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URBAN AI STRATEGIES BASED ON THE ECONOMIC IMPACTS OF SMART CITIES

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DOI: 10.5937/EEE24068S
JEL: Z32, L26, Q13
Review Scientific Paper

ABSTRACT

The way artificial intelligence systems are developed has major consequences for society as a whole. It is important how policy issues are resolved, ethical conflicts are reconciled, legal realities are resolved and how much transparency there is. It includes areas such as finance, national security, health care, criminal justice, transportation and smart cities. City governments are using AI to improve city service delivery. This research aims to define guidelines to help cities and local communities develop artificial intelligence systems that are consistent with inclusiveness and sustainable development goals. It includes considerations for creating an enabling environment, fostering cooperation and building local capacity. Regulation is a key tool for cities to direct the development of artificial intelligence and its interactions in the local environment.

KEYWORDS

artificial intelligence, economic impact, smart cities, sustainable development, urban strategies

INTRODUCTION

Human choices for software development affect the way decisions are made and the way they are integrated into organizational routines. Artificial intelligence can be a revolution and become the most influential human innovation in history. AI plays an increasingly important role in our lives and economy, and is already impacting our world in many different ways. The world competition to take advantage of its advantages is huge, and global leaders - the USA and Asia - have appeared on the scene.

Artificial intelligence is seen as an engine of productivity and economic growth. It can increase efficiency and improve the decision-making process by analyzing large amounts of data. It can also create the new products and services, markets and industries, thereby increasing consumer demand and generating new revenue streams.

However, AI can also have a very disruptive effect on the economy and society. Some warn that this could lead to the creation of super firms - hubs of wealth and knowledge - which could have damaging effects on the wider economy. It can also widen the gap between developed and developing countries and boost the need for workers with certain skills. This latest trend could have far-reaching consequences for the labor market. Experts also warn of the potential for increased inequality, lower wages and a shrinking tax base. Although those concerns

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remain valid, there is no consensus on whether and to what extent the risks will materialize. It is necessary to define a common strategy that would enable the most effective way of using AI.

THE ROLE AND POTENTIAL OF ARTIFICIAL INTELLIGENCE IN THE ECONOMIC SECTOR

Artificial intelligence is not a futuristic vision, but something that is integrated and deployed in different sectors here today. There are numerous examples where artificial intelligence is already influencing the world and significantly enhancing human capabilities.

One of the reasons for the growing role of artificial intelligence is the enormous opportunities for economic development that it represents. A Price Waterhouse Coopers (PwC) project estimated that "AI technologies could increase global GDP by \$15.7 trillion by 2030, a full 14%." That includes \$7 trillion in progress in China, \$3.7 trillion in North America, \$1.8 trillion in Northern Europe, \$1.2 trillion for Africa and Oceania, \$0.9 trillion in the rest of Asia excluding China, \$0.7 trillion in Southern Europe, and \$0.5 trillion in Latin America. China is slowly making progress as it has set a national goal to invest 150 billion USD in AI and become a global leader in this field by 2030 (PwC, 2023).

Meanwhile, a study by China's McKinsey Global Institute found that "AI-driven automation could give China's economy a productivity injection that would add 0.8 to 1.4 percentage points to annual GDP growth, depending on the speed of adoption" (McKinsey Global Institute, 2024).

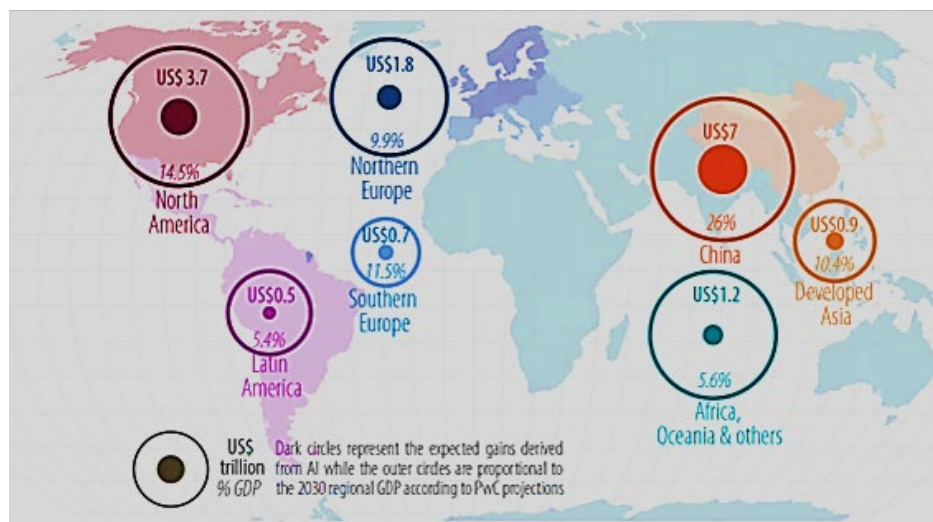
Most studies emphasize that AI will have a significant economic impact. Research commissioned by consultancy firm Accenture covering 12 developed economies, which together generate more than 0.5% of global economic output, predicts that AI could double annual global economic growth rates by 2035. AI will drive this growth in three important ways.

- First, it will lead to a strong increase in labor productivity (up to 40%) thanks to innovative technologies, it will enable more effective time management related to the workforce.
- Second, AI will create a new virtual workforce - described as "intelligent automation" in the report - capable of problem solving and self-learning.
- Third, the economy will also benefit from the diffusion of innovation.

A study by PwC estimates that global GDP may increase by up to 14% by 2030 as a result of accelerated development (PwC, 2018) – Picture 1.

Overall, it appears that while AI has significant potential to increase productivity, the ultimate effects will depend on the speed with which AI spreads in the economy and on investment in new technologies and relevant skills in the workforce.

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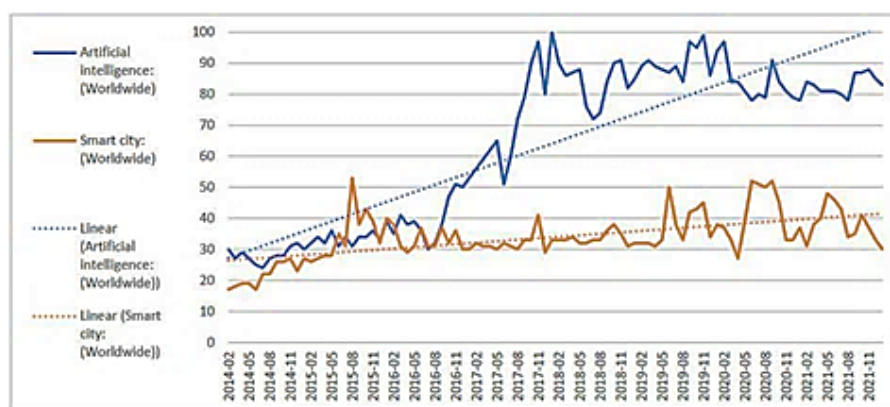


Picture 1. Expected gains from artificial intelligence in various regions of the world by 2030
Source: *The Macroeconomic Impact of Artificial Intelligence*, PwC, 2018.

THE URBAN POTENTIAL OF AI AND SMART CITIES

Allam and Dhunni (2019) studied the urban potential of artificial intelligence and proposed a new system that connects artificial intelligence and cities, while ensuring the incorporation of essential aspects such as governance, metabolism, and also culture, all of which are recognized as important in effective integration smart cities in order to meet the Sustainable Development Goals (SDGs) as well as the new urban agenda (Herath, Mittal, 2022).

Technology plays a key role in smart cities, according to (Kar et al., 2017), and creative technology techniques effectively help cities become smarter. Smart cities use ICT to automate processes and improve people's quality of life in urban regions (Picture 2).



Picture 2. The popularity of the keywords "Smart City" and "Artificial Intelligence" since 2014
Source: Google Trend, 2014.



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Furthermore, they use integrated intelligence technologies to improve municipal infrastructure and enable responsible governance and involve residents in city governance. Technologies based on artificial intelligence are used to conduct advanced research on the recorded information. Big Data and IoT will collect more useful information for citizens, according to (Guevara, Cheein, 2020), thanks to 5G technology (Herath, Mittal, 2022).

A number of urban areas are adopting smart city applications that use artificial intelligence to improve service delivery, environmental planning, resource management, energy use and crime prevention. In its Smart Cities Index, Fast Company magazine ranked US locations and found Seattle, Boston, San Francisco, Washington, D.C. and New York City as the cities that have best embraced AI (Fast Company Premium, 2021). Through these and other means, urban areas lead the country in the application of AI solutions. Indeed, according to a report by the National League of Cities, 66 percent of US cities are investing in smart city technology.

SHORT CASE STUDIES

Case study: Amsterdam

Europe is the leading continent in the world in terms of smart city development. The city of Amsterdam in the Netherlands is a smart city of the 21st century. The "Amsterdam Smart City Initiative", which was launched in 2009, includes more than 170 projects developed in cooperation with local residents, government and businesses. Amsterdam was a pioneer in establishing contract clauses for their public procurement process for algorithms. The clauses focus on technical transparency, procedural transparency and explainability. Standard clauses for the procurement of reliable algorithmic systems are openly available and can be freely downloaded from the Amsterdam City Council website (Haataja et al., 2021).

Case study: Barcelona

Barcelona is considered a pioneer in the development of a city strategy for the way data, and therefore AI, should be used in the city. The city has developed a value-based digital strategy starting with the framing and design phase. The plan is a toolkit known as Ethical Digital Standards that includes methods, standards, practices, procurement tools and software standards. Together, these standards set the conditions for working within the city, the conditions for investment and create a value-driven environment (Digital City of Barcelona, 2016). Barcelona had two defining contextual features: first, a visionary leadership supported by the political party that came to power, and second, a history of a strong civil society focused on technology as a power driver in the city (Monge, 2022). Barcelona is solving the weather problems. Smart sensors in the smart LED street light measure the amount of rainfall and analyze the irrigation level in the country. Thanks to advanced technological innovations, smart cities in the world are becoming more numerous, and the basis of their development is a strong integration of human and artificial intelligence in the city.



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PROPOSAL OF URBAN AI STRATEGIES BASED ON CASE STUDIES

An urban AI strategy is a means of articulating context-specific local goals. The focus is on recommendations and concrete practical suggestions for local authorities on how to develop an artificial intelligence framework and strategy. Key tools useful for supporting urban AI strategies, such as algorithm registries and algorithmic impact assessments, are highlighted in brief case studies (UN Habitat, 2022).

Recommendations

1. Create an appropriate environment.

While governments are late adopters of digital innovation, they are playing a key role in shaping the AI context in the city. By reviewing different sectors, defining the parameters of innovation through local regulation, local authorities have the power to create new ways for better services. Local authorities often have a great influence on creating the conditions for AI development in the city as well.

Building an AI-enabling environment means creating the conditions for responsible AI in the city. The development of artificial intelligence in the city will require medium to long-term changes. This time horizon is sometimes difficult to discuss and implement when politicians only focus on short-term priorities (Prince et al., 2020).

2. Introduce local technological standards and certificates.

Technical standards, explanatory standards and ethical standards can be useful regulatory tools. A promising perspective is the design of standards for data exchange that will allow the city to use data collected by private actors and facilitate collaborative management. The implementation of these standards can be supported by the establishment of a certification system for those working with artificial intelligence and the development of policies for their implementation (Prins et al., 2021).

The Open Mobility Foundation is a non-profit organization that has developed the Open Mobility Standards. It is "an open source standard that includes real-time reporting via API" (D'Agostino et al., 2019). It tracks individual mobility using a unique ID and creates a valuable location database. Originally developed in Los Angeles, it now operates in more than 130 cities worldwide.

3. Build on the existing monitoring and evaluation for supervision and system through all phases.

Evaluation must be ongoing at all stages of the AI's life. Monitoring must also include how the AI system works, as well as its impact after deployment. A robust monitoring and evaluation framework for AI systems needs to be built. Existing evaluation frameworks should be built upon, linking to algorithmic audit and impact assessment. Monitoring should involve an interdisciplinary team. It is also important that monitoring frameworks take the public interest into account. A specific monitoring mechanism is also needed (Jameson et al., 2021).

4. Include and adapt assessment tools as well.

Evaluation is not a one-time process, but it is continuous and recurring. Cities should design procedures with a long-term perspective, so that when things change the city can react.

5. Adjust procurement processes.



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The vast majority of urban AI will be acquired through procurement. Most cities do not have the internal capacity to develop robust AI solutions. Cities need the capacity to evaluate AI solutions that are presented to them during the procurement process (UN Habitat, 2022).

CONCLUSION

This paper provides a general framework on how to apply AI responsibly in the context of cities and towns. Big data contains a lot of information, including economic, social, scientific values and other aspects, by analyzing big data you can get the information you want. Many new ideas, new applications and methods have emerged.

Some types of jobs will eventually be replaced by AI. Robots will become extremely useful in everyday life. With all these new use cases for artificial intelligence comes the scary question of whether machines will overtake humans as a workforce. The structure of the workforce is changing, allowing us to create a knowledge-based economy and use this to create better automation for a better quality of life.

In the economic past, there were opportunities to move from agriculture to manufacturing and to services, (Tapscot, 2006). but now this is not the case. The industry is completely robotized and we see that automation makes economic sense. We are facing a changing reality and questioning the basic assumptions of society. We have to really think about it and decide what makes us productive and what is the value of people in society.

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