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## Changes in Management During Transformation of Power Industry

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### **Abstract:**

**Purpose:** Given the considerable pollution of land, air, and water, it seems urgently necessary to change the sources of energy production so that their use does not pollute the environment. Special priority should be given to the generation of electricity from solar energy (photovoltaics) and wind. This article aims to present conceptual changes in the development of Industry 4.0 and to point out further research directions.

**Design/Methodology/Approach:** The first part of the article introduces possible changes, the concept of Industry 4.0, management factors, and an overview of the research results to date. To identify the changes taking place, a survey was conducted with a group of 330 managers from 5 countries (USA, United Kingdom, Poland, Hungary, India, and Georgia). In the second part, further empirical research (related to organizational structure and decision making) and its implementation in organizations is proposed.

**Findings:** The summary contains conclusions on management changes based on the results of the presented research.

**Practical Implications:** The research results collected can provide an impetus for the organization's development in a direction that facilitates participation in the processes of sustainable development. These processes contribute to the improvement of the ecosystem and the rationalization of energy sources and the way they are used.

**Originality/Value:** The research results show that organizations need to consider and adapt to changing conditions. An analysis shows to implement management changes and be competitive, organizations operating in the industry 4.0 era should first build their so-called "ecosystem" by assessing their maturity level in order to understand what is achievable.

**Keywords:** Energy transformation, sustainable development, inter-organizational cooperation.

**JEL:** G32, J53, M12, M54.

**Paper Type:** Research Paper.

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## **1. Introduction**

The mid-20th century saw the beginning of the initially slow and then accelerating development process of the service sector in the USA and the developed countries of Western Europe. On the one hand, it was related to the increase in prosperity of local societies and, on the other, to the automation of production, which was slowly gaining ground. This led to a decline in the demand for production workers. As a result, there was a market where people were looking for new attractions in life, but at the same time, former workers who could not find work in production, some of whom were mainly young, took up a new challenge.

They create a new type of activity that required innovation (Rzepka, 2019), tolerance (market diversity, complexity), and flexibility from new employees. The transition from the post-industrial era to the service era led to radical changes in organizational structures and in the rules governing their operation and solutions that favor innovation, speed, or creativity. It seems that the concept of teal organizations could serve as a reference point to determine the scope and direction of these changes (Olesiński, 2020). Today, organizations should develop in the spirit of modern, agile, and flexible management.

## **2. Literature Review**

While the industrial age (Laloux, 2015) was characterized by centralized, vertical, and hierarchical organizational structures that required workers to be willing to give up the interests of the individual in favor of the collective and to submit to orders and prohibitions from above, the new age of services (also called post-industrial, post-modern, or green) was the opposite. The new age valued the independence and initiative of workers. "Individualization would not have been possible, however, without the expansion of the welfare state in the post-war period, thanks to which the individual was able to emancipate himself from his multi-generational family, his religious organization, his ethnic group, his trade union, i.e., from all those social ties that limited the autonomy of the individual, but at the same time gave him a feeling of security and reduced the risk," as Bachmann notes (Bachmann, 2020).

*From ego to eco:* The burgeoning of the world's population from just over 2 billion people in the 1960s to almost 8 billion today, and the associated increase in the use of the Earth's natural resources, has led to significant changes in nature (IPCC, 2018). First, the pollution of land, water, and air has increased rapidly. One sign of this pollution was the vast quantities of plastic bags that floated on the surfaces of the seas and oceans. Air pollution with carbon dioxide resulting from burning coal, oil, and gas became another symbol of this era (European Commission, 2018). The increase in exhaust emissions caused the greenhouse effect, which led to the melting of ice at the Earth's poles due to the Earth's rising temperature (IPCC, 2018). The greenhouse effect caused desertification in many areas of the globe and caused the rise in sea levels, making low-lying areas more vulnerable to flooding (World Energy Council, 2016).

**Table 1.** Characteristics of the transformation from the industrial age to the service age

	The industrial age	The post-industrial age
Attitudes of citizens	materialistic	post-materialistic
Attitude towards others	collectivism	individualism
Attitude towards nature	ego	eco
Organizational structures	hierarchical vertical centralized	horizontal flat democratic
Interpersonal relationships	subordination obedience	tolerance flexibility
Understanding reality	determinism	individualism liquidity

**Source:** Own elaboration.

One of the first signals for the need to change how Earth was exploited was the 1987 report of the World Commission on Environment and Development entitled "Our Common Future." Brundtland led the team behind the report. The main conclusions of the report are as follows (Brundtland, 1987):

- "To propose long-term environmental strategies for achieving sustainable development.
- To recommend ways concern for the environment may be translated into greater cooperation among developing countries and between countries at different economic and social development stages and lead to the achievement of shared and mutually supportive objectives that take account of the interrelationships between people, resources, and resources environment, and development.
- To consider ways and means by which the international community can deal more effectively with environmental concerns."

In 1992, the United Nations Conference on Environment and Development in Rio de Janeiro acknowledged the necessity for the international pursuit of sustainable development and suggested that *"to achieve sustainable development and a higher quality of life for all people, States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies"* (United Nations, 1993). At the international level, sustainable development is seen as a leading trend in social, economic, and ecological development in both macro- and microeconomic terms (Urbaniec, 2016).

In principle, sustainable development ensures that the needs of the present generation are met while having a limited negative impact on the needs of future generations (Johnston *et al.*, 2007). In 2002, the Rio+10 Conference was held in Johannesburg, the central theme of which was changed in the natural environment (Report of the World Summit on Sustainable Development, 2002). On 20–22 June 2012, the Rio+20 Conference was held in Rio de Janeiro. This meeting was held under the name of

"The Future We Want." Some developed countries committed to providing 0.7% of their GNP and 0.15% -0.2% of GNP to developing countries (United Nations, 2012).

In 2015, the General Assembly of United Nations adopted an action plan called the "2030 Agenda for Sustainable Development" to improve human wellbeing, strengthen universal peace, protect, and promote fundamental freedoms, and preserve the environment (United Nations, 2015). In the context of the above events, the scientific community has shown a growing interest in this subject, as evidenced by the rapid development of literature on the subject. (Łuszczuk, 2020; Borowiecki *et al.*, 2018; Kołodko, 2009; 2010; Scharmer and Kaufer, 2013).

*In search of new energy sources:* Given excessive exhaust emissions, there is an urgent need to replace energy sources such as coal and oil with other energy sources. At present (in 2020), wind energy and photovoltaics appear to be such energy sources. Renewable energy sources (Zakrzewska and Rojek, 2019) (wind, solar, hydro, ocean, geothermal, biomass, and biofuels) are an alternative to fossil fuels and help reduce greenhouse gas emissions, diversify energy supplies, and reduce dependence on uncertain and unstable fossil fuel markets (Dyr *et al.*, 2019).

At present, these sources take relatively longer than burning coal to produce a similar amount of energy, and the amount they produce is relatively small. However, it is like these energy sources that the energy they produce can supply households or small towns. Such solutions require a decentralization of today's energy industry structures or their supplementation by specific groups of producers who are constantly cooperating. The concept of a prosumer is being molded, i.e., a producer (in this case, a producer of electricity) who is partly also a consumer.

To a certain extent, wind farms can generate considerable amounts of electricity (Paska and Kłos, 2008). For example, they currently generate up to 80% of the electricity consumed in Spain. In Poland, too, wind turbine masts over a hundred meters high are installed on the Baltic coast. Hypothetically, 200 or even 300-meter-high steel structures on which wind turbines are installed can be assumed (Vincent *et al.*, 2019). Such a wind farm can theoretically achieve a capacity close to that of a small power plant. Because of the amount of energy, it produces it is more likely to serve local consumers of energy, facilitating the development of local, inter-organizational cooperation networks. The rapid development of wind power in many countries has sparked exceptionally high interest in terms of the reliability of electricity systems (Paska and Surma, 2015) and the ability of wind farms to meet the demand for electricity and power.

Photovoltaics seems to have more development prospects now. Their development will depend above all on the energy efficiency of the devices we design. It is crucial how quickly and at what price it will be possible to build devices that supply energy, not to individual houses but entire cities. It is also crucial to what extent it will be possible to transmit energy due to the changing times of day (Paska and Surma, 2014), and above all, how efficiently it will be technically possible to supply

electricity at night.

Hypothetically, a transmission network between Europe and Asia would supply electricity to consumers around the clock due to the time difference in the individual regions. Hypothetically, the transmission of electricity from South Asia or Africa to Europe is also easy to visualize. The development of such transcontinental transmission networks would undoubtedly positively affect globalization processes and could be a mitigating factor in conflicts over the overriding interest of electricity transmission charges.

Another potentially future-oriented power source could be so-called heat pumps (i.e., devices that absorb heat from the ground (Zalewski, 2016)). It could be assumed that, if it were technically possible to extract heat from the ground at a depth of several kilometers, a considerable amount of heat could be collected in such away. At present, however, these devices are mainly used for households or small towns. Here too, as with the new energy sources mentioned above, they promote decentralization and the development of local cooperation.

*Industry 4.0:* Industry 4.0 (Miśkiewicz, 2019) is an approach that changes the way companies work (Roblek *et al.*, 2016). The main objective of Industry 4.0 is to achieve accuracy and precision and a higher level of automation (Thames, Schaefer, 2016). The Fourth Industrial Revolution concept stands for a simultaneous combination of three independent elements—real-world production machines, virtual world, and information technology (Zhong *et al.*, 2017).

Rapid technological and technological changes, such as hyper-automation and the development of information technology, lead to new solutions such as the 5G system or the Internet of Things (IoT) (Moeuf *et al.*, 2018) create favorable opportunities to improve the functioning of enterprises. Companies that understand that innovation is the key to success in the age of Industry 4.0 can observe the unfolding developments (Smit *et al.*, 2016). The Fourth Industrial Revolution, which links the physical world with the digital one, offers excellent opportunities for such companies (King, 2018). The introduction of new products and production methods must be faster than ever. This is possible thanks to innovations, which are the driving force of the current revolution (Szczepańska-Woszczyzna, 2018).

The main goal of implementing Industry 4.0 in a company is to achieve higher productivity and flexibility. However, this goal is to be achieved by improving production processes or by gradually introducing production process-related innovations, but rather by fundamental technological and organizational changes and updating the company's business model (Roblek *et al.*, 2016).

Industry 4.0 is likely to change the way we design and create services/products and how organizations are managed (Stverkova, Pohludka, 2018). Industry 4.0 integrates digital and physical worlds. The digitization of workflows, production, delivery networks, or products enables companies to combine the knowledge acquired through

people, machines, analysis, and insight to make better and more holistic decisions (Masood and Egger, 2019).

### **3. Methodology**

The research used in the article is part of a research project entitled "TEAL Organization in the Age of Economy 4.0", which was conducted in Poland and other selected countries such as the USA, Georgia, Hungary, England, Yemen, United Arab Emirates, India, Germany, and Austria. These countries were selected based on the availability of respondents. The study aims to show whether today's companies have certain characteristic features of teal organizations in their activities and management style and to analyze various factors that influence the degree of occurrence of these features. The study is divided into stages and covers 2020–2021. It includes a pilot study (May–June 2020); stage I - quantitative study (July–September 2020); and stage II - repeated study (after six months). The current phase of the study includes the pilot study with 300 respondents and stage I with 330 respondents.

The study is conducted according to the principles and standards developed by the Network on Development Evaluation of the OECD Development Assistance Committee (DAC). The following work was carried out during the study, Desk research, IDI (Individual In-Depth Interview), and questionnaire study with selected groups of people using Computer-Assisted Web Interview (CAWI) and Paper and Pencil Interview (PAPI) techniques.

A statistical analysis of the collected data was carried out with the SPSS STATISTICS 21 software. The analysis aimed to find and describe those characteristic features of the surveyed enterprises that differentiate the level of the subsequent indicators. To verify the reliability of the questions, we carried out the Alpha-Cronbach test. Subsequently, we examined whether the distributions of the variables were close to average based on the calculations performed with the Kolmogorov-Smirnov test. The achievement of a significant result shows that the distribution of the observed variables is not like the normal distribution. In such cases, non-parametric statistical tests were performed, such as the Mann-Whitney U test, the Kruskal-Wallis H test, and Spearman's rank correlation.

When the distribution was close to the normal distribution, the tests were parametric and included the student's t-test, the analysis of variance, and Pearson's correlation coefficient ( $r$ ). The tests for variable analysis were supplemented by post-hoc tests, including Bonferroni Procedure, Tukey b, Duncan's multi-range test, and the Scheffe test, to show which variables showed significant differences. The use of the above tests facilitated the verification of the research hypotheses of the project and made it possible to demonstrate the existence of statistically significant relationships between the variables.

An attempt to identify changes in management-research results and discussion: The following research results comprise the pilot study conducted between May and June

2020 on a sample of 300 respondents (N=300), and stage I conducted between July and September 2020 on 330 respondents (N=330). The distribution of respondents in stage I was as follows Poland - 100, India - 50, USA - 30, UK - 50, Georgia - 50, Hungary - 50 respondents. The survey was based on a deliberate selection of respondents (managers) from various micro and small enterprises.

Our attention was particularly drawn to responses to organizational structure, decision-making patterns, relationships with business partners, leadership style, communication, and information flow. One of the most important questions addressed to the respondents was about their assessment of innovation.

**Table 2.** *Innovation<sup>5</sup>: Respondents' answers to the question whether their company attaches great importance to investment in modern technologies (scale 1-5)*

Age of respondents	Country					
	Poland	Germany	United Kingdom	USA	India	Hungary
25 or younger	3.00	1.00	-	-	4.38	3.42
26–35	3.75	4.09	4.69	4.50	4.11	3.57
36–45	3.42	4.32	4.30	4.00	4.00	3.87
46–55	3.68	2.00	4.50	4.10	3.91	2.78
56–65	4.23	-	-	3.75	5.00	-
65 or older	-	-	-	-	-	-
<b>Industry</b>						
Hotels	1.00	4.55	4.44	-	-	3.67
Municipal	3.91	-	-	-	-	-
IT	3.88	-	4.93	4.91	4.00	3.75
Banking	2.25	3.86	-	3.62	4.67	4.50
Education	3.43	-	-	3.50	4.00	3.43
Construction	3.75	3.80	2.50	-	5.00	-
Food	3.67	3.33	4.00	-	2.50	3.67
Other	3.54	5.00	4.13	3.50	4.23	3.79

*Source:* Own elaboration based on research results.

The analysis of the collected data allowed us to distinguish three groups of countries, namely (1) the United Kingdom and the USA, (2) Poland and Hungary, (3) India and Georgia. Regarding the question of whether the respondent's company attaches great importance to investment in modern technologies on a scale from 1 (definitely not) to 5 (definitely yes), the highest indications were found among respondents from the

<sup>5</sup>Alfa Cronbacha = 0,900.

United Kingdom (between 4.30 and 4.69) and the USA (between 3.75 and 4.50). It is noteworthy that young employees tend to be more optimistic about investing in modern technologies than older employees. Admittedly, Poland and Hungary are much more cautious about the importance manufacturers attach to investment in modern technology. In Poland, the figures ranged from 3.0 to 4.23, and, interestingly, younger workers were more reluctant, which seems to be a kind of irritation of young people about the degree of innovation. In Hungary, the indicators are even more cautious, ranging from 2.78 (workers aged 46–55) to 3.87 (workers aged 36–45).

In India, workers across the surveyed age groups are pretty optimistic about innovation. Workers aged 56–65 achieved the highest scores (5.0), and workers aged 46–55 the lowest (3.91). This reflects the enthusiasm of older workers for change that does not necessarily apply to them (because it takes place among workers in other positions) and the fear of their younger colleagues who will work in new, perhaps controlling, conditions in the coming years.

Comparing the older group (workers aged 46–55) with the younger group, it can be concluded that the younger group is more optimistic about change, while the older group is more cautious. In Georgia, the situation is somewhat like that in Poland, where the younger workers are more cautious about the rate of change, while the older workers are more optimistic about it.

In summary, it is justified to say that the rate at which innovation is introduced is higher in the more developed countries, and it is primarily young people who are enthusiastic about change. In terms of the industry in which the respondents work, IT received a far better rating for innovation. Banking was also rated highly, especially in countries like India and Hungary. Education and construction were rated relatively low in many countries. One likely conclusion is that innovation progress is lower in industries that require the use of advanced technologies.

Organizational structures were developed over thousands of years of human experience. The main problem was adapting structures to the task and whether and how the formative structure was centralized (in contrast to decentralization, i.e., in extreme cases, to the complete absence of hierarchy and organizational structure). A certain degree of centralization is helpful for a particular task, but a structure with a similar degree of centralization is useless for any other task. When analyzing the centralization of organizational structures throughout history, Laloux concluded that the highest degree of centralization was observed in periods before the formation of proto-states and the advent of the law (Laloux, 2015).

During our research, we have adopted a more complex hypothesis of pulsating centralization. This means that there were organizations with different degrees of centralization in the same historical period, which does not contradict the conclusion of Laloux that, on average, there was a lower degree of centralization in each historical era than in previous ones.



"Today, Western culture is in a stage where about 20% of the population is in a pluralistic, post-modern stage (green - author's note), about 30–40% in a modern rational stage (orange - author's note), about 40–50% in a mythical stage (amber, pre-industrial - author's note) and up to 10% in a magical state (red, pre-state - author's note). The crucial stage (post-postmodern, real author's note) has combined all the values, made them their own, and given them a place in its general world view. For the first time in human history, a truly global and non-marginalizing level of human consciousness appeared. Moreover, this has changed everything" (Wilber, 2019).

In general, centralization is more pronounced in countries with lower levels of development, in countries with weaker legal institutions, in traditional industries with less advanced technologies, and more traditional social groups. The respondents had several options to answer the question about organizational structures. It seems that the most characteristic was the question of the network structure.

**Table 3.** *Organizational structure: Respondents' answers to the question of networks and whether their management coordinates and controls internal and external relationships (in %).*

PL	GE	UK	USA	IN	HU
19	12	48	43.3	20	18

**Note:**  $\chi^2=58,249$ ,  $V$  Cramera=0,210,  $p=0,000$ .

**Source:** Own creation.

As can be observed, the percentage of positive responses is much higher in developed countries such as the UK and the US than in the other countries.

**Table 4.** *Organizational structure: Respondents' answers to the notion of holarity, and lack of positions and managers (in %)*

PL	GE	UK	USA	IN	HU
5	0	8	6,7	8	4

**Note:**  $\chi^2=58,249$ ,  $V$  Cramera=0,210,  $p=0,000$

**Source:** Own creation.

From the above results, it can be concluded that a practical introduction of hypothetical solutions typical for the teal age is currently marginal worldwide. The second factor in the questionnaire survey concerned the way decisions were made in the organizations surveyed. Hypothetically, we deal with a continuous process from authoritarian/dictatorial decision-making to democratic (or even anarchist, under certain conditions). As with organizational structures, we are dealing with a pulsating pattern of decision-making. Authoritarian (dictatorial) methods correlate with centralized structures and a limited scope of the law, while democratic (anarchist) methods correlate with decentralized structures. In practice, elements of authoritarian decision-making can manifest themselves in structures that are decentralized to a certain extent. This process is influenced by many factors, such as traditions of leadership in particular environments or particular organizations (uniformed

services).

As with organizational structures, decision-making is subject to similar factors. In democratic countries with strong legal institutions, authoritarianism in the decision-making process is less pronounced. When it comes to the organizational structures of the economy, the higher the degree of democratic decision-making, the higher the level of technology used, and the higher the level of training of employees.

In the survey, we included a question on decision-making, asking respondents whether all the employees are focused on the company's strategy and goals.

**Table 5.** *Decision-making pattern: Respondents' answers to the question of whether their decision-making pattern is focused on the company's strategy and objectives (in %).*

PL	GE	UK	USA	IN	HU
46	30	32	33.3	54	52

**Note:**  $\chi^2=103,936$ ,  $V$  Cramer=0,281,  $p=0,000$

**Source:** Own creation.

If we correlate the above question with holarchy, we get a much higher indication in the UK and US. In other countries, the percentage of confirming answers seems to be too high. The third factor analyzed in the article is the relationships with business partners. This type of cooperation is as old as the economy itself, as people have worked together since the beginning.

Nowadays, these processes have taken on a new meaning, which is mainly connected with the processes of globalization. This involves legal, and other normative factors, but cultural, customary, and moral ties are also growing faster. Modern inter-organizational cooperation increasingly requires mutual openness and tolerance, especially when differences in value systems are involved. The data in Table 6 seem to confirm earlier observations of a more positive attitude among younger workers in more developed countries and sectors with higher technological levels such as IT and banking. In contrast, a worse attitude is found in education, where the hierarchical system still dominates globally.

The fourth factor analyzed in this article is leadership style. On the one hand, extreme situations include issuing orders that subordinates must obey. On the other, a different extreme situation includes a consultative leadership style, consisting of discussion, even negotiation, and mutual persuasion. Such a leadership style is now called coaching (Szewczak *et al.*, 2020). In such a case, the boss is a coach indicating how to solve the problem, and the employee must make the final decision for which he bears particular responsibility. In this management style, a significant role and importance are given to mentors (Laloux, 2015), i.e., external advisors who provide insight into solving emerging problems.

**Table 6.** Relationships with business partners: Respondents' answers to the question whether their relationships were based on partnership (w %)

Age of respondents	Country					
	PL	GE	UK	USA	IN	HU
25 or younger	100.0	0.0	-	-	16.7	25.0
26–35	25.0	4.3	87.5	25.0	11.1	21.4
36–45	26.3	16.0	46.7	66.7	20.0	60.0
46–55	32.1	0.0	50.0	60.0	27.3	22.2
56–65	15.4	-	-	25.0	100.0	-
65 or older	-	-	-	-	-	-
<b>Industry</b>	<b>PL</b>	<b>GE</b>	<b>UK</b>	<b>USA</b>	<b>IN</b>	<b>HU</b>
Hotels	0.0	22.7	56.0	-	-	33.3
Municipal	13.3	-	-	-	-	-
IT	25.0	-	57.1	81.8	25.0	50.0
Banking	0.0	0.0	-	46.2	0.0	50.0
Education	28.6	-	-	0.0	0.0	14.3
Construction	25.0	0.0	100.0	-	100.0	-
Food	66.7	0.0	100.0	-	50.0	0.0
Other	50.0	0.0	62.5	25.0	18.4	21.4

*Source:* Own elaboration based on research.

**Table 7.** Communication and information flow: Respondents' answers concerning the issue of informal and formal communication platforms, and transparency (in %)

Age of respondents	Country					
	PL	GE	UK	USA	IN	HU
Less 25	100.0	0.0	-	-	45.8	8.3
26–35	10.0	8.7	68.8	25.0	66.7	21.4
36–45	26.3	20.0	33.3	58.3	40.0	20.0
46–55	21.4	0.0	50.0	60.0	45.5	33.3
56–65	7.7	-	-	25.0	0.0	-
65 or older	-	-	-	-	-	-
<b>Industry</b>	<b>Pl</b>	<b>GE</b>	<b>UK</b>	<b>USA</b>	<b>IN</b>	<b>HU</b>
Hotels	0.0	27.3	48.0	-	-	0.0
Municipal	11.1	-	-	-	-	-
IT	50.0	-	42.9	72.7	25.0	75.0
Banking	25.0	0.0	-	38.5	66.7	50.0
Education	42.9	-	-	50.0	40.0	14.3
Construction	0.0	0.0	50.0	-	100.0	-
Food	0.0	0.0	0.0	-	0.0	0.0
Other	3.6	0.0	12.5	25.0	12.9	0.0

*Source:* Own elaboration based on research.

Our survey confirms a more modern leadership style in the UK and the US and a more traditional one in the rest of the world. The fifth factor analyzed is communication and information. In an extreme situation, on the one hand, the flow of information could take place in one direction only (from top to bottom) in a situation where only precise information is allowed to be directed in the opposite direction, and the horizontal flow of information is frowned upon or even prohibited.

On the other hand, we could be dealing with free circulation of information in all directions (from top to bottom, bottom to top, horizontally, diagonally) via all the channels used in each organizational structure. The results presented above confirm the analyses included in this article.

#### **4. Summary and Final Conclusions**

The conducted survey shows a reasonably close correlation between the legal system in each country, the degree of development of democracy, the level of technologies used in a given economy or society, and the level of employee training and development of the five factors analyzed above, i.e., organizational structure, decision-making pattern, relationships with business partners, leadership style, and communication and information flow.

The data collected as part of the study can indicate how the analyzed factors manifest themselves in a given situation. Specific results should be taken with caution as, once employees have seen the results of the first measurement, they would have been able to understand the survey's aim and provide answers oriented towards the expected results. Research shows that thanks to these factors, the organization's management has a measurable tool at its disposal to stimulate the organization's development following the mission it has assumed. By stimulating organizational structures and decision-making patterns, relationships with business partners are formed, the management style evolves, and the flow of communication and information develops. The research results collected can provide an impetus for the organization's development in a direction that facilitates participation in the processes of sustainable development. These processes contribute to the improvement of the ecosystem and the rationalization of energy sources and the way they are used.

It should be borne in mind that the above processes take place at different speeds in different countries and regions and that the authorities will influence the course of these processes. K. Buchmann concludes his text by asserting that *"change does not always have to go from materialism to postmodernism, from collectivism to individualization (see Table 1 note). Armed conflicts, catastrophes, and natural disasters can reverse it. When people feel that something is threatening their security or even their survival, the attachment to the possession of material goods, the desire to defend and the willingness to submit increases, while tolerance decreases"*.

In this way, the development of organizational structures and changes in the principles of their functioning can be slowed down or even reversed. Even in successful and dynamic social and economic development, decentralized organizational structures and self-organizing work teams will account for only a few percent of the total organizational structures and work teams.

To implement management changes and be competitive, organizations operating in the industry 4.0 era should first build their so-called "ecosystem" by assessing their maturity level in order to understand what is achievable and what measures should

be taken to build the necessary technological capacity using the resources already available, compared to new resources that may be needed to get there (e.g., expert resources).

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