ICT architecture, dedicated to focusing on ICT utilisation, allowing CIOs the capacity for strategic and exploratory endeavours.

Moreover, we observed a prevalent leaning among CIOs towards wanting to "minimise risk" and "preserve stability/status quo". However, innovation and adaptability often necessitate embracing calculated risks, confronting uncertainty, and venturing into uncharted territory. This risk-averse mindset may put off organisations from investing in initiatives capable of disrupting

the status quo, even if they have the potential for long-term growth and success. This reluctance to embrace risk may also stem from the fact that digital immigrant organisations need to undergo a cultural shift in their values, where risk aversion is part of the legacy mindset. This tendency may also be influenced by the sectors we studied, such as finance, where risk avoidance is integral to the business model.

However, we should also highlight that some CIOs reported innovative and long-term projects, notably centred around the integration of sustainability and Environmental, Social, and Governance (ESG) considerations into business operations and technology strategy. CIOs emphasised that this focus is becoming increasingly important in modern business practice, as stakeholders, including customers, investors, and regulators, demand higher standards of corporate responsibility.

For example, one Head of Technology at a real estate company described their efforts to "go to great lengths to reduce waste, provide sustainable energy to our customers, and run our business centres sustainably." Thus, sustainable growth and long-term success were prominent themes in some of the discussions, but very narrowly related to ESG considerations.

In addition to the conceptual challenges surrounding productivity, CIOs emphasised the difficulties in assessing productivity, leading them to rely heavily on monetary indicators such as sales over cost or sales per employee, particularly in service-oriented sectors.

The primary issue they described was the inability to establish a direct link between ICT investments and "hard productivity gains," as these investments often have an indirect or delayed effect.

It's very hard to measure the benefits on those things... they'll say: 'Oh well, we're not going to save a head but their time will be used as something else that's more productive,' but you never... you can never measure it." (Director - Technology & Ecommerce, Retail).

Instead, they described how ICT investments tend to result in 'soft productivity gains' which are less tangible and more challenging to measure. These gains frequently encompass improvements in employee morale, job satisfaction, engagement, and overall workplace culture.

CIOs emphasise that many ICT investments result in incremental process improvements rather than revolutionary changes. These improvements can enhance efficiency and user (both customer and employee) experience without necessarily producing significant, immediately quantifiable financial gains. For instance, they can improve communication, collaboration, and access to information, which can significantly boost employee morale and job satisfaction. However, these benefits are difficult to quantify financially and to link directly and exclusively to a specific ICT investment. Additionally, they described how ICT investments often support back-end functions such as HR, finance, and administration, improving internal processes and employee experience, which leads to indirect rather than direct productivity gains.

This underscores a key difference between digital immigrant and digital native organisations. Digital immigrants, like our interviewees, often focus on back-end investments to optimise internal processes, which makes it harder to demonstrate a clear financial return. In contrast, digital natives tend to prioritise customer-facing innovations and front-end systems, making it

easier to measure and justify the direct impact of their IT investments. This difference reflects a broader cultural divide in how these two types of organisations approach and evaluate the value of technology investments. In this context, we also spoke to several CIOs about the use of AI in their organisations and the potential resulting productivity gains. We discussed applications such as chatbots and virtual assistants, sentiment analysis, sales trend forecasting, customer lifetime value estimation, and churn rate analysis to optimise marketing strategies and resource allocation, as well as robotic process automation. While CIOs recognised the potential for productivity gains resulting from AI applications, they expressed concerns about measurability. For instance, we explored how AI and Gen AI applications often provide a wide range of benefits across multiple areas, such as improved decision-making, enhanced customer experiences, and the automation of complex tasks. These diverse benefits make it challenging to isolate and measure the impact of specific technologies and processes within an organisation, as they form a web of interdependencies. This interconnectedness complicates attributing productivity gains or financial results directly to a single AI investment.

This focus on precise measurability suggests a tendency to make “the perfect the enemy of the good”. While AI solutions can deliver clear improvements, the desire to attribute specific gains to individual AI investments can slow decision-making and delay implementation. CIOs, in their efforts to measure every outcome perfectly, may overlook the broader, incremental benefits these technologies offer. By insisting on perfect attribution, organisations may risk missing the opportunity to reap substantial, albeit less easily measured, productivity gains.

Additionally, we discussed how AI technologies are constantly evolving, with frequent updates and new features. This dynamic nature means that the benefits and performance of AI investments can change over time, complicating long-term measurement and evaluation. Moreover, CIOs acknowledged that the adoption of AI applications often involves significant learning curves and adjustment periods for employees. During these periods, productivity may temporarily decline before the full benefits are realised, making short-term assessments potentially misleading. Furthermore, the implementation of AI systems can entail substantial initial costs for software, hardware, and training. These costs can overshadow the initial financial benefits, making it difficult to demonstrate a clear return on investment (ROI) in the short term.

In this context, we also engaged in an insightful discussion with several CIOs about the intersection between legal compliance and increasing productivity. Productivity was discussed by the CIOs in terms of optimising processes while simultaneously ensuring adherence to all regulatory requirements. They emphasised that the implementation of AI and other advanced technologies can streamline compliance processes, reduce errors, and increase overall productivity. However, as AI applications become more widespread, organisations must consider ethical and regulatory considerations, which can introduce additional costs and necessitate operational changes.

Our interviewees highlighted that they are frequently tasked with ensuring their organisation's ICT systems comply with relevant laws and regulations. This dual responsibility is central to the CIO role. In addition to driving efficiency and innovation, CIOs must also ensure adherence to legal requirements, such as data privacy laws (e.g., GDPR, CCPA), industry-specific regulations, and general corporate governance standards. Balancing these responsibilities can be

challenging, as the need for compliance often complicates the pursuit of productivity gains. Compliance is critical to avoiding legal penalties and reputational damage. CIOs must manage the risks associated with ICT systems and data. Compliance helps mitigate these risks by establishing clear policies and standards. Effective risk management through compliance can prevent data breaches, cyber-attacks, and other security incidents that could disrupt operations and impact productivity. Compliance not only protects the organisation but also supports strategic objectives by maintaining the trust of customers, partners, and regulators. This alignment is essential for sustainable growth and productivity.

Several CIOs emphasised that non-compliance can lead to significant financial penalties and increased operational costs. By ensuring compliance, CIOs help avoid these costs, although they noted that this cost avoidance is often not recognised as a performance gain.

This section emphasises the need for CIOs to navigate the complex interplay between efficiency, productivity and compliance in their day-to-day decision-making. While efficiency offers immediate, quantifiable benefits, most CIOs recognise that "true" productivity encompasses broader, long-term outcomes that are often more difficult to measure. The overlap between compliance and productivity underscores the delicate balance CIOs must manage as they work to boost efficiency without compromising on legal obligations. The integration of AI and other advanced technologies adds to this complexity, offering multiple benefits that are difficult to isolate and directly attribute to specific investments. In addition, the increasing importance of sustainability and ESG considerations highlights the growing role of CIOs in meeting stakeholder demands for corporate responsibility. Understanding these factors is critical for organisations to balance short-term gains with long-term strategic goals to ensure sustainable growth and improved competitiveness in a rapidly changing technological landscape.

C-Suite (mis-)alignment

Earlier research has underscored the pivotal role of a robust collaboration between the Chief Information Officer (CIO) and the Chief Executive Officer (CEO) or other members of C-suite in fostering a strong partnership between ICT and business functions (Benlian and Haffke, 2016, Denford and Schobel, 2021).

However, our interviews uncovered several challenges in aligning CIOs with the rest of the C-Suite team:

1. While the concept of leveraging ICT to create value seemed promising for most organisations, many CIOs acknowledged the difficulty of clearly demonstrating the value of these technology investments. In many instances, overly optimistic expectations regarding the business potential of ICT remain unmet, resulting in the cancellation of numerous ICT initiatives before their completion. Other investments ended up exceeding their initially estimated costs outlined in the business case. According to our interviewees, the C-suite often struggles to recognise the value generated once an ICT project has been implemented. Tangible benefits, such as cost reductions stemming from staff savings, are frequently not immediately apparent, as the added value tends to manifest indirectly (as discussed earlier), making it

considerably more challenging to observe and measure. For instance, enhancements in customer service may lead to increased sales or profits, yet attributing these benefits directly to ICT initiatives proves to be often challenging or even impossible.

2. Adding to the complexity, numerous CIOs reported that CEOs and other C-level managers often struggle to comprehend the implemented ICT solutions and their impact on business value creation. CIOs emphasised that a significant proportion of their C-level colleagues lack technical expertise. This knowledge gap frequently results in a disconnect between the technological opportunities provided by ICT solutions and the strategic goals of the organisation as perceived by the C-level executives. CIOs attributed this to varying levels of technical knowledge, differing perspectives, priorities, and terminology. We believe this discrepancy was more pronounced in our interviews, as senior managers in digital immigrant companies often come from non-technical backgrounds. In contrast, digital native companies are typically founded and led by tech-savvy executives, with CEOs and other leaders frequently possessing technical expertise. This fundamental difference enables digital natives to more easily align IT initiatives with their strategic goals, while digital immigrants may face challenges due to a lack of shared technical understanding at the executive level. Specifically, the CIOs highlighted the importance of using visualisations to explain abstract ICT projects to their C-level colleagues:

   I'm constantly asking myself, as an IT leader, how can we visualise or physically represent what we do so that business leaders who are not technologists can understand it? (CDO, Agriculture).

   Case studies from other legacy companies such as GM, Unilever or Nike illustrate the importance of acquisition and partnerships outside the organisation to acquire and strengthen technical expertise and transfer skills and knowledge to long-term employees or even C-suite members. GM's $500 million investment in Lyft, for example, was aimed at jointly developing an on-demand network of autonomous vehicles. This partnership allowed GM to go deeper into the rideshare market and explore self-driving technologies, leveraging Lyft's expertise and market presence to accelerate innovation and operational integration. This collaboration facilitated the transfer of technical knowledge in autonomous vehicle technology and provided GM's Board of Directors with the opportunity to gain insight into Lyft's dynamic market strategies.

3. The role of ICT differs among the organisations we spoke with and is often seen in their reporting structures. In companies where the ICT department is primarily perceived as a cost centre, it is common for the CIO to report to the CFO. Conversely, in companies where the CIO reports directly to the CEO, the ICT department is accorded greater operational and strategic importance, at least according to our interviewees. Regardless of the organisational structure, our interviews underscored the complexity and interdependence of decision-making processes within organisations, frequently manifesting in budget prioritisation processes and approval hierarchies. For instance,

one interviewee reported: "I am authorised to approve up to two and a half million dollars. If I go over two and a half million, it goes to the president of the region or the head of the company. If it's more than 10 million, it goes up to our CFO, and if it's more than 25 million, it goes up to our CEO," (CDO, Agriculture). CIOs recognise that effective resource allocation (budget prioritisation) is essential to support strategic projects, but often criticised that this strict approval hierarchy conflicts with alignment between functions: "*Sometimes our CEO says, 'Oh, that's an IT project.' And the business says: 'We don't have time for this. Just implement the system.' Well, we can't do anything on our own. So, we have to make sure that the business gives us strong support in designing the business processes, training the users, managing change, and taking ownership of the system… As soon as it becomes an ICT project, it's destined for failure, because people think it's just down to you, but that is never the case*." (Director - Technology & Ecommerce, Retail). Such statements highlight that it is crucial that CEOs act as ambassadors for ICT projects, particularly when the project is transformative in terms of the business model or value proposition. Without strong leadership advocating for the strategic importance of these projects, they are often dismissed as mere IT tasks. This mindset limits cross-functional collaboration and undermines the potential for these technologies to drive fundamental changes. Further, it became clear that the structure of an organisation significantly impacts its productivity and decision-making processes. CIOs reported that functional silos, where departments operate independently with little cross-functional interaction, can create barriers to effective communication and collaboration, leading to inefficiencies and delays in project delivery. As one Chief Technology and Product Officer (Veterinary Solutions) described it, "*As soon as you divide people into functional units, that's when the problems start. And I think that's the real productivity problem—we need to think more about how people are organised in sub-units and how decisions are made within and between functional business units*." This underscores the point that to build strategic capabilities for ICT investments to result in productivity gains, organisations may need to dismantle parts of their formal organisational structure and create more informal ones, or allow these to form organically. Key features might include structures and networks that facilitate cross-functional and cross-level collaboration, decentralised decision-making, and enhanced transparency and information sharing. In other words, organisations must overcome bureaucracy. CIOs particularly emphasise that structures separating business units and preventing teams from organically forming around specific challenges or problems, as well as horizontal structures that inhibit information sharing and collaboration, are significant obstacles.

Our discussions particularly centred on the coordination between the Chief Financial Officer (CFO) and the CIO, constituting a pivotal dyadic relationship within corporate governance. This relationship is progressively intensifying, partly driven by recent regulatory shifts in accounting, necessitating heightened support from IT. Through our interviews, it frequently emerged that the CFO tightly controls resources crucial to the CIO's initiatives, while the CIO often oversees a substantial portion of the organisation's discretionary budget, under the purview of the CFO. This mutual dependency and oversight are frequently depicted by CIOs as constraining and stifling innovation.

…but for the CFO was trying to flex as much as he could out of the money out…which I understand so that that sort of a more even split my average savings targets per year were between ten and 15 percent on OpEx [operational expenditure] because we're EBITDA [earnings before interest, taxes, depreciation, and amortisation] driven… then obviously CapEx [capital expenditure] contributes to cash position especially when you're coming up selling… So we had to really optimise on the CapEx and then you know things like cutting back some of the key projects. (Chief Technology and Information Officer, Financial Services).

The interviews revealed a tension between the need for agility and innovation in technology and the CFO's financial oversight responsibilities. Many CIOs felt constrained when their role focussed solely on financial planning and budgeting:

It's a constant challenge, right? Uh, and I think, you know, some of the things that are challenging, right? Sometimes, and I'll kind of talk about this maybe in different segments. Of course, the CFO organisation, their responsibility is to spend money wisely, right? So they're always going to put, put a challenge against how much money it takes us to spend, uh, and how long it takes us to, to do a specific project. Um, and they're really looking for what that, you know, positive internal rate of return over those five years. (CDO, Agriculture)

However, it is crucial to recognise the importance of budget efficiency, especially given the high cost of most ICT projects. It is the CFO's key responsibility to monitor outcomes and ensure that investments in new technologies deliver the expected returns. This oversight is not just a necessary control; it is a positive force in driving budget efficiency, which is a crucial aspect of overall productivity. By holding technology projects accountable for financial performance, the CFO helps ensure that resources are used wisely and that the benefits of ICT investments are fully realised for the organisation

When CIOs and CFOs collaborate effectively—through joint planning, aligning financial goals with technological initiatives, and maintaining open communication throughout the project lifecycle—they can significantly enhance productivity by improving procurement and resource allocation. This partnership ensures that technology investments are prioritised appropriately, costs are managed efficiently, and the organisation maximises the value of these investments. By involving the CFO early in the planning stages, the CIO can better integrate financial and technological objectives, reducing the risk of misaligned priorities and wasted resources.

And is that a standard thing you would do, like tracking the outcomes of, let's say you have invested in a new technology, or you have implemented a new technology - is the tracking of outcomes an important part of the overall process? Or is it something that… is skipped or not followed up on much? That's where you need the really strong CFO or finance function, because that's benefits realisation at the end of the day… it is something we've really struggled with as an organisation." (Chief Product and Technology Officer, Financial services).

Thus, the effective realisation of the full potential of technology to drive business growth and innovation is therefore highly dependent on "proximity" between members of top management. Such proximity can improve decision-making and the implementation of initiatives that require both financial oversight (CFO) and technological expertise (CIO) (see also Denford & Schobel, 2021).

Technological determinism

The CIOs themselves have pinpointed one of the reasons they believe technology investments fail to yield anticipated productivity gains, which can be encapsulated as *technological determinism* within the corporate culture.

Ronald Kline (2001) explains that technological determinism challenges two extreme ideas: first, the belief that technology develops on its own without influence from society or social influences, and second, the idea that technological changes automatically shape social changes in a fixed way. In contrast, the *social construction of technology* argues that technology is shaped by social, cultural, and political factors, rather than just technical or scientific ones. This view suggests that technology is created through human actions and decisions, not by forces that operate independently of society.

Thus, technological determinism entails several assumptions, including the belief that technology exerts a transformative force on the world irrespective of human decisions, that there exists a general sequence and pace of scientific and technological advancement propelled by an internal logic that renders technological change seemingly independent, and that individual may lack awareness of their technological choices.

The CIOs pointed out instances where staff members or managers believed that simply adopting new technology would automatically solve business challenges. For example, they cited cases where the introduction of customer relationship management software was expected to inherently boost sales. In other situations, technology was implemented without taking into account how employees collaborate and interact on a daily basis, or how it would integrate with existing workflows, tools, and processes.

project management software without accounting for pre-existing workflows.

The CIOs noted a common oversight within their organisations regarding the dynamic nature of technology and the investment in its implementation. They highlighted that relying solely on the formulation of a business case is inadequate for managing the digital transformation process effectively.

Instead, the CIOs underscored the significance of change management and communication, particularly through discussions, negotiations, and dialogues concerning technology adoption and adaptation:

> *I mean… nobody wants change. Everyone's reluctant to change, right?… It's more mental overhead to change something… So when we've done sort of stuff that's truly*

transformational, that change management is massive and it takes years to pivot an entire business around it. (IT Director, Insurance).

Most interviewees recognised the necessity of accommodating diverse perspectives and conflicting objectives, such as the tension between efficiency and job security, innovation and stability, or cost reduction and investment. Moreover, individual objectives may sometimes diverge from the overarching organisational vision. An instance was cited where technology deployed to streamline operations was disregarded by employees who viewed it as a surveillance tool. Another CIO noted that expenses associated with employee training are frequently downplayed in business cases to expedite approval, consequently impeding skill development and the effective utilisation of new technologies.

All CIOs underscored that the essence of any ICT initiative lies in organisational change.

Specifically, our discussions highlighted the pivotal role of:

a) leadership and vision - CIOs emphasise the critical role of leadership and vision in guiding technology strategy and ensuring alignment with business goals. According to them effective leadership provides direction and sets the tone for technological innovation and strategic alignment.

   The board most recently has quite rightly challenged us overtly on what our digital strategy is and how are we leveraging technology more effectively to deliver the business strategies. (Chief Technology and Product Officer, Veterinary Solutions).

b) employee engagement – CIO continuously emphasise that engaged employees are more likely to adopt new systems, contribute to process improvements, and support organisational change.
   It's hard to convince people to adopt a different way of thinking– it's a bit easier when they are somewhat engaged in the process. (Chief Technology and Product Officer, Veterinary Solutions).

c) continuous learning – CIOs highlight that training and development are essential to equip employees with the necessary skills and knowledge to effectively use new technologies and systems. Proper training ensures that employees can leverage ICT investments to their full potential.

   We really need to make sure the business is heavily engaged with us in designing the business process, training the users, making sure we're doing change management, and taking ownership of their system. (CDO, Agriculture).

d) continuous improvement - CIOs stress the need for ongoing evaluation and enhancement of processes and systems to ensure they meet evolving business needs, to maintain competitive, and adapt to a changing business environment.

> *We need to be looking at this more closely and probably spend a bit more time and effort understanding why things are not turning out the way that we had originally planned for.* (Chief Technology and Product Officer, Veterinary Solutions)

Consequently, there is a pressing need for substantial investment in all of these aspects listed above. However, according to the CIOs, these necessary investments are frequently overlooked in business cases to avoid projects appearing excessively costly, resulting in neglect of training and education budgets and subsequent project failures.

We would like to highlight three critical elements that are often missing in discussions with CIOs and are essential for overcoming cultural barriers: entrepreneurialism, the role of HR leaders, and recognising the gradual, employee-driven nature of organisational change.

Firstly, legacy companies need to cultivate an entrepreneurial mindset. While we acknowledge that the organisations, we have spoken to exhibit entrepreneurial qualities, what we advocate is a mindset characterised by habitual curiosity to identify opportunities for impact, leveraging creativity, networks, and innovation, and then committing to realising these opportunities. During our interviews, we observed a general reluctance and lack of determination to take action, particularly in terms of embracing risk.

Secondly, we are convinced that HR leaders play a pivotal role in creating the link between technology and social (van Ark and Devine, 2024), a view supported by all the CIOs we interviewed. CIOs recognise the added value of HR leaders in several key areas:

- cultural insights: HR leaders can understand the cultural values that make some companies more successful than others in leveraging ICT investments for productivity gains.
- employee perception: they can monitor employee perceptions of ICT projects and their overall engagement and commitment to the company culture.
- cultural shaping: HR leaders support other leaders in shaping an organisational culture conducive to future successes, helping to overcome resistance to change.
- workforce trends and skills: they investigate external labour trends, assess current workforce skills, and design learning strategies to further develop these skills.
- alignment of HR practices: HR leaders ensure that current HR practices are aligned with the values and behaviours the organisation aims to promote.
- facilitation of collaboration: they equip employees with the right physical spaces and tools to collaborate, innovate, and work across boundaries.

Thirdly, it is crucial to acknowledge that organisational transformation is often gradual and employee-driven. Rather than being the result of top-down initiatives or sudden shifts, transformation is ongoing and happens incrementally through the everyday actions and decisions of employees (Orlikowski, 1996). Recognising and supporting this emergent, continuous process is key to realising the full potential of ICT investments. CIOs must foster an environment where employees feel empowered to innovate and contribute to ongoing change rather than waiting for planned, large-scale interventions.

In summary, fostering an entrepreneurial mindset, leveraging the strategic role of HR leaders, and embracing the gradual, employee-driven nature of transformation are essential for overcoming cultural barriers and fully realising the potential of ICT investments. These elements are crucial for driving long-term productivity gains and ensuring sustainable growth within organisations.

Conclusion

Based on our discussions with CIOs, we identified key strategies for improving cross-functional collaboration and boosting productivity. Business leaders must actively engage in conversations about productivity, identify its drivers, and ensure coordination across all departments. This includes empowering CIOs to lead technological advancements rather than just overseeing ICT utilisation, fostering better collaboration and understanding between CIOs and other C-suite members, improving technical literacy at the leadership level, and clarifying reporting structures to reflect ICT's strategic importance.

By aligning ICT initiatives with business objectives and encouraging collaboration, organisations can treat productivity as a core component of their growth strategy. Recent shifts— such as rapid AI advancements, the rise of remote and hybrid work models, the increasing importance of sustainability and ESG considerations, and disruptions like the COVID-19 pandemic and escalating inflation—highlight the need for a clear, company-wide focus on productivity, driven by senior management.

However, we found a gap in how productivity is communicated and embedded in everyday business practices. Leadership teams often struggle to incorporate productivity into decision-making and planning, which hinders their ability to translate it into actionable strategies. We propose the following sequence to initiate this process:

1. Leadership must acknowledge that productivity is a key driver of business performance.
2. Functional leaders should clearly articulate their narratives, concepts, and measurements. If they recognise the drivers of productivity, they must determine whether it is necessary to specifically measure these drivers and, if so, how.
3. This information should then be brought back to the boardroom to integrate the various perspectives.

This integration is often challenging, as it requires an understanding of trade-offs and synergies, necessitating informed decision-making.

We further argue that organisations should expand their measurement systems to refine target-setting processes and develop comprehensive metrics that encompass quality and long-term effectiveness, alongside short-term indicators. This holistic approach to measurement will provide a more thorough understanding of productivity and guide decision-making effectively. Additionally, broadening evaluation criteria beyond financial metrics is essential. Organisations should prioritise improvements in work methods and processes to drive greater productivity gains compared to traditional cost-cutting measures.

In the following section, we will provide a detailed overview of our key takeaways and practical recommendations to help organisations address these challenges and effectively enhance productivity through cross-functional collaboration and strategic leadership.

Key take-aways and recommendations

Findings	Recommendation
Understanding productivity and efficiency	
CIOs equate productivity with efficiency, frequently referencing cost reduction and streamlined processes.	Educate CIOs and leadership on the distinction between efficiency and productivity. Implement training programs that highlight broader business goals and long-term outcomes in ICT project evaluations.
CIOs often blur the lines between efficiency and productivity, leading to a focus on short-term gains.	Develop clear guidelines and metrics that differentiate between efficiency and productivity. Ensure project objectives are aligned with broader business goals and use project management frameworks that incorporate both efficiency and effectiveness measures.
Focusing solely on efficiency can lead to neglecting broader business impacts and long-term sustainability.	Balance short-term efficiency initiatives with long-term strategic goals. Encourage a culture that values both quick wins and sustainable growth. Implement a dual focus on immediate efficiency improvements and long-term productivity gains in ICT investments.
Measuring and enhancing productivity	
The prevalent preference for efficiency is driven by easily quantifiable metrics and quick results.	Introduce metrics that capture long-term productivity gains, such as user satisfaction, market impact, and innovation potential. Encourage CIOs to report on both short-term efficiency metrics and long-term productivity outcomes.
IT investments often result in 'soft productivity gains' such as improved morale and job satisfaction.	Recognise and communicate the value of soft productivity gains. Develop metrics and reporting mechanisms that capture improvements in employee morale, job satisfaction, engagement, and overall workplace culture. Ensure these softer metrics are integrated into overall productivity assessments and business cases.
Innovation and long-term competitiveness	
Efficiency-driven culture may inhibit innovation and long-term competitiveness.	Foster an innovation-friendly culture by allocating resources and time for experimentation and long-term projects. Encourage CIOs to dedicate a portion of their budget to research and development. Promote a balanced approach where efficiency initiatives are complemented by

	strategic investments in innovation and future technologies.
Short-term efficiency focus can undermine long-term innovation and adaptability.	Implement mechanisms for regular review and adjustment of project priorities to ensure long-term innovation is not sacrificed for short-term efficiency. Use pilot projects and iterative approaches to balance efficiency and innovation. Encourage cross-functional teams to collaborate on projects, ensuring diverse perspectives and comprehensive planning.
Innovation and adaptability require embracing calculated risks and venturing into uncharted territory.	Cultivate an entrepreneurial mindset within the organisation. Encourage risk-taking and experimentation, and provide a safe environment for learning from failures. Recognize and reward initiatives that explore new ideas and contribute to long-term growth. Collaborate with HR to support a culture of innovation and continuous improvement.
Demonstrating value and alignment within C-Suite	
CIOs find it challenging to tangibly demonstrate the value of ICT investments to the organisation, leading to unmet expectations and project cancellations.	Develop robust business cases with clear value propositions for ICT investments. Incorporate both tangible and intangible benefits in project evaluations. Use comprehensive metrics to track and communicate the value of ICT initiatives to all stakeholders. Implement post-implementation reviews to measure and report on the actual benefits realized.
C-Suite often struggles to recognize the value generated by ICT projects due to indirect benefits and difficulty in measurement.	Enhance communication and reporting frameworks to demonstrate the broader impact of ICT projects. Use case studies and examples to illustrate the link between ICT initiatives and business outcomes. Engage C-suite members in the planning and evaluation processes to increase their understanding and buy-in.
Knowledge gaps and communication challenges	
CEOs and other C-level managers often lack technical expertise, resulting in a disconnect between ICT opportunities and strategic goals.	Implement regular training sessions for C-suite members to build their technical knowledge and understanding of ICT solutions. Use visualisations and simplified explanations to communicate complex ICT concepts. Encourage cross-functional workshops and collaboration to bridge the knowledge gap and align ICT initiatives with strategic goals.

Organisational structure and decision-making	
Reporting structures in which the CIO reports to the CFO and not the CEO indicate that the strategic value of the ICT function is not fully acknowledged within the organisation.	Review and potentially adjust reporting structures within the organisation to reflect the strategic importance of the ICT function. Rather than viewing IT as a standalone department, it should be considered a critical strategic asset to the organisation. One approach is to have the CIO report directly to the CEO, rather than the CFO, to highlight the strategic and operational significance of ICT. This structural change can foster closer collaboration between IT and other business functions, ensuring that ICT initiatives are aligned with overall business goals
Strict approval hierarchies and functional silos create barriers to effective communication and collaboration.	Simplify approval processes and encourage decentralised decision-making to foster agility. Break down functional silos by promoting cross-functional teams and collaborative projects. Enhance transparency and information sharing across departments to improve coordination and reduce inefficiencies.
Relationship between CFO and CIO	
CFOs tightly control resources critical to CIO initiatives, leading to constraints and stifled innovation.	Foster a collaborative relationship between the CFO and CIO by aligning financial planning with ICT strategy. Establish joint planning sessions to ensure mutual understanding and support for ICT investments. Highlight the long-term benefits of ICT projects to secure necessary funding and resources.
There is a tension between the need for agility in technology and the CFO's financial oversight responsibilities.	Balance the need for financial oversight with the flexibility required for ICT innovation. Ensure the CFO is involved from the start of any project or process to provide strategic financial guidance and support. By engaging early, the CFO can play a more proactive role in facilitating technology-driven growth and innovation, helping to align financial oversight with the organisation's long-term strategic goals.
Tracking the outcomes of ICT investments is often skipped or not followed up effectively.	Implement rigorous outcome tracking mechanisms for ICT investments. Develop a benefits realisation framework to ensure that anticipated benefits are achieved and reported. Engage the CFO in the process to

	monitor outcomes and validate the return on investment.
Technological determinism and organisational change	
Technological determinism within corporate culture leads to the belief that technology alone can solve business challenges.	Educate staff and management on the importance of considering social, cultural, and contextual factors in technology implementation. Develop comprehensive change management strategies that involve discussions, negotiations, and dialogues concerning technology adoption and adaptation. Use case studies to illustrate the failures and successes of past technology implementations.
Relying solely on business cases for managing digital transformation is inadequate.	Incorporate dynamic and iterative planning processes that go beyond static business cases. Emphasise the need for ongoing evaluation and adaptation throughout the digital transformation process. Ensure that business cases include provisions for training, change management, and continuous improvement.
Change management and communication	
Change management is massive and requires significant resources to pivot an entire business.	Allocate sufficient resources and time for comprehensive change management initiatives. Develop detailed change management plans that include timelines, resource allocations, and stakeholder engagement strategies. Recognise the psychological and organisational challenges of change and address them through targeted interventions and support mechanisms.
Organisational transformation is a gradual, employee-driven process that occurs through everyday actions, rather than through sudden, top-down initiatives.	Create a culture that empowers employees to take initiative and innovate on a day-to-day basis. Facilitate this culture by providing the necessary tools, training, and resources, and by encouraging a flexible, adaptive approach to change rather than relying solely on large, planned interventions.
Leadership and vision	
Leadership and vision are critical for guiding technology strategy and aligning it with business goals.	Ensure that CIOs and other leaders articulate a clear vision for technology's role in achieving business objectives. Regularly communicate this vision to all levels of the organization. Provide leadership training focused on strategic alignment and the integration of technology with business goals. Engage the board and executive team

	in developing and supporting the technology strategy.
Employee engagement and development	
Engaged employees are more likely to adopt new systems and support organisational change.	Increase efforts to engage employees in the planning and implementation of ICT projects. Conduct regular surveys and feedback sessions to gauge employee involvement and satisfaction. Implement change management practices that actively involve employees, addressing their concerns and ensuring they are part of the solution.
Training and development are essential to equip employees with the necessary skills and knowledge.	Allocate sufficient resources for comprehensive training programs that equip employees with the skills needed to use new technologies effectively. Foster a culture of continuous learning by incorporating ongoing development opportunities and support systems, ensuring employees can adapt to evolving technologies. Make training an integral part of the business case for ICT projects to secure necessary funding and long-term commitment.
Continuous improvement	
Continuous improvement is necessary to meet evolving business needs and maintain competitiveness.	Establish a culture of continuous improvement by regularly reviewing and enhancing processes and systems. Encourage feedback and iterative development to adapt to changing business environments. Implement performance metrics that track progress and identify areas for improvement. Invest in technologies and practices that support ongoing optimisation and innovation.
Overcoming cultural barriers	
A reluctance to embrace risk and a lack of entrepreneurial mindset can hinder innovation**.**	Cultivate an entrepreneurial mindset within the organisation characterised by curiosity, creativity, and a willingness to embrace risk. Encourage and reward innovative thinking and actions. Provide training and resources to support entrepreneurial initiatives and create a safe environment for experimentation and learning from failures.
HR leaders play a pivotal role in shaping organisational culture and overcoming resistance to change.	Involve HR leaders in ICT initiatives to harness their expertise in cultural change and employee engagement. Work with HR to develop change management strategies that tackle cultural barriers and align ICT projects

	with organisational values that foster innovation and productivity.

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