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Editorial

E-business, Information Systems Management and Sustainable Strategy Development in the Digital Era

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This Special Issue includes a range of articles that collectively examine some of the key change processes evident in the current "digital era" in organisations. Topics covered include various aspects of e-business, the role of social media, approaches to sustainability, gamification in business, threat modelling, and the evolving role of information technology (IT) strategy, all discussed in specific contexts (industries, enterprises, etc.). The significance of digital technologies and their impact on business and society is much debated. Although many of these technologies are, in fact, not "new" [1], they are undoubtedly engendering new levels of innovation and change through their combined effect, improved network connectivity and increasingly widespread deployment.

When the term "digitalisation" first surfaced around the turn of the century, the acronym SMAC was used to identify the key technologies involved (Social Media, Mobile, Artificial Intelligence and Cloud). Today, significantly more technologies have been brought to market and implemented across industry, the public sector and society at large (Figure 1). Their collective impact has been such that we now have the concept of "digital transformation", which Ismail et al. [2] (p. 6) see as "the process through which companies converge multiple new digital technologies to achieve superior business performance and competitive advantage". This is now impacting the way organisations of all shapes and sizes are developing and operating their businesses. Such advances in technology in recent decades have been intertwined with the growing adoption of sustainability principles in industry, with digital transformation now linked by many authors to the move towards more sustainable business operations and the circular economy. The articles in this Special Issue discuss various aspects of this broader change process, often involving innovative working practices, enhanced people skills and competencies, and an increased focus on sustainability in industry and in society at large.

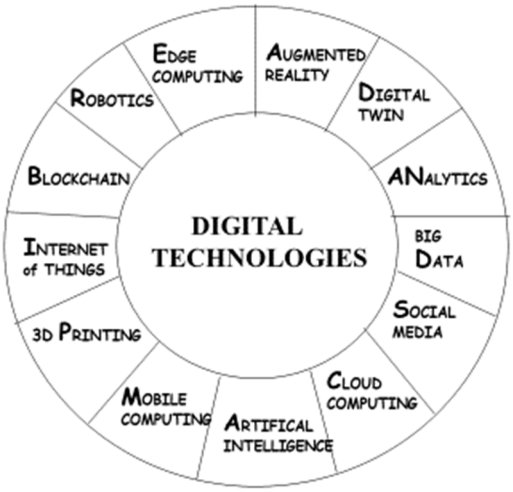

Figure 1. The Digital Technologies 2022.

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Virtual Reality (VR), Augmented Reality (AR), and Extended Reality (XR) are often collectively termed the "immersive technologies". As Baker [3] (p. 34) recently noted "these technologies are pushing the boundaries to change how we create and experience content, allowing the consumer to be immersed in a simulated world, rather than merely observing it passively through a 2D screen". In the first paper, Tegegne Tesfaye Haile and Mincheol Kang report on research into the use of Mobile Augmented Reality (MAR) technology, specifically as it affects consumer attitudes and behaviour. Using data collected from 179 participants, the authors employ quantitative techniques to explore a number of hypotheses. The overall result of the study demonstrates the positive influence of MAR application in enhancing consumers' purchasing intention, and the authors conclude that "MAR has emerged as a technology that made an innovative and entertaining way of information acquisition possible by superimposing an extra layer of virtual information on top of the perception of the real world in real-time. Understanding the perception of users about MAR is important for marketers since these perceptions affect consumers' attitudes towards advertising". (Contribution 1).

Peter Jones and I then examine the approach of the leading digital technology companies to sustainable development. Despite the growing influence of sustainability considerations in the development of business strategy, Hilali et al. [4] (p. 30) have observed that "companies are still trying to find the 'secret sauce' to reach sustainability, an equilibrium between their economic ambitions, their social impacts on communities and their carbon footprints on environment". Some of the extant literature focuses on the general relationships between digital technologies and sustainable development, while some concentrates on individual digital technologies, specific sustainability challenges and elements within the value chain. Here, the approach of the leading digital technology companies to sustainability is analysed. Through an examination of published company reports, six major sustainability themes being actively promoted and supported by these companies are identified, but evidence to date suggests that commercial reality is the main driver of current sustainability objectives. Nevertheless, it remains of utmost importance that the leading companies in the digital transformation market "maintain their positive enthusiasm about the commercial and social benefits of digital transformation, but that they also temper that enthusiasm with a continuing vigilance about the challenges of digitalisation that reflects a wide range of stakeholder concerns". (Contribution 2).

Modern e-business platforms and ecosystems have their roots in technologies and processes that date back to the last century, but significant challenges in adopting and benefitting from e-business remain, particularly for small businesses in the developing world. In the third paper, Olakunle Olayinka and I examine the adoption of e-business in small business enterprises in Nigeria. The paper identifies a number of critical influencing factors and puts forward a framework to guide practitioners working in similar environments in the transition to e-business operations. The study emphasizes the need for the effective management of various technologies and different dimensions of change in e-business projects, and "provides a realistic route map for progressing e-business initiatives, geared mainly to the practicalities of small business management rather than theoretical concepts". As Huy et al. [5] (p. 3) note "ultimately, successful change managers shift their focus from single initiatives to the dynamics among multiple initiatives. A successful transformation typically does not rely on any single change initiative but emerges from the careful management of multiple, integrated initiatives that interact and reinforce one another over time". (Contribution 3).

In the fourth article, Run-ze-Wu and Xiu-Fu Tian examine the introduction and deployment of enterprise social networks (ESNs) in China. This concept has antecedents in the Groupware products of the 1980s, the corporate Intranet in the 1990s, and the range of social media platforms and products now available. These include work-oriented social media platforms (WOSMs), which are very much akin to ESNs, and have recently been researched by Nobbay [6] (p. 182), who observed that these technologies enable "people in multiple social and economic strata, across diverse geographies, languages and cultures, to

create and collaborate in multiple fora to produce new and useful knowledge efficiently". Here, the focus is on the companies providing these platforms and how they can continue to grow their user base. Using a quantitative, survey-based research methodology, the authors tested a range of hypotheses and identified the critical factors for the continued and expanded use of these products in user environments, concluding that "ESNs emerge as a new office model that combines the mobile communication technology and office". (Contribution 4).

In the fifth paper, Ahmed Saleh Mohamed Alichleh AL-Ali, Gyanendra Singh Sisodia, Bhumika Gupta, and Murale Venugopalan examine how e-commerce in the United Arab Emirates has been impacted by the COVID-19 pandemic in the digital era, focusing particularly on changing consumer behaviour, innovation implementation and effective change management. Using a qualitative, inductive approach, the authors undertook 10 semi-structured interviews with senior managers. Their findings highlight how the pandemic and the advance of digitalisation are facilitating new levels of innovation and change. Such innovation may be incremental or radical, but does not have to be disruptive. As the authors conclude: "e-commerce organizations are urged to adopt the mindset that their organizations are not a set of rigid systems but rather a continuously evolving process. Practitioners also need to ensure that, rather than revamping the organization and developing new ways of working, they are leveraging traditional ways of doing business and innovatively applying them to their organization". This aligns with the view of Chan Kim and Mauborgne [7] (p. 9) that "non-disruptive creation opens a less threatening path to innovation for established companies", and "by framing their innovation efforts in a broader context that embraces both disruptive and nondisruptive creation, established companies can better manage their organizational politics and the anxieties of their people". (Contribution 5).

Digitalization has meant that it is now easier for end-user departments to acquire technology products, such as AI, analytics and big data, usually via cloud service providers, sometimes without reference to central control and governance by the formal IT function. The changing role of end-user departments in technology management is well illustrated in the sixth article, by Ibelema Sam-Epelle, Olakunle Olayinka and Peter Jones, on gamification. Gaming has been used for industry simulations and in combination with computer-based training packages since the 1980s (see, for example, Hiley and Wynn [8]), but the recent past has seen this taken in a new direction, with the digitalisation of gaming and the advent of gamification—comprising a software product that contains game-like components but which itself has a functional non-game purpose, and non-game-like elements. The authors suggest that value-based frameworks could usefully be deployed to assess the impact of gamification "for a more comprehensive understanding of gamification broadly, and enterprise gamification more specifically" and that "a value perspective to gamification acceptance can benefit explaining gamification's growing proliferation, academic and practitioner interest, and market value". (Contribution 6).

Another major challenge for all organisations in the digital era is the effective management of multi-faceted security issues. In a recent IDG Research Report, Sayer [9] (para. 7) found that "securing the enterprise" was the major concern for CIOs, with 25% of IT leaders confirming that "cybersecurity initiatives such as real-time security monitoring and forensics were the most important things they were working on". In the seventh paper—within the related context of the smart city environment—Marc Wright, Hassan Chizari and Thiago Viana review the extant literature on threat response and smart city infrastructure, and discuss how cybersecurity is being applied within this environment. This encompasses the application of Bayesian networks and alternative methodologies for analysis of smart city infrastructure (SCI) and related critical national infrastructure (CNI). The authors conclude that "there is an overall lack of national level perspective analysis regarding SCI and related CNI to analyse and provide complete protective mechanisms", and that "modelling should also include local, regional, and national influences on the

overall system structure's effectiveness and importance, regarding the much larger national architecture". (Contribution 7).

In the final article, Peter Jones and I review the role IT strategy has played in guiding digitalisation in the hotel industry in recent years, and assess the challenges now confronting IT professionals and end-user departments in managing this change. Almost a decade ago, Law et al. [10] (p. 10) noted "the hospitality industry is not technology-oriented by nature, but the increasing demands from sophisticated customers, together with the information intensive characteristics of the industry, are prompting managers to embrace IT to meet present and future business needs". Since then, much of the hotel industry has embraced these new technologies, with mobile apps, robotics and IoT devices, in particular, being deployed in key customer-facing functions. However, the need for connectivity between digital technologies and integration with core information systems has not always been adequately pursued, with the resultant risk of project and strategy failure. The article finds that "there is something of a schism between IT strategy development and the design and execution of digital transformation projects" and that "this lack of alignment with an overarching strategy constitutes a high-risk approach that reflects the diversity of views on the essence and significance of digital transformation". The article concludes that proven IT strategy development methodologies are still valid in the digital era and can play a critical role in underpinning successful outcomes in digital transformation initiatives. (Contribution 8).

These eight articles give a flavour of the impact that digitalisation has had on the management of IT in recent years—but how significant has this been when put in historical context? Is it any greater than that which followed the introduction of the personal computer into industry in the 1980s, or that instigated by the use of the Internet in the 1990s? A look back at my own experience in IT in organisations across this period provides some perspective on this.

When I first started out in IT at Ford's centre for UK operations in the late 1960s, the company was a leading exponent of what was then termed "data processing". The company had two IBM mainframes located on the ground floor of their large 6-storey US-styled office block at Warley in Essex, UK. These machines (IBM 360-65s), with their golf ball operators' consoles (subsequently replaced by VDUs in the 370–158 series), each had 32 disc drives and 32 tape drives, plus card readers, card punches and several printers on each machine, and up to 1 megabyte of core memory. Production, inventory, payroll and sales data came in from the main manufacturing plants at Halewood, Dagenham and other car production sites around the UK for processing. Some of the data came on punch cards that would be fed onto the punch card reader and transferred onto tape. I was one of three tape librarians working shifts around the clock, preparing trolley loads of tapes for running different programming jobs, and then putting them back in the stacked shelves of the tape library once they were returned from the main computer room. The tapes were on large reels about 12"wide; whether they had a plastic ring in the back or not determined if they were read only or could be overwritten.

Some fifteen years later, I was working for Glaxo Pharmaceuticals at its UK headquarters at Greenford in London. The company was undergoing major change in its technology infrastructure, as its HP 3000 series mini-computers—hitherto linked only to desk-top terminals in radial fashion—were now being accessed by desktop PCs connected by local area networks, not only at Greenford, but also at the three main production sites around the UK at Ware, Barnard Castle and Speke, all benefitting from a state-of-the-art wide area network. The department had just been reorganised and been renamed, changing from "Management Services Division" to "Information Management Division". End-user computing—with PC-based word-processors, graphics packages, data bases, spreadsheets and computer-based training modules—was rapidly spreading across the company's functional areas [11]. Information, rather than data, had become the key driver of the company's IT strategy, with packaged business software being acquired to replace the old in-house programs (written in Cobol and Pascal) for all main business functions.

Fast-forward another fifteen years to the turn of the century, and I was working at cider-maker HP Bulmer, now part of international drinks group Heineken. Over a 10-year period, the company had migrated from its old legacy systems running on proprietary Data General hardware, to an integrated set of packages (the Oracle Enterprise Resource Planning—ERP—suite) with some bespoke elements, but all written in Oracle, using the Oracle relational data-base, running on Intel chip-based servers. The Internet was widely accessed within the company, and the Oracle ERP system was being expanded and migrated to the web-enabled version (Oracle 11i). Ownership and management of elements of the IT provision had been transferred to the business functions, notably for process management, and data and systems maintenance. In the year 2000, I gave a presentation at the IT Directors Forum at Cranfield University that attempted to highlight some of the key challenges faced by IT Directors and Chief Information Officers (CIOs) at that time [12]. These included, amongst other things, the rapid growth of e-business, the growing significance of information and data management, the need for new skills and competencies in the IT team, and the growing importance of IT security, following the Y2K technology hiatus. Many of these issues remain of importance today in the management of IT.

What these snapshots tell us is that the IT landscape has constantly evolved over the past 50 years to accommodate new developments which have instigated change in the ways in which IT is deployed and managed within organisations. The "digital era" can best viewed in this context, and whilst digitalisation has certainly had a very significant impact on business and society, it has arguably not been any greater than that of new technology developments in previous eras. Nevertheless, here in 2022 at the University of Gloucestershire, the university has a digital strategy, as well as an IT strategy, reflecting the impact that digitalisation is having on the organization, and the continued development and increased deployment of digital technologies remains one of the key change factors and challenges facing all organisations today.

List of Contributions

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