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B. Business Impact

Human intelligence vs. Artificial Intelligence: Developing human capabilities in the era of automation and digitalization

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Abstract

This paper would like to reflect on the advent of artificial intelligence (AI) technologies and identify key implications for the development of human intelligence (HI). On one side, there is the risk to weaken human capabilities that are delegated to machines but, on the other side, there is the opportunity to acquire more efficient practices and focus on more relevant tasks. Three levels of contribution of human beings to the workplace are described: intelligent hand, intelligent mind, and intelligent heart.

Organizations have the critical role to develop policies that can mitigate possible losses and exploit the potential of new technologies for a better working experience.

Keywords: artificial intelligence, human intelligence, capabilities, development

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Human Intelligence vs. Artificial Intelligence: Developing human capabilities in the era of automation and digitalization

The fervid discussion about artificial intelligence and its "extraordinary potential" is surprisingly leading to a **rediscovery** of humans' contribution to work. If robots can bring speed, precision, and strength, we still need fantasy, intuition, and affection.

It is important to debunk the belief that machines will steal the jobs of human beings unless they are asked to repeat only one single task. In fact, we won't see the elimination of our occupations, but they will certainly be deeply **impacted** and **modified** by artificial intelligence applications.

In this paper, we would like to reflect on this **impact** focusing on the development of human capabilities and explain **three levels** of contributions to organizations. It follows a brief description of possible **synergies** between AI and HI and, finally, the role of companies and academic institutions will be discussed.

The risk of weakening human capabilities

Automation will change the behaviours of workers and the risk is that some abilities could be undermined, such as memory, attention, accuracy, manual precision, and many others.

How can we leverage new technologies without diminishing our competences? Which human assets are in danger and do we need to protect?

It is not easy to describe the magnificence of human intelligence and the literature has not yet presented an exhaustive taxonomy of relevant human capabilities in the digital age. As a starting point, we propose a description structured over three levels.

1. The intelligent hand

Some manual skills cannot be replaced by machines while keeping the same **versatility** and level of **quality**. We can observe several examples in craftmanship (Kroezen et al., 2021), in which expert workers are still the most effective and efficient resource.

In every organization, we can identify some activities that require a particular know-how and a great amount of knowledge that is transferred over time, through on-the-job training. We can refer to multi-centenary firms which have transmitted craft through multiple generations to preserve the traditional line of business and to guarantee top-quality products (Sasaki et al., 2019). Several lines of manual work require the ability **to solve complex changing problems** which are always slightly different because the raw material is different, the temperature is different, or the context is different. It would make no sense to program a robot to solve a problem that occurs differently almost every time. From a study on historical passementerie and binderies, it has been estimated that some workers require a training period that goes from 6 to 10 years, including the use and maintenance of ancient machines from past centuries, which cannot be substituted by modern technologies due to their limited **flexibility** and "**customizability.**"

The world of luxury, in particular, strives for **authenticity** and values artisanal processes, which make some handmade goods unique. Contemporary research (Verhaal & Carroll, 2022) finds that products, services, and organizations perceived as authentic carry value that consumers are willing to pay for.

Finally, as a side effect, if we push to replace manual work with AI, we might miss some parts of the **work experience**, such as **mastery** of technique, **dedication** to the job, **experimentation**, **apprenticeship**, **concentration**, and caring about **excellence**, with possible implications and impacts, difficult to assess for the workplace.

2. The intelligent mind

Matthew Crawford (2009) warns us regarding the risk of "**learned helplessness**" as an effect of automation and digitalization. People display a lower level of **individual agency** and a higher level of **dissatisfaction**. Office jobs often don't allow us to experience the direct effects of our actions and to see tangible results. In fact, we have a greater amount of data at our disposal, but an inferior capacity to read them, and probably at a lower speed in comparison with an algorithm. It appears natural to delegate complex tasks and difficult decisions to machines, the danger being to lose **critical thinking**. This might weaken our **exercise of judgment** and we may face problems more superficially and impulsively, without going into depth and without analysing root causes.

This might represent a problem considering that cognitive skills – **problem-solving**, **creativity**, **innovativeness**, **learning to learn** – are becoming increasingly important in the workplace. Decisions are taken by managers largely based on their **intuition** and not based on a mere analysis of data. AI doesn't have the **sensitivity** to manage unexpected events or crisis. A onewell-known example is that of an autonomous driving vehicle, which stops before a roundabout connecting seven roads in a busy Brazilian city. Although cars access it without (too many) problems, the self-driving car doesn't enter it, as it cannot identify a zero-risk condition. Human drivers, instead, find the **courage** to travel **adapting to the flow** and moderating their speed to avoid accidents, as a robot will (probably)be never able to do.

It is necessary to acquire higher awareness of the potentiality of our mind and its ability to find mental shortcuts, the so-called **heuristics**, which allow us to source daily experience to survive and overcome obstacles (Viale, 2018).

3. The intelligent heart

Communication among human beings is becoming more complex and more frequent; it can be supported, facilitated, "augmented" by technologies, but never fully substituted by a remote system. Mysteriously, the hormone oxytocin, which is essential for the development of **trust** and **emotional engagement**, is produced only when we interact in presence.

Emotional intelligence and a **sense of humour**, as indicated by a study from Stanford University (Aaker & Bagdonas, 2021) can be extremely powerful, especially in the workplace. Only real interactions and laughing together release 'feel-good' hormones, such as **endorphins**, **dopamine,** and **oxytocin**.

Moreover, the possibility to help and to be helped spontaneously by a colleague is one of the more rewarding experiences in a workplace. **Solidarity** and **gratuity** among individuals can be restricted by the over-detailed planning of activities modern working tools enable.

Finally, the moral question, of **distinguishing between good and bad**, is central, when we discuss artificial intelligence. Computers alone are not able to **work ethically** and, consequently, discrimination and injustice might be automated. In this regard, it is necessary to elevate the discussion from a simplistic technical issue to a universal matter, involving different professionals from different fields and disciplines.

How human beings are augmented by machines

If Steve Jobs said that "computers are like a bicycle for the mind," AI represents its racing car. In fact, there are several areas in which **AI can effectively support HI**, such as offering new paths for **exploration**, enhancing the **creative process**, saving time, and focusing attention on **relevant tasks** (Pagani & Jablokov, 2023).

First, in organizations, AI can facilitate the **imagination process** in the development of new products or new ideas. The exploratory phase typically requires access to information, multiple experiences, time, and space to take place. AI can accelerate this phase, removing several roadblocks and quickly **testing new directions**.

In the healthcare sector, just to describe one example, AI can provide a timely diagnosis of aggressive cancer, starting from an early X-ray image of the tumour mass and making multiple hypotheses regarding its potential growth.

AI and technological developments have begun to **transform** and **aid** creative and complex processes, as well as challenge what we believe to be **advanced reasoning** ability.

After being defeated for the first time by a computer program, the Go champion Lee Sedol declared: "I'm learning new moves and I'm becoming a better player thanks to AlphaGo…".

Conclusion

The complexity of the context is forcing companies to **redesign** their organizational model and to clarify the **contribution of employees**, in particular of **managers**. This can represent an opportunity to develop human potential and to increase people's **effectiveness** and **satisfaction** (Morieux, 2018).

TALENT MANAGEMENT: It is necessary to acquire **higher awareness** of human capabilities and personal talents. Organizations need to create environments in which people can express themselves, make mistakes, restart, create, and innovate, and **not just execute** tasks or **process information** (like robots).

CAPABILITIES BUILDING: **Educational institutions** play a crucial role in developing them. Instead of focusing on knowledge transfer, academic curricula need to be devoted to developing skills and **attitudes** that allow graduates to adapt to a dynamic work environment. As said, jobs won't be stolen by AI, but they will be profoundly transformed by it. **Re-skilling** of employees and life-long learning will become core activities of the higher education system.

POLICY MAKING: It is important to regulate the integration of AI to support and protect HI. In order to do so, companies should put the **experience** of their employees and customers at the **center** of their decision-making process. A good example comes from the airline industry, where the full autopilot system is available, but not adopted. In fact, 98% of the route can be delegated to AI, but takeoff and landing are still in the hands of a human being.

"*We don't want our pilots **to forget how to drive**. This is essential to manage events with **unprecedented conditions**, like in the case of the miracle on the Hudson River*".

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