

The shift from human capital to structural capital in the light of the artificial intelligence development

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Abstract: *The article deals with the issue of artificial intelligence and its development. The first part describes the theory of intellectual capital, within which it is possible to define human capital and artificial intelligence. The second part of the article analyzes artificial intelligence from the current point of view. The practical part of the article deals with the evaluation of the popularity of artificial intelligence among the professional public, where an analysis of the volume of published contributions in the WOS database is performed.*

Keywords: *Intellectual Capital; Artificial Intelligence; Intangible Assests; IFRS; IAS38*

JEL codes: M41, O34.

1 Introduction

In recent years, various tools based on artificial intelligence have become more and more popular in business practice. This trend is associated with the digital transformation of companies and, among other things, affects the structure of reported information in the financial statements of companies. An area inflected in the literature in connection with this trend is the area of management and reporting of intellectual capital (Parshakov and Shakina, 2020). At the turn of the millennium, a change in the economic environment in the developed world was evident, when economics changed from an industrial focus to a knowledge focus. However, this trend has brought complications in financial reporting, with employees instead of machinery becoming the company's main assets. In financial reporting, employees cannot be understood and reported as corporate assets because they do not meet the very definition of an asset, as opposed to machines that are fully owned by entities. It is therefore clear that the financial statements have lost some of their ability to tell about the success of entities, more in some sectors and less in others. In recent years, however, with the rise of artificial intelligence (AI), the opposite trend can be observed. Artificial intelligence gradually replaces the processes performed by employees, and value creation shifts from employees back to machines (Lobova et al., 2020). The aim of this article is to define the effects of the development of artificial intelligence on the reporting of accounting entities, where an increase in reported information on intangible assets can be expected and to evaluate the development of professional public interest in artificial intelligence.

2 Intellectual capital

A number of definitions of intellectual capital can be found in professional publications, some of which are very specific and some of which seek to define intellectual capital in general. All definitions agree in the basic characteristic, which describes intellectual capital as a set of intangible elements that bring a competitive advantage. Intellectual capital is characterized as a combination of human, structural and relational capital of an organization. These three components work together to add value to the entity. Human capital is defined as the sum of knowledge and skills of employees that do not remain in the organization when they leave (Kianto et al., 2017). Structural capital is based on the results of employees' activities, which remain in the entity even after their departure.

Examples may include business processes and procedures, workplace culture, database level, etc. (Gallego et al., 2020). It is clear from the above definitions that human and structural capital are very close, but from the point of view of financial reporting they have significant differences. These components of intellectual capital differ primarily in what is the entity's assets and what can therefore be reported in the financial statements. Companies can always only lease human capital from their employees, while structural capital is the property of the entity, which can dispose of it at its discretion. The relationship capital then consists of all the company's relations with the external environment. This is mainly the level of relationships with customers, suppliers and other stakeholders. Examples of this component of intellectual capital include reputation, customer satisfaction, or supplier loyalty (Moon and Kym, 2006). Many entities report their carrying amount many times lower than the market value of the entity. This difference is largely attributed to human capital, which cannot be captured and reflected in the financial statements (Rieg and Vanini, 2017). The conceptual framework within IFRS regulation defines an asset as a resource managed by an enterprise whose existence is the result of past events and which is the bearer of future economic benefits (IASB, 2018). Here it is necessary to emphasize the requirement of manageability, which is not fulfilled in the case of human capital, when entities cannot fully manage the activities of their employees. With artificial intelligence tools, the situation is the opposite, at least for now, and the owner of such a tool has full control over it.

3 Artificial Intelligence as a part of structural capital

Scientific and technological progress is constantly evolving, which necessitates the ongoing study of new technologies. For example, in the early stages of robotics development, it was assumed that a robot was nothing more than a machine that could act exclusively according to algorithms specified by its developer. However, further developments in robotics and programming, which resulted in the emergence of artificial intelligence, have created a need to rethink our understanding of robots and their potential. The fact is that artificial intelligence, unlike a "normal" robot, has the ability to make independent decisions based on the data obtained. (Shi and LI, 2020) Artificial intelligence is also able to analyze its own previously made decisions and change them and act alternatively.

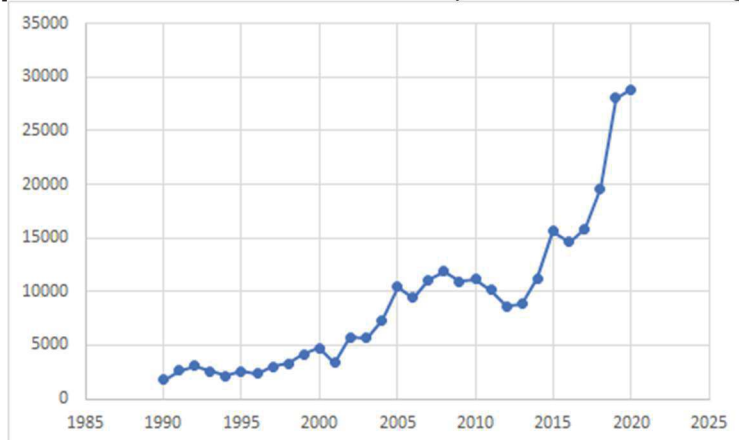
This characteristic is often called the ability to learn on its own, making artificial intelligence technology similar to the capabilities of the human mind. It is a mixture of software and hardware that serves as a substitute for human intelligence, which allows you to solve complex problems through thinking and learning. Among other things, it should be able to recognize patterns as humans do. Artificial intelligence can help in managerial decision making and providing more accurate information. The concept of machine learning is often associated with artificial intelligence and robotics. Machine learning is a part of artificial intelligence that uses artificial intelligence to train to analyze data and learn from it the way people do. (Kovalenko and SN, 2021) An advanced type of machine learning is in-depth learning. In-depth learning is based on algorithms that are inspired by brain processes. Artificial intelligence can be divided into the following three levels - limited artificial intelligence, general artificial intelligence, artificial superintelligence. Limited AI refers to the ability of a computer system to perform a narrowly defined task better than a human (Qasim and Kharbat, 2020). General AI refers to the ability of a computer system to overcome people in any intellectual task. Artificial superintelligence is able to outperform people in almost all areas, including scientific creativity, general knowledge and social skills (Gruening, 2011; Petkov, 2020). In general, it can be estimated that following the implementation of artificial intelligence tools, the share of intangible assets in total assets will increase for entities, which has already been happening continuously for the last decade. It should not be forgotten that some forms of artificial intelligence are firmly connected with tangible assets, and in connection with this it is possible to observe an increase in the value of tangible assets. On the other hand, the loss of another type of asset cannot be expected, as artificial intelligence largely replaces the work of employees - people who were not and cannot be reported as assets of entities in any of the globally expanded accounting systems. The question remains whether a decrease in the wage costs of accounting entities can be expected, as the demand for more qualified employees

increases with the implementation of artificial intelligence. Overall, it can be assumed that artificial intelligence will bring a higher predictive power of financial statements, because, as already mentioned, there is a shift in value creation from human capital to structural capital, which can be captured and reported in accounting.

4 Popularity of the artificial intelligence and the intellectual capital

This part of the paper analyzes the development in the publication of scientific papers dealing with artificial intelligence in connection with intellectual capital and financial reporting. The Web of Science Core Collection tool was used for the analysis, in which it is possible to search for professional papers through years of publication and also through the focus. Graph 1 shows the historical development of published articles on Artificial Intelligence, regardless of the thematic direction of the article. It is obvious that the volume of published articles has been constantly growing since the 1990s, when growth has been the fastest in the last five years. From 1990 to 2020, a total of 280,955 papers dealing with the topic of Artificial Intelligence were published.

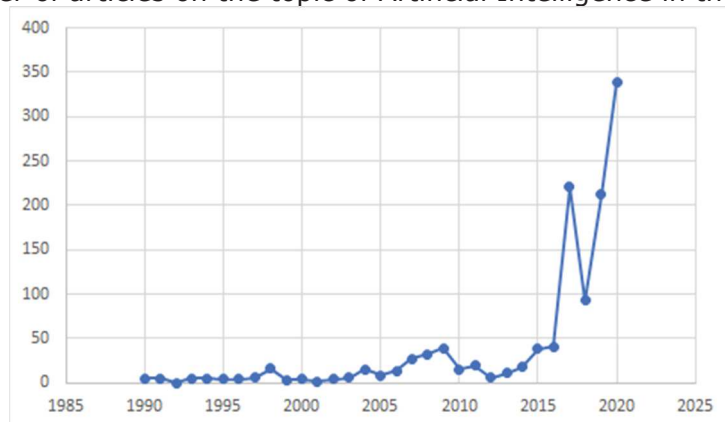
Graph 1 Number of articles on the topic of Artificial Intelligence



Resource: own elaboration

Graph 2 provides an overview of the development of articles on the topic of Artificial intelligence, which fall into the category of Business (articles analyzing Artificial intelligence from an economic point of view). In contrast to the overall development in Graph 1, the development of economically oriented articles is evident only in the last five years, when until this point the number of published articles per year had almost stagnated.

Graph 2 Number of articles on the topic of Artificial Intelligence in the business sector

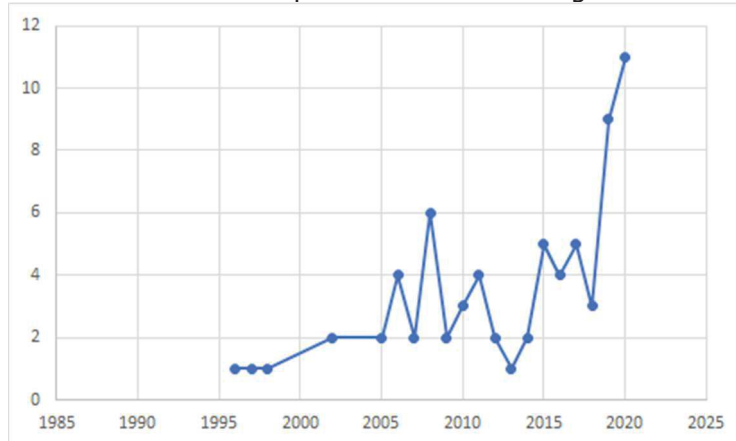


Resource: own elaboration

The following two graphs, which put Artificial Intelligence and Intellectual Capital in context, are particularly important for the fulfillment of the objectives of this article. Graph 3 characterizes the development of articles focused in this way. Articles dealing with these

two areas together began to be published much later than articles dealing only with Artificial Intelligence. The main reason may be the development of Intellectual Capital, which was evident at the turn of the millennium, when a number of models for the reporting of intellectual capital were created. The rapid increase can again be observed in the last 5 years, when the annual rate has multiplied significantly.

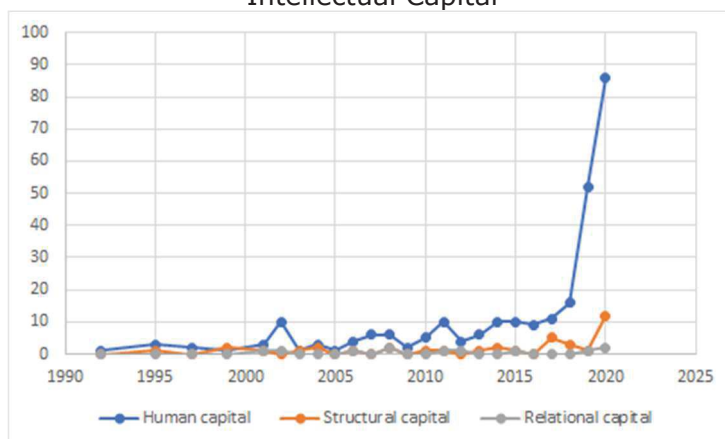
Graph 3 Number of articles on the topic of Artificial Intelligence and Intellectual Capital



Resource: own elaboration

As explained in Chapter 2, intellectual capital consists of three components - human capital, structural capital, and relational capital. It is generally discussed that Artificial Intelligence gradually replaces and will replace human capital (capital held by employees). This assumption is underlined by a significant increase in the number of scientific papers dealing with Artificial Intelligence and human capital together, as indicated in Graph 4. Papers on human capital and artificial intelligence have shown a sharp increase in the last five years and on the other hand the connection of artificial intelligence and the remaining components of intellectual capital show almost no development.

Graph 4 Number of articles on the topic of Artificial Intelligence and categories of Intellectual Capital



Resource: own elaboration

Conclusions

Global development in the use of artificial intelligence already seems inevitable, and this view can also be based on the volume of scientific contributions on this topic. Especially in the last five years, the area of artificial intelligence has been moving in the field of economics, where financial reporting is no exception. Artificial intelligence has once again opened up space for discussions about the reporting of intellectual capital, where artificial intelligence, as a part of structural capital, often fulfills the necessary features of intangible and tangible assets. However, this is the current situation and it is gradually becoming clear that artificial intelligence cannot be understood in the way we have so far understood

intangible assets in the form of software etc. Artificial intelligence is starting to show abilities that so far only people have been able to demonstrate, ie self-development, etc. Gradually, with the development of artificial intelligence in the business activities of companies, there is increasing pressure on the regulation and reporting of intangible assets in accounting, where current regulation significantly regulates the area of those intangible assets that can be disclosed in financial statements. The consequence is that a significant amount of intangible assets remain hidden from users of financial statements.

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