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Abstract

Artificial intelligence (AI) is transforming the business landscape and changing the way competition occurs. Sources of competitive advantage change, as some become outdated and others appear as critical. In this article, we describe how AI reduces some traditional sources of competitive advantages, how combining AI and human expertise leads to new sources of competitive advantages and we highlight the transformation required to embrace this combination. The article provides practical guidance for decision makers seeking to navigate this complex and rapidly evolving landscape, helping them to identify new opportunities and stay ahead of the competition.

Keywords: Artificial Intelligence, human-AI collaboration, sustainable competitive advantage, digital transformation

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Introduction

The goal of any strategy is to achieve a sustainable competitive advantage, an ability to generate more profit than the competition in the long run. Distinctive resources such as brand, patents, human talents, infrastructure as well as distinctive capabilities such as product design, customer service or manufacturing, are the basis for achieving this advantage. The process of building such resources and capabilities is long. However, changes in the environment (regulation, technology, ...) regularly make redundant some resources and capabilities and change the basis for competition.

Artificial Intelligence (AI) is such a driving force. It is rapidly transforming the business landscape, and companies are scrambling to adapt to this new paradigm (Ransbotham et al. 2020). AI has the potential to fundamentally alter the sources of competitive advantage by reducing the importance of some traditional factors and introducing new ones. For example, Generative AI tools such as Chat-GPT and DALL-E leverage huge volumes of data to produce original content when they are given a prompt. Such tools may potentially impact the key success factors of many industries that rely on human talents for some of their processes (Chui et al. 2022). A lot has been written and said about how AI-related technical resources such as proprietary data, specific algorithms or technical infrastructures can be a source of competitive advantage. In this article we specifically examine how AI affects existing human-based sources of advantage and creates new ones.

This article begins by discussing how AI can reduce the value of human-based specific resources and stressing how temporary the technical advantages are. It then describes how AI can enable companies to combine their human expertise with machine learning algorithms to create new competitive advantages. This paper argues that the transformational power of AI is not limited to automation but extends to the redefinition of jobs and processes. In the last part, we propose guidelines for decision-makers to embrace this transformation, highlighting that AI-human integration is not just about technology adoption but also involves a fundamental shift in organizational culture and mindset.

AI erodes human-based competitive advantages and constitutes only a temporary advantage

To be a source of competitive advantage, resources must be valuable and rare. With AI, a lot of tasks previously performed by humans are automated (setting a price, writing a memo, organising work, ...). Given their superior computational capabilities, algorithms process more information more rapidly than humans. In their research, Blohm & al. (2022) compare the investment returns of an algorithm with those of 255 Business Angels investing via an angel investment platform. The results show that the algorithm outperforms the majority of business angels.

Consequently, given the wide scope of activities that are under threat of being automated, companies that built an advantage out of their human talent and processes see this advantage vanishing. Conversely, companies using algorithms to make decisions see their advantage increasing. This happens both from a quantitative and qualitative perspective.

From a quantitative perspective, because AI enables the automation of tasks, some operations may need less or no human labor. However, some companies have developed a competitive advantage based on the availability of a qualified and well-organised workforce. In customer service or maintenance, some companies based their advantage on how productive their teams were. When tasks are automated, this advantage erodes.

From a qualitative perspective, automation reduces the competitive advantage of companies that rely on human expertise. In such cases, the competitive advantage stems from a pool of experts able to make better decisions than the competition thanks to their long-earned experience and expertise. In marketing, design, or quality control, with systems able to make decisions with an even higher success rate, the advantage of having trained a pool of experts erodes too.

For a resource to form the basis of competitive advantage, it need not only be rare and valuable, but also difficult to imitate or copy. However, as the information to train an algorithm for making a specific decision is widely available, as are the necessary talent, software and infrastructure to create and run it, the uniqueness and distinctiveness of such an algorithm reduces. All this means that we may expect some commoditization of automated decision-making: more available and easy to access, then less distinctive and a weaker source of competitive advantage (unless the company has proprietary access to a very specific and valuable dataset to train the model). Technical capabilities constitute imitable and thus outsourceable non-core resources.

Combining AI and human expertise leads to more sustainable advantages

Last, in order to serve for building a competitive advantage, resources also need to be embedded in the organisation processes. That is why technical AI-related resources and capabilities must be combined with human-based resources and capabilities in order to be a source of competitive advantage. Firms can perform better than their competitors when they develop capabilities that combine technical and social assets. In particular, the ability to interpret data insights and make decisions on the basis of such insights are core internal capabilities that create value. Personnel and management capabilities cannot be easily imitated and are, therefore, an important source of competitive advantage (Oesterreich et al., 2022). In the following section, we discuss several aspects of human expertise that are difficult for AI systems to imitate.

AI systems, while highly advanced, may still fall short in the exercise of good judgment or common sense (Cremer et al. 2021). Unlike machines, humans are capable of bringing their intuition and judgment to the table when making decisions. Humans can process a wide range of information, and can make decisions based on their understanding of the context and the situation. Furthermore, human decision-making is informed by their life experiences which can provide them with unique perspectives and insights that machines may not be able to replicate. Therefore, while AI can be a powerful tool, it is important to remember that human intuition and judgment remain vital for making decisions that take into consideration the complexity of real-life situations.

Besides, human experts play a vital role in ensuring that AI systems are designed and trained in an ethical and unbiased manner, reducing the risk of unintended consequences and negative impacts on society. In the context of criminal justice, AI algorithms may inadvertently introduce biases based on factors such as race, gender, or socioeconomic status (O'Neil 2016). They may not be able to take into account individual circumstances or

use their legal expertise to make a more informed decision. This is where human experts can step in to complement the AI system, providing a more comprehensive and nuanced view of the situation. By incorporating the knowledge and experience of human judges or parole boards, AI systems can be made more effective and fair, ensuring that justice is served in a way that is both ethical and unbiased. In doing so, we can reduce the risk of unintended consequences and negative impacts on society and create a more just and equitable world.

While AI algorithms have made it easier to analyze data and make predictions based on past patterns, they still have limitations when it comes to adapting to new situations. Unlike humans, AI algorithms cannot draw on their own knowledge and experience and are limited in what they have seen, i.e., training data. This adaptability to unknown situations is particularly important in "black swan" cases, when unexpected events occur and require an immediate response. For example, imagine a business that relies solely on AI algorithms to make decisions. What would happen if a sudden natural disaster occurred that disrupted the supply chain? Can an existing AI algorithm adapt to this new situation and make the necessary decisions? Probably not. On the other hand, a human expert with experience in the industry might be able to draw on their own knowledge and experience to make decisions that take into account a wider range of factors, such as alternative suppliers, supply chain redundancies, and potential long-term impacts on the business. In short, while AI algorithms have their place in decision-making, they should be used in conjunction with human expertise to maximize their effectiveness and address their limitations.

Creativity is a complex concept that involves thinking outside the box and generating new ideas, not solely based on data patterns. It is the ability to approach a problem or situation from a fresh perspective and come up with innovative solutions. While AI systems can perform complex tasks and analyze large volumes of data with ease, human experts are able to bring their creative thinking to the table, helping to come up with new approaches and ideas. For instance, painters can create artwork that resonates emotionally with the viewer, evoking feelings and emotions that AI-generated artwork may not be able to replicate. In business, creative thinking can lead to the creation of new products, services, and marketing strategies, thereby enhancing the competitiveness of a company in the marketplace.

AI systems can be highly effective when optimized for a single objective. However, when it comes to prioritizing multiple objectives, it is critical to have a human decision-maker involved. For instance, when considering sustainability, it's important to keep in mind that solutions that appear positive for the environment may not necessarily be equally beneficial regarding other aspects of society. In fact, some solutions may even have negative impacts on other societal factors. This is because sustainability is not just about preserving the environment; it's about creating a balance between environmental, social, and economic factors. Therefore, it is essential to have a well-informed human decision-maker with a holistic understanding of the situation to ensure that all objectives are being considered and balanced in the decision-making process. Furthermore, when it comes to complex issues such as sustainability, it may be necessary to gather input from a diverse group of stakeholders to ensure that all perspectives are being taken into account. In this way, we can ensure that our decisions are not only optimized for a single objective, but are also sustainable and beneficial for all involved parties.

The transformation required to embrace this combination

Synchronizing human and technical resources is then a clear path for achieving a sustainable competitive advantage. However, this combination constitutes a significant

challenge. To illustrate that, we can share the example of a company we interacted with recently.

| Organization and structure | Training and skills development | Technology infrastructure and models |
|---|--|--|
| Develop new job roles Redefine performance metrics | Develop new training programs | Transform from data-driven to data-centric Choose AI models wisely Build proper infrastructure |

Table 1. Framework of transformation dimensions

The company has successfully leveraged several AI tools to support and automate its customer support processes. Robot mails, chatbots, and speech analysis had been successfully implemented to serve better, and using fewer resources, the demands of the clients. The results in terms of productivity were immediately clear: for the same volume of activity, fewer humans were needed without deteriorating the quality of the service.

However, implementing these tools, the company faced new challenges. For example, as a lot of tasks and answers were automated, the customer service agents were only dealing with the most difficult problems. This had several side effects. First, the job became more demanding as the employees never had any slack during the day. Second, as they needed to be more expert, more investments in training and experience were required. Third, as the turnover on the job was still high, the investments in training and experience were not paid back on a long enough tenure. Last, as the job was more demanding, the possible candidates for occupying it were not numerous enough.

We can highlight from this story and other experiences the following transformation dimensions, which are also summarized in Table 1.

One thing that organizations may want to consider is to develop new job roles that require a combination of artificial intelligence and human skills. One way to do this is by analyzing the current roles within the company and identifying areas where AI can be utilized to automate certain tasks, while also ensuring room for human input and decision-making. Another approach is to look at emerging AI technologies and explore how they can be integrated into existing job roles or create new positions that require a blend of AI and human capabilities. On the other hand, with the increasing adoption of human-AI collaboration in the workplace, traditional metrics of productivity, such as output per worker or sales per employee, may no longer be sufficient to accurately measure the value of human labor. A redefinition of performance metrics is necessary to account for the changing nature of work in an AI-enabled environment. This could involve developing new metrics that take into account the unique contributions of human workers in conjunction with AI systems, such as cognitive flexibility or creativity. Additionally, it may be useful to consider metrics that measure the efficiency of human-AI collaboration, such as the speed and accuracy of decision-making or the ability to solve complex problems.

Humans play a crucial role in influencing the outcomes of an algorithm, by selecting the most appropriate algorithm and model for a given task, or by tuning the algorithm to achieve better results (Krakowski et al., 2022). Humans can also develop new domain-specific capabilities that are essential for working with AI, but with supply and imitation restrictions. In order to facilitate better collaboration between human and AI workers, organizations may choose to develop training programs that help employees understand the benefits of working with AI. This could involve educating employees on the ways in which AI can augment their existing skills and make them more effective at their jobs. Such

programs could be offered at all levels of the organization, from entry-level employees to senior management.

Data is undeniably critical in today's business landscape. Organizations need to recognize the paramount importance of data and shift their focus from being merely data-driven to data-centric. A data-centric approach places greater emphasis on the context and meaning of the data. It involves collecting, storing, and analyzing data in a way that is aligned with the organization's goals and objectives, and taking into account the limitations and biases inherent in the data. This approach recognizes that data is only one part of the decision-making process and that human expertise and judgment are still essential components in making informed decisions that take into consideration the complexity of real-life situations. In the context of human-AI collaboration, another key question is how to choose AI models wisely. When choosing between in-house and off-the-shelf models, organizations should consider factors such as the complexity of the problem being addressed, the availability of data, and the required level of customization. In-house models may be better suited for complex problems that require a high level of customization, while off-the-shelf solutions may be more appropriate for simpler problems that can be addressed with pre-existing models.

When it comes to infrastructure, organizations must consider many different factors. These include not only cost, scalability, and security, but also the specific needs of the organization, the level of technical expertise available, and the potential impact of any outages or downtime. In-house infrastructure may be more expensive to set up and maintain, but it offers a number of potential benefits, including greater control over the hardware and software used, as well as greater flexibility when it comes to customizing the infrastructure to meet the specific needs of the organization. On the other hand, outsourced infrastructure may be more cost-effective and scalable, but it comes with its own set of risks and challenges.

Conclusion

To summarize, organizations must be willing to invest in the necessary resources and capabilities to successfully integrate AI and human expertise. This may involve investing in new technologies, hiring new talent, and developing new job roles and training programs. It may also require a cultural shift, as organizations move from a traditional, hierarchical model to a more collaborative, cross-functional approach. By embracing this transformation, organizations can create a more sustainable competitive advantage, and unlock new opportunities for growth and innovation.

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