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Katarzyna Cymbranowicz, Assistant

Krakow University of Economics

E-mail: cymbrank@uek.krakow.pl

ORCID ID: 0000-0001-8943-868X

Anna Ceglarska, Assistant

Faculty of Law and Administration, Jagiellonian University, Krakow

E-mail: anna.ceglarska@uj.edu.pl

ORCID ID: 0000-0003-0868-6097

MODERN ECONOMY AND ANCIENT THOUGHT – POSSIBLE ANSWERS FOR MODERN CHALLENGES?

ABSTRACT

One of the most widely used terms to describe today's economy is the Knowledge-Based Economy, which emphasises the importance of knowledge as an invaluable resource. In our paper, we aim to explore the origins and evolution of the concept of the knowledge-based economy, as well as the challenges and opportunities that lie ahead. As new theories continue to emerge, we are no longer at a crossroads, but are faced with a multitude of paths that are difficult to evaluate. In order to meet this challenge, it is proposed that we shift our focus from the contemporary concepts involved in this debate to the fundamental principles of the European heritage, namely Greek thought, which unites politics, economics and philosophy. Therefore, drawing mainly on Aristotle, but also on the ancient concept of myth, understood as a fable with an educational purpose, we would like to argue that what the contemporary world needs is a skill that is not limited to the analysis of facts, but that includes the ability to discuss possibilities, to evaluate probable but not certain outcomes, and to dare to take the risk of acting. This ability, already recognised in antiquity, was what enabled the critical approach to both data and knowledge gained, and thus the effective shaping of the field of practice. We believe that, in an era of rapid economic development, we can still benefit from these ancient concepts, which refer both to universal values as well as individual needs, and emphasize the need for preserving the "human factor", that unites us and seems essential for future development.

Keywords: knowledge, the Knowledge-Based Economy, Aristotle, myth, philosophy

1. INTRODUCTION

For centuries, knowledge has been recognised as a catalyst for socio-economic growth and development. However, it was not until the 20th century, when the concept of the Knowledge-Based Economy (further on referred to as KBE) became pervasive, that the substantial role of knowledge in our lives became a widely acknowledged phenomenon, in both theory and practice. The concept of "knowledge" is not universally defined. It is analysed in many disciplines and fields, and the multiplicity of research perspectives on the problem of defining the concept of "knowledge" can testify to its relevance and importance in both individual and social dimensions. The question of the definition of "knowledge" can be and is explored through the lenses of many social sciences, especially philosophy, economics, psychology or sociology, as well as is recognised in the broadly understood humanities. A review of the scientific literature reveals that the absence of a universally accepted definition of "knowledge" can be attributed, as P. Samuelson states, to the tendency to utilise the same term for different concepts and to employ different terms for the same concept.¹ This results in a plethora of definitions and various attempts to characterise this concept. However, it can be posited that no single, overarching definition of knowledge exists, neither in economics nor in other disciplines. Despite the heterogeneity of these positions, it is possible to identify shared elements that facilitate a systematic discussion on the concept and role of knowledge in the contemporary world. "Knowledge" *sensu largo* is defined as a set of information, opinions, views and beliefs that possess cognitive or practical value. *Sensu stricto*, "knowledge" is the totality of information and skills that are employed in problem-solving.²

The recognition of this "human factor"³ has been a focal point within modern social sciences, with an increasing emphasis on this aspects of human personality that are beyond rationality, including emotions, beliefs, values, volition, and so forth. These components, which collectively form the basis of what we might call the "human nature", influence our behaviour, marking it with elements of irrationality and emotionality.⁴ We truly believe that these components must also

¹ Quote after: Boettke, P.J., *Information and Knowledge: Austrian Economics in Search of its Uniqueness*, The Review of Austrian Economics, 15/2002, no. 4, p. 272.

² Probst, S., Raub, K., Romhardt, K., *Zarządzanie wiedzą w organizacji*, Oficyna Ekonomiczna, Kraków 2002, p. 35.

³ This phenomenon is particularly evident in the plethora of publications, magazines, popular science articles, even dedicated departments or faculties that focus on this subject, and the literature on the subject in various domains of science, both theoretical and practical, is substantial.

⁴ These phenomena have been the subject of philosophical discussion for centuries. For instance, they have been perceived as threatening to the established order (Plato, Hobbes), as an inevitable part of human life (Aristotle), as something positive (Hume), or not

be considered in any deliberation regarding the social sphere, including the economic one. Many contemporary theorists have adopted this approach, which has resulted in the formulation of diverse models, and fields like behavioural economics, institutional economics, purpose economy or economic sociology among others, all explore these issues of human factor in application. However those very human elements have gained their recognition also earlier on. In economic literature regarding KBE, the eminent classical philosophers Socrates, Plato and Aristotle are occasionally designated as first of those who endeavoured to formulate a definition of "knowledge" in antiquity.⁵ For them, both what is currently referred to as "scientific knowledge" (and in Greek was called *episteme*) and wisdom (*sofia*) constituted the fundamental objectives of a true philosopher, a goal that both Socrates and Plato sought to attain. However, Aristotle's conception of human beings as "social animals"⁶ led him to seek a unification of the objectives of philosophy and human life, incorporating elements such as human will, emotional sphere, and the desire for recognition – precisely the thing modern social sciences aim to accomplish.

The objective of this study is to ascertain whether references to ancient thought, particularly in the context of KBE, including its challenges and problems, can offer suggestions for change or solutions, and whether we can speak of the relevance of ancient thought also to contemporary dilemmas. To achieve this goal, first, various understandings of "knowledge" in economic literature will be presented, as they constitute the basis for understanding the concept of KBE. A literature review is an essential component of any scientific investigation, as a comprehensive understanding of the existing research is indispensable for grasping the core of the issue under consideration. Subsequently, the possibility of referring to antiquity in the economic context will be analysed, taking into account the specificity of the ancient and modern eras as well as timeless threads referring to human nature. Then we will then proceed to discuss the challenges associated with KBE, including the accumulation and utilisation of knowledge to induce change and

completely contrary to reason (Nietzsche). See, for example: Hatzimoysis, A.(ed.), *Philosophy and the Emotions*, Cambridge University Press, New York 2003; Tappolet, Ch., *Philosophy of Emotion*, Routledge, New York-London 2023; Kurth, Ch., *Emotion*, Routledge, New York-London 2022; Rick, S., Loewenstein, G., *The Role of Emotion in Economic Behavior*, [in:] *Handbook of Emotions*, eds. M. Lewis, J.M. Haviland-Jones, L. Feldman Barrett, The Guilford Press, New York 2008, p. 138-156; Loewenstein, G., *Emotions in Economic Theory and Economic Behavior*, *The American Economic Review* 90/2000, no. 2, p. 426-432.

⁵ Fazlagić, J., *Innowacyjne zarządzanie wiedzą*, Difin, Warszawa 2014, p. 28; Nonaka, I., Toyama, R., Hirata, T., *Managing Flow. A Process Theory of the Knowledge-Based Firm*, Palgrave Macmillan, New York 2008, p. 3.

⁶ Aristotle considered humans to be *zoon politikon*, which was subsequently transferred into Latin by Cicero, who also recognized humans' social nature.

development, and the risks associated with these processes. These challenges will be examined through the lens of antiquity, drawing upon the myth of Prometheus as a case study due to its connections with technology and its continued relevance to the subject matter. Consequently, the text will employ a multifaceted approach encompassing philosophical analysis, analogy, the comparative method, and references to cultural texts.

2. THE NOTION OF "KNOWLEDGE" IN MODERN ECONOMICS

Given the above, it can be stated that the concept of "knowledge" is intricate and multi-faceted, and as a result, numerous definitions have been proposed within the economic literature. These definitions vary depending on factors such as the time and place of use, the purpose, or the method of interpretation.⁷ One interpretation of the concept of "knowledge" found in the economic literature is the hierarchy of cognitive concepts. It is not uncommon, as a result of deliberate (conscious) or unintentional (unconscious) efforts, to erroneously equate the concept "knowledge" with other concepts such as "data", "information" or "wisdom". However, it should be emphasised that, although these concepts are not synonymous, the relationship between them is reflected in their juxtaposition. This relationship is vividly illustrated by the so-called "pyramid" or "hierarchy of knowledge" (DIKW). This concept has been explored by numerous researchers, including B. Lloyd, "Wisdom can be considered to be a useful truth (or knowledge) with a long shelf-life. And Knowledge is useful information with a shorter shelf-life than wisdom, with information being data but with a longer shelf-life"⁸ The comprehensive DIKW pyramid/hierarchy was initially presented and described by M. Zelezny⁹ and M. Cooley¹⁰ in the mid-1980s. Subsequently, an expanded form of it was proposed by R.L. Ackoff.¹¹ Nevertheless, as the undertaken literature analysis suggests, it did not garner significant traction among researchers.¹²

⁷ Sikorski, J., *Wiedza jako fundament skutecznego konkurowania w gospodarce rynkowej*, NE 28/2018, p. 44.

⁸ Lloyd, B., *Knowledge management: what has wisdom got to do with it?*, [in:] *Knowledge Management: Social, Cultural and Theoretical Perspectives*, ed. R. Rikowski, Chandos Publishing, Oxford 2007, p. 7.

⁹ Zelezny, M., *Management Support Systems: Towards Integrated Knowledge Management*, *Human Systems Management* 7(1)/1987, p. 59-70.

¹⁰ Cooley, M., *Architecture or Bee?*, The Hogarth Press, London 1987.

¹¹ Ackoff, R.L., *From Data to Wisdom*, *Journal of Applies Systems Analysis*, 16/1989, p. 3-9.

¹² Grabowski, M., Zając, A., *Dane, informacja, wiedza – próba definicji*, *Zeszyty Naukowe UEK* 798/2009, p. 103.

Therefore, the prevailing hierarchy of cognitive concepts is comprised of four distinct levels: 1) data, 2) information, 3) knowledge, and 4) wisdom. According to K.C. Laudon and J.P. Laudon, data are defined as raw facts that can be shaped and moulded to form information. Information, in contrast, is data that has been shaped or moulded by humans into a meaningful and useful form¹³. T.H. Davenport and L. Prusak posit that knowledge, in contrast to data and information, arises, develops and perpetuates in the human mind as a result of the accumulation of experience and learning, and is, so to speak, a "product" of human mind, which can be categorised into two distinct types: conscious, which is acquired systematically and intentionally during the educational process, and unconscious, which is acquired in an unsystematic, unplanned and unintentional manner.¹⁴

In the economic literature, knowledge is often interpreted as the result of the application of information in the thinking process. In this view, "knowledge" can be considered a "resource" accumulated and fixed in the human mind, a derivative of the learning and experience process. For example, R. Maier, T. Hädrich, and R. Peinl define knowledge "as the capacity to interpret and act."¹⁵

The third interpretation of the concept of "knowledge" found in the economic literature is somewhat similar to the previous one, as it emphasises the essence and importance of knowledge and skills that are used by individuals to solve problems.¹⁶ And so, T.D. Wilson defines "knowledge" as "the mental processes of comprehension, understanding and learning that go on in the mind and only in the mind, however much they involve interaction with the world outside the mind, and interaction with others",¹⁷ while M.C. Weggemann treats it as "a personal capacity that should be seen as the product of the information, the experience, the skills and the attitude which someone has at a certain point in time."¹⁸

The concept of "knowledge" as a reflection of the actual state of affairs in the human mind is espoused by E. Skrzypek or J. Rokita, among others. According to the former, knowledge consists of the whole possessed reliable information about

¹³ Laudon, K.C., Laudon, J.P., *Business Information Systems: a problem solving approach*, Dryden Press, Chicago 1991, p. 14.

¹⁴ Davenport, T.H., Prusak, L., *Working Knowledge – How Organizations Manage What They Know*, Harvard Business School Press, Boston 1998, p. 5.

¹⁵ Maier, R., Hädrich, T., Peinl, R., *Enterprise Knowledge Infrastructure*, Springer, Berlin Heidelberg 2009, p. 20.

¹⁶ Probst, G., Raub, S., Romhardt, K., *locus. cit.*, note 2.

¹⁷ Wilson, T.D., *The nonsense of Knowledge Management*, Information Research, 8/2002, no. 1, p. 144.

¹⁸ Quote after: Beijerse, R.P., *Questions in Knowledge Management: Defining and Conceptualising a Phenomenon*, Journal of Knowledge Management 2/1999, p. 99.

reality but also with the ability to use it¹⁹. In contrast, J. Rokita's interpretation posits that knowledge is a reflection of the perceived reality, which contains different events, processes and objects, that is formed in human consciousness, as well as the understanding of the characteristics and relations occurring between those elements of reality.²⁰

Table 1. Examples of knowledge definitions²¹

Author(s)	Definition
S. Elliott	It is an information that has a value.
B. Gupta, L.S. Iyer, J.E. Aronson	It is a dynamic combination (mixture) of formed experience, value, contextual information, and specialised intuition that provides a substructure for evaluating and incorporating new experience and information.
B. Lloyd	It is information that is used, which in turn leads to the acquisition of further information, which is then transformed into even more grounded knowledge.
T. Davenport, L. Prusak	A fluid composition of concentrated experience, values, relevant information and expert insight that provides a basis for evaluating and assimilating new experience and information. providing a foundation for evaluating and assimilating novel experiences and information. Knowledge is conceptualised and formulated in the minds of individuals. Within organisations, it is frequently documented in documents and databases, as well as in customs, norms and procedures
R. McAdam, R. Reid	It can be defined as a standardised set of facts and rational principles.
W. R. Wiig	It consists of truths and beliefs, perspectives and concepts, judgments, and explicit methods and expertise.

¹⁹ Skrzypek, E., *Nowe podejście do wiedzy w organizacji*, [in:] *Organizacyjne uczenie się w rozwoju kompetencji przedsiębiorstw*, ed. A. Sitko-Lutek, E. Skrzypek, C.H. Beck, Warszawa 2009, p. 59.

²⁰ Rokita, J., *Dynamika zarządzania organizacjami*, Wydawnictwo Akademii Ekonomicznej w Katowicach, Katowice 2009, p. 109.

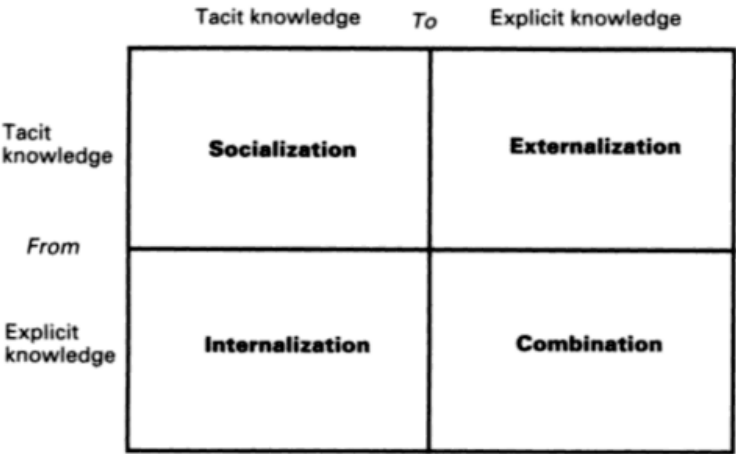
²¹ Source: Authors' own presentation based on: Lloyd, B., *op. cit.* note 8, p. 8; Evans, Ch., *Zarządzanie wiedzą*, Wydawnictwo PWE, Warszawa 2005, p. 30; Kisielnicki, J., *Zarządzanie wiedzą we współczesnych organizacjach*, [in:] *Zarządzanie wiedzą w systemach informatycznych*, ed. W. Abramowicz, A. Nowicki, M. Owoc, Wydawnictwo Akademii Ekonomicznej we Wrocławiu, Wrocław 2004, p. 29-30; Szaban, J., *Zarządzanie wiedzą*, [in:] *Miękkie zarządzanie: ze współczesnych problemów zarządzania ludźmi*, ed. J. Szaban, Wydawnictwo Wyższej Szkoły Przedsiębiorczości i Zarządzania im. Leona Koźmińskiego w Warszawie, Warszawa 2003, p. 44; Mikuła, B., *Organizacje oparte na wiedzy*, Wydawnictwo Akademii Ekonomicznej w Krakowie, Kraków 2006, p. 108-109; McAdam, R., Reid, R., *SME and Large Organisation Perceptions of Knowledge Management: Comparisons and Contrasts*, Journal of Knowledge Management 3/2001, p. 233; Elliott, S., *APQC Conference Attendees Discover the Value and Enablers of a Successful KM Program*, Knowledge Management in Practice, 5/1996, p. 1-8; Gupta, B., Iyer, L.S., Aronson J.E., *Knowledge Management: Practices and Challenges*, Industrial Management & Data Systems, 1/2000, p. 17-21; Nonaka, I., Takeuchi, H., *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*, Oxford University Press, New York-Oxford 1995, p. 58.

J. Kisielnicki	It is an intangible resource of an organisation, related to human activity, the application of which can be the basis of an organisation’s competitive advantage. It is related to the resources held: data, information, procedures, as well as experience and training.
J. Szaban	We deal with knowledge when there is a model, a pattern. This archetype is characterised by its repeatability and predictability, and it is through the realisation of its existence and implications that knowledge is achieved. The essence of knowledge lies not in its collection, but in its application.
Mikuła	Knowledge is a flexible and dynamic intangible substance that is the result of the mental processing of information sets possessed and obtained by humans.
I. Nonaka, H.Takeuchi	Knowledge is a confirmed belief.

In summary, the general overview of the definitions of “knowledge” reveals that it is the ability to interpret data and information in the process of making meaning of them. It seems important to note the research of I. Nonaka and H. Takeuchi²², who, in addition to attempting to define knowledge, also explained the process of its creation and evolution. They argue that “knowledge” is created through the interaction between “tacit knowledge” and “explicit knowledge”. This process, termed “knowledge transformation”, occurs in four distinct ways (see Figure 1.):

- 1. From tacit knowledge to tacit knowledge – socialisation
- 2. From tacit knowledge to explicit knowledge – externalisation
- 3. From explicit knowledge to explicit knowledge – combination
- 4. From explicit knowledge to tacit knowledge – internalisation

Figure 1. The knowledge spiral – ways of transformation²³



²² Nonaka, I., Takeuchi, H., *op. cit.* note 5, p. 62.

²³ Source: Nonaka, I., Takeuchi, H., *op. cit.* note 5, p. 62.

The knowledge conversion process outlined above is a contributing factor to an increase in the overall stock of knowledge and provides the impetus for innovative activity, which is the main source of growth and development in the modern era. As previously indicated, the primary source of knowledge is humankind, as knowledge is created as a result of mental activities performed by people. Therefore, efforts must be made to make it productive and useful by managing it efficiently and transforming it into innovations that satisfy ever newer conscious and unconscious human needs. This conclusion is of particular significance in the context of the efficiency of innovation creation, which, in the Knowledge Economy, is the primary catalyst for socio-economic growth and, consequently, for the development of society and the economy. Therefore, it seems reasonable to conclude that the majority of definitions of the KBE are based on an attempt to identify its defining characteristics. In examining the extant literature on the subject, the "new economy" can be ascribed the following characteristics:²⁴

- The creation and development of intangible capital as the most important factor of production;
- The utilisation of research results in the economy;
- The investment of the state and economic actors in research and development;
- The institutionalisation of innovation in the research and development departments of large corporations;
- The emergence of new economic sectors, designated as high-tech industries, driven by scientific research and the increasing availability of scientific knowledge;
- The advancement and extensive utilisation of telecommunications and information technologies;
- A notable shift in the educational landscape, characterised by the decline of elitism and the proliferation of higher education.

In light of the aforementioned considerations, the following factors have been identified as instrumental in the advancement of KBE:²⁵

- The evolution of contemporary educational systems;
- The establishment of scientific and research institutions;
- The expansion of the know-how base;
- Investments in cutting-edge technologies and innovations;

²⁴ Marcinkowski, A., *Era gospodarki opartej na wiedzy*, [in:] *Wiedza współczesnych organizacji. Wybrane problemy zarządzania*, ed. P. Jedynak, Wyd. UJ, Kraków 2010, p. 20.

²⁵ Kleer, J., *Gospodarka oparta na wiedzy a globalizacja: związki czasowe i przyczynowe*, [in:] *GOW – wyzwanie dla Polski*, ed. J. Kotowicz-Jawor, PTE, Warszawa 2009, p. 71-73.

- The implementation of modern solutions for optimising the flow of information and the entire information infrastructure;
- An increase in investment in research and development;
- An open economy and society that actively engages in the exchange of goods, services and ideas through the utilisation of IT techniques;
- Modifications to the functions of the public sector;
- A transition from a welfare state to a mixed economic model.

As has been demonstrated, the KBE is a type of economy that is formed and developed under the dominant influence of science or scientific knowledge. Consequently, academic and research centres play a pivotal role in this process. They establish an environment conducive to learning and, consequently, to the generation of new knowledge, its transfer through educational and training activities, its dissemination through information technologies and its utilisation in the form of adaptation to modern industrial solutions.

The trajectory of KBE's evolution is contingent on numerous factors. While the 21st century unquestionably offers significant opportunities, it is important to acknowledge the challenges and problems that it presents. It would be impossible to address all these issues within the boundaries of a single text, particularly as they pertain to the interests of many different social sciences and their respective research methodologies. However, one of the more frequently discussed themes is that of the development of AI, which, on the one hand, facilitates the rapid accumulation and acquisition of knowledge and may automate tedious, repetitive tasks, streamline procedures or minimise the risks of error and the hazards associated with dangerous tasks. As AI systems evolve, they are capable of performing duties of both highly skilled professionals as well as entry-level workers. This shift has the potential to diminish the value attributed to human knowledge, innovation, and creativity, leading to the:

- the emergence and intensification of socio-economic inequalities (e.g. the "digital divide");
- challenges to the existing legal framework, as there is often a lack of appropriate regulations that can ensure the safe and fair use of modern technologies;
- difficulties in managing knowledge and innovation so that they can be efficiently created, processed, stored and used in practice;
- lack of sustainable development policies, leading to the deepening of socio-economic inequalities or environmental degradation due to a lack of sustainable development;

- data security and privacy risks (e.g. abuse, theft, unauthorised access, cyber-attacks), which can lead to serious risks for individuals and societies as a whole;
- volatility and unpredictability of the labour market (e.g. automation, robotisation, digitisation, artificial intelligence), which may lead to changes in the labour market in the form of increasing or decreasing employment levels in various sectors or exclusion from the labour market of workers lacking abilities to adapt to a rapidly changing work environment.

Furthermore, it can result in the instrumentalisation of knowledge, leading to its reduction to basic data sets, that are collected and stored by AI, rather than being utilised as a means of knowledge and be acted upon. Consequently, the "human factor" previously mentioned is lost. Attention is directed towards this element not only in scientific research, but also in popular science texts.²⁶ However, what needs to be stressed here and possibly can be seen as a way to overcome this challenge, is the fact that in the various divisions and definitions of elements related to knowledge, there is one element that is both obvious and yet the most difficult to grasp. This element is not about knowledge in itself, but about its use in a way that influences development and improves living conditions. This is particularly emphasised in the works of I. Nonaka et. al. where, however, much more emphasis is placed on elements of altruistic behaviour. The assumption is that the utilisation of knowledge is primarily driven by a sense of altruism, with the aim of achieving collective goals, often involving a disregard for personal interests in favour of broader objectives.²⁷ This raises the issue of integrating individual interests with collective goals. Following the previous individualist shift observed in libertarian thought or the earlier Benthamite atomism, it seems that now we are moving towards the other extreme, that of exclusively altruistic actions for the sake of the community action. Still, regardless of the theoretical framework adopted, it is evident that the human being remains at the centre of these theories, as only humans have the capacity to act and utilise the resources at their disposal – including knowledge.

²⁶ *Konsekwencje AI – czy gospodarka oparta na wiedzy jest na wylocie?*, Filary Biznesu 2025, <https://filarybiznesu.pl/innowacje/nowe-technologie/konsekwencje-ai-czy-gospodarka-oparta-na-wiedzy-jest-na-wylocie/a26743>, 1 March, 2025

²⁷ Nonaka, I., Toyama, R., Hirata, T., *op. cit.* note 5, p. 53.

3. THE NOTION OF "KNOWLEDGE" IN ANCIENT TIMES

This constatement, vital for KBE, is, in fact, is not a novel concept. Already in antiquity, one of the greatest ancient philosophers, Aristotle, highlighted this crucial aspect: regardless of the number of knowledge types that are delineated, defined and valued, they possess no inherent ability to alter the future; human action is indispensable for this purpose. That element found its way to the modern definitions of knowledge as well, for example it is present in the one made by Maier et. al., quoted above, emphasizing the element of "action". However, there is one more thing that ancient philosopher already understood – at times, this human action may not be entirely knowledge-based or rational. It is often accompanied by considerable risks, is susceptible to errors, and its evaluation as beneficial or detrimental only becomes possible over time, often exhibiting a combination of both positive and negative outcomes. Consequently, as Aristotle also implies, such action cannot be undertaken by any arbitrary individual, but rather by one who possesses the capacity to contemplate the possibilities and assume the risks associated with it.²⁸ Aristotle's insights offer a perspective that transcends time, emphasising the necessity for economic and technological advancements to be guided by deliberate and ethical decision-making.

It may appear to be an excessive undertaking to delve so deeply into the past in this context. While it is true that we predominantly refer to ancient thought, when considering culture, literature, philosophy, even law (although there it is mostly Roman, not Greek thought that is referred to), the question arises as to whether it is possible to translate ancient ideas into contemporary economic dilemmas or to search for solutions so deep into the past. It seems insufficient to assert that the term "economics" itself is of Greek origin, or that Xenophon and Aristotle authored treatises bearing such titles, given that these works primarily addressed domestic management. The predominant perspective asserts that it is only in the wake of a technological revolution that the subject of economics can be meaningfully addressed. Rightfully so, if we restrict ourselves only to the modern thought, however, certain phenomena manifested in history and human life prior to the establishment of appropriate nomenclature and academic disciplines and it is not the existence of the latter that determines the possibility of their analysis; rather, it is the presence of specific mechanisms in human life that does so. Therefore, references to antiquity, which also contain elements of knowledge (a prerequisite for philosophy), and human actions (including those of an economic nature), may prove useful. Furthermore, we cannot concur with the notion that the

²⁸ Aristotle, *Nicomachean Ethics*, [in:] *Aristotle in 23 Volumes*, vol. 19, transl. H. Rackham, Harvard University Press - William Heinemann Ltd., London - Cambridge, MA 1934, VI,5; VI,7.

evolution of economics can be traced back no earlier than the feudalism,²⁹ since the earliest known examples of economic thinking can be traced back to the cities of ancient Mesopotamia and Egypt,³⁰ and the ancient Greeks demonstrated a solid grasp of fundamental economic principles. Aristotle, in employing the term *oekonomika*, was able to differentiate between activities pertaining to the state and public matters, and the art of household management, taxation, loans, banks, and state income.³¹ Additionally, for the Greeks, the issue of knowledge was of the utmost importance, not only as a "scholarly" activity, but in practice as well. Philosophers, those who "loved wisdom", taught and advised rulers, proposed potential solutions to practical problems, engaged in politics and even played an active part in economic life: for instance, Thales of Miletus and an anonymous man from Sicily were among the first individual citizens to introduce a monopoly.³² However, beyond formal treatises, the Greeks also conveyed profound insights into human progress, action and decision-making through the exceptional medium of education – myths and their various forms of expression, including, but not limited to poetry, tragedy, fable or narrative. Unlike abstract theories, myths offered a dynamic mean to explore the consequences of human action, and the classical Greek *mythos* was a well-developed, logical and reasonable plot intended to show probable effects and consequences³³. In light of the prevailing concern regarding the significance of knowledge, its acquisition, and its utilisation, the myth of Prometheus emerges as a particularly pertinent exemplar. This myth not only explores the themes of innovation and technological advancement, but also underscores the responsibilities and risks associated with knowledge.

The myth of Prometheus is evident in a variety of forms throughout ancient thought, with notable representations found in the works of Hesiod, Aeschylus, and Plato³⁴. These accounts vary slightly in their depictions of the specific actions

²⁹ Piech, K., *Gospodarka oparta na wiedzy jako etap przemian społeczno-gospodarczych krajów transformacji systemowej*, [in:] *Gospodarka, przedsiębiorstwo i konsument a wyzwania europejskie*, eds. J. Nowakowski, A. Skowronek-Mielczarek, SGH, Warszawa 2004, p. 181.

³⁰ Atanelishvili, T., Silagadze, A., *Formation of Economic Views in the Ancient Era*, Bulletin of the Georgian National Academy of Sciences, 12/2018, no.2, p. 191-196.

³¹ Aristotle, *Oeconomica*, transl. E.S. Forster, Clarendon Press, Oxford 1920, 1345b-1346a.

³² Aristotle, *Politics*, [in:] *Aristotle in 23 Volumes*, vol. 21, transl. H. Rackham, Harvard University Press - William Heinemann Ltd., London - Cambridge, MA 1944, 1259a.

³³ Aristotle, *Poetics*, [in:] *Aristotle in 23 Volumes*, vol. 23, transl. W.H. Fyfe, Harvard University Press - William Heinemann Ltd., London - Cambridge, MA 1932, 1452a.

³⁴ Hesiod, *Works and Days* 42-105 and *Theogony* 520-616, [in:] *Hesiod. The Homeric Hymns and Homerica*, transl. H.G. Evelyn-White, Harvard University Press - William Heinemann Ltd., London - Cambridge, MA 1914; Aeschylus, *Prometheus Bound*, transl. H.W. Smyth, Harvard University Press, Cambridge, MA 1926; Plato, *Protagoras*, transl.

attributed to Prometheus and the moral evaluation of these actions. However, a consistent core theme can be identified within these variations. Prometheus, a Titan, played a pivotal role in the great war between the Titans and the Olympian gods, led by Zeus. By supporting the latter, Prometheus evaded the fate of being sent to Tartarus. However, following the creation of humankind, Prometheus developed a fondness for these new beings and sought to assist them in not only in surviving in the unfriendly world, but also in leading a fulfilling, good life (as Plato recounts, this desire was influenced by the actions of his less intelligent brother, Epimetheus, who, given the chance to distribute all of the beneficial traits, gave them all to animals).³⁵ Prometheus, being a highly intelligent individual, recognized the immense potential of fire to enhance the quality of human life. However, Zeus was averse to the idea of bestowing fire upon humankind. Therefore Prometheus has stolen the godly Olympic fire and gave it to people. In reprisal, he was chained to the Caucasus mountain, with an eagle incessantly devouring his liver. Furthermore, humanity was subjected to afflictions such as sickness, old age, woe, and toil, brought by Pandora. Notwithstanding, the gift of fire enabled humanity to illuminate the dark, to maintain warmth, and to prepare their meals. It seems unquestionable that taming of fire can be called the first great technological revolution in the history of humanity, and as such, may fit might even fit the widely recognized Schumpeter's theory of innovation waves, as the very first one that facilitated the development of civilisation, in a manner similar to the impact of the Industrial Revolution on modern times. Consequently, it is unsurprising that the Prometheus myth is predominantly associated with the development and perils of technology.³⁶

Whilst these interpretations have some merit, it is our view that they are excessively preoccupied with customisation to align with contemporary needs, and to a certain extent, diverge from the original message. This standpoint is in alignment with the principles articulated by Aristotle and the contemporary challenges confronting KBE – what should and can we do with knowledge, meaning how can we act. Prometheus embodies not only the act of decision-making and the acceptance of consequences, but also the “human factor” previously referenced. Therefore, the presented interpretation refers to that essential, but mostly overlooked aspect of the Prometheus myth, namely the role of applying knowledge through human action, as well as deliberating upon that

W.R.M. Lamb. Harvard University Press - William Heinemann Ltd., London - Cambridge, MA 1967, 320d-322a.

³⁵ Plato, *op. cit.* note 34, 321c.

³⁶ Mokyr, J., Vickers, Ch., Ziebarth, N.L., *The History of Technological Anxiety and the Future of Economic Growth: Is This Time Different?*, Journal of Economic Perspectives, 29/2015, no. 3, p. 3; Francis, D., *Technology, Mythology and the Search for Meaning*, Cambridge Scholars Publishing, Cambridge 2024, p. 4, 10.

action, weighing risks and evaluating possible consequences. As explicitly stated by L. Vinsel,³⁷ the myth is not required to understand technological development; indeed, it may suggest that this development is beyond human control. The Greeks, with their profound engagement in philosophy, mathematics, and astronomy, among other fields, were likely among the last to whom we may attribute a conscious conviction that development hinged on divine whim. The primary leitmotif of the myth, therefore, aligns closely with the objectives of KBE: the risks associated with the application of possessed knowledge, encompassing the decision itself and its potential outcomes.

Prometheus, whose name in Greek means "forethought", is distinguished by his ability to first think, then act, in contrast to his brother Epimetheus ("afterthought"). Prometheus is regarded as one of the most intelligent Titans, having significantly contributed to Zeus's triumph in the Titanomachy. Aeschylus also suggests that the gift of fire enabled humans to master other crafts (*techne*),³⁸ such as writing, mathematics, astronomy and agriculture, which are fundamental to human civilisation.³⁹ The etymology and meaning of Greek *techne* clearly lead to modern technology, hence the connection with Prometheus. However, his gift can be problematic. Not only did he himself suffer retribution, but humankind also suffered, as they received new toils and troubles in place of the previous ones. Therefore, the question arises as to whether he can truly be regarded as the hero of humankind.⁴⁰ While his gift is often perceived as a symbol of human progress, the myth also conveys a more profound message about the risks inherent in using knowledge to reshape the world. The actions of Prometheus led to significant consequences, both for himself and for humankind. This prompts further inquiry, both pertinent to the narrative of Prometheus and the future of KBE: how can the advantages of novel knowledge be balanced against the potential hazards?

Prometheus's remarkable ability was to look further than others. Not to foresee the future, but to reason and predict, provided he had the premises. He was well-equipped with knowledge, having learnt from his elders, and establishes as a quick thinker, as well as a good and prudent advisor. Yet there were many things he could have done with the possessed knowledge – including doing nothing. The world would not change, humanity would not evolve, everything would be stable. Despite this, Prometheus discerned the potential repercussions and chose to take

³⁷ Vinsel, L., *Why the Myth of Prometheus Haunts Talk of Technology?*, The Montréal Review 2024, https://www.themontrealreview.com/Articles/Prometheus_Why_the_Myth_of_Prometheus_Haunts_Talk_of_Technology.php, 25 February, 2025

³⁸ Aeschylus, *op. cit.* note 34, p. 256.

³⁹ *Ibid.*, p. 455-470.

⁴⁰ Vinsel, L., *op. cit.* note 37.

action. While he may not have been certain of the divine retribution that would befall humankind, armed with his profound understanding of the gods, he calculated that the advantages would outweigh the costs. He also took a substantial gamble, one that would have significant personal costs. Yet, as depicted in Aeschylus's play, he takes pride in his actions and because of them is widely recognised as the foremost benefactor of humanity.⁴¹ Therefore, the fire-stealing cannot be considered entirely selfless, as Prometheus himself gained fame and renown. From a contemporary perspective, his deed can be regarded as beneficial, as it contributed to the evolution of humanity. However, the initially unanticipated consequences of the act, include also negative ones: wars, environmental degradation, diseases and toil. Prometheus, just like the modern inventors may not have anticipated the dual capacity of their technological contributions (like the dynamite, steam engines, computers, AI and so forth) to be both beneficial and harmful. The utilisation of knowledge for transformative purposes invariably entails a certain degree of risk, stemming from the uncertainty surrounding the consequences of such actions. This risk is further compounded when we discern a potential trade-off between the enhancement of one domain and the deterioration of another: technology vs environment, AI vs human contact. Nevertheless, the reluctance to act, stemming from a fear of the unknown, can result in the mere accumulation of knowledge, a state that is ultimately stagnant. It is evident that the myth reflects not only the acquisition of knowledge, but also its application. This is evidenced by the significance of Prometheus' actions. He not only had or passed knowledge, but also taught people how to act upon it.

This finding is in alignment with the differentiation between the types of knowledge posited by J. Mokyr,⁴² who, while discussing the origins of the knowledge economy, introduced the concept of propositional (theoretical) and prescriptive (practical) knowledge. These can be easily connected with the ancient Greek categories of *episteme* – philosophical, full knowledge regarding the world as it is – and *techne*, the knowledge of how to do things, how to craft them. For a considerable period, the first one was regarded as the most significant, as it was believed to facilitate access to the ultimate truth about the world. However, this form of knowledge, as articulated by Hannah Arendt, results in a state of *vita contemplative*,⁴³ a life of contemplation, where the philosopher becomes detached from the material world and merely observes it, seeking universal truths. In this realm of observation no possibility for transformation exists. Aristotle's philosophical perspective places greater emphasis on individuals who engage in

⁴¹ Aeschylus, *op. cit.* note 34, 101, p. 236-240.

⁴² Mokyr, J., *The Gifts of Athena: Historical Origins of the Knowledge Economy*, Princeton University Press, Princeton 2011, p. 4.

⁴³ Arendt, H., *The Human Condition*, University of Chicago Press, Chicago-London 1998, p. 14, 20.

deliberation and action.⁴⁴ He employs the Athenian statesman Pericles as a case study, and we draw parallels with Prometheus, highlighting the common threads between these two figures. Both Pericles and Prometheus find themselves confronted with challenging circumstances: the former with the Peloponnesian War, while the latter faces the threat of humankind's downfall. They both meticulously assess the situation and select the course of action they deem most rational, carefully balancing the pros and cons. However, their actions extend beyond mere presentation of possibilities or recommendations; they actively act, and not merely as craftsmans or demagogues who influence and manipulate others to gain support, but as conscious individuals, aware of the risks and able to draw on both the propositional and prescriptive "knowledges" Mokyry writes about, to achieve change and some effect. Yet, there is more to that. The knowledge they possess is applied in a social situation, in relation to other humans. They interact with others, hoping that their actions will be recognised and lead to something good, both for themselves and others, even if the personal gain is something immaterial, like fame and renown. The value of myth lies in its ability to form yet another relationship: between the heroes of the story and the audience. It provides a means to grapple with challenging dilemmas or moral issues without direct involvement, yet it engages all human emotions in the process. This formed the foundation of Greek education and was known as catharsis in theatre. Consequently, Greek myth retold offers insights into knowledge and its application, as well as the elusive "human factor".⁴⁵

4. CONCLUSION

When considered within its original context, the myth of Prometheus offers an important lesson for the KBE. The ancient Greeks already recognised that knowledge alone is insufficient, stressing the importance of its practical application. This element is also getting emphasized in modern definitions: that knowledge requires action and interaction with others to play a role in society and economy.⁴⁶ However, this application, to be successful, also requires knowledge of more elusive elements, that cannot be kept within the labels of "data" and "information", such as the ability to deliberate upon possible effects and undertake a considerable risk with no guarantee of success. These human elements also constitute a form of knowledge – not necessarily tacit, as they might be realised

⁴⁴ Aristotle, *Nicomachean Ethics*, *op. cit.* note 28, VI, 5.

⁴⁵ For more on the modern educational aspects of the Greek myths, see: Ceglarska, A., *The relation between classical and legal education: the role of myth in educating lawyers*, *Miscellanea Historico-Iuridica*, 23/2024, no. 2, p. 277-300.

⁴⁶ E.g. Maier, R., et al, *op. cit.* note 15; Wilson, T.D., *op. cit.* note 17.

by the doer, but far less certain, as they refer to the emotions, opinions and individual will. Aristotle's philosophy and the myth of Prometheus' gift of fire both serve to highlight the fact that every technological advancement and economic decision is accompanied by a certain degree of risk and the possibility of unintended consequences. However, it is equally important to recognise that stagnation, caused by fear, is not a viable solution. The true challenge lies not only in the acquisition of knowledge but also in its transformation into meaningful action. In this regard, Prometheus is not only the one possessing knowledge – the philosopher, leading the *vita contemplativa* – but he is also the one who possesses what Aristotle calls the "practical knowledge", that requires deliberation, action and courage – to take the risks and to wait for evaluation from others. That practical knowledge should be the very type of knowledge that KBE seeks and needs as it relates to both the accumulation and the application of said knowledge, and would enable further development. As was the case with Prometheus and as is now, action depends on the individuals. L. Vinsel states "feeling that the aggregate effects of technology use is beyond our control as individuals is perfectly understandable".⁴⁷ Nevertheless, he adds that there are a multitude of things that are beyond human control. Inaction, or impulsive action, is not a viable solution, nor is it sufficient to merely conform to established practices or frameworks. At times, unconventional and potentially risky actions are necessary to address complex issues, as ultimately, development is not about any quantifiable indicators that we use to describe it,⁴⁸ but rather about enhancing human life, a concept that is inherently subjective and influenced by individual preferences, values, and opinions. That element of uncertainty, of acting without the full knowledge and risking the judgement of others, the Aristotelian "practical knowledge", still seems most difficult to grasp.

The appeal of AI appears to lie in its capacity to avoid such element of uncertainty by amassing precise and comprehensive data. However, as K. Różanowski rightfully observed,⁴⁹ contemporary artificial intelligence, at its present (and likely for a considerable time more) developmental stage, exhibits a deficiency in strictly human competencies, notably consciousness, emotion, awareness or social intelligence. What was already understood by the ancients, should also guide the future for the KBE now, and all results of human innovative mind should be used in a conscious and responsible way, keeping in mind that these are means to an end, not goals themselves and there is always a need for a conscious person behind them, both willing to take the risk of using them and deliberate or asses

⁴⁷ Vinsel, L., *op. cit.* note 37.

⁴⁸ Such as, for example: GDP per capita, Gini coefficient, Global Innovation Index, Global Sustainability Index, Human Development Index, etc.

⁴⁹ Różanowski, K., *Sztuczna inteligencja: rozwój, szanse i zagrożenia*, Zeszyty Naukowe Warszawskiej Wyższej Szkoły Informatyki, 2/2007, p. 109-135.

consequences. A discernible shift away from the positivist paradigm of thinking resulted in a growing acknowledgement of this element across various research trends and new models. K. Raworth also gives a striking example for the need to change our paradigms of thinking further, an example she deemed important for her need to create a new economic theory. She relates the stories of students of economics in Paris and Harvard who decided to take action, in order to change and improve their current educational situation, despite the inherent risks involved.⁵⁰ In Paris they have sent a critical letter to their lecturer, while at Harvard, they have left a lecture given by a distinguished scientist to protest against outdated forms of teaching economics. The risk faced by the students was twofold: firstly, that their demands would remain unfulfilled, and secondly, that they would face some form of consequence. However, they were conscious of the pressing need for change. For Raworth, it resulted in forming the very imagination-appealing doughnut economy model. And so, contemporary trends in the development of economics clearly suggest that taking into account this human factor is crucial for the economy itself and for its understanding by society.

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