

CREATIVITY AS A STRATEGIC ORIENTATION OF INDUSTRY 4.0 ORGANIZATIONS IN THE CONDITIONS OF SUSTAINABLE DEVELOPMENT

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Purpose: The main purpose of the article is to determine the strategic directions of Industry 4.0 organizations in the conditions of sustainable development.

Design/methodology/approach: Many different strategy typologies have been presented in the literature. They allow for the identification of different strategic orientations of organizations operating in a changing market environment. Taking into account the concept of Industry 4.0, the essence of which is the extensive use of the Internet, networks, and data exchange for increasingly better functioning of the organization, an in-depth analysis and review of the literature on sustainable development was carried out, which provided the basis for developing a model of strategic directions recommended to organizations implementing the idea of Industry 4.0.

Findings: Based on an in-depth analysis and literature review, a model of strategic orientations of Industry 4.0 organizations was developed, covering four basic activities: organizational expansion, organizational innovation, organizational entrepreneurship, and organizational creativity enabling sustainable development of the organization.

Originality/value: The article presents an original approach to strategic orientation as a key competence of contemporary organizations implementing the Industry 4.0 concept in conditions of sustainable development. In the proposed model, the authors emphasize the special role of organizational creativity, which stimulates the creation of new values in the organization and its strategy aimed at implementing the Industry 4.0 concept in conditions of sustainable development. These new values have a decisive impact on the organization's growth and sustainability in a turbulent and dynamic environment, focusing on maintaining the integrity of the ecosystem.

Keywords: Industry 4.0, sustainable development, organization, orientation, strategy, values.

Category of the paper: Viewpoint, conceptual paper.

1. Introduction

The fourth industrial revolution and the digital transformation that underlies it is progressing exponentially. The digital revolution is changing the way people live and the way organizations function.

The growing interest in the concept of Industry 4.0 of various stakeholders, including public authorities, entrepreneurs, R&D sector entities, and business environment institutions, is related to the process of globalization and internationalization of the world economy and the need to strengthen innovation, entrepreneurship, and competitiveness of individual national economies on a macro scale meso, and micro. In this context, these concepts are perceived both as determinants of the so-called fourth industrial revolution, as well as the evolution of information and communication technologies, business models and virtualization, and enterprise strategies (Ardito et al., 2019, pp. 323-346).

Expansion, innovation, entrepreneurship, and creativity are the key processes of organizations operating in the 4.0 industry. In light of the selected area of literature research, it was assumed that the aim of the conceptual article is to present the strategic orientations of organizations implementing the concept of Industry 4.0. in conditions of sustainable development.

2. The concept of sustainable development

The term sustainability development has been known in the literature since the last century (Müller, Voigt, 2019, pp. 659-670). There are many definitions of the term in the scientific literature, with no clear definition. Moreover, the concept of sustainable development is often misused as a so-called buzzword, which is currently fashionable, and thus indicative of being a cult. As J. Skorupski writes, "the idea of sustainable development has become a paradigm of environmentally friendly economic development, often serving as a buzzword disavowing the actual environmental burdens generated by various industrial, infrastructure, agricultural or service projects" (Skorupski, 2018).

The term was first defined in the World Commission on Environment and Development's 1987 Brundtland report 'Our Common Future' as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (Report of the World Commission on Environment and Development: Our Common Future, 1987).

The concept of sustainable development evolved and was developed, including at the 1992 United Nations Conference on Environment and Development in Rio de Janeiro (at the so-called Earth Summit) and expressed in Agenda 21, the United Nations Millennium

Declaration, and the declaration *The Future We Want* by the UN. It was then that the relationship between economic development and environmental protection began to be discussed. The Rio Declaration is a set of principles that address future development and environmental commitments. In 2001, meanwhile, the EU adopted a strategy for sustainable development. It was revised in 2006 and "enabled the realization of a long-term vision of sustainable development that combines mutually supportive economic growth, social cohesion, and environmental protection." Subsequently, since 2009, sustainable development has officially become one of the long-term goals of the European Union in accordance with Article 3(3) of the Treaty on the European Union (Zrównoważony rozwój, <https://eur-lex.europa.eu/...>, Aug. 24, 2023). In subsequent documents, namely the United Nations Millennium Declaration. (Resolution adopted by the General Assembly [without reference to a Main Committee (A/55/L.2) 55/2. United Nations Millennium Declaration, New York, 6-8 September 2000), in the United Nations declaration *The Future We Want* (*The Future We Want: final document of the Rio+20 Conference Rio de Janeiro, Brazil June 20-22, 2012*) and the 2030 Development Agenda (*Transforming Our World: the 2030 Agenda for Sustainable Development, United Nations, 2015*), has remained essentially unchanged in its context. Sustainable development thus emphasizes the parallel development of the economy, society, and the environment.

Sustainable development can therefore be defined in two ways:

1. sustainable development can be formulated as broadly defined as the development of, among other things: countries, cities, communities, or businesses, which combines the needs of today's people and the ability to saturate the needs of future generations, but also the wants and needs of one person with another,
2. sustainable development can be defined as: "a sequence of changes in which the use of resources, the structure of investments, the orientation of technical progress, and institutional structures are to be made in such a way that there is no contradiction between future and present needs" (Sztumski, 2006, p. 73).

The key pillars of sustainable development are management by values, concern for the environment, and social commitment, which are the basis for the equalized development of organizations on the one hand and form the foundation of accountability on the other. Moreover, in sustainable, development the basis is the environment, the tool is the economy, while the goal of sustainable development is the well-being of society. Taking the above considerations into account, it is necessary to consider what is the sustainable development of an organization. Sustainable development of an organization should be understood as "such a way of management that simultaneously and equivalently respects economic, environmental and social issues that are related to their functioning. In practice, this means that in organizations following such a path of development, a new quality of management should emerge (Brzozowski, 2015, p. 138). This understanding of the sustainable development of organizations is also supported by authors of this paper, while pointing to the significant importance of human and natural resources in addition to economic, environmental, and social issues. As already indicated, there

are fundamental pillars of sustainable development that focus on: workers, society, and the economy (Figure 1). In fact, it is only when we address their essence that we can confidently talk about the growth of an organization. As can easily be seen, organizational creativity is the missing link here. That is why the authors of this publication propose to extend these pillars by combining them through the fluid creativity of organizations.

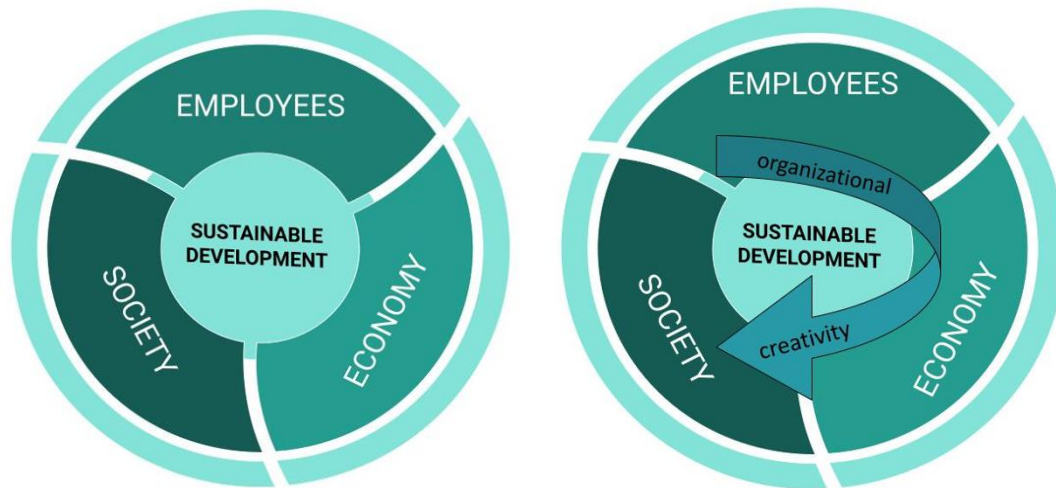


Figure 1. Pillars of sustainable development & organizational creativity as the key competence.

Source: own research.

The idea of organizational sustainability is increasingly well-known and widespread. "For the business enterprise, sustainable development means adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining, and enhancing the human and natural resources that will be needed in the future". (Business Strategies for sustainable development Based on the book *Business Strategy for Sustainable Development: Leadership and Accountability for the 90s*, published in 1992 by the International Institute for Sustainable Development in conjunction with Deloitte & Touche and the World Business Council for Sustainable Development, <https://www.iisd.org/system/...>, Aug. 26, 2023).

We propose to expand this traditional understanding of the idea of organizational sustainability by adding one more component, namely organizational creativity. This is a valuable, rare, and difficult-to-reproduce intangible resource. In this article, we have assumed that organizational creativity has objective implications for building innovation capacity that can result in new products, processes, and organizational innovations, it also has a subjective role. This subjective role involves improving entrepreneurial capacity, which in turn is a key problem-solving-oriented resource in organizational sustainability processes. Although the importance of organizational creativity as a resource has been exhaustively studied, to our knowledge there is still a lack of research to understand how organizational creativity supports the competencies needed by organizations to operate in a sustainable economy.

As T. Borys points out in his reflections - the concept of sustainable development is nowadays a largely operational category - with increasing concreteness at different levels of management (Borys, 2015, pp. 9-12).

In an effort to explain what sustainable business models will look like, we should refer to the genesis of the emergence of business models that integrate sustainability goals with business strategy. An interesting look at this evolution as well as the possible direction of development of this concept was presented by F. Melissen and L. Moratis (2016, pp. 8-16). According to them, four generations of sustainable business models can be distinguished (Figure 1). Three generations of sustainable business models, by definition, do not change the rules of the game, as they operate according to existing market rules. Organizations that want to go beyond the patterns of the current system must apply business models that go beyond the solutions proposed by the first three generations. To do this, consumer acceptance and support are needed (only then can sustainable products and services have a positive impact on society).

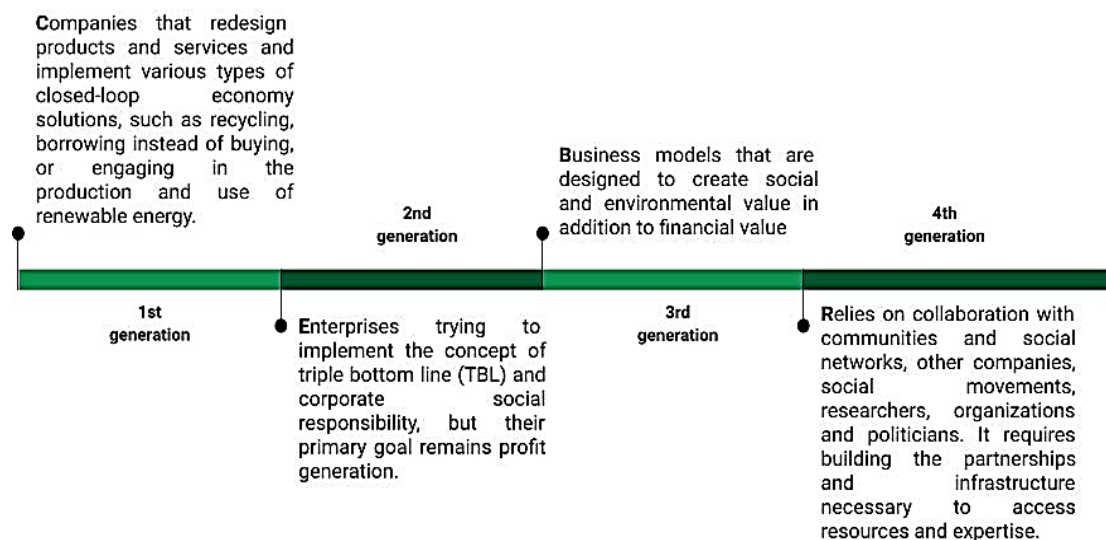


Figure 1. Four generations of sustainable business models.

Source: Own research based on Szumniak-Samolej (2022, pp. 37-45).

Thus, the concept of the fourth (current) generation of sustainable business models seems interesting and may give one direction for the development of this type of business. The premise is to integrate technology and social phenomena and new ways of organizing and collaborating. In this way, opportunities can be explored for co-creating a sustainable socio-economic system based on equality, inclusiveness, responsibility, and balanced interaction with the environment. (Szumniak-Samolej, 2022, pp. 37-45).

3. Strategic orientations of Industry 4.0 organizations in conditions of sustainable development

The development of the topic of models of sustainable development is the result of the search for new solutions and better ideas for implementing the postulates of sustainable development into business practice. The authors postulate a model of sustainable development for organizations based on expansiveness, entrepreneurship, innovation, and organizational creativity (Table 1).

Table 1.

A model for sustainable organizational development based on expansiveness, entrepreneurship, innovation and creativity

Management organization	Environment	Stable, secure, low risk	Unstable, uncertain, high risk
By the limit value		Organizational expansion	Organizational entrepreneurship
By new value		Organizational innovation	Organizational creativity

Source: own research.

The planes that will determine the form of the aligned organizational management model are, firstly, the way in which the organization is managed (by boundary value and by new value) and, secondly, the environmental plane (Stable, secure, low risk or Unstable, secure, high risk). When these planes overlap, a suitable management model can be identified: organizational expansiveness, organizational entrepreneurship, organizational innovation and organizational creativity.

Despite the important role of creativity as a potential basis for creating intellectual capital and competitive advantage as well as a source of enterprise growth, the understanding of creativity as an important strategic factor implying the development of an organization in conditions of sustainable development has not been fully understood. There is still a cognitive gap in the scientific literature on creativity and sustainability in terms of sustainable organizational models and understanding organizational creativity in a strategic aspect. Therefore, we treat the issue of strategic orientations as a contribution to the discussion on an organization implementing the concept of Industry 4.0 in the conditions of sustainable development.

4. Organizational creativity in the conditions of the sustainable development

For the paradigm of sustainable development, creativity is increasingly important (d'Orville, 2019, pp. 65-73; Mitchell, Walinga, 2017 pp. 1872-1884). Creativity and sustainable development are two key factors influencing the development of civilization. As S. Kaufman writes, in the world of the infinitely rich creativity of nature, man is an active co-creator of it (Kauffman, 2011, pp. 60-63). Adopting such a perspective enables us to relate creativity to the study of organizational phenomena. From this perspective, creativity can be treated as an attribute of contemporary organizations (Dereń, Skonieczny, 2016). Organizational creativity is commonly believed to refer to the production by individuals or groups of new and potentially useful ideas about products, services, working methods, processes, and procedures (Amabile, 1988, pp. 123-167). In this sense, creativity is different from innovative activity (Klijn, Tomic, 2010, pp. 322-343), which focuses not so much on generating creative ideas as on putting them into practice. If the generation of useful novelties takes place among the participants of the organization, we are talking about organizational creativity. More precisely, "organizational creativity is the creation of a valuable, useful, new product, service, idea, procedure or process by individuals working in the social system" (Woodman, 1993, p. 293). Organizational creativity is also defined as the ability to think beyond accepted ideas and conventional thinking patterns, to combine previously acquired knowledge in an unprecedented way (Kraft, 2005, pp. 16-23); new mental models (Lozano, 2014, pp. 205-216); the ability to abandon habitual ways of thinking and accumulate pieces of previously unrelated knowledge and experience (Geschka, 1983, pp. 169-183); the ability and power to develop new ideas (Wehrich, Koontz, 2005); generating innovative and adequate ideas - solutions - for open problems in any domain of human activity (Amabile, 1997, pp. 39-58); combining cognitive, affective and social domains (Runco et al., 1998, pp. 1-17), and solving problems in an unconventional way (Reiter-Palmon, Illies, 2004, pp. 55-57; Mitchell, Walinga, 2017, pp. 1872-1884). Organizational creativity arises thanks to units cooperating with each other in a complex social system, which is influenced by individual and group creativity as well as the organizational environment (Borghini, 2005, pp. 19-33; Skonieczny, 2019, pp. 113-171).

In this article, organizational creativity is conceptualized as an organizational creative process that results in ideas, thoughts, perspectives, views, and mental models characterized by novelty/originality and usefulness/value, oriented towards the sustainable development of the organization. In tab. 2. presents this conceptualization recommended for the three levels of functioning of modern organizations, the overarching goal of which is sustainable development based on the generation of new values.

Table 2.*Organizational creativity in the conditions of sustainable development of the organization*

Management level	Strategic goal	New values	Result
Organization level	Sustainable development of the organization	New values in the organization	Creative organization
Business strategy level	Sustainable development of the business strategy	New values in the business strategy	Creative business strategy
Project level	Sustainable development of the project	New values in the project, e.g. new product and/or service	Creative project

Source: own study.

Assuming that organizational creativity is the key competence of an organization in the process of its sustainable development, we refer it to three levels of management: organization as a whole, business strategy, and project. These three levels of management are aimed at creating new values in the business strategy of the organization and in project activities aimed at its implementation. The harmonious combination of these new values focused on the sustainable development of the organization leads to the formation of a creative organization related to the dynamically changing natural environment.

Creative organization is a concept discussed in various contexts, but its characterization, and in particular the indication of its basic components and showing its links with the natural environment, is not an easy task. In the literature on the subject, there are not many examples that can be considered a universally applicable standard. A. Dereń and J. Skonieczny (2017, pp. 163-170). present a creative organization as a set of four factors: information technologies; creative environment; organizational creativity; and creative effects. This proposal was developed in the definition of the basic components of a creative organization, which include: creative people, creative goals and tasks, and creative means. The choice of these three basic elements refers to the classical approach to organization. The organization is created and developed by people who, working together, achieve specific goals using the available means (Dereń, Skonieczny, 2016, pp. 124). In a creative organization, the human being is the most important - understood as a whole, not only as an employee but as a person. What matters is his knowledge and skills, as well as his emotions, motivations, and imagination.

The issue of creative strategies was the subject of an analysis undertaken by R.L. Kuhn, the result of which was, among others distinguishing 10 types of the so-called creative strategies: domination; pressure on the product; stand out; concentration; development of high-quality management staff; the use of opportunities by creative employees; effective innovation; agile perception of the environment; compromise; flexibility (Kuhn, 1989). J. McCrae defines a creative strategy as a set of purposeful activities aimed at business development and growth, grouped into three phases: market research, the use of creativity, and the use of strategic planning. Creative strategy understood in this way is based on five foundations: identifying market needs; setting creative, non-standard ways of achieving goals; seeking feedback on the competition sector; exceptional brand positioning and building a unique perspective for

business; building networks inside and outside the organization, influencing people and attracting others to ideas (McCrae, 2013).

In the construction of the creative strategy developed by W. Dyduch (2013, pp. 115-117), four interrelated elements can be distinguished: strategic innovation; strategic entrepreneurship; strategic leadership; and strategic design of a creative organization. A.M. Dereń and J. Skonieczny are in favor of this approach to creativity in the organizational strategy and propose a model containing sixteen strategies based on intellectual resources. The dimensions of these strategies are generic strategies (cost leadership, differentiation, focus on costs, focus on differentiation), internal and external development of intellectual property (cooperation contracts, strategic alliance, acquisition), and ways of protecting intellectual property (protection, lending, sharing, acquisition) (Dereń, Skonieczny, 2016, pp. 195-204). The authors develop this theme in the work devoted to "green intellectual property" as a strategic resource of the organization in the conditions of sustainable development (Dereń, Skonieczny, 2022, pp. 1-11). The authors assume that each strategy is a creative product and arises as a result of a creative process taking place in the organization, expressed in a mental, objective, organizational, and market form. A creative strategy is characterized by a combination of the following features: values, usefulness, and novelty, and includes four basic activities: "invent", "replace", "change", and "duplicate" (Dereń, Skonieczny, 2016).

All the social reality that surrounds us and all elements of the civilization created by man are products derived from ideas and creative ideas accumulated over millennia. That is why human creativity should be treated as any intellectual event, as a process or state in the experiences and experiences of a human being, having its effects in every sphere of social relations. A product that we define as creative may have any character; it can be a work of art, a discovery, an original machine a structure, or a specific design endeavor.

A project undertaking consists of planning, developing schedules, and controlling activities specified in the project in order to achieve the assumed level of results and costs specified within the time frame for a given scope of work, with the simultaneous effective and efficient use of available resources (Lewis, 2006, p. 135). It follows from the above definition that managing a project is not only about preparing a schedule and an action plan. It is also taking into account the parameters of time, costs, and quality of the results obtained. In addition, it is very important to use the resources at your disposal during the implementation of the project in an effective and efficient manner.

The creative design endeavor is a bit more complex than carrying out so-called standard projects. This is mainly because these are innovative activities, carried out under conditions of high risk and uncertainty. Moreover, the scope of such an undertaking is impossible to define in detail, and therefore when it is carried out, new challenges may arise constantly, and the risk is also increased as the probability of success or failure. Creative design projects carried out in the conditions of sustainable development require special monitoring and taking into account the following principles in strategic planning:

- the principle of eco-development,
- the principle of environmental integrity (ecosystem integrity); its essence is the recommendation to "think globally (holistically), but act; locally",
- the principle of economization, also known as the principle of economic efficiency and ecological eco-development (including environmental protection); calls for the implementation of such a policy so that the environmental goals are achieved at the minimum social cost,
- the principle of prevention, also known as the principle of active policy or, in a narrower interpretation, the principle of elimination of pollution at source,
- the principle of reacting to the existing ecological threats, also called - not always in a justified way - the principle of passive politics; a manifestation of passive politics is e.g. the formulation of declarations and subsequent programs with a clear underestimation of the implementation side,
- the principle of partnership (cooperation) and public (social) participation, also known as the principle of community participation in solving environmental problems or the principle of socialization,
- the principle of regionalization of eco-development programming (including ecological policy), is understood as a postulate to adapt protection requirements to regional and local conditions and to enable regional and local authorities to choose tools for implementing the idea of eco-development,
- the principle of the rule of law, which means that the ecological law system and the manner of its implementation must be restructured in such a way that each provision is strictly observed and it is impossible to replace the provisions with arguments so well known to the public about "higher necessity", "social interest", "we are yet to be protected the environment cannot afford "or" we are too poor to protect the environment "etc.,
- the principle of observing intergenerational (intergenerational) ecological justice, is sometimes also called the principle of intergenerational ecological egalitarianism (Berner, 2006).

C. Cucuzzella also writes about the need to respect the principles of sustainable development by organizations implementing creative design projects, emphasizes the special importance of two principles: prevention and precaution, considering them to be key and decisive in reducing the risk of a project undertaking (Cucuzzella, 2016, pp. 1548-1558). Organizational creativity conceptualized in the article in the conditions of sustainable development of the organization fits in with the concept of green creativity proposed by Chen and Chang, which concerns the development of original, innovative, and useful ideas for ecological products, services, processes, and practices (Chen, Chang, 2013; Eide et al., 2020). Green Creativity involves the ability to present novel ways to improve performance in

an environmentally sustainable manner (Mittal, Dhar, 2016, pp. 118-127); it can therefore be expected to lead to innovation in services, eco-friendly practices, actions to preserve cultural heritage, and actions that add value to both customers and businesses (Bhutto et al., 2020). Shaping green creativity depends on various organizational and individual antecedents (Chen, Chang, 2013; Eide et al., 2020; Song, Yu, 2017, pp. 135-150). However, the current thinking, attitudes, and behavior of leaders and managers towards environmental problems are of key importance for its implementation in practice (Arici, Uysal, 2022). It allows you to generate and develop new values that serve the well-thought-out use of resources in such a way that they will be enough to build the prosperity of the current generation, but also be able to meet the needs of the future.

5. Summary

Organizational creativity is the opposite of ordinary, stereotypical, and repetitive activities. The essence of the creative process in an organization is to reorganize existing experience and create new combinations on its basis, new combinations of mental, objective, organizational, and market products. These connections create the concept of a creative product that is a finished, organized, and communicative whole.

Organizational creativity can be considered a key competence of Industry 4.0 organizations operating in conditions of sustainable development. A review of available domestic and foreign literature and research reports on creativity as a key strategic factor in the development of Industry 4.0 organizations allowed us to notice a cognitive gap. The authors treat this topic as a basis for conducting research in Industry 4.0 organizations focused on sustainable development. This research will allow for the verification of the adopted theoretical assumptions.

In the authors' opinion, creativity stimulates new values in relation to the organization as a whole, its strategy, and the projects it implements. These new values have a decisive impact on the growth and socio-economic development of Industry 4.0 organizations, whose goals and tasks should focus on maintaining the integrity of the ecosystem.

Organizational creativity in connection with the sustainable development of Industry 4.0 organizations indicates a pro-environmental approach. This usually means that the business is environmentally friendly and the technologies used are optimal.

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