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A Roadmap to Artificial Intelligence: Navigating Core Impacts to Successfully Transform Organisations

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Abstract: Artificial Intelligence (AI) is a highly disruptive technology that will have major effects on the business world over the coming years. It has the potential to allow companies to achieve major efficiency gains and a more productive workforce through automating existing processes, providing deeper levels of analytics, providing better customer support, and increasing security. On the other hand, it may lead to lower staff levels and a drop in existing employee morale. Given the complexities of these projects, AI will only benefit organisations if they understand its capabilities in addition to its shortcomings. This investigation addresses the predicted impact on skills, roles and employee morale of artificial intelligence on the workforce of the future as AI continues to become more prevalent in our society. We investigate these impacts of AI specifically across four key industries by engaging in interviews with experts in the field to answer two research questions: (i) What are the core impacts of introducing AI systems in the workplace?, and; (ii) How can organisations develop AI projects for successful transformation? The inclusion strategy for this research were professionals who were highly knowledgeable in the area, and from our findings we were able to identify several impacts that AI made to companies developing these projects; namely employment levels, workforce morale, and process efficiency. With these insights, we subsequently developed a roadmap which contains the recommended steps and decisions that are necessary for successfully introducing AI to an organisation. This roadmap visualises the key decisions and steps that are critical for any AI based initiative for organisations, which will provide practitioners with a higher level of understanding of what is expected, in addition to enabling more effective collaboration with the system developers. Furthermore, this roadmap allows organisations to take a positive and proactive approach to designing these systems with their workforce in mind and to prepares them for the implications with the development, deployment, and use of these AI systems.

Keywords: artificial intelligence, transformation, strategy implementation, process efficiency, workforce morale, AI transformation, roadmap

1. Introduction

Organisations in the digital era must continually adapt their systems to keep up to date with new and evolving technologies in order to enhance their efficiency and competitiveness. Despite the many advantages of embracing these disruptive technologies, evidence continues to emerge that these systems will replace routine labour in particular, in addition to placing an ever-increasing burden on human intelligence (Grencikova, Kordos and Berkovi 2020). These disruptions might lead to significant impacts on job creation and retention as many roles will have to be re-designed to accommodate the knowledge and skills that embrace these new technologies. Implementing AI within organisations can also lead to lower levels of employee confidence and engagement, if managed improperly (Brougham and Haar, 2018).

The first section of this paper explores current literature surrounding AI, before presenting the identified research gap, and the aim of this investigation. Next, the paper outlines the research design decisions made to address the research questions, and subsequently presents the findings of this study. Lastly, the discussion outlines the impact this research has for both research and industry, while identifying future areas of interest.

2. Literature review

AI has pervaded several industries, ranging from computer science and telecommunications to business and finance, arguably making it the single scientific field with the most potential for massive changes to civilization (Bostrom, 2019). Organisations must be sufficiently prepared to engage, and work with AI as embracing this technology is now more urgent than ever for competitive necessity. For example, American Family Insurance Group reported a 32% decrease in false-positive vulnerability alerts, a 45% reduction in security scan time, and 57% fewer alerts for human developers, accelerating application delivery times by 24% (Schwenger, 2020). Today, AI is used as an umbrella term for technologies such as computer vision, machine learning, and language processing which can mimic human intelligence and has the potential to transform entire industries (Russell and Norvig, 2015).

Presently however, there is only a focus on narrow scale AI implementations where computational thinking and programming techniques are used to create machines that perform specific tasks using machine learning

technologies (Wong et al., 2020). These systems are usually fed with large bodies of data set, known as training datasets. If these are unrepresentative, or reflect patterns of prejudice, the system is likely to make decisions that are discriminatory in nature, with several examples of bias emerging from such cases. These failures include Amazon's recruiting tool, Facebook's biased ads, and radically biased healthcare risk algorithms, highlighting the lack of regulation in AI development, in addition to how organisations are struggling to alleviate the dangers associated with this technology (Treacy, 2021).

While AI can provide analytical capabilities lacking in current toolsets, aid (or bypass entirely) developers in the highly technical skill sets by acting as intelligent translators from human ideas into working code, it can also drastically improve quality assurance and security of software through conducting automatic code analysis. With this in mind, research has previously indicated that AI can affect: (i) performance and learning strategies, (ii) deep learning that results in innovative ways of thinking, (iii) critical thinking and analytical skills of knowledge workers, and (iv) the ability of knowledge workers to share and combine knowledge, to create new knowledge (Hetzner et al. 2009). This reveals the significant role the human factor plays, as these systems often reflect the developers' biases-intentional or otherwise.

2.1 Research gap

Despite the increased interest in AI by academia, industry, and public institutions, there is yet no standard definition of what AI actually involves (Samoili et al. 2020). The increased success of AI, followed by the excitement to embrace this technology, has also led to several societal implications, raising further questions on its impact within organisations. One potential reason for this absence is the dynamism of changes in the technology, as it is constantly evolving. This can be seen through the multi-layered nature of interpreting the concept, as it is simultaneously observed as a scientific discipline as part of computer science; a system that generates decision-making, learning, reasoning etc.; a technology and knowledge source; as well as being a key driver of economic development (Gojakovic et al. 2021). In addition to this is the link between AI and human intelligence, which is a subjective category that is difficult to define and measure in both cases. Perhaps the most complex reason, is the increasingly pronounced system of cause-and-effect in the socio-political, economic, industrial and scientific trends on the development of AI.

Introducing this disruptive medium to organisations must be managed effectively, or risk potential fallout from improper deployment. Indeed, research has shown that AI has the potential to improve firm performance, "*only in the organisation that has an adequate human capital capability in integrating these new technologies across its processes*" (Harraf and Ghura, 2021, p. 99). For example, managers are expected to respond to several unknowns related to the inclusion of AI as a new and unique lifecycle, from conceptualisation of an idea, through to the final output. Managers are also expected to enable the creation of certain conditions for quality organisational communication, while also encouraging employees in creating value to implementation strategies. However, as research within the area of AI in business contexts is growing, aggregated knowledge within the subject can be limited, and studies that are rigorous and relevant are needed (Gulati, 2007). Managers are left with little support from academia when aiming to implement AI in their firm's operations which leads to an increased risk of project failure and unwanted results (Reim et al., 2020).

Future projections of AI technology point towards fielding solutions more rapidly, but not necessarily with more accountability, and our limited understanding of AI applications, and how value is created and captured serves to highlight the importance of this research (Åström et al., 2022). Therefore, organisations must understand how to align AI systems to the vision of their purpose and to the end goal of value creation (Morales, 2020). Given this state of uncertainty, the research questions in this investigation are:

- What are the core impacts of introducing AI systems in the workplace?
- How can organisations develop AI projects for successful transformation?

3. Research strategy

Twelve expert judgement studies were conducted via semi-structured interviews across four key industries that have experienced significant adoption of AI technologies in recent years: data analytics, law, consulting and accounting, as outlined below in Table 1. These experts had titles that ranged from CEO's, CIO's, digital specialists and senior managers, and each had extensive experience in AI systems across their areas of expertise.

Table 1: Expert details for judgement studies

#	Expert Role	Industry
E-1	Chief Executive Officer	Data Analytics
E-2	Senior Associate	Data Analytics
E-3	Professor of Digital Transformation	Data Analytics
E-4	Chief Executive Officer	Law
E-5	Chief Information Officer	Law
E-6	Digital Specialist	Law
E-7	Vice President	Consulting
E-8	Director of Data Analytics	Consulting
E-9	Senior AI Engineer	Consulting
E-10	Senior Data Analytics Manager	Accounting
E-11	Senior Manager	Accounting
E-12	Finance Manager	Accounting

The interviews were semi-structured, with a focus on the interviewee's background, experience in AI projects and AI implementation in their line of business and industry overall. These themes were covered in every interview, though the exact questions used in each interview differed depending on the expertise of the interviewee. All interviewees gave their permission to record the interview, after which the interviews were transcribed. The interviews were subsequently thematically analysed by reducing the data and separating from each interview the section in which AI is discussed. Since this research focused on ascertaining the impacts of AI, in addition to formulating a roadmap for AI transformation, we reduced the data to focus on these key aspects before starting the coding process.

The first phase of coding involved thematically analysing AI sentiment from across the different experts and reduced the data by excluding those sections in which AI was not explicitly mentioned by the interviewee. In the second phase we coded the sections based on how AI impacts organisations, how AI projects the respondents had previously been involved with had developed over time, and the context in which they emerged. The third phase was focused on analysing these steps, and how they influenced an AI project over the course of conception to implementation. Based on these insights generated, the similarities and differences were analysed and mapped out to form different categories. We thus identified three main impacts of AI systems on the workforce (employment levels, workforce morale, and process efficiency), before identifying a further ten aspects which would ultimately form the basis for our roadmap for AI transformation model. We also rechecked data, regularities, and patterns, drew explanations and reviewed findings among third persons as per Yin (1994).

4. Findings

Only themes that were encountered multiple times by two or more experts formed the basis for these findings.

4.1 Core impacts of introducing an AI system in the workplace

Several themes emerged from the findings, revealing the potential of AI to impact across employment levels, workforce morale, and process efficiency. The first theme that emerged from the findings, and one of the biggest areas of debate in the interviews was the effect that AI would have on **employment levels**. The experts stressed that while AI is currently being widely used across industries for basic tasks, it has not progressed enough to perform higher level tasks. These basic tasks that AI can currently perform include voice, image, video and text recognition, data analytics, report writing, language translation, gathering and presenting data, customer service, stock control, sentiment analysis, validating payments, driving, fraud detection, and virtual assistants. Experts accepted that certain sectors face large job losses due to large scale AI implementation, and the ability of replicating human capabilities over the coming years to perform more job roles: "*AI will displace a large proportion of middle-class jobs, leading to a greater divide between low-skilled and high skilled jobs*" (E-3). One expert described how their organisation has already felt its impact, forcing them to cut back on legal staff as AI was being deployed for document reviews, analysis, and e-discovery, claiming that "*within the next three years most law firms will be using AI and if they're not they're in trouble*" although, this was also being "*countered by increasing the number of technology and support staff*" (E-5). Other experts agreed that many of

today's job roles would rapidly drop in numbers as a result of AI, a prime example being truck drivers due to recent developments in autonomous driving: "*the majority of jobs at risk are all the ones that have been around since the industrial revolution. If AI gets to the point where it can do all those routine jobs, then a lot of people will lose their jobs, for example we are now seeing truck drivers lose their jobs*" (E-8).

Although some experts predicted that AI may lead to mass unemployment of basic job roles due to its disruptive nature, most experts were optimistic however about future employment opportunities. The argument presented was that AI will be used to complement workers, rather than replace them entirely, as the strength of AI is different to those of their human counterparts. One expert reiterated how every technological advancement encountered thus far has been met with an increase in employment levels "*it is a proven stat for every job that disappears due to AI, three or four jobs appear to support it, like security and analysts*" (E-5). The strategy of hiring has also seen a seismic shift in recent years also, with experts revealing that they are pivoting away from degree-based appointments, but to be more receptive towards candidates with a proven track record of learning experience in the field: "*we are hiring skills. We are not hiring people for particular roles*" (E-8). These skills should not only complement working with AI, but also serve them to be less endangered to being replaced by automation and unemployment. This was echoed by other experts who argued that empathy is a uniquely human trait that is becoming far more important with the use AI, due to the increased number of human interactions that are being created: "*I've never hired a person because they are technically good. You hire a person because they can communicate, they've got empathy, they can walk in other people's shoes and understand their problems, not just their own problems*." (E-5). This does not mean that everyone will have to be technology experts, as mostly this technology will be to help employees adapt and upskill in order to create more job value or satisfaction in their current role: "*I often hear this in the legal sector, whether lawyers need to become coders. I roll my eyes when I hear tha*t*… AI can't do large corporate deals, family law can't be done with that*." (E-4).

Secondly, these findings reveal mixed feelings on how employees would react to greater AI use and the consequent **workforce morale** implications associated with that transition. Many experts expressed how their employees were generally excited and interested in using AI: "*People are really excited about it and are ready to embrace it*!" (E-8), while other experts agreed that if these systems were brought in gradually, with effective change management and keeping employees informed and trained, morale should not be significantly impacted. Once these companies relay the benefits of the AI to the workforce, it should then increase morale: "*from what I've seen in the training courses, people are actually really excited about the capabilities of the tools… they are embracing it*" (E-12). The experts stressed however that it will be a gradual change, and the workforce must be well informed on how the systems will enhance their workday, increase their skills, and give them the opportunity to "*have a better career as a result*" (E-2). Some experts even suggested that the introduction of AI will create a greater work-life balance, arguing that "*employees could have less demands on them with these new systems and new ways of working, and have a more positive life balance*" (E-5). Several negative sentiments did emerge however, with experts emphasizing that no-one likes change having seen first-hand how data scientists and analysts have resisted the introduction of AI technologies in fear that these systems can perform their job better than they can, and that their job status would diminish as a result: "*Humans hate change. No human will put their hand up and say change*!" (E-5). Experts also outlined that once AI takes over some tasks that a human does, and performs them at the same, or even a higher level, then workers can lose their motivation, and their sense of purpose may be lost. Firms must therefore ensure that while their change management strategies are realistic, they must also be honest with their employees regarding any disruption that might occur and should be inclusive to all employees. Experts suggested the inclusion of adequate training to use and understand these systems, and validate any concerns, along with plans for further upskilling and career training in addition to evaluating the performance of use. These steps will ensure the employees still feel needed and validate that their place within the company is still important. However, experts highlighted that just because employees are informed of change, it does not mean they feel good about it. Employees will need something to work towards, and if they can't move onto something better within their jobs, then their sense of purpose for work may be lost.

Some experts were less optimistic about the short-term potential of AI driven projects, arguing instead that we won't see the full potential of this movement until at least another decade: "*it's much slower burning than what you read*" (E-1). While these experts were in agreement that AI currently has a lot of hype surrounding it given the disruptive potential it carries, the timescale of adoption was adopted at length: "*AI will be disruptive, yes. But is it happening now? Probably more on a minor scale, it is definitely more talked about than actual*

disruption. This is hype and reality, which are two different things. It's getting there." (E-1). To illustrate this point, several AI projects were described that were ultimately abandoned after failing to meet requirements, one of which being an Irish company that invested €50,000 to develop AI software to match deliveries and invoices. Another failed example described by experts involved Anderson Group Hospitals investing €65 million for IBM Watson to deliver cancer research which was similarly abandoned.

Thirdly, experts were unanimous that too much time was being spent on low level data gathering, and expressed frustration that not enough time was being spent on analysis and decision making to realise the AI strategy. As a result, the findings outlined increased levels of **process efficiency** as being another impact of AI systems in the workplace. The experts argued that with AI based initiative replacing repetitive tasks, it would make remaining employees more efficient: "*It definitely has a positive impact on efficiency… it 100% makes employees a lot more productive*" (E-2), freeing them up for better quality, and more meaningful work. Indeed, organisations should be cognisant of the available technologies that might be suitable for particular use cases. For example, in the accounting sector, some of these repetitive jobs might involve carrying out report writing and looking at the integrity and accuracy of accounts that experts "*would fully expect AI to be able to do sometime in the near future*" (E-2). Indeed, some argued that "*the implementation of AI will be around the kind of grunt work like reviewing documents, looking for issues in contracts etc… which is something AI and machine learning can do infinitely better*" (E-4). This was echoed by other experts, who stated that "*it will make the jobs richer, and accountants can spend more time on more interesting parts, and a higher level of analysis rather than having to pull all of the data together*" (E-12), and that AI should "*remove 20% of your role that is boring or repetitive*" (E-5). While a strength of AI is the speed in which it can process queries, experts also argued that you still need a human element for the integrity of the decisions being made: "*AI is going to make so many decisions in sub-second time. The challenge is going to be how are we making sure that those decisions are being made in a responsible framework?*" (E-7). The fear is that AI does not contain morals, and cannot be programmed to contain empathy, or emotion making effective governance of these technologies crucial. Experts also highlighted that AI was better suited to analysing large datasets and documents, whereas people are better at socialising and decision-making as a result of these tools: "*dashboards and being able to run queries through them is definitely a growing and desired skillset, to be technically proficient*" (E-7). Experts agreed that AI could take over much of the repetitive background work and free up workers time to focus on more rewarding work. This would have large efficiency and productivity benefits by allowing organisations to use their employees time at work more effectively. For example, one expert outlined how analysts are spending too much time gathering data, and not enough time interpreting it to present findings to senior management: "*Using AI would allow more time to gain insights from the data and use it to make stronger business decisions*" (E-12).

4.2 Roadmap

Using our findings, we developed a roadmap for AI transformation, comprising of ten steps outlined below in Figure 1. The first step outlined by the experts, was to **create the strategy** for the introduction of AI, which includes clear and well-defined business cases. Organisations must define clear requirements around how they intend to use the AI systems being introduced to suit their needs, and to exploit the capabilities of these technologies. Given AI's growing profile, determining these use cases that offer sufficient value was argued to be a pivotal first step in their transformation journey. Once the vision is in place, experts outlined the second step involves **researching the appropriate technologies** to realise the strategy as with the prevalence of AI several options may be available for the organisation to choose from. Whether the organisations develop these solutions in house, or purchase them from an external vendor, as with any innovation, the organisation will have no shortage of options available to them. In some cases, experts recommended undertaking a market and in-house talent analysis to get this choice correct, and to establish levels of expectation early in the project. If initial expectations are unrealistic, then organisations are likely to be dissatisfied with the final product. Building on this, the third step necessary for this transformation is to ensure a transparent level of **data governance**, as any successful AI implementation will be dependent on high-quality data as input. Experts stressed that having data governance mechanisms to ensure data gathering, labelling, storage and deletion procedures are standardized to train AI systems to make them smarter, and to provide accurate predictions and high-quality insights that can be used by the organisation. Several experts outlined how they had experience in several failed projects due to poor data quality, unstructured data, and a lack of standardised documents being fed into the system.

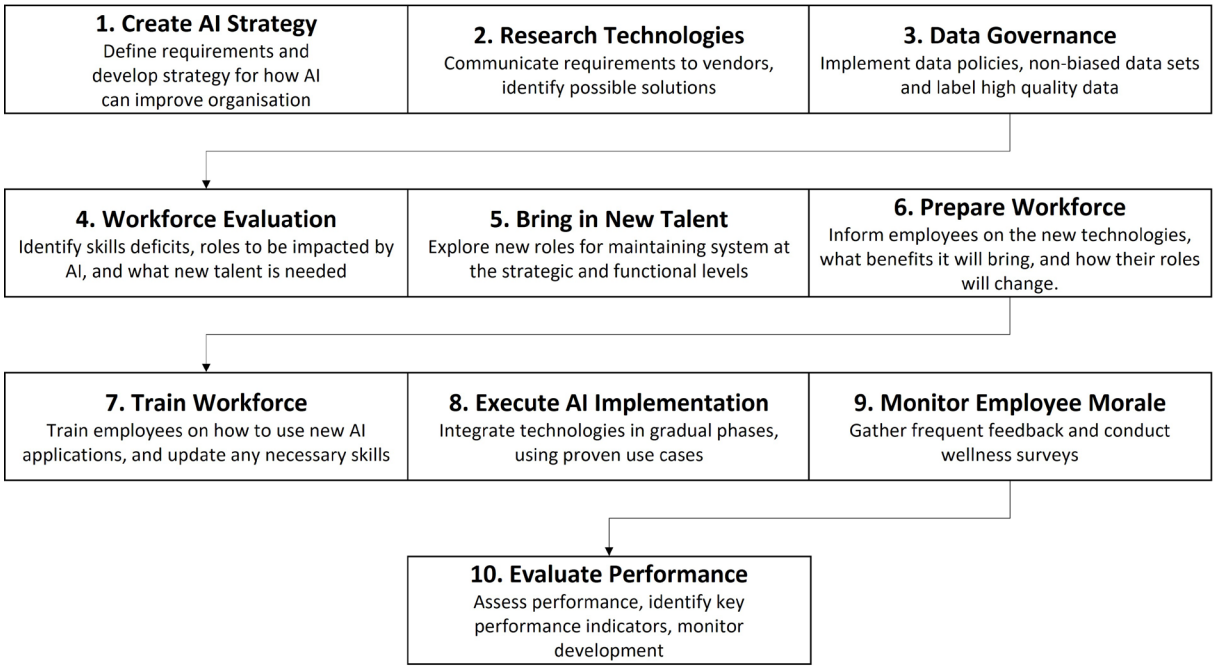


Figure 1: Roadmap for AI transformation

Once the organisation has a vision for the strategy, selection of technologies, and data governance these systems require, experts outlined the next step must focus on **evaluating the current workforce** and how they might receive this new paradigm. This step might include identifying all the skills available in the talent pool, and mapping them against the capabilities offered by the new AI technology being introduced. This procedure should help management identify any gap in talent and skills required within the organisation and can be used to inform future hiring decisions to bring in the requisite levels of talent. Building on this step, once the shortages of the existing workforce have been identified, experts suggested that it represents an opportunity to **hire new talent** to fulfil these requirements, and to ensure the correct operation for these systems. According to the experts interviewed, hiring new talent at various functional and strategic levels to support this system will be a necessity. It is the responsibility of the organisation once they have identified the right talent to subsequently **prepare the workforce,** so they are aware of how the new system is to be applied to the correct business problems and processes. They should also be informed as to whether their job is currently at risk as a result of this strategy. Experts advised that the key to this lies in communicating and informing the employees as to why this technology is being brought in, explaining the business value that is expected from it, and what impact it will have on their existing roles. By engaging employees in the process early, experts outlined it should result in higher morale towards its adoption.

The seventh step in this roadmap requires **the training of the workforce** to ensure effective use of the new system being implemented. Experts stressed importance towards this step, as with the introduction of new technology will ultimately bring with it the need for the existing workforce and/or new hires to be reskilled, or upskilled. These training sessions can be delivered through either online training platforms, classroom trainings, or bringing in third party consultants to provide this level of instruction. Following from this, organisations can begin to **execute the AI plan** by adopting a staged approach to the AI venture. Experts recommended that organisations develop several time scales to judge the success of this rollout, with the short-term focus concentrating on taking incremental steps towards building on the initial successes the system delivers. In the medium term, develop new use cases and exploring different avenues of deployment. The long-term focus for these projects is ultimately return on investment, but given these technologies are not fully mature yet, experts advise that organisations should not expect this immediately, but something to be developed between the medium and long term of its use. To deliver this, organisations need to be at the forefront of innovating with AI implementation while critically analysing their own business models to see where else it might be suitable. Throughout these different stages of the project, organisations should develop strategies and practices to **monitor employee morale** as it continues to be rolled out. A change of this nature will more than likely lead to a dramatic impact on the workers, and managers and team leaders should monitor their workers to ensure they are adjusting positively to change. Experts urged that they be open to

discussions with staff and ensure there are avenues for workers to provide feedback. Experts suggested this can be done in several ways, for example, deploying AI enabled responsive feedback platforms, or even conventional feedback systems to conduct wellness surveys to gauge employee engagement and morale. Finally, organisations must also critically **evaluate the performance** of these systems to move iteratively along the maturity curve of adoption. As each application and use case will require different tools, resources, and algorithms, evaluating AI systems to get feedback across a benchmark of key performance indicators would help organisations to upscale accordingly. Some experts revealed how previous projects had vastly underestimated both the amount of time and effort to release an AI system and had not planned accordingly.

5. Discussion, conclusions, and implications

Companies must undertake the necessary preparation if they intend to implement AI, or they risk AI projects being developed overtime, overbudget, or being abandoned completely. Having a clear strategy for AI implementation and data governance mechanisms is vital in this regard. In addition, our findings confirm that workers can be affected by AI depending on both the positions they occupy, and the very nature of their tasks, with organisations increasingly seeking to replace the monotonous aspects or work through AI transformation and automation. On the other hand, employees with high educational attainment, and emotional intelligence were identified as being more secure, as these traits are not easily replicated by automation (yet). Given how the transformative potential of this technology remains difficult for most organisations, this research has also generated a roadmap for AI transformation that these organisations can adopt in introducing these systems. This roadmap is a linear process, with several sequential steps needing to be explored before final system release. Throughout this journey, this artifact poses significant questions to practitioners including the selection of technologies appropriate for their solution, the strategy for why these technologies are required, data governance mechanisms, talent identification, and monitoring and evaluating both system performance and employee morale. These findings confirm that while AI is set to revolutionise and change the ways of working of many traditional operations, academics across the world must prepare to actively research and engage in this journey, and they must prepare students to control and drive this transformation through innovative research.

This research has several implications for both research and practice. Firstly, in the practitioner realm, AI is shown to already be prominent in accurate forecasting, improved insights, superior product quality, increased operational efficiency and enhanced customer experience. This research accentuates the literature in the ever-evolving field of AI by describing the findings outlined above. The identification of three core impacts (employment levels, workforce morale, and process efficiency) along with ten criteria (strategy creation, technology selection, data governance, workforce evaluation, hiring strategies, communication to workforce, training workforce, implementation of system, morale monitoring, and performance evaluation) for a successful AI transformation project represent the key findings outlined in this study. Secondly, AI will continue to evolve to become smarter and more intelligent to augment human thinking and could eventually dominate the human creative thinking ability. These findings highlight both the dynamic nature and the strategic decisions involved in any AI transformation project and provides practitioners with a clear understanding of what is involved from start to finish. Understanding these areas allows for a more granular project approach, and by extension, a more in-depth appreciation of these crucial factors. To foster the potential value within organisations, our roadmap reveals decision makers need to do more than just select the technology most suitable for their use case. Thirdly, while we endeavoured to achieve the highest levels of objectivity, accuracy and validity, the exploratory nature of this study was provided by a relatively small population size of twelve qualitative experts focusing on four distinct industries. Future research now encouraged to approach this subject matter from different industries, including healthcare, education, marketing, retail and e-commerce etc. Future studies are now advised to build on this roadmap through larger scale endeavours, focusing how these organisations can manage these distinct steps, and what metrics might be most suitable to ensure progress through their journey.

In closing, the future will bring new scenarios and tools, along with an increasing need to adapt to emerging markets and threats. To become resilient, organisations require complex solutions to compliment evolving strategies, where cooperation with employees could be the most essential component. The frontier of AI in this research space is expected to become wider and deeper, thus progressively creating research inputs with stronger, actionable insights.

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