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Innovation Automation by AI as an Engine for Value Creation

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ABSTRACT

Artificial intelligence and innovation have shaped the business landscape, transformed public administration, and brought new opportunities and challenges. Artificial intelligence, AI, provides the computing power needed to analyse and predict a huge amount of data, enabling the identification and creation of new ideas. At the same time, AI can be used to improve business efficiency through automation and intelligent systems, freeing up human capital for more strategic tasks. In this article, we will focus on examining the potential of AI from the perspective of innovation, operational efficiency, and utilization of human capital. The role of artificial intelligence has been analysed in the innovation process, examining its potential to generate and identify new ideas and enhance innovation activities. Case environment is innovation through the use of artificial intelligence in developing services in the municipal environment of Heinola City.

Keywords: Innovation automation, Artificial intelligence, Human capital, Synergy, Value creation

INTRODUCTION

The state of maturity of knowledge-based management in municipalities shows that the key development areas identified included deficiencies in the management of knowledge-based management as a whole. No clear objectives, budget or responsibilities have been set for knowledge-based management (Kivimäki et al., 2023). In the development of knowledge-based management, the needs of information users should be more strongly considered in the improvement of reporting and information management, and the organization's knowledge-based management should be simplified and made visible. At the same time, the public sector should demand information management services from private service providers, and clear responsibility boundaries, such as the storage of research data or the updating of information models for infrastructure projects and constructions, should be defined in contracts according to their implementation.

In the technical sector of municipalities, artificial intelligence is only just in the beginning of implementation. Research data on the relationship between

artificial intelligence and innovations can be found in theoretical analysis, rather than in combining theory with practice. According to Houhala's (2018) dissertation, public-private interfaces have clear intersection and contact points where value is created. The value can be either positive or negative, depending on how it is done. They know how to use points.

On the other hand, the transfer of value and human communication at these points are regulated by law and other administrative means. For these reasons, the significance of data or information transfer at sector interfaces and interfaces must be understood in value creation and risk assessment. Today, the problem is not the quantity of data, but its quality, anonymization, and secure use.

There has been an enormous amount of applied discussion during the last year and attempts to make solutions by applying artificially intelligence, AI, especially Machine learning, ML, or Generative AI in various applications. All of that development work has increased learning and is essential for implementation in the future, but most of the solutions have been simple details without continuity. You easily burn your hands in implementing new technology in the wrong place and lose your interest for a long time. The overall picture or generative application of artificial intelligence to everyday needs is only just finding its place in operational activities and service production. The main fact in implementing new technology is that created solutions must create value, increase sustainability, and be socially acceptable and economically viable.

In this article, we will focus on examining the potential of implementing AI in municipal sector services from the perspective of innovation, operational efficiency, and utilization of human capital.

THEORETICAL APPROACH

To achieve long-term development and to create a solid foundation for knowledge-based management in creating new services in the municipal environment, an enterprise architecture and development plan have to be created for knowledge-based management (Kivimäki et al., 2023). Wicked problems cannot be solved by familiar practices or continuous improvement, but require radical changes in structures, thinking processes, and operating models (Metsola & Sutinen, 2023).

Customer expectations and business models evolve with AI, which requires the production of company adaptability, flexibility, and holistic and agile manufacturing. Gartner has published Top Strategic Technology Trends 2024 which points out that when applying new technology, you must simultaneously go through and understand: How do they impact business goals? What are the technologies and how to use them? What benefits and outcomes do they drive? What early adopters are doing? and What are the action plans and steps for implementation? (Gartner, 2023).

The refinement of knowledge is only possible if the properties of knowledge can be understood as a self-interpreting spiral of tacit knowledge and precise knowledge described (Nonaka et al., 2000).

RESEARCH OBJECTIVES, QUESTIONS AND APPROACH

We explore the role of artificial intelligence in the innovation process, examining its potential to generate and identify new ideas and enhance innovation activities. This article answers for research questions:

- How to create continuous value by utilizing artificial intelligence as an engine for innovation automation
- How to intersect human capital with artificial intelligence in innovation automation.

The collection of data and research approach has been partially constructive, conceptual and analytical, because it introduces a pathway to innovation automation by utilizing AI as an engine for new value creation. The article presents background experiences and results from various development initiatives and theses executed in the environment of the city of Heinola, where Heinola has served as a research platform and contributed to the understanding as a learning organization.

ARTIFICIAL INTELLIGENCE AND THE INNOVATION PROCESS

This article delves into the role of artificial intelligence in innovations and its connection to streamlining operations and optimizing the utilization of human capital. We journey towards the possibilities in the space of knowledge that opens new doors for creating innovations.

Similarly, the relationship between knowledge and value requires that, in addition to its precision, the information has a contextual meaning that the processor of the information in question is able to understand. In the public sector, an understanding of meaning and value is of great importance for democratic decision-making to be able to deal with complex and multidimensional issues or processes. Value should not be confused with the economic price, as they are not synonymous. The same complex situation exists in many value-based public administration proceedings when at the same time one has to interpret economic, social, ecological, or cultural perspectives in solving issues. Examining the challenges described above is particularly important when examining the potential of AI at the interfaces and interfaces between the public and private sectors, when data and information need to move in an automated and secure manner, creating value and eliminating harm or loss. At the same time, it should be noted that knowledge always involves interest (Habermas, 1976).

AI has a lot to offer in many ways of improving and streamlining processes and services in the public sector. Similarly, the potential of artificial intelligence in utilizing the innovation process is only just beginning, because an organization's readiness for digitalization (Pulkkinen & Suhonen, 2023) is not of uniform quality nationally, and administration and legislation are lagging in terms of framing, understanding value creation and risk management. Regulation, cyber security and human adoption of technologies are years behind schedule, so information, information hierarchy and algorithms must be transparent.

From a technological point of view, data and information interfaces are constantly being opened to promote digitalization, but at the same time, large technology companies are trying to prevent the introduction of solutions or operating models that increase information security, such as requirements that increase transparency. Due to the negligence of pioneering companies, technological development has to be restricted even unnecessarily in order to implement the protection of individuals, states and global business environments in accordance with the principles of existing regulation.

THE ROLE OF ARTIFICIAL INTELLIGENCE IN BUSINESS OPTIMIZATION

We scrutinize how artificial intelligence enhances business efficiency through automation and intelligent systems. Liberating human capital for more strategic tasks is a central theme in this section.

The potential of artificial intelligence in both public service production and companies' business operations is enormous, as routine work alone can be automated in the creation of digital archives on a rule-based basis. Only then will artificial intelligence be utilized in service production, when generative AI and the applications built around it receive data-based sources as raw materials. In the public sector, the problem is still getting massive paper archive and source materials into digital format and being placed in structures that are secure in terms of information hierarchy, where interfaces can be opened. In many respects, the work is progressing, but especially in the municipal sector, the work would be faster and more cost-effective as a centrally processed joint project.

The limited utilization of public sector data masses is also a hindrance and, in some cases, even an obstacle to the creation of business-driven services from datasets in society's hall. Similarly, non-digitized data also restrict remote or multi-location work (Houhala & Hurmola-Remmi, 2022). In the public sector, interfaces to datasets have been opened, but much remains to be done to increase the coverage of data. The infrastructure materials of municipal engineering would have a lot of information resources that could be utilized, but at the same time, municipalities must ensure the protection of datasets related to the security of supply and disturbances from a security perspective.

In the public sector, the core of AI management are human resources, good governance, ethical principles, and individual protection. Therefore, priorities for expanding AI could include increasing participation in decision-making, obtaining more accurate information as a basis for preparation, and encouraging staff to utilize new technologies in line with the OSKI model (Sigfrids et al., 2023).

SYNERGY BETWEEN HUMAN CAPITAL AND ARTIFICIAL INTELLIGENCE

We emphasize opportunities and an efficient division of roles for cooperation between human capital and artificial intelligence, as well as taking into

account the special characteristics of the public sector in the utilization of regulatory, rule-based, or generative decision-making models, for example. In addition to the division of roles, it is also important to identify the data processing principles applied by technologies and make them transparent. Only clear responsibilities between different stakeholders and the suitability of data processing methods increase value and safeguard society's interests. Recognizing that value points and value creation structures are often situated within the context of life and business events. Seamless collaboration between public and private actors is often required in these events (Houhala, 2018).

Human expertise is still needed to enable AI-based data production, ambiguous examination of complex issues, and detection of systemic errors. The sustainable link between AI and human capital is based on a responsible and risk-based division of labour between these roles in order to monitor and analyse data or information circulating at borders and interfaces.

Human factors should be harnessed to examine cultural and social acceptability, as AI-based tools do not recognize the meanings of emotional reactions or the everyday meanings of factors affecting human identity. Synergies between human capital and AI can create smarter, more efficient, and ethically sustainable decision-making processes when data and information resources enable it (Helander et al., 2020).

In its operations and services, the public sector takes into account legislative, administrative, ethical and moral factors, which cybercriminals, in turn, try to challenge. All in all, safety-related factors are also strongly linked to human factors and risks that various security measures aim to prevent. The biggest risks are related to human error, negligence or getting people to commit data leaks or cyber security crimes.

A PERSPECTIVE FROM THE PUBLIC SECTOR

We consider the unique perspective of the public sector and contemplate the challenges and opportunities of using artificial intelligence in this sector. Key considerations include cybersecurity and ethical issues.

Understanding the potential of AI is just beginning because the creation of knowledge, understanding and the operating models synthesized from them is only just beginning. City of Heinola has drawn up a digital roadmap during year 2022 to provide guidelines for the development of digitalization (Houhala & Hurmola-Remmi, 2022).

Over the past couple of years, the City of Heinola has launched more extensive cooperation with higher education institutions. We have provided the students of our organization with a living lab platform for both knowledge management and, this autumn, data automation and the use of artificial intelligence to increase their understanding. In terms of its basic functions, the city of Heinola is a regional town in Päijät-Häme based on its old industrial history and national administrative city. Thus, there is a strong industrial and administrative mindset in the heritage of the locality, which is partly reflected in the stubborn belief in the administrative handling of matters. Heinola also had a teacher seminar from 1899 to 1972. In renewing these traditions and

the functional history of the locality, cooperation with higher education institutions has proven to be a significant opportunity. Every higher education student has given a significant impulse in the improvement of the city's digitalization, operations and the resulting targeted services, to challenge our services with new perspectives, ideas have been generated for the possibilities of electronic services, and more holistic thinking about both products and services has been formed thanks to cooperation.

The digitalization of services and processes is a basic requirement for the wider use of artificial intelligence. The first entity to improve digitalization is the availability of paper materials in electronic storage format (pdf). However, this frees officials and employees from being bound by time and place. The next measure to increase digitalization and the utilization of artificial intelligence is to make electronic documents securely available to the officials, organizations and customers who need them. These initial measures will enable us to disconnect from physical workplaces.

To utilize artificial intelligence, organizations must have secure access to electronic documents and materials for AI review. Heinola, for example, has approximately two shelf kilometres worth of paper materials waiting to be saved in electronic format. The exact amount of digitization will be determined once the material has been processed and examined in accordance with the principles of legislation. For these reasons, AI-based applications, language models or machine, deep and self-learning systems should also be able to process electronic datasets in static form. The expansion and development of the hierarchy of information systems in organizations will help in the operational activities of AI-based operations or customer services to a new level. AI can be used to solve customers' service needs or organizations' complex issues and produce information to support decision-making.

The utilization of AI-based systems and applications in public sector operations requires the management of legislative, governmental, and information security-related risks, but at the same time the identification and utilization of opportunities. In terms of legislation, automated systems are used, for example, in the services of the Tax Administration, which means that rule-based automation can be used to solve mass data related to taxation.

In Heinola, the building supervision permit process is fully automated, which means that permits are applied for and processed in one system. The system also automatically archives documents required by law following statutory principles. The system can also be used to buy the materials they want 24/7 from the online store, so automation creates a customer-oriented service platform where customers can manage their official services from their point of view regardless of time and place. In the permit and supervision sector, the next major technological leap will take place in 2025, when permit processing will become Building Information Modelling (BIM)-based. The change will have a significant impact on the entire construction cluster, business models, value chains, and official practices. But also, the availability of private sector designers when older industry experts retire due to the transformation.

City of Heinola is also working on expanding the utilization of spatial data so that we can serve municipal residents, infrastructure construction partners,

and the state administration in information production. Key development measures are currently being taken to add street, park, and green areas to the city's map information service. The Graphical Information Service (GIS) service already provides up-to-date information on zoning, permits, ownership, and the quality of the built environment.

Getting AI into service production requires simultaneous development measures at the individual, service, and organizational levels in organizations. Heinola has started with cooperation with higher education institutions and, partly at the individual level, with officials whose pilot experiences are shared within the organization. Difficulties in utilizing artificial intelligence are caused by information security restrictions, the functionalities of permitted AI applications, the underdevelopment of organizations' information systems, and human factors, such as timidity, lack of training, and minimization of risks created by official duties. Road safety breaches and system-level weaknesses in the public sector contribute to the fact that artificial intelligence and its utilization in innovation and value processes have not yet taken the same leap as in the corporate sector. As the understanding of strengths and weaknesses as well as opportunities and threats increase, such as the financial and legislative support measures of central government, the benefits of artificial intelligence in the municipal field can increase even in the short term. At the same time, it is important to note that the public sector cannot leverage cash flows in accelerating value creation and developing services in the same way that the private sector can, in terms of meaning and enabling business results.

REQUIREMENTS FOR ARTIFICIAL INTELLIGENCE AND FUTURE PROSPECTS

In the final section, we ponder the technical and organizational requirements for artificial intelligence and its future potential in innovations. Well-planned and appropriately assigned artificial intelligence can be the key to sustainable and efficient value creation and an increase in well-being.

The spread of artificial intelligence in public sector functions and services requires at least the renewal of information technology, continuous training of personnel and the identification of safety-related factors. Nevertheless, it is difficult to see that a country like Finland in its network of 295 municipal units and other public actors achieves significant advances other than systematically and progressing more consistently in system-level solutions for automation, digitalization, and artificial intelligence. Promoting digitalization in the public sector requires coordination, funding and comprehensive enterprise resource planning.

At best, the length of careers in the public sector can promote the development of both automation and artificial intelligence, as the passion, creativity, and initiative of personnel (Hamel et al., 2007) serve as a guide in pursuing future goals and promoting development. However, research and business collaboration, as well as creative experiments with universities, are needed, with the public organization serving as an experimental platform.

For this reason, the strategic goals and objectives of the general government must include nationwide means, functionalities, and precise entries on requirement levels that increase digitalization and the utilization of artificial intelligence (Houhala & Hurmola-Remmi, 2022). Artificial intelligence and technological tools can be made to eliminate disadvantages and increase benefits but putting them to good use is a joint effort and investment by both the public and private sectors.

CONCLUSION

In conclusion, AI can be a significant engine for value creation as long as its use is strategically integrated and human power and thinking remain at the centre. The use of AI in utilities and infrastructure investments brings out both technical and human perspectives and creates new business opportunities. An in-depth understanding of these aspects enables the design of sustainable and efficient systems that support smart urban development and improve services for residents and customers.

Urban technological development, innovation processes, and infrastructure investments require a balanced approach that integrates technology, a rules-based approach, and a more productive use of human capital. Value creation through AI enables cities to improve their functionality, services, sustainability, and thus the quality of life of their residents. At the same time, public property can be put to more efficient use following the uses and asset types allocated that it enables (e.g. forests: economy – conservation – recreation – diversity).

A rules-based approach is essential for technological developments in cities and must play a key role in all innovation processes by enabling 24/7 services. The use of AI must comply with rules and ethical standards and be carefully designed taking into account the needs and rights of town residents. Similarly, the quality assurance of generative AI requires control or monitoring to ensure that, for example, the understanding of the meanings of legislation is sustainable and interpretations increase legal certainty, i.e. they fulfil the preconditions related to case-by-case solutions in legislation.

Adding automation or artificial intelligence to public services requires openness and transparency so that the legal certainty of services or permit solutions can be verified from the perspectives of equality, proportionality and non-discrimination. At the same time, the protection of customers' legitimate expectations, impartiality in the handling of the matter, purpose limitation in the application of the law, the implementation of the rule of law, and consideration of discretionary restrictions, such as values, different perspectives and interests, must be ensured. For the reasons described above, human competence, interpretation, and understanding of the big picture are needed to support artificial intelligence and automation.

Ensuring human capital in AI development is also essential to achieving a balance between technology and human-centricity. User-oriented design, training, and both open communication and interaction play a key role in ensuring that artificial intelligence serves city residents in the best possible way. Therefore, artificial intelligence itself is not the goal; rather, it is the

well-being of residents and the fulfilment of conditions related to well-being in everyday life and the adoption of innovations in business and industry.

In a nutshell, these perspectives form a strong foundation for smart, ethical, and human-centred urban development, urban structure, and value creation in the public and private sectors. Continuous value creation in urban environments therefore requires synergies between technology, societal demands, and people, which together enable a sustainable and balanced future.

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