Japan Bilingual Publishing Co.

Sustainable Business and Management

https://ojs.bilpub.com/index.php/sbm

ARTICLE

A New Dimension of Sustainable Business—A Theoretical Framework

Zdeněk Mikoláš

Department of Entrepreneurship and Management, Faculty of Entrepreneurship and Law, Pan-European University, 190 00 Prague, Czech

ABSTRACT

In the last decade of the 21st century, humanity has been creating products that exceed many human capabilities. A current topic is the sustainability of business, regarding the relationship between people and the virtual environment. Competition between people and their products (artificial intelligence, robots, etc.) leads to different variants of the development of humanity, and, therefore, business. The article offers selective references to related literary sources and the author's own research, and presents a deductive model based on international applied research in Central Europe. The results of several research projects that were implemented with the participation of the author of the article over more than twenty years have shifted the knowledge and theory of business to new paradigms. The presented findings and related discussions raise questions that need to be addressed with regard to corporate social responsibility. Current research information presented in publications is limited because it addresses the researched issue only from the perspective of the relevant scientific discipline. A holistic approach is missing. Therefore, space is opening up for theoretical and applied research not only in economics, but also in technical and natural sciences. Contemporary entrepreneurship theory offers possibilities for syncretism of findings from various scientific fields. Entrepreneurship diagnostics has particularly positive results. The article outlines new directions for professional discussions on both the content and the concept of social responsibility for the development of society in the coming decades.

Keywords: Society; Business; Sustainability; Artificial Intelligence (AI); Robot; Virtuality; Competitiveness; Time

*CORRESPONDING AUTHOR:

Zdeněk Mikoláš, Department of Entrepreneurship and Management, Faculty of Entrepreneurship and Law, Pan-European University, 190 00 Prague, Czech; Email: zdenek.mikolas@peuni.cz

ARTICLE INFO

Received: 20 September 2025 | Revised: 16 November 2025 | Accepted: 23 November 2025 | Published Online: 30 November 2025
DOI: https://doi.org/10.55121/sbm.v1i1.102511

CITATION

Mikoláš, Z., 2025. A New Dimension of Sustainable Business—A Theoretical Framework. Sustainable Business and Management. 1(1): 14–25. DOI: https://doi.org/10.55121/sbm.v1i1.102511

1. Introduction

Sustainable development is a way of development that balances economic, social and environmental aspects to meet the needs of current generations without compromising the ability of future generations to meet their own needs. The accelerating pace of societal change and the rapid advancement of natural, technical, and information sciences increasingly require economic research to move beyond disciplinary fragmentation. Contemporary economic inquiry is thus compelled to focus on achieving systemic harmony among natural, technical, economic, and social processes, acknowledging their mutual interdependence and co-evolution. Such an integrative perspective is essential for addressing complex global challenges, including climate change, resource scarcity and technological disparities [1–4].

In this context, economic sciences and theories of entrepreneurship are progressively shifting towards circular and evolutionary economics, as well as to concepts of socially responsible and sustainable business models. The linear "extract–produce–dispose" model is increasingly being replaced by circular frameworks that emphasize regeneration, reuse, and long-term value creation, supported by digital technologies and innovation-driven competitiveness [5–9].

A persistent gap in economic research, however, lies in understanding the conditions under which evolutionary processes, such as innovation dynamics, productivity growth, competitiveness, and the time economy of production systems, operate in harmony or, conversely, generate systemic disharmony. This gap is particularly evident in analyses of transformational change, where short-term efficiency gains may conflict with long-term sustainability and societal resilience [10–12].

The key question is the current and future relationship between humans and their products, primarily AI, robots, body implants, quantum computers, etc. [13–15].

One of the most critical and forward-looking research questions concerns the evolving relationship between humans and their products, especially advanced technologies such as artificial intelligence, autonomous robots, cyber-physical systems, body-enhancing implants, and emerging quantum computing infrastructures. These technologies fundamentally reshape the nature of work, decision-making, and value creation, raising profound economic, ethical, and institutional challenges. Economic theory must therefore increasingly address not only productivity and growth effects, but also issues of human–technology complementarity, governance, and long-term social sustainability [16, 17].

Based on the analysis of available literature sources, it was identified:

- The issues of entrepreneurial potential and social responsibility at the micro-level of entrepreneurship are not sufficiently interconnected.
- Management and entrepreneurship theories do not sufficiently connect the economy (management) of time and social responsibility.
- There is a lack of models for examining time in the form of potential (capital) as a key factor of competitiveness in socially responsible entrepreneurship.
- There is an obvious need to integrate the behavioural concept of the economy of time and entrepreneurship.

There is a lack of a holistic approach. There is a space for interconnected theoretical and applied research in economics, engineering and natural sciences. Similar to the last century, when systems theory and systems engineering were formed, we are on the threshold of new integrated research. Different scientific fields are mutually enriching, including the creation of common terminology and methodology. Contemporary entrepreneurship theory offers the possibility of syncretism of knowledge from different scientific fields. The entrepreneurship diagnosis has positive results in understanding knowledge that is different in different fields.

Some cooperating universities from the Czech Republic and Poland have attempted to overcome the above-mentioned research gaps. The article summarizes the findings of previous joint international research projects of Czech, Polish and Slovak universities and finalizes them into the formulation of theoretical considerations modelling the disparity of the relationship between humans (human society) and the virtual environment [18–20].

The central impulse of theoretical considerations is the latest innovations in business and social life. The main problem is the difference in the reaction times of biological and electronic systems. Not only in everyday life or business, but also on the battlefields of war, we see a person on one side and his current product on the other. A fundamental ethical question arises as to how to evaluate the relationship between a living person and an inanimate machine.

2. Materials and Methods

2.1. Research and Methodology

Especially in Central European countries, which were transitioning from centrally planned economies to the capitalist system after 1990, research had to be developed intensively, because the so-called Western business models could not be applied in the practice of these transforming countries without corrections. There are many research reports and literature in the national languages of these countries. This was due to the need to translate new theoretical knowledge directly into economic practice

As an example of the above-described development of science in the field of entrepreneurship in these cooperating countries, the research projects on which the following text of the article and the presented deductive model are based can be cited:

- SP/2010167 Contemporary Concept of Competitive Business Potentials of Industrial Enterprises (CZ).
- 402/08/H051 Optimization of Multidisciplinary Design and Modelling of the Production System of Virtual Firms (CZ).
- Project National Science Centre (Poland), Lodz University of Technology (Poland) 2015/17/B/HS4/00988.

Another challenge has gradually been posed to entrepreneurship research[18, 19]. The speeds that humans are capable of achieving are completely different from those of their contemporary products, especially AI, virtual robots, quantum computers and similar electronic devices. This disparity in the reactions of humans and their products over time is multiplied by the use of quantum computing technologies[21].

Literature searches (except those already mentioned here) were conducted within the framework of research-related publications (see the list of sources below). It should be critically noted that the available sources are mostly based on older concepts (based on the 3rd and 4th industrial revolutions) of the relationship between competitiveness, time economy and social responsibility and sustainable development of humanity. Gradually, a completely different theoretical concept (adequate for the 5th industrial revolution and Society 5.0) has been created (at the mentioned universities), which deals with the systemic links between competitiveness, time economy and sustainable development of business.

The main paradigmatic changes include:

1. The shift from industrial (factory) revolutions to the revolution of intelligence and society (humanity).
2. The paradigm of increasing performance is changing to the paradigm of how we think, decide and organize society (i.e., how to live harmoniously).
3. Human decision-making, often deterministic, is developing into adaptive decision-making by people assisted by AI.
4. Quantum computing makes it possible to abandon the hitherto prevailing calculations in the form of linear processes and implement exponential (quantum) computing processes.
5. The paradigm of the dominance of technological innovations as a tool of productivity is changing to the paradigm of technologies that increase the quality of people's lives.
6. Economic development has so far been built on industry. The new paradigm brings the so-called intelligent business (built on data platforms and creativity).
7. In productive systems, humans were usually assigned the role of an operator in the technological process. In the new paradigm of the concept of the role of man, man is the creator and coordinator of processes.
8. The 1st and 4th industrial revolutions defined productive systems as closed. The 5th industrial revolution brings interconnected ecosystems (including living, non-living and artificial nature).
9. Human society is moving away from an economically oriented society to a human-centric one (5.0).

Society finds itself in a similar situation to that experienced by A. Einstein. Knowledge of previous paradigms must lead to a different view of things and processes than was the case before. Scientific intuition enters the scene. Samples[22] in the book Metaphorical Mind: Celebrating Creative Consciousness paraphrases the words of A. Einstein: "The intuitive mind is a sacred gift and the rational mind is a faithful servant. We have created a society that honours the servant and has forgotten the gift."

A. Einstein's statement was the inspiration for a shift in research activities. The findings from the aforementioned research, which were also based on quantitative (statistical)

surveys, were used for deductive modelling and the formulation of new theoretical concepts.

From the perspective of corporate social responsibility, it is not enough to simply monitor past and current developments. It is not enough to monitor economic returns (effects) and costs (resource inputs) without further context. Scientific knowledge must be moved towards the future. The basic concept for understanding the future is potential.

Potential is defined as the difference between what is now and what can or must be in the future. However, potential cannot be monitored only from an economic perspective. Entrepreneurial potential must be understood holistically. The potential of the future is multidimensional and includes natural, technical, social, ethical, economic and other dimensions.

Recent global turmoil offers examples of neglecting the examination of potential, from which extreme situations of a global scale have developed. Let us recall the COVID pandemic. The relationship between biological processes and global human contacts was underestimated. In the case of the war in Ukraine, the relationship between politics and the use of military force was underestimated. The same applies to events related to Iran. An example is the impact of ecological disasters (large-scale floods, fires, etc.) on people' lives.

All of the above events were not detected in advance, because social sciences (including economics and legislation) and economic practice were anchored in linear and extrapolative thinking and a focus on achieved results (i.e., consumed potential created in the past). There was a lack of holistic and syncretic finding of new potentials determining future events.

In addition, there is a methodological barrier. Potential cannot be directly measured ex ante. Direct measurement is possible only when it is consumed (i.e., ex post) and converted into effects (E) and the amount of inputs to the transformation process (M). That is, when events occur.

Therefore, it is necessary to apply indirect methods, which are referred to as diagnostic. In business theory and practice, various methods and techniques from economics, geology, medicine, linguistics (e.g., in connection with AI), etc. can be used.

The methodological complexity lies in the multidisciplinary approach and the combination of qualitative and quantitative research methods. Diagnostics in entrepreneurship and business management after revolutionary changes in post-socialist countries have received considerable attention (e.g., Prof. Bieniok, Prof. Kašík, Prof. Mikoláš, Dr. Neumannová)[23–26]. It was a tool contributing to the transformation of a centrally organized economy into a market economy.

This approach is based on several principles, in particular:

- We look at business holistically—in all its connections and contexts (i.e., from the perspective of economic, social, psychological, technical, ecological, etc.).
- We examine business evolution, i.e., in the historical context of the development of entrepreneurs.
- We try to understand entrepreneurs, the company and their environment "with eyes from the inside."
- We cooperate with people involved in the company and key entities from their surroundings.
- We look for causal relationships between the causes and manifestations of internal and external states and processes.
- We do not strive to forcefully correct the state and processes from the outside, but we assume the active participation of the "patient" (the owner and employees of the company, as well as the relevant environment).
- We use methods and techniques from various scientific disciplines and look for synergistic effects resulting from a combination of various factors, causes, etc.

The proven methodological procedure for applying the diagnostic-therapeutic approach and related basic methods includes the following elements:

- Use of communication methods to create a participatory (mutually friendly) relationship between the researcher and the research subject.
- Application of methods for collecting information from secondary sources.
- Interview, questionnaire, brainstorming, and other methods for collecting primary information.
- Application of analytical methods such as comparison, scoring, SWOT (Strength, Weakness, Opportunity, Threat) analysis, methods of financial, marketing and systems analysis, etc.
- Use of methods for synthesizing information obtained

through analysis and syncretic methods (i.e., non-homogeneous synthesis) of knowledge.
- Creation of incidence matrices and graphic representation of the causality of the acquired knowledge.
- Creation of variant hypotheses of therapy (i.e., corrective measures to find a harmonious state and behaviour of the system).
- Selection of therapy based on established criteria and limitations.
- Implementation of the selected therapy.
- Recovery of the system after implementation of therapy.
- Control of the state and behaviour of the system after recovery, especially whether there is no return to the state before therapy.
- Subsequent preventive checks system development.

Entrepreneurship diagnostics uses a wide range of techniques: questioning, comparison, scoring, scaling, typologies, barometers, vector analysis, colour scale techniques, various mathematical and statistical procedures, AI tools, etc., depending on the methodology used and specific needs.

The basic condition for implementing a diagnostic approach is mutual communication and trust in the relationship between the researcher and the respondent. The respondent must have an active interest in understanding his/her condition and the need to correct the disharmony in his/her condition and behaviour.

This approach has a wide range of applications (e.g., Organisation for Economic Co-operation and Development (OECD)[27]). Based on thousands of diagnostic research and therapies of productive systems (especially family businesses), it was possible to generalize the findings through a deductive approach into a mental model. Formulas and mathematically described relationships serve to express the causality of the model in a clearer and more logical way. The construction of a deductive model (formulated in the form of equations) is based primarily on the creation of mind maps, Boolean algebra and value engineering procedures[28–30].

2.2. Model of the Relationship between Competitive Strength and the Time Economy of Productive Systems

The competitiveness of the productive system is directly related to the issue of the economy of time. That is, for a productive system to physically exist (survive), it must have competitive potential and competitiveness[31–35].

From the perspective of evolutionary (spiral) economics, it is therefore necessary to examine productive systems in the unity (synergy) of their three opposing dimensions of time[36–38]:

- Astronomical time.
- Productive (economic) time of the system.
- Physical time of the system.

The following model describes the causality of economic and physical time of productive systems with respect to changes in the speed of transformation processes.

In economic theory and practice, the relationship

$$A = B \times v \tag{1}$$

is used.

Where A is the effective (effective) potential that is transformed into an effect, the output of the system E. B is the expended potential (transformed into the mass of inputs to the system M). And the coefficient of direct proportionality v is the rate (speed) of productive transformation of the expended potential B into the effective potential A.

The total potential P of the productive system is defined as:

$$P = A + B + C. \tag{2}$$

The letter C denotes the stabilized potential that is preserved for the next transformation cycle (it is not about the consumption of potential C in the consumption cycles A and B). It is assumed that the total potential grows intergenerationally in the ratio

$$\varphi = P_{i+1} : P_i > 1\,[33, 35]. \tag{3}$$

The dynamics of new knowledge leads to the fact that the following two generations (cycles) of the productive system (person, family, business, etc.) innovate productive transformations with increasing rates of transformation, i.e.,

$$v_{i+1} > v_i, \text{ or } \sigma = v_{i+1} : v_i > 1. \tag{4}$$

It is assumed that the relative productive (effective, economic) time t_e is in an inverse position to the transformation speed v, i.e., that the time (time interval) t_e and the speed v are in the relationship

$$t_e = 1 : v. \tag{5}$$

Two factors affect the existence of a productive system. Firstly, it is necessary to examine the influence of growth potential on the length of reproductive cycles (generations). New scientific knowledge (innovations) has a positive effect on the length of the system's existence. On the contrary, the dynamics of changes in the speed of transformations (v) have a contradictory effect. The so-called moral wear and tear of the system occurs. For example, the potential for human life expectancy increases, but other influences on human health (i.e., lifestyle, modern diseases) have a contradictory effect. Then, physically, a person does not live to reach the potential (ideal) age, although this age is gradually lengthening.

Therefore, it is also necessary to examine the influence of the growth potential of the productive system on the length of reproductive cycles (generations). We will refer to this time interval as "physical time" t_f. The result of the above-described contradictory phenomena is then the relationship

$$t_{f(i+1)} = (\varphi{:}\sigma) \times t_{fi}. \tag{6}$$

Thus

$$\varphi = \sigma \times (t_{f(i+1)} : t_{fi}), \tag{7}$$

or after applying Equation (5), we get the relation

$$\varphi = (t_{ei} : t_{e(i+1)}) \times (t_{f(i+1)} : t_{fi}). \tag{8}$$

There is therefore a paradox (disparity) of time:

- The new generation (i + 1) lives productively (effectively) for a shorter period $t_{e(i+1)}$, i.e., its productive cycle is shorter compared to the previous generation (i).
- At the same time, its time of physical existence $t_{f(i+1)}$ is extended.

A typical example is the extension of a person's physical age, but the shortening of the period of his productive activity. Therefore, in order to be productively applied, a person must be educated throughout life, innovating his knowledge, abilities and skills.

Thus, there arises a difference, or rather a surplus, between the physical and productive (effective) time of successive generations of the productive system. The difference in subsequent evolutionary cycles increases, provided that ideal conditions for the spontaneous order of development of the productive system exist.

The evolutionary theory of productive systems offers further links between the potential and physical time of a productive system [20, 37]. The research conducted above has brought very inspiring findings. The competitiveness of the productive system basically has two basic components:

- The performance of the productive system, which represents the productive transformation of the expended potential B (i.e., the volume of input M) into the useful potential A (or the effect of the output E).
- The ability to accumulate potential for further development, i.e., to create a stabilized potential C.

Then the above findings are expressed by the formulas:

- $$t_{f(i+1)} = B_{i+1} + (C_i : v_{i+1}). \tag{9}$$
- $$t_{fi} = B_i + (C_{i-1} : v_i). \tag{10}$$
- $$kt_{f(i+1)} = t_{f(i+1)} : t_{fi} = (B_{i+1} + (C_i : v_{i+1})) : (B_i + (C_{i-1} : v_i)). \tag{11}$$

The described phenomena bring a number of additional economic, social, ethical, ecological and other (often negative) impacts to productive systems.

In socially responsible business, we must understand performance as the ability to create effect E. That is, the ability to transform the purposeful potential A into effect E. Mostly, it concerns the volume of production and services provided, financial resources, etc. Specific performance must also be understood as, for example, the ability to create jobs, contribute to the development of the environment, the culture of the region, socially beneficial activities, etc.

We must also accept the expended potential B (i.e., raw materials, consumed materials, losses, harmful emissions, etc.) as specific performance, because the expended potential B, which is transformed into the amount (mass) M of consumed resources (inputs) of the productive system, must be restored in order to be able to restore the productive process. Therefore, there is a need to demand additional expended potential B, or additional resources. Competitiveness is transformed in specific businesses and other activities into the form of the competitive strength of the productive system.

The competitive strength of the productive system (SF) can be defined by the following equation:

$$kSF_{i+1} = (P_{i+1} : P_1) \times (v_{i+1} : v_i), \tag{12}$$

i.e.,

$$kSF_{i+1} = \varphi \times \sigma. \tag{13}$$

From the above text, we obtain the formulas:

$$\varphi = \sigma \times (t_{f(i+1)} : t_{fi}) \tag{14}$$

and a

$$kSF_{i+1} = (t_{f(i+1)} : t_{fi}) \times \sigma^2. \tag{15}$$

And consequently

$$kSF_{i+1} = (t_{f(i+1)} : t_{fi}) \times (v_{i+1} : v_i)^2 \tag{16}$$

and

$$kSF_{i+1} = (t_{f(i+1)} : t_{fi}) \times (t_{ei} : t_{e(i+1)})^2. \tag{17}$$

The interpretation of the mentioned formulas presupposes the possibility of comparing the examined and the reference (pattern) productive process [21]. In the above research, the above relations, especially Equation (16), were verified with positive results [18, 19].

3. Results

From the presented theory, a new dimension of sustainable business, its limits, and possibly threats and opportunities for humanity can be derived.

3.1. Limits of Contemporary Theory

The available economic literature works with the concept of entrepreneurial potential minimally. It does not comprehensively deal with the transformation of potential into effects and the expended potentials necessary to achieve the effect. Another limitation of mainstream economics is the fact that it minimally deals with the links between potential, its dynamics and the economy of time.

A common mistake in social sciences is that they understand entrepreneurship only from the perspective of economics or law. Entrepreneurship theory must be understood holistically; it is necessary to find syncretism in a wide spectrum of scientific knowledge (from psychology, through sociology, economics, law to computer science and natural sciences).

Only after 2000 did classical economics and entrepreneurship theory adequately move to the issue of the social responsibility of productive systems. Previous limitations, often referred to as externalities, were overcome by, for example, behavioural, circular or evolutionary economics.

It is necessary to point out the methodological-philosophical barrier. This is the preference for quantitative (primarily statistical) analyses over qualitative research. Quantitative analyses of phenomena prevail over the examination of their essence. The theory of entrepreneurship (or economics) cannot explain many of the turbulent phenomena that the current real world offers, because it attempts to extrapolate previous events. It does not reveal the potential and causality of qualitatively new processes. There is a lack of intellectual and logical models that would be able to describe the current dynamically transforming processes and principles of the life of society and nature.

The present paper presents a model, based on previous research (see above), which attempts to outline a way to overcome the gaps in the research on the competitiveness and social responsibility of productive systems.

3.2. Human Biological Limits

Further research must move to the question of the relationship between man and his product. It is necessary to address situations of competitiveness, social responsibility and the reaction time of the productive system in extreme conditions.

The speed of signal transmission in the brain ranges from 2 m/s to 120 m/s. This speed depends on which area of the brain the signals are spreading in. This means that information in the brain can spread at a speed of up to 432 km/h. Signal transmission is carried out using electrical impulses and chemical signals. Information to the brain is transmitted from the sensory organs, so the transmissions also have mechanical, optical, thermal and other characteristics.

For example, the speed of sound in dry air at 20 °C is approximately 343 m/s, which is equivalent to about 1,235 km/h. This speed varies depending on atmospheric conditions. Another delay occurs when we receive information with our eyes. Light travels through air at a speed of 299,702,547 m/s (slower than in a vacuum). People live in different environments and receive light and sound information at different speeds.

The above facts have a significant impact on human practical life. For example, the reaction time of a driver ranges from 0.4 to 1.5 s on average. This time includes the time needed to visually process information and the physical reaction, such as pressing the brake pedal or turning the

steering wheel. A completely controversial situation occurs in the case of an autonomous car, when a robot (including the use of artificial intelligence) makes an incorrect reaction to a traffic situation instead of a human. An accident occurs, possibly with fatal consequences. In addition to material, social, ethical, or environmental damage, a major legal problem arises. Who is to blame for the accident? The driver, the car owner, the designer of the robotic system, the car supplier, etc.?

The speeds that humans are capable of achieving are completely different from those of their contemporary products, especially AI, virtual robots, quantum computers and similar electronic devices. This disparity in the reactions of humans and their products over time is multiplied by the use of quantum computing technologies. Quantum computers have a significantly higher calculation speed than traditional computers, and thanks to their unique properties, they can perform calculations in parallel, which leads to exponentially faster calculations.

The extreme examples given between human biological capabilities and new technologies open up a whole new space for exploring the social responsibility of business.

3.3. Social Unsustainability of the Disparity of Extreme Changes in Speed in Productive Systems

Let us assume a borderline variant of the reasoning. After the reproductive cycle (i) of a human (Homo sapiens sapiens), a product of a human (AI, robots, etc.) takes over the initiative ("government") in the reproductive cycle (i + 1). Let us return to Equation (16) and ask ourselves the essential questions for the current turbulent times.

Question one: If the changes in the speed of transformations of new technologies ($v_{i+1} : v_i$) become too great, will man be able to handle these changes with regard to his natural physiological, psychological and social disposition? Will not diseases and conflicts increase as a result of the "competitive" disharmony between man and the artificial nature (which he himself created)?

Question two: If, in the future, artificial intelligence and new forms of robots will realize transformation processes at the speed of light $v_{i+1} = c$, then the competing "energy" will be

$$ESF_{i+1} = t_{f(i+1)} \times (c_{i+1})^2. \quad (18)$$

How to interpret this phenomenon? The physical time of "something artificial" $t_{f(i+1)}$ will be completely different in its dimension from the physical (biological) time of a person. It will be outside of human psychosomatics, as long as a person (homo sapiens sapiens) still exists. Will digital fascism and the enslavement of a person by algorithms be born, which will be controlled by only a small group of people in the world?

Answers must be sought without delay. Unanswered questions pose a risk of irreversible consequences. They would probably have negative impacts on humans as individuals and on humanity.

3.4. Energy Balance of Transformation Processes

A very acute issue is the energy demand of artificial intelligence when solving business tasks, similar to those solved by humans in everyday life. The energy demand of AI varies greatly depending on the type of model and the task it solves.

In general, it can be said that a person functions continuously. This includes perception, reasoning, memory and emotions. The human brain and the related involvement of the entire body in solving a task are highly energy efficient given the complexity of its activities (its consumption is approximately 20 W).

Artificial intelligence works differently. First of all, it has no emotions. Its consumption basically consists of two energy items. Training the model, which is usually a one-time thing and consumes thousands to millions of kWh. The second item is the answer to the question. One answer (inference) consumes approximately 1–10 Wh. These processes run on servers and databases, which have high performance and consumption.

Let's choose a simple question: how do I get from place A to place B? The energy demand of solving the task is as follows:

- A person needs about 10 s to answer and consumes about 0.055 Wh.
- AI consumes at least 1, possibly up to 10 Wh for the same task.

In this case, a person is more energy efficient than an AI. However, this result is conditioned by the fact that a

person is in a familiar environment. The advantage is lost if a person is in a foreign environment, usually uses navigation or has to interact with the environment in another way (e.g., ask questions). In this case, AI has the advantage of being connected (compared to a person) to a global network in a virtual environment.

Therefore, we find ourselves in a difficult situation when assessing the competitiveness of a person and his product with regard to social responsibility in life and business (see Equations (9)–(11)). Given the energy limits of the Earth, the analysis of the energy balance is a very serious problem for the development of humanity. In the event of uncontrolled development, the ecological dimension of the socially sustainable development of business and living conditions would be destroyed.

3.5. Singularity and Re-Evolution

From the above formulas, it can be deduced

$$t_{f(i+1)} = B_{i+1} + (C_i : c_{i+1}) \tag{19}$$

and we can develop a discussion of the further development of human society.

If new forms of productive systems reached the speed of processes at the speed of light c_{i+1} at the limit moment, then the physical time $t_{f(i+1)}$ would be limited by the consumption of the potential $B_{(i+1)}$ and the residual potential $C_i : c_{i+1}$. Does this mean that at a given moment a state of re-evolution occurs. Thus, one evolutionary process ends and a new process begins?

Let us assume that in this singular state in the denominator of Equation (19), on the one hand, the speed of light is c_{i+1} ("outgoing" evolutionary generation). On the other hand, and at the same time, the speed of the new (re-evolutionary) generation is equal to zero, then the physical time of the productive system

$$t_{f(i+1)} = B_{(i+1)} + \infty. \tag{20}$$

At the moment of consumption B_{i+1}, the physical time of the system $t_{f(i+1)}$ is therefore infinite ($+\infty$).

If the above formulas are incorporated into the theory of evolutionary economics [20], it is clear that each developmental line tends to its saturation limit, when approximately

$$k_{tf(i+1)} = 1. \tag{21}$$

Assuming that this line does not tragically disappear, a fundamental evolutionary change occurs [21]. That is, re-evolution. This means that the evolutionary process itself changes evolutionarily to a higher order [12, 19].

4. Discussion

If we generalize the presented deductive model and research results to the conditions of human life and human society, then it is clear that new technologies can extend their physical life and shorten their productive life. The difference between a person's physical and economic time for the next generation under conditions approaching the ideal of world development can lead to his greater personal freedom and quality of life, to the development of his personality.

Ideal conditions for the reproduction of a productive system cannot realistically be ensured due to natural influences, political changes, economic crises, wars, epidemics, a lack of resources and other negative events that affect the world, regions, businesses or individual people, etc.

It would be a significant methodological (or philosophical) mistake if the competition between humans and robots were understood as an irreconcilable contradiction. The human-robot relationship must be understood as a unity of opposites based on the value system of existence and survival of man (humanity). In particular, it is necessary to address the relationship of temporal disparity in the human-robot relationship.

If we project the above-mentioned model of thought into practical life (presented research results), then the challenge for technical and other fields is to ensure that their applied projects are socially responsible.

We will develop the above example from automobile transport. Two cars are driving on the highway at the same time. One is driven by a human and the other by a robot (it is an autonomous vehicle). The virtual robot's "decision-making" about the traffic situation is much faster than that of a human. Is this an absolute advantage of the new technology? This practical consideration leads to a number of other research questions. What impact can new technologies (including drones) have on passenger transport? Or when and how does a robot use the experience of a driver (human) in a non-standard traffic situation? When will artificial intelligence have its own emotions? Promising technical

solutions offer other directions for research solutions in the field of psychological, social, economic and legal issues that go beyond the framework of natural sciences and technical projects.

The given practical example does not exhaust all possible variants of the relationship between a person and his products (material or virtual robots). It is only a reminder of the topicality of solving the temporal disparity of the relationship.

Humanity stands on the threshold of harmony of its development or its tragedy. It is necessary to appreciate the Japanese decision-making sphere, which responds to the new challenges of the development of the strategies of Society 5.0[39–41].

We must realize that the economic and social status of people also varies between continents, countries and regions. The impact of current technologies on individual spatial units and communities is different. There is therefore a risk of conscious or unconscious discrimination between those who do not have access to new technologies and those who do. This dimension of corporate social responsibility and social development should also be taken into account when examining the relationship between humans and the virtual environment.

The current concept of responsibility for the development of human society should be expanded by two concepts, namely emancipation and satisfaction. Socially responsible behaviour and entrepreneurship should lead to the liberation of people from the negative burdens of life and establish a freer lifestyle for humanity. Satisfaction should lead to a positive feeling in people, nations and global society from the achieved results of human activities, including entrepreneurship.

The previous text also suggests a new form of competition between man and his product: time. The issue of time in productive systems should not be examined only from a technical and economic point of view. Time from a human perspective has many dimensions (biological, psychological, social, economic, etc.). Every person is unique; therefore, every business, corporation and other community is unique. Therefore, their time is perceived subjectively. It is necessary that this aspect is reflected in the research on the social responsibility of business.

Then the conclusion is obvious. The goal of entrepreneurship at the micro level should not be to maximize profit, but to maximize added value in a broad sense (i.e., in the economic, social, ethical, ecological, etc.).

From a mezzo and macro perspective, the activities of humanity (including business) should be aimed at ensuring the maximization of well-being (including individual and social freedom) of all nations, ethnicities and communities on Earth under the conditions of sustainable development of the local, national and global economy.

We are entering a situation where man as a natural system and his product can, at an extreme moment, enter into a disparity of their developmental phases. Humanity is approaching a point beyond which lies the path to either harmony or the tragedy of the coexistence of man and his products[20, 21, 42]. This opens up a new research space for science, not only in the fields of economics, business and management.

5. Conclusions

The article presents a deductive mental model derived from long-term international applied research. The stated formulas are not used for practical calculations, but for logical simulations creating space for further research activities.

Based on the use of the model, research results were presented, which open new perspectives on the social responsibility of human behaviour and business in particular.

A holistic approach to further research is absolutely necessary. Moreover, the described relationship is reflected in the coexistence of people and in the understanding of the world by different generations. The harmony of sustainable intergenerational development can be found in the integrity of the evolutionary development of society.

Humanity faces challenges in resolving the expected complex relationships between man(s) and his products. This dilemma was even pointed out more than 100 years ago by the Czech author Čapek[43] in his science fiction play R.U.R. (Rossum's Universal Robots).

Funding

This work received no external funding.

Institutional Review Board Statement

Not applicable for studies not involving humans or animals.

Informed Consent Statement

Not applicable.

Data Availability Statement

Research data is not generally available because the article presents a deductive model with mental (qualitative) conclusions drawn. The underlying data was obtained through field research in selected EU countries, primarily in the Czech Republic, Poland and Slovakia, from 2000 to 2025, mainly in small and medium-sized enterprises and family businesses. With regard to the protection of personal and corporate information, specific data was not presented publicly. Selected statistical data were publicly available in the publications of researchers (see references in the article sources).

Conflicts of Interest

The author declares that he has no conflict of interest related to the preparation and publication of the article.

AI Use Statement

The author declares that the article was not written by artificial intelligence (AI). The artificial intelligence tool Copilot was used to check the correctness of the APA format for some literary sources in this manuscript. This fact did not affect the content and form of the article. The author takes full responsibility for the final content of the published article.

References

[1] Andersen, M.M., 2025. Evolutionary dynamics of the green and circular economy. In: Mathews, J.A., Oqubay, A. (Eds.). The Oxford Handbook on the Greening of Economic Development. Oxford University Press: Oxford, UK. pp. 79–114. DOI: https://doi.org/10.1093/oxfordhb/9780198883487.013.5

[2] Japan Science and Technology Agency, 2023. "Super Smart Society (Society 5.0)" Mission Area: Modelling and AI that Connects the Cyber and Physical Worlds. Available from: https://www.jst.go.jp/mirai/en/program/super-smart/theme02.html (cited 30 January 2025).

[3] Ključnikov, A., Civelek, M., Polách, J., et al., 2020. How do security and benefits in still trustworthiness of a digital local currency? Oeconomia Copernicana. 11(3), 433–465. DOI: https://doi.org/10.24136/oc.2020.018

[4] International Journal of Technology Management, 2013. Special issue on: "Competitiveness assessment and enhancement in virtual organisations". Available from: https://www.inderscience.com/info/ingeneral/cfp.php?id=1951 (cited 30 January 2025).

[5] Džajić Uršič, E., Fric, U., Rončević, B., 2024. The circular economy: Recent debates and research trends. Journal of Infrastructure, Policy and Development. 8(3), 2855. DOI: https://doi.org/10.24294/jipd.v8i3.2855

[6] Chenavaz, R.Y., Couston, A., Heichelbech, S., et al., 2023. Corporate social responsibility and entrepreneurial ventures: A conceptual framework and research agenda. Sustainability. 15(11), 8849. DOI: https://doi.org/10.3390/su15118849

[7] Musová, Z., 2021. Consumer behavior of generation Z in the context of circular economy principles. Application of circular economy principles in Slovakia. In: Musová, Z., Bystrica, B. (Eds.). Proceedings of Scientific Papers from the VEGA Project 1/0705/19. Belianum: Banská Bystrica, Slovakia. pp. 147–159. (in Slovak)

[8] Rosário, A.T., Figueiredo, J., 2024. Sustainable entrepreneurship and corporate social responsibility: Analysing the state of research. Sustainable Environment. 10(1), 2324572. DOI: https://doi.org/10.1080/27658511.2024.2324572

[9] Teixeira, N., 2025. Circular economy perspectives: Challenges, innovations, and sustainable futures. Discover Sustainability. 6, 738. DOI: https://doi.org/10.1007/s43621-025-01606-x

[10] United Nations, 1987. Report of the World Commission on Environment and Development: Our Common Future. United Nations: Washington, DC, USA. Available from: https://www.brundtland.co.za/wp-content/uploads/2022/08/Brundtland-Report-1987-Our-Common-Future.pdf

[11] Kaushik, N., Dangwal, R.C., 2025. Sustainable entrepreneurship: A systematic review and future research directions. Abhigyan. 43(1), 28–53. DOI: https://doi.org/10.1177/09702385241280810

[12] Sedláček, T., Graeber, D., Chlupatý, R., 2013. (R)Evolutionary Economics: About the System and People. Nakladatelství 65. Pole: Praha, Czech. (in Czech)

[13] Cazzaniga, M., Jaumotte, F., Li, L., et al., 2024. Gen AI: Artificial Intelligence and the Future of Work. International Monetary Fund: Washington, DC, USA.

[14] Morales-Raya, M., Muñoz, P., 2024. Varieties of time in business sustainability research: An integrative review and research agenda. Organization & Environment. 37(2), 257–297. DOI: https://doi.org/10.1177/10860266231210610

[15] Yuan, L., Zheng, L., Xu, Y., 2023. Corporate social responsibility and corporate innovation efficiency: Evidence from China. International Journal of Emerging Markets. 18(12), 6125–6142. DOI: https://doi.org/10.1108/IJOEM-09-2021-1364

[16] Bylund, P.L., 2025. Entrepreneurship and Evolutionary Economics. Elements in Evolutionary Economics. Cambridge University Press: Cambridge, UK.

[17] Mohand-Amar, S., Soler-Torres, P., 2025. Sustainable corporate entrepreneurship: Mapping the scientific coverage and future research agenda. Business Strategy and the Environment. 34(8), 10769–10784. DOI: https://doi.org/10.1002/bse.70150

[18] Lachiewicz, S., Matejun, M., Mikoláš, Z., 2021. Opportunities in Innovation Management in SMEs. Wydawnictwo CeDeWu: Warszawa, Poland. (in Polish)

[19] Matejun, M., Mikoláš, Z., 2023. Theory and practice of the evolutionary networks of potential in a family business succession. Journal of Economics and Management. 45(1), 345–373.

[20] Mikoláš, Z., 2021. Introduction to Spiral (Evolutionary) Economics, or This Is How I See the World. TZ-one: Hradec Králové, Czech. (in Czech)

[21] Smuts, H., Hinkelmann, K., (Eds.), 2025. Society 5.0 4th International Conference, Society 5.0 2024, Moka, Mauritius, June 26–28, 2024, Revised Selected Papers. Springer: Cham, Switzerland.

[22] Samples, B., 1976. The Metaphoric Mind: A Celebration of Creative Consciousness. Addison-Wesley: Reading, MA, USA.

[23] Kašík, J., Michalko, M., 1998. Business Diagnostics. Tandem: Ostrava, Czech. (in Czech)

[24] International Trade Centre, 2014. A Guide to Diagnose a Business and Its Management. ITC: Geneva, Switzerland.

[25] Kryvovyazyuk, I., Otlyvanska, G., Shostak, L., et al., 2021. Business diagnostics as a universal tool for study of state and determination of corporation's development directions and strategies. Academy of Strategic Management Journal. 20(2).

[26] Aliyeva, N., Chernov, S., Babaskina, L., et al., 2022. Comprehensive business diagnostics of a company's activities. In: Lawrence, K.D., Pai, D.R. (Eds.). Applications of Management Science. Emerald Publishing: Leeds, UK.

[27] OECD, 2005. Business Clusters: Promoting Enterprise in Central and Eastern Europe. OECD: Paris, France.

[28] Givant, S., Halmos, P., 2009. Introduction to Boolean Algebras. Springer: New York, NY, USA.

[29] Arjunraj, P., 2022. Concepts of Value Engineering. Notion Press: Chennai, India.

[30] Osman, N., Steels, L., (Eds.), 2024. Value Engineering in Artificial Intelligence: First International Workshop, VALE 2023, Krakow, Poland, September 30, 2023, Proceedings. Springer: Cham, Switzerland.

[31] Flak, O., Głód, G., 2012. The Competitive Will Survives. Difin: Warszawa, Poland. (in Polish)

[32] Głód, G., Flak, O., 2017. Factors of competitiveness in Polish companies in the Silesian Region in 2014–2016. Oeconomia Copernicana. 8(4), 601–619. DOI: https://doi.org/10.24136/oc.v8i4.37

[33] Mikoláš, Z., 2005. How to Increase a Company's Competitiveness, Competitive Potential and Business Dynamics. Grada: Praha, Czech. (in Czech)

[34] Mikoláš, Z., Wozniaková, Z., 2009. Virtual firm competitiveness. International Journal of Economics and Management Engineering. 3(10), 1860–1864.

[35] Mikoláš, Z., 2011. Competitive Potential of an Industrial Enterprise. C. H. Beck: Praha, Czech. (in Czech)

[36] Lee, K., 2024. Economics of technology cycle time and catch-up: Micro-, meso-, and macro-analyses and implications. Journal of Evolutionary Economics. 34, 319–349.

[37] Mikoláš, Z., 2023. The special theory of (re) evolutionary economy. DOI: https://doi.org/10.13140/RG.2.2.24018.32961

[38] Rohatinski, Ž., 2017. Time and Economics: The Concept of Functional Time. Springer: Cham, Switzerland.

[39] Calp, H.M., Bütüner, R., 2022. Chapter 7—Society 5.0: Effective technology for a smart society. In: Hassanien, A.E., Chatterjee, J.M., Jain, V. (Eds.). Artificial Intelligence and Industry 4.0: Intelligent Data-Centric Systems. Academic Press: Cambridge, MA, USA. pp. 175–194. DOI: https://doi.org/10.1016/B978-0-323-88468-6.00006-1

[40] Japan Science and Technology Agency (JST). Available from: https://www.jst.go.jp/EN/ (cited 30 January 2025).

[41] Cabinet Office, Government of Japan, 2016. Society 5.0. Available from: https://www8.cao.go.jp/cstp/english/society5_0/index.html (cited 30 January 2025).

[42] McKinsey Global Institute, 2025. Agents, Robots, and Us: Skill Partnerships in the Age of AI. McKinsey Global Institute: Washington, DC, USA. Available from: https://www.mckinsey.com/mgi/our-research/agents-robots-and-us-skill-partnerships-in-the-age-of-ai

[43] Čapek, K., 1923. R.U.R. (Rossum's Universal Robots). Selver, P., Playfair, N. (Trans.). Oxford University Press: Oxford, UK.