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Managing Strategic Changes in Personnel Resistance to Open Innovation in Companies

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Abstract: The aim of the work is to develop theoretical, methodological, and applied foundations and practical recommendations for managing strategic changes in personnel resistance to open innovations in companies. The following special methods were used in the research process: Comparative and economic-statistical analysis—to assess the level of unique, threshold, and average opportunities for resistance to changes in open innovation; ranking—to assess the development of corporate culture. The main method of study was expert evaluation through questionnaires. The experts were middle managers of five branches of international car companies in Poland: Fiat, Opel, Toyota, Volkswagen, and Volvo. The reason for choosing these companies is that they collectively occupy 85% of the Polish automotive market. Resistance to open innovations usually arises at the individual level of personnel and is addressed through informational and motivational measures. According to the study, the threat to strategic change management in companies is system resistance for Opel and Toyota. This allowed us to draw a conclusion on the development of a predominantly fiduciary corporate culture, which minimizes the resistance to open innovation in companies. Approbation of the approaches of the companies under study proved that in the current conditions, there is a combination of different types of strategies. Recommendations regarding the choice of change strategies are substantiated for all the companies under study.

Keywords: resistance to open innovations; corporate culture; international company; personnel; intellectual capital; model

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1. Introduction

The innovative paradigm of a country's development makes adjustments in all types of activities, but mostly in the activities of those who create, implement, and use innovations. Human capital is the dominant component of every company's innovative development. This capital is the main component of such development and its main resource. After all, innovations are created by highly qualified and talented employees [1]. Therefore, the authors consider the value-motivational sphere of personality as a potential source of innovation-active behavior, and the mechanism of innovation motivation is the most important component for its intensification.

Innovation-active behavior of people directly depends on the level of innovation consciousness, which is formed in the process of innovative development. The main role in the structure of innovation consciousness (among such factors as interests, value orientations, ad needs related to the implementation of innovations) is played by the

motivation of innovative behavior [2]. For companies to be able to constantly market new, improved, and competitive products and services in the conditions of the global economy, their employees must be appropriately (creatively, innovatively) tuned (motivated) in their daily activities. Therefore, a significant factor in innovation activity is motivation as a set of driving forces that motivate people to create and use innovation, and the mechanism of motivation plays a more important role in regulating the innovation process. Significant acceleration of innovative development due to the coordination of interests of all its participants depends on the efficiency of such a mechanism.

The implementation of open innovation (OI) in the company is associated with a policy of strategic change. At the present stage of development, strategic changes become an objective necessity for the implementation of the strategy and a condition for the effectiveness of the enterprise in the market. A well-established system of strategic change management is a sign of effective management and the basis for making informed management decisions regarding the future activities and development of the enterprise [3]. However, strategic change, as a complex and systematic phenomenon that affects all aspects of the enterprise, requires system communication of managers at all stages of implementation and introduction: From the appearance of signals of change to the adoption of management decisions on their implementation and follow-up. At the same time, it is mandatory to take into account both the level of available potential for the implementation of changes and their perception by the company's personnel and external stakeholders who form the environment of strategic change [4]. The system of management of strategic changes corresponding to the current requirements allows for ensuring both effective work of the company's divisions and an operative response to changes in the operating environment for the transformation of threats into opportunities for development in the conditions of competition.

Modern society dictates new requirements in all areas of human activity, which are implemented through innovations. Given the importance of improving the efficiency of the process of implementing open innovations in organizations based on overcoming the resistance of personnel, the main reasons for their appearance require more detailed consideration.

The effectiveness of innovative activity is one of the key characteristics of company management in the modern post-industrial economy. There are many factors that make a company truly innovative: Innovative strategy, business leadership, deep understanding of the customer, and talent of the employees [5]. However, more important than any of the above elements is the corporate culture, which is a multitude of behavior patterns, meanings, and values inherent in the members of this organization.

According to a survey of 600 top managers of the world's leading innovation companies, the most important factor in the effectiveness of innovation costs is the support for the innovation strategy by the corporate culture [6]. According to the study participants, the ability to take risks and show creativity, openness, and cooperation is critical for achieving success in the global innovation economy. At the same time, only 47% of the surveyed top managers stated that the corporate culture of their companies was in line with the innovation strategy of top management [6].

The urgency of these problems and the need for their integrated and systematic solution led to the selection of the topic of the study, setting its purpose and objectives.

The aim of the work is to develop theoretical, methodological, and applied foundations and practical recommendations for managing strategic changes in personnel resistance to open innovations in companies.

To achieve the set goal, the following objectives are provided for and solved: Improve the conceptual approach to substantiating the multifaceted resistance to OI changes, highlight the human factor and the place of corporate culture in the management of strategic changes in companies; determine the level of opportunities for implementing strategic changes and position companies according to the calculated coefficient of opportunities; implement a methodical approach to establishing the types of creation of resistance to OI

changes in the company in accordance with the fiduciary/non-fiduciary corporate culture; develop a system of measures for the formation of a fiduciary corporate culture to overcome resistance to strategic changes in companies; and substantiate the conceptual basis of the formation and implementation of the strategy of changes in companies.

The study was conducted in Polish car companies. In 2020, the production of motor vehicles, trailers, semi-trailers, and other transport equipment accounted for 11.7% of the total production of the Polish industry. Poland is one of the largest car manufacturers in Central and Eastern Europe. In 2020, Poland ranked 21st in terms of total motor vehicle production in the world.

2. Literature Review

2.1. Development of the Concept of Open Innovation

The term "open innovation" was coined by Henry Chesbrough in 2003. To this day, he is one of the main researchers on this subject. Interest in the subject of "open innovation" is only growing.

One of the first to study the application of the "open innovation" paradigm in practice was Robert Kirschbaum, vice president of the Danish coal mining company DSM [7]. Back in 2000, a special department was created in this company, which selected projects and ideas that the company should or should not invest in. These ideas came from both inside and outside—from other companies, universities, or research institutes. Only some of these ideas were of interest to DSM and were studied in more detail.

Based on a survey of 605 representatives of small and medium-sized businesses in the Netherlands, researchers [8] studied the prevalence of the open innovation paradigm in this business segment. The result of this study was the conclusion that small and medium-sized enterprises (SMEs) are involved in many open innovation practices and have increasingly adopted such practices over the past 7 years [8]. Besides, we do not see significant differences between manufacturing and services, but medium-sized firms are more actively involved in open innovation than their smaller counterparts. Furthermore, we find that SMEs are pursuing open innovation primarily for market-driven reasons such as meeting customer needs or staying competitive.

Researchers [9] studied the impact of the "open innovation" paradigm on the innovation activity of small and medium-sized enterprises. The results of the study confirm the potential of open innovation for SMEs and indicate that the creation of networks/clusters is one of the most effective ways to promote open innovation among SMEs. Based on the fact that post-invention commercialization is important for innovation and that SMEs are good at inventions but do not have sufficient resources to commercialize them, we suggest that one of the opportunities to stimulate open innovation in SMEs is to collaborate with other firms during the commercialization phase.

The first large-scale study on the current state of open innovation was published in 2011 [10]. Moreover, it was the first work that defined the strategic approaches of firms to technological transactions within the innovation process. The study led to some unexpected results. Although the size of a firm has a strong positive effect on the degree of openness, the firm industry does not have a significant effect. So, the degree of openness of the innovation process is mainly determined by the individual decision of the firm, and not by industry characteristics.

Dodgson, M., Gann, D., and Salter, A. [11] studied how technology alliances ultimately affect the financial characteristics of a firm. The findings of this study empirically confirm the assumption of existing research that the diversity of the technology alliance portfolio has an indirect positive impact on financial characteristics by improving the effectiveness of innovative products.

The study [12] analyzed the question of whether companies use different models to open up their innovation process. The authors identify four specific open innovation models that depend on the number and type of partners involved, and the number and

type of phases open to outside participation: Open innovators, specialized collaborators, integrated collaborators, and closed innovators.

Gambardella, A., and Panico, C. [13] identified three archetypes of knowledge flows in an open innovation environment: (1) Inward flows, (2) outward flows, and (3) bidirectional flows, and they suggest that these knowledge flows are critical to the innovation processes of firms.

These studies can benefit from the availability of more advanced tools for network analysis, making it possible to show how social capital—at different levels of analysis—can shape open innovation.

One cause for concern is that executives who now seem interested in innovation management may be disappointed when it becomes clear that "open innovation" is not a panacea. The best way to avoid this is to consider open innovation as an unfinished line of research.

2.2. Analysis of Studies on Open Innovation and Corporate Culture

According to the sociological approach to the interpretation of the innovation process based on the reaction of personnel to the implementation of open innovations, one can distinguish two dominant strategies of organizational behavior: A desire for change and resistance to innovations [14]. The process of innovation perception depends on the degree of complexity and nature of change, which can both encourage innovation development and cause negative consequences in the form of resistance.

The notion of resistance to organizational change is considered in the context of different concepts of organizational development.

According to [15], regarding strategic management, resistance is seen as a multifaceted phenomenon that causes unforeseen delays, additional costs, and instability in the change process. The specificity of resistance is that it always manifests itself in the response to any changes.

The process of implementing open innovation accompanied by resistance to change is characterized by postponing the start of the change process, an unforeseen increase in terms of innovation implementation, other difficulties that slow down changes and increase costs compared to planned costs, attempts to sabotage changes within the company, and losing them in the flow of other priority matters and leveling their significance [16].

Furthermore, according to [17], resistance is a manifestation of the irrational behavior of the organization's personnel, and a refusal to recognize new trends in reality, think logically, and put into practice the conclusions of logical thinking.

From the point of view of behavioral sciences, resistance is a natural manifestation of various psychological attitudes concerning rationality, according to which groups and individuals interact with one another [18].

Resistance to change is defined as any behavior of a member of the organization aimed at disrupting and discrediting the transformations [19]. The introduction of open innovations leads to the fact that a member of the organization is faced with a choice—to become a supporter or agent of resistance to innovation [19]. This phenomenon is a direct consequence of the fact that innovation carries uncertainty and is perceived by certain individuals as a threat to their stable position in the existing social system.

The source of resistance can be the individual's illusions about their own importance, and resistance to innovation is inversely proportional to the individual's desire to gain new experience and receive a new reward [20].

In this context, we consider the studies of [21] on the development of organizations interesting, which resulted in the emergence of the concept of a "force field", which appears in the organizational dynamics during the period of intensive structural change. According to the researcher, structural change is an evolutionary process that aims to improve the efficiency of the system and consists of three main stages: "defrosting"—the institutionalization of doubts about the effectiveness of existing cultural stereotypes; "change"—acquisition of new information and knowledge; and "freezing"—the integration

of knowledge into the example of activities, the routinization of skills, and the transition to a more efficient level of system operation [22].

In this case, the organization is a certain social space that depends on the balance of forces supporting or limiting the vectors of change. The organizational structure is characterized by both phases of transformation and phases of the relative balance of interacting forces. Structural transformation is provided by the sequence of actions of the control system: The formation of new forces that support change, the gradual transformation of limiting forces, strengthening the power of the supporting forces, reducing the power of the limiting forces, and the final transformation of the limiting forces into OI support forces [23].

Emphasis is also placed on the socio-cultural aspects of these processes: the agent of change provides the innovation process with gradual innovations in the field of cultural norms—values, principles, expectations, and attitudes shared by the members of the organization [24].

From the point of view of organizational psychology and management psychology, the essence of resistance to open innovations is that human actions in a usual, familiar situation are honed to automatism, that is, routine norms and rules of behavior are pushed out of active consciousness, and thus the old situation is perceived as comfortable [25]. To implement innovation, it is necessary to overcome anti-innovation stereotypes, psychological protection mechanisms, etc. [26].

When describing a phenomenon such as resistance, researchers often dwell on the selection of types of resistance and causes of its occurrence, as well as on the development of methods to overcome it.

Depending on the strength and intensity of resistance to change, passive and active resistance are distinguished:

- Passive resistance: Hidden rejection of change characterized by a decrease in productivity or a person that has a desire to move to another job [27].
- Active resistance: Open opposition to innovation processes manifested in the form of strikes and boycotts of innovations [28].

There are a number of stereotypes associated with the process of implementing open innovations:

"We already have it" [29]: The essence is that in order to deny the need for open innovations, a similar innovation is indicated, which is already in place. To justify new changes, it is necessary to prove the fallacy of innovation similarity and emphasize the importance of differences.

"We will not have success" [30]: Substantiation of seemingly objective conditions regarding the impossibility of implementing a specific innovation.

"It does not solve the main problems" [31]: In this case, innovation is attributed the image of a palliative, and the innovator is assigned the characteristics of a not-bold-enough leader of true progress.

"It requires refinement" [32]: Certainly, every innovation and every project needs refinement. Indeed, putting forward this argument, they point to the weaknesses of innovation.

"Everything is not equal here" [33]: If you cut off some details of innovation, the tangible planned effect is no longer expected.

"There are other proposals" [34]: In this case, an alternative to the innovation is offered, not in order to offer a better solution, but rather only to divert attention from the use of this innovation.

The authors identify four reasons for OI resistance [35]:

1. Self-interest, the desire not to lose something valuable: Status, power, material gain, comfort, familiarity, political superiority, and informal connections.
2. Misunderstandings and lack of trust arise due to insufficient effort and time to build relationships with direct participants in change and a lack of arguments and explanation of the essence of innovations.

3. Low tolerance. For some people, even a minor disruption means a crisis, while for others, it requires excessive energy to regain control and adapt to a new environment. Some people resist the need for learning, which often accompanies change, and some automatically resist everything.
4. Different assessments of the situation. Resistance arises as a result of not understanding the benefits of change or when people see more losses than benefits from open innovation, and not only for themselves but for the organization as a whole.

The attitude to management is among the reasons for resistance to open innovations, namely a lack of respect and trust for those who make changes, inadequate reward systems, and contempt for employees, which is manifested in the commanding tone of managers who implement changes [36].

A separate group of individual reasons for OI resistance is the demographic characteristics of personnel. It is about the influence of gender, age, qualifications, and education. Thus, some studies emphasize that young people find it easier to adapt to new conditions due to their youthful dynamism and higher social adaptability [37].

According to some experts [38], qualifications and education are very important factors of innovation. In turn, they can be both positive factors contributing to better efficiency of open innovation due to understanding their necessity and purpose and negative factors preventing change due to a high level of criticality.

Analysis of the scientific literature on the subject under study allows us to draw the conclusion that there are different approaches to the classification of reasons for resistance to the introduction of open innovations and different content of factors of personnel resistance to OI, which complicates the development of effective and universal tools to overcome resistance in companies.

3. Materials and Methods

The theoretical and methodological foundation of the research is the theses of the theory of change management and scientific developments on the issues of change management in the problem of OI resistance.

The following general scientific and special methods were used in the research process: Methods of generalization and systematization—to determine the matter; methods of grouping and classification—for the content analysis of scientific approaches to specific manifestations of resistance to OI changes and the reasons for it; methods of scientific deduction and induction—to substantiate the logic of implementing strategic change management in the company; graphic and tabular methods—for visual presentation of statistical material and the visualization of obtained theoretical and practical data; calculation-analytical and comparative methods—to study the dynamics and structure of key indicators, the level of use of opportunities for strategic changes, and to assess lability to changes; methods of comparative and economic-statistical analysis—to assess local components of internal drivers of strategic changes, and the level of unique, threshold, and average opportunities for strategic changes; and ranking—the positioning of companies in accordance with the level of resistance to OI and the development of corporate culture.

Information processing was carried out using MS Excel 2016 and STATISTICA 10.0.

Analytical and statistical data of international organizations, recommendations of experts, rating agencies, analytical publications, materials of companies' official websites, scientific publications, references, and the results of our own studies served as the information base of the research.

Summarizing the existing approaches of scientists to determining the level of resistance to the introduction of open innovations as a process of strategic changes, one can identify the following trends:

- The expediency of calculating the level of resistance to changes in the enterprise using a symbolic (numerical) value is indisputable [4–16].
- For determining the level of resistance, it is important to identify the types of behavior (attitude) of personnel regarding OI [17–22].

- Measuring the level of resistance implies the presence of a scale for assessing the strength of its manifestation [22–26].
- In some cases, the assessment of OI resistance is reduced to the measurement of internal resistance [28].

Considering all the existing achievements in the field of assessing the level of OI resistance, it is suggested to use the following sequence of management actions for its implementation (Figure 1).

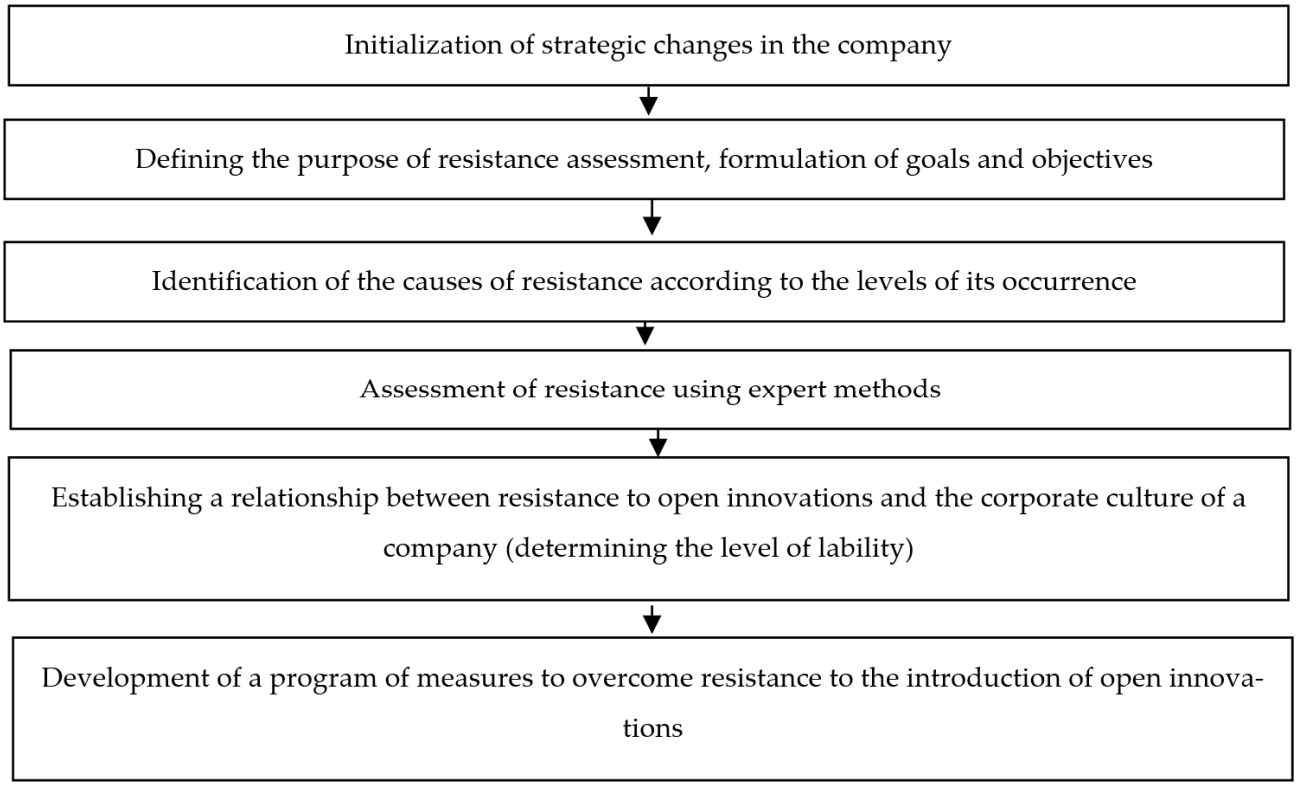

Figure 1. The process of assessing resistance to open innovations as an integrated component of strategic change management in the corporation.

Figure 1 shows that the assessment of OI resistance is suggested in the form of a linear sequence of actions of the enterprise management system (strategic change team) and includes:

- Initialization of strategic changes. A series of actions that precede the implementation of strategic changes in the enterprise. In the case of the assessment of resistance to changes at the stage of planning strategic changes or at the intermediate stage of their implementation, these actions involve the development of the entire program of changes and their organizational and economic justification.
- Defining the purpose of resistance assessment and formulating its goals and objectives. This involves the formation of a clear idea of the final and intermediate results of the assessment of OI resistance and the possibility of their practical use by a change team.

The purpose of the resistance assessment is proposed to consider the determination of possible non-acceptance of OI by the people involved in their implementation or in the direct or indirect consumption of the results of their action. The goals of resistance assessment may include establishing the causes of resistance at different levels and of different OI stakeholders the identification of resistance carriers, resistance typing, possible consequences of distorting or correcting the goals of achieving changes by the actions or inaction of the subjects of change, etc. The list of objectives for resistance

assessment is determined for each subsequent stage of assessment directly by the OI management system:

- Identification of the causes of OI resistance is carried out at the individual, group, and system levels. Determining the market causes of OI resistance is within the framework of the implementation of the external loop of strategic change management.
- Resistance assessment using expert methods. It involves quantitative measurement of OI resistance using a special questionnaire.
- Determining the level of lability regarding OI and establishing the level of dependency of IO resistance on the enterprise corporate culture.
- Development and implementation of measures to overcome OI resistance at the enterprise.

To identify the level of OI resistance, it is suggested to use a method based on the study of the degree of its manifestation at three levels: Individual, group, and system levels. This assessment will allow for considering psychological, behavioral, and managerial causes of IO resistance. Within each level of resistance, an assessment of four key characteristics of its occurrence and manifestation is provided.

Within each characteristic, there are a number of partial states, which are assessed by respondents on a 10-point scale, and the total value of the characteristic is defined as the arithmetic mean of the values of partial states. The score is determined by a scale that is built on the following principle: 1—complete absence; 2—insignificant presence; 3–4—partial presence; 5—average presence; 6–7—pronounced state; 8–9—manifestation in most cases; 10—full presence.

The individual level of resistance is assessed in the context of identifying the psychological and subjective causes of resistance. The following causes (factors) are assessed for this level of resistance (Table 1): Personal security and stability (accepted as a characteristic of those involved in changes and concerned with their level of success); the volume of work and its increase associated with the implementation of OI; the competence of an employee regarding the objectives of OI implementation and the need to improve it; and previous experience of an employee in participating in changes.

Table 1. Description of partial characteristics (states) of individual resistance to open innovations in companies.

Name of a Partial Characteristic (State) of Resistance	Information Source
A measure of changes in the personal security and stability of those involved in the changes and concerned in their level of success	Personnel survey
Increase in the volume of work and authorities associated with the implementation of OI	Personnel survey, content analysis of documentation, expert evaluation by summarizing information of HR-managers
Level of lack of competence of an employee regarding the objectives of OI implementation	Personnel survey, expert evaluation by summarizing information of HR-managers and line management of departments
Previous experience of an employee regarding OI implementation	Personnel survey

The group level of resistance is assessed from the standpoint of the possibility of accumulation of resistance by formal and informal groups of employees, the resistance generated by the susceptibility of team members to the influence of another person's opinion, and conformism. The following causes (factors) are assessed for this level of resistance (Table 2): The efficiency of group communications in the process of OI implementation; the position of the group leader (formal and informal) regarding OI and its implementation; the consequences of changes for the group; and conflicts and outsider influences related to OI implementation.

Table 2. Description of partial characteristics (states) of group resistance to open innovations in companies.

Name of a Partial Characteristic (State) of Resistance	Information Source
A measure of the effectiveness of group communications in the process of implementation of strategic changes	Personnel survey, content analysis of documentation
Measure of acceptability of the position of the group leader (formal and informal) regarding strategic changes and implementation of OI	Personnel survey
Presence of negative effects of OI implementation for the group	Personnel survey, expert evaluation by summarizing information of HR-managers and heads of functional units
Conflicts and outsider influences related to OI implementation	Personnel survey

The system level of resistance to open innovations is assessed from the standpoint of the possibilities of its emergence as a result of general organizational factors, including (Table 3) the organizational structure and its dynamics in the process of OI implementation, the positions of the authorities and the leader of OI implementation, the number of simultaneous OI and the time for their implementation, and motivation for changes.

Table 3. Description of partial characteristics (states) of system resistance to open innovations in companies.

Name of a Partial Characteristic (State) of Resistance	Information Source
Level of compliance of the organizational structure with the processes of strategic changes	Content analysis of documentation, expert evaluation by summarizing information of heads of functional units
Level of acceptability of the position of the authorities and the leader of OI implementation for the team	Personnel survey, expert evaluation by summarizing information
Level of time sufficiency for the implementation of strategic OI	Personnel survey
Assessment of motivation (tangible and intangible) for the implementation of OI	Personnel survey, content analysis of documentation, expert evaluation by summarizing information of HR-managers

Based on the data in Tables 1–3, the general level of resistance to open innovations for the *i*-th company is determined as the weighted average of the partial characteristics (states) of resistance at different levels:

$$RIO_i = \frac{1}{n} \times (RIO_i^i + RIO_i^g + RIO_i^s) \quad (1)$$

where RIO_i is the general level of resistance to open innovations for the *i*-th company; n is the number of partial characteristics; RIO_i^i is the level of partial characteristics (states) of individual resistance to open innovations; RIO_i^g is the level of partial characteristics (states) of group resistance to open innovations; and RIO_i^s is the level of partial characteristics (states) of system resistance to open innovations.

For the purposes of open innovation management, the following scale for assessing resistance to open innovations is proposed (RIO_i):

RIO_i—resistance to open innovations is low, OI should be implemented.

$0 < RIO_i < 2.99$—resistance to open innovations is acceptable.

$3.0 < RIO_i < 4.99$—resistance to open innovations is pronounced.

$8.0 < RIO_i > 10.00$—resistance to open innovations is significant, and the OI program should be revised.

OI resistance depends on the type of corporate culture of the company, but it should be noted that it exists in any organization, with any type and level of corporate culture, and is determined by the level of lability formed within the corporate culture (explicit or implicit) regarding OI.

Lability regarding OI is the functional mobility of corporate culture characterized by the frequency with which resistance may arise in response to OI and measures to overcome it. That is why it can be determined that the level of resistance to open innovations depends on the level of development of the corporate culture of a company, and this dependence has the following form:

$$L = \frac{\%\Delta ROI}{\%\Delta CC} \quad (2)$$

where $\%\Delta RIO$ is the percentage change in resistance to open innovations and $\%\Delta CC$ is the percentage change in corporate culture.

At the same time, there are such conditions: If $L > 1$—IO-labile corporate culture, in which the rate of change in resistance is higher than the rate of change in the level of corporate culture, that is, resistance can be overcome without significant changes in corporate culture; $L = 1$—corporate culture of the enterprise does not affect the level of change and resistance, the situation of the so-called parabiosis of corporate culture; $L < 1$—corporate culture is stable to changes, that is, resistance to open innovations is stable to changes in corporate culture.

In relation to the management of open innovations, we propose distinguishing between two types of corporate culture: Fiduciary and non-fiduciary corporate cultures, which are determined by the attitude of personnel to the introduction of open innovations in the company.

In the fiduciary type of corporate culture, personnel has confidence in the company's management, which, in turn, entrusts the team of strategic changes with their implementation. OI resistance is minimal. Usually, it occurs at the individual level and is quickly eliminated by implementing informational and motivational measures.

In the non-fiduciary type of corporate culture, trust in management (or strategic change teams) for change is minimal/absent, and OI resistance is significant and of a group or system (general) nature. Such a culture is characterized by lability to change at this level.

The general level of corporate culture in relation to OI in the implementation of open innovations (CC_i) for the i-th corporation is defined as the weighted average of the partial indicators (characteristics) of corporate culture:

$$CC_i = \frac{1}{n} \times \sum_{n=1}^{8} CC_i^n \quad (3)$$

It is proposed to use the following values to identify the corporate culture in relation to OI: $CC_i > 5$—fiduciary corporate culture; $CC_i \leq 5$—non-fiduciary corporate culture.

Resistance to change, unlike the previous form of attitude to change, has many more types of manifestation [29–32]:

- Objection—this presupposes rejection of the fact that changes are necessary. It is the most common form of resistance. It is possible either when people really do not see the need to change anything, or when the indicated problems seem to them to be far-fetched and the change—to be imposed. It appears at the third level of corporate culture and manifests itself at the first, attributive level.
- Indifference—this is expressed in an indifferent attitude to changes due to the presence of problems in relations with colleagues, managers, the influence of an informal group, etc. The prevailing hidden forms of emotional resistance are as follows: The phenomenon of learned helplessness (it will not work anyway) or the formation of factions and intrigues.
- Demonstration of incompetence—this manifests in situations when employees cannot do even what they are actually quite capable of doing; it can also be intentional, as an indirect manifestation of serious resistance to change. Most often, it is due to a strong concern about the potential negative consequences of the changes being made (such as, for example, loss of self-importance).

- Avoidance—this is a hidden form of instrumental resistance manifesting in the creation of technical failures, complicating the collection of information, references to difficulties, criticism of innovations, and procrastination.
- Rationalization—this is a clear form of instrumental resistance, which is expressed in an appeal to the significant complexity of the material and its misunderstanding, or non-fulfillment of the task when specifying the reasons for it.
- Absenteeism—this is the phenomenon of the frequent absence of an employee from the workplace. Most often, absenteeism is defined as the total number of lost working days (hours) or the frequency of cases of absence from work. At the same time, an individual is absent from the workplace, as a rule, for an invalid reason (for example, due to ill health, but without visiting a doctor, due to family circumstances). Organizations usually incur large financial losses due to cases of absenteeism.
- Indignation—this is a clear form of emotional resistance expressed in the form of sabotage or protests, the willingness of the group to support criticism, and compromising change leaders on personal grounds.
- Skepticism—this is a justified skepticism about the need for change or about the ability of both managers and colleagues to successfully implement it. It also occurs in the form of a request for confirmation of the qualifications or motivation of the initiator of changes. Pessimism may be an extreme form of ingrained skepticism. Obviously, the collective pessimism of employees is formed in response to a long-term conflict of goals, values, and norms adopted in the formal and informal systems of interaction of the organization.
- Intolerance—this manifests in the growth of conflicts, not following work deadlines, excessively meticulous attention to details, the appearance of terrible rumors, and other numerous phenomena. All of this leads to blocking or stretching constructive activity in time.

The typology of resistance to open innovations in the company is closely related to the levels of corporate culture (artifacts, values, and basic ideas), as it determines the nature of such resistance and its demonstration (Table 4).

Table 4. Relationship between the typology of OI resistance and levels of corporate culture.

Corporate Culture Level	IO Resistance Manifestation Type								
	Denial	Indifference	Avoidance	Incompetence Demonstration	Absenteeism	Rationaliza-tion	Indignation	Skepticism	Impatience
First level—"culture artifacts"	+	X	X	+	+	+	+	X	X
Second level—values	X	+	+	X	X	X	X	+	+
Third level—basic ideas	+	X	X	X	X	X	+	X	+

The data in Table 4 show the complex nature of the occurrence of types of resistance, which has its roots mainly in the second (values) and third (basic ideas) levels of corporate culture. Manifestation of resistance at the level of artifacts is an extreme measure of OI resistance.

The following large international companies with a significant presence in the Polish automotive sector were selected: Fiat, Opel, Toyota, Volkswagen, and Volvo. An expert survey was conducted using the developed questionnaire (Appendix A) from January–April 2021. The number of experts in each company was 30 middle managers.

These experts have a high level of competence based on self-assessment. The formation of an expert group based on the principles of the competence approach, taking into account the ranks of positions, allows one to create a group that, in accordance with job duties, makes it possible to build a personnel evaluation system in accordance with the goals of the enterprises. Specific requirements for the members of the expert group leave their mark on the principles of their selection.

To determine the competence of experts, it is necessary to evaluate the following qualities: Competence, creativity, attitude to expertise, conformity, analyticity, collectivism, self-criticism, and reliability [30].

Certainly, expert competence is the level of his qualification. The competence of experts is determined on the basis of experts' judgments about the degree of their awareness of solving problems and disclosing information about typical sources of reasoning for judgments [31]. To determine the argumentation coefficient (KA), each expert fills out a reference table, while each source has the evaluation levels of A, B, and C. The argumentation coefficient is in the range of $0 \leq KA \leq 1$ and has the following scaling: $KA = 1$—high; $KA = 0.8$—medium; $KA = 0.5$—low levels of professional competence based on self-assessment.

At all enterprises under study, the selected experts have a high (level A) competence coefficient (Kc) based on self-assessment.

The consistency of expert opinions was calculated using the Kendall rank correlation coefficient [29]. The coefficient is equal to 0.71, which indicates a high level of consistency.

4. Results

The authors distinguish three types of resistance to open innovations in companies: Individual, group, and system resistance, as the consequences of the generation of different levels of corporate culture are not mutually exclusive and do not cross-over into each other in the general creation of resistance of OI.

The estimated values of the level of resistance to open innovations according to formula (1) in the Polish branches of international automotive companies are presented in Table 5.

Table 5. Estimated values of the general level of resistance to open innovation in the Polish branches of international automotive companies.

Characteristic	Fiat	Opel	Toyota	Volkswagen	Volvo
Characteristics of individual resistance to open innovations $\left(RIO^{i}\right)$	5.72	5.94	5.18	3.72	5.28
Characteristics of group resistance to open innovations (RIO^{g})	2.14	3.79	4.08	2.18	5.11
Characteristics of system resistance to open innovations (RIO^{s})	4.34	3.89	4.62	4.49	6.13
General estimated level of resistance to open innovations (RIO)	4.07	4.54	4.63	3.46	5.51
Rating	2	3	+4	1	5

Table 5 shows that the resistance to open innovation in the Polish branches of international automotive companies in 2021 was recorded in the intervals [3.46; 5.51], i.e., the resistance is acceptable at all surveyed enterprises except Volvo, where, in the analyzed year, the resistance is pronounced (condition $5.0 < RIO_i < 7.99$ is met). In detail, in 80% of cases (four companies out of the five studied), individual resistance prevails, while in 40% of cases (two companies out of the five studied), system resistance prevails. In the period under analysis, a prevalence of group OI resistance did not occur, which is related, in our opinion, primarily to the specifics of the operational activities of the companies.

The rating values of the level of resistance to open innovations in the studied companies are summarized in Figure 2, where 1 is the lowest indicator and 5 is the value of the company with the highest level of resistance.

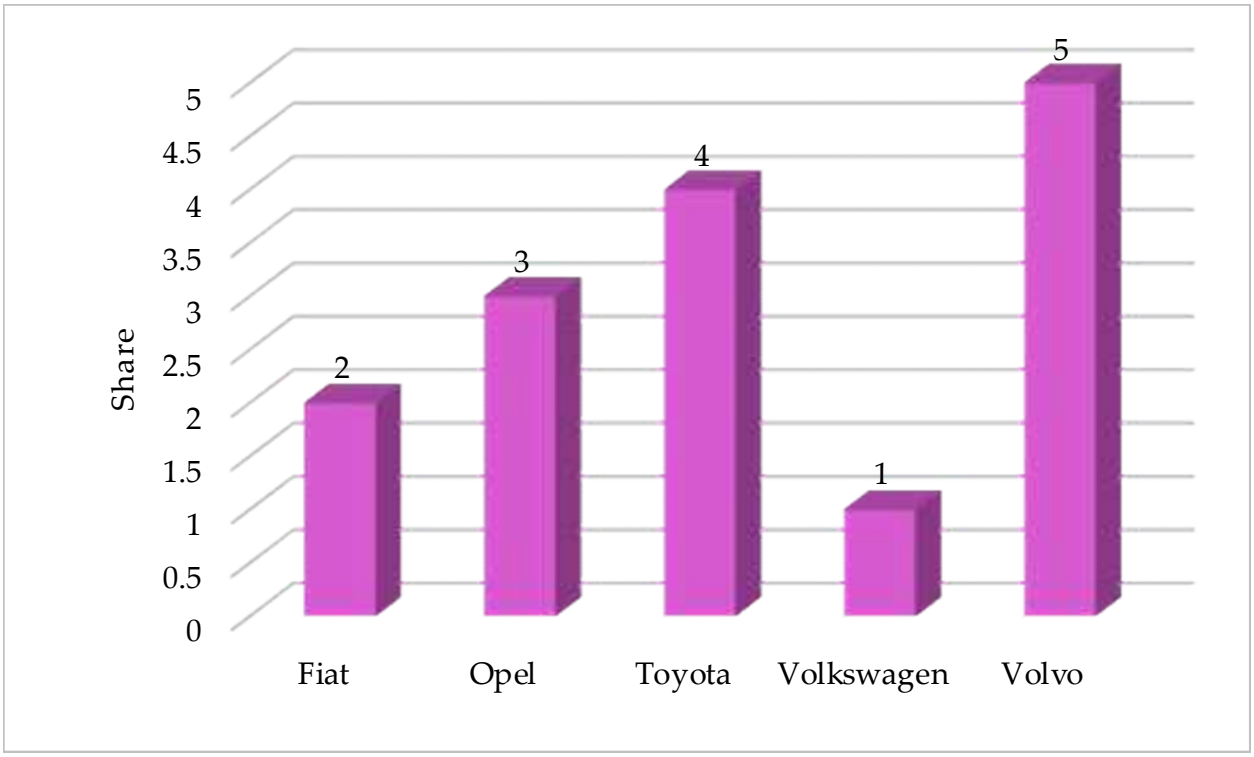

Figure 2. Rating values of the level of resistance to open innovations in Polish branches of international automobile companies in 2021.

The obtained estimates of OI resistance are an important basis for identifying the type of corporate culture of the enterprise.

The substantive aspect of corporate culture can be traced through its levels.

The first level is visible, basic, and is called "artifacts of culture". It forms the basis of models of behavior of the human factor in the team, and its attitude to the implementation of production processes. This level reflects the rules of conduct of personnel, the manner of dress, symbols and organizational ceremonies, and specifics of the location of offices, i.e., which all allow for monitoring the behavior of both managers and workers.

The second level is invisible and substantive. It characterizes the result of the work of the human factor, considering the achievements of the first level, and reflects the values that are cultivated in the process of work. In fact, it turns out there is a certain share of values that are inherent in the semi-consciousness of the bearers of the human factor, and although they are not noticed, they control the behavior of the human factor in the formation and implementation of management decisions.

The third level is invisible and underlying. At this level, a manifestation of personal psychological values occurs, which were formed and laid down earlier: Thinking, feelings, and will. However, it is these values that direct the bearers of the human factor to achieve objective good in accordance with the three areas of spirituality—knowledge, art, and morality.

By generalizing the levels of manifestation of corporate culture and taking into account the nature of OI resistance, the author formed a model of the attitude of OI subjects to OI and their management at different levels of the corporate culture. It is determined that the attitude to OI is formed at the third, invisible, underlying level of corporate culture, which determines the type of response to OI: Support, neutrality, or resistance to OI.

In the case of resistance, its generation, from individual to system resistance, occurs from the third to the first level of the corporate culture. At the same time, at the third and second levels, the response and manifestation of the attitude to OI and their management are hidden, and at the first level they are clear and declared.

To set the level of resistance to open innovations and its dependence on the corporate culture of the enterprise, it is advisable to identify the type of corporate culture depending on its attitude to OI. This study, conducted on the types of corporate culture, revealed their diversity, which, on the one hand, reflects the multifacetedness of this management category, and, on the other hand, allows for stating the uniqueness of the corporate culture of each company.

The obtained estimated values of the general level of corporate culture in relation to the introduction of open innovations are summarized in Table 6 and Figure 3.

Table 6. Estimated values of the general level of corporate culture in relation to the introduction of open innovation in Polish branches of international automotive companies in 2021.

Characteristic	Fiat	Opel	Toyota	Volkswagen	Volvo
Characteristic of "strong–weak" corporate culture (CC1)	6.34	5.57	5.31	7.03	5.42
Characteristic of "adaptive–non-adaptive" corporate culture (CC2)	6.29	6.07	6.01	6.52	7.02
Characteristic of "ethical–unethical" corporate culture (CC3)	5.85	5.94	5.64	7.07	6.94
Characteristic of "developed–latent" corporate culture (CC4)	5.63	5.43	5.43	7.18	5.72
Characteristic of "harmonious–inharmonious" corporate culture (CC5)	5.72	5.62	5.98	6.99	6.33
Characteristic of "creative–bureaucratic" corporate culture (CC6)	5.69	5.58	5.62	7.02	6.18
Characteristic of "controlled–spontaneous" corporate culture (CC7)	6.2	5.4	5.45	6.82	5.94
Characteristic of the "level of lability to open innovations" (CC8)	7.11	6.49	6.01	6.63	5.62
Total score of a corporate culture (CC_i)	6.10	5.76	5.68	6.91	6.15
Rating	3	+4	5	1	2

One can draw the following conclusions from the data in Table 6 and Figure 3:

- The level of development of the corporate culture of enterprises is in the interval [5.68; 6.91], that is, it is equal to $CC_i > 5$, and the corporate culture of companies can be identified as a fiduciary type culture.
- The most developed in relation to OI is the culture of Volkswagen, which scores 6.91 points and has the following characteristics: Developed, strong, ethical, and creative.
- Toyota has the least developed corporate culture, the score of which is recorded at 5.68 points. The defining characteristics of this culture are adaptivity and lability to IO.
- The evaluation of the "lability to OI" culture component allowed for determining the highest level of the indicator in Fiat, which is 7.07 points. The lowest level of the indicator was recorded in Volvo, which allows for identifying the personnel attitude to open innovations at the level of support (the former) and disapproval (the latter).

According to the diagram of the resistance evaluation process in Figure 1 as an integrated component of OI management, the next stage of the evaluation is to determine the level of lability to OI and to establish the relationship between OI resistance and corporate culture.

For this stage, the level of lability to OI was calculated according to formula (2) and the results are summarized in Appendix B. The graphical interpretation is shown in Figure 4.

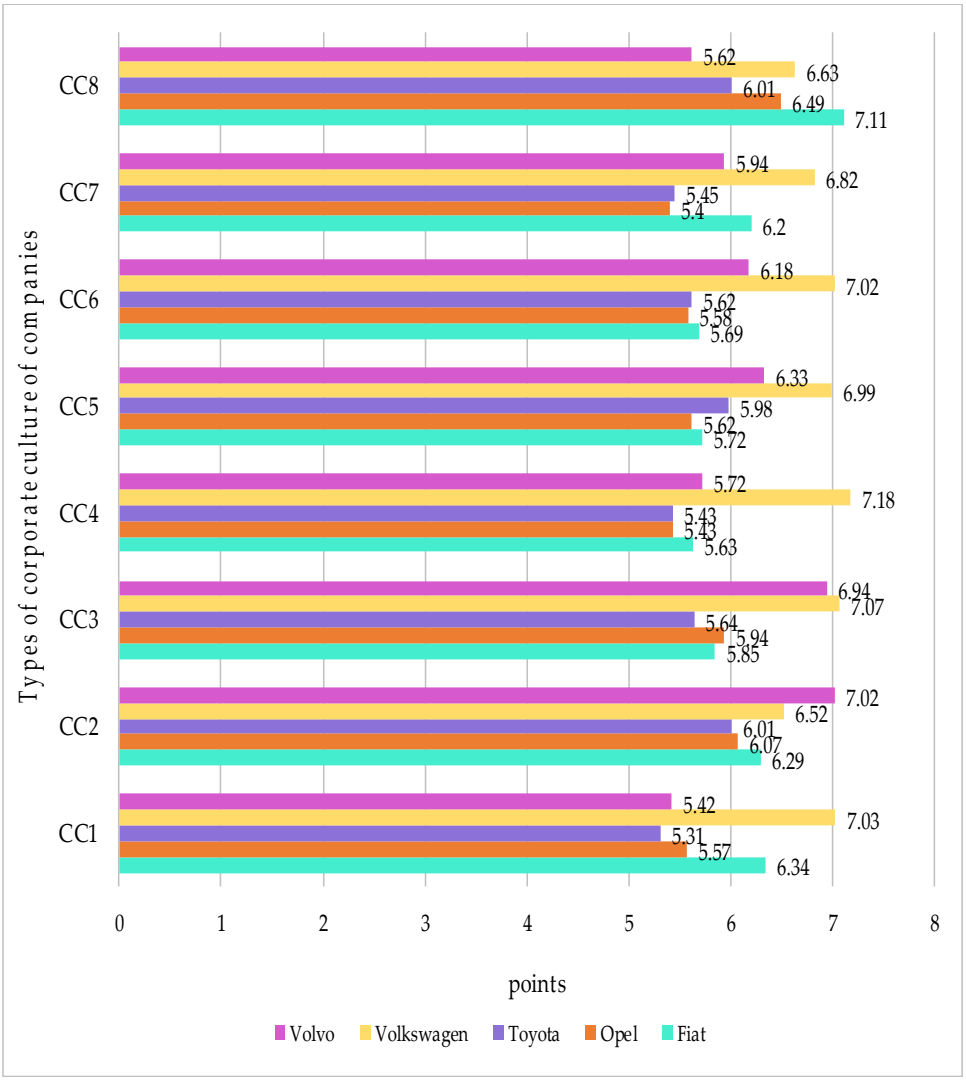

Figure 3. Visualization of corporate culture components in Polish branches of international automotive companies in 2021.

One can draw the following conclusions:

- The level of lability to OI in the corporate culture of the Polish branches of international automotive companies is unstable and dynamic. This is primarily due to the mobility of the social system and various stages of implementation of open innovation.
- In 2016–2020, in the Polish branches of international automotive companies, there were common trends of fluctuations in lability to open innovations observed, which are cosine-like in nature. This is explained by the action of external factors of OI.
- Fiat and Volkswagen are characterized by the least labile resistance of corporate culture to OI (the value $L > 1$ was recorded only in 2016). In 2020, Volkswagen PJSC experienced a situation of parabiosis of corporate culture, which can be considered a transitional state, which, under the condition of effective OI management, can provide lability and additional levers to manage OI resistance.
- The resistance to open innovation in Volvo is the most sensitive to changes in corporate culture, which means it is manageable (the value of the lability index $L > 1$ in three cases out of four).
- The level of OI resistance in Opel and Fiat has an average level of lability of OI resistance to corporate culture (the value of the lability index $L > 1$ in two cases out of four).

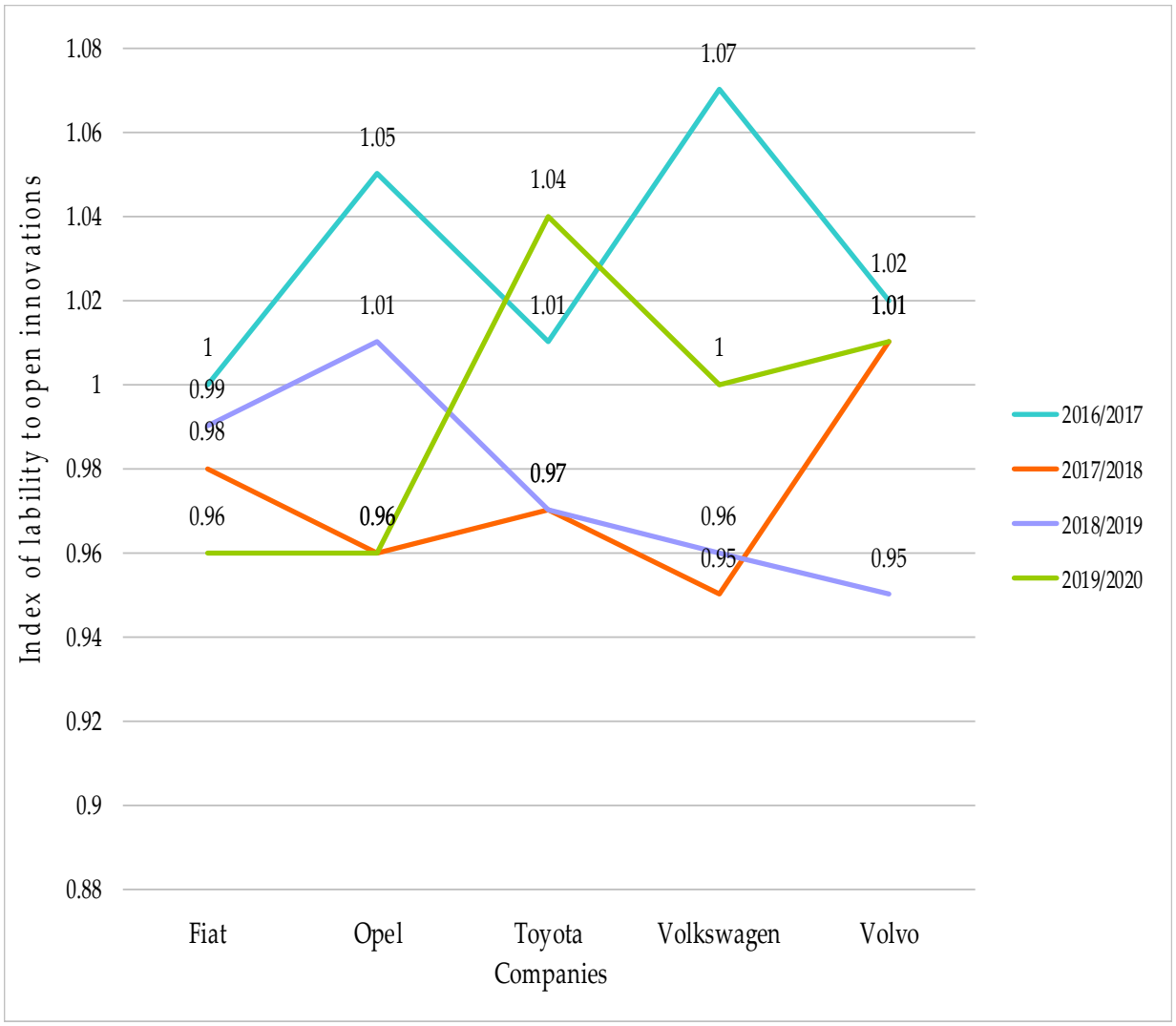

Figure 4. Graphic visualization of the level of lability to open innovations in Polish branches of international automotive companies in 2016–2020.

In general, the results of the analysis show the relationship between the level of OI resistance and the corporate culture of the studied enterprises (the value of the lability index $L > 1$), which proves the feasibility of developing measures to overcome OI resistance through corporate culture tools.

The development of measures to overcome OI resistance in companies should be a logical continuation of the proposed set of actions of the OI management system and should take into account both the sources of OI resistance and the type of corporate culture within which resistance arose. Determining the areas of overcoming OI resistance should take into account the following: Firstly, the general level of resistance, and secondly, the level of resistance according to its levels of occurrence, which will allow for considering the whole set of characteristics (states) of OI resistance in the enterprise. The general content of measures to overcome OI resistance within the fiduciary and non-fiduciary types of corporate culture depends on the approaches to strategic change management used by the enterprise change management system (Table 7).

The obtained results have different meanings for the company change management system. Resistance to open innovation at $3 < CC_i > 4.99$ should be in the field of view of the management of the change team and should be subject to preventive management. Within the established corporate culture of the company, one should encourage the aspects of OI support (values and norms) that meet the needs of the OI program and the current

strategy. OI resistance at $8 < CC_i > 10$ poses a significant threat to the organization and the OI program and requires mandatory and immediate elimination. For this OI resistance, management based on flexible emergency solutions should be applied, and the corporate culture should be transformed and act as a tool to support open innovations.

Table 7. Approaches to managing strategic changes within the fiduciary and non-fiduciary types of corporate culture.

Assessment of Resistance to Open Innovations	Corporate Culture Type	
	Fiduciary	**Non-Fiduciary**
$0 < CC_i > 2.99$ resistance is low	Management of strategic changes based on extrapolation, control of key sources of resistance.	Trust management of strategic changes, resistance control is formal, implemented within established procedures.
$3 < CC_i > 4.99$ resistance is acceptable	Forecast-based management, monitoring of strong resistance signals, planning of measures to overcome resistance.	Trust management of strategic changes, systematic control of resistance, discussion of the causes of resistance, motivation as a tool to overcome resistance.
$5 < CC_i > 7.99$ resistance is pronounced	Management based on flexible emergency solutions, resistance forecasting, monitoring of weak resistance signals, development of programs to overcome resistance based on its ranking.	Preventive management of strategic changes, monitoring of resistance signals, motivation as a tool to prevent resistance.
$8 < CC_i > 10$ resistance is significant	One should review open innovations.	Correcting the program of strategic changes based on a detailed study of the causes of resistance.

The matrix of resistance to open innovation for the conditions of the automotive industry built on the data of Table 4 is given in Table 8.

Table 8. Matrix of resistance to open innovations in the Polish branches of the international automotive companies in 2021.

Open Innovation Resistance Strength	Open Innovation Resistance Level		
	Individual	**Group**	**System**
Low resistance	X	Volkswagen, Fiat	X
Acceptable resistance	Volkswagen	Opel, Toyota	Opel, Toyota, Volkswagen, Fiat
Pronounced resistance	Fiat, Opel, Toyota, Volvo	Volvo	Volvo
Significant resistance	X	X	X

According to Table 8, a significant threat to the system of open innovation strategic change management of companies is posed by the following: For Opel, Toyota, Volkswagen, and Fiat, system resistance, which is acceptable; for Fiat, Opel, Toyota, and Volvo, individual resistance, which is pronounced; for Volvo, group resistance, which is pronounced; for Volvo, system resistance, which is pronounced.

The strategy of OI generation is used by companies for the middle and threshold levels of opportunities for strategic changes, and the strategy of simulating strategic changes is used for the unique level of opportunities for strategic changes [39]. In such conditions, in order to ensure the anticipatory nature of strategic enterprise management, one should focus on ensuring the key competencies of the management system in the area of strategic change generation, which will meet the unique level of strategic changes in the target market and support the implementation of the active strategy of stimulating strategic changes [40].

At the level of corporate strategy, one should focus on the growth strategy, and at the level of competitive strategy, the focus should be on the strategy of ensuring market

leadership. Functional strategies should provide a synergistic effect for the growth of an effective component of the potential for strategic changes. Within the framework of OI consolidation, the motivation of the personnel to support and generate OI, the development of fiduciary corporate culture for open innovations, and the organization of the team of strategic changes require emphasis [41].

According to their status, Fiat and Volkswagen implement a combination of active and passive strategies for implementing strategic changes regarding open innovation (active–passive strategy for change). When implementing a unique level of strategic changes, this strategy is an active simulation of effective management practices, being passive for the middle and threshold levels of strategic opportunities, i.e., it contains reactive strategic actions for change drivers.

The active-passive simulation strategy of strategic changes involves the use of measures to accumulate, study, and implement usual successful management actions and market-proven practices of strategic change (prepared simulation) to ensure the anticipatory nature of strategic management [42].

The content of the strategic response to the change of drivers is the implementation of earlier-prepared reactive actions within the existing strategic alternatives. At the level of the corporate strategy, such companies, depending on the market situation, implement strategic alternatives to growth or stabilization; the competitive strategy is focused on maintaining the achieved level of competitiveness (including through measures to simulate successful practices of strategic changes); and the basis of functional strategies is maintaining the effective level of potential for strategic changes and increasing the subject one. Management actions to consolidate strategic changes and ensure their implementation require the development of fiduciary corporate culture and ensuring the promotion of strategic changes by the personnel.

According to the analysis, the conservative-passive simulation strategy of Opel is used as a combination based on a conservative strategy approach, for a unique level of strategic change opportunities, and a passive-simulation strategy approach, for threshold and middle levels of strategic change opportunities.

The basis of this strategy is a set of reactive simulation strategic measures based on the economical use of the existing potential for strategic changes of the enterprise (especially the subject component). This strategy is aimed at achieving (maintaining) stable positions in the market and in the area of competition. The pool of functional strategies is implemented in the mode of "support" for the achieved level of capacity and strategic resources [43].

The basis of ensuring the achievement of the goals of strategic changes and the anticipatory nature of management is external local drivers of strategic changes, in response to which the classic methods of strategic management and strategic change management are used [44]. To implement the consolidation of strategic changes, companies use supportive organizational and economic measures aimed at minimizing OI resistance, and especially its external loci of manifestation, and the stabilization of corporate culture in relation to open innovation (in the case of a fiduciary corporate culture, support for standard methods of motivation; in the case of a non-fiduciary corporate culture, prevention of an increase in the level of OI resistance).

The implementation of these approaches to the strategy of change in enterprises and ensuring the anticipatory nature of strategic management should be continuous, in a closed cycle of management actions that involve changes in types of strategies depending on the type of drivers of strategic changes and goals of the continuum of enterprise strategies.

5. Discussion

During the authors' research, confirmations of the results obtained were found.

One of the classic approaches to studying the influence of corporate culture on the efficiency of a company and its value is to consider corporate culture as a component of its intellectual capital [45].

In this concept, corporate culture is an intangible asset of the organization that increases the value of the business and needs investment [46]. In [47], the corporate culture is considered a subcomponent of the process capital subsystem, which creates favorable conditions for the implementation of human capital.

If, in our study, we paid attention to local issues of the influence of corporate culture on changing the resistance to OI, the rest of the authors study the subject using broader vectors.

The influence of corporate culture on potential growth in value is carried out in three areas [48]: The growth of labor motivation and involvement of employees in the labor process, the growth of the company reputation as an employer, and the improvement of the ethics of communication with customers and partners. This leads to increased productivity, employee and partner loyalty, innovative activity, and efficiency.

Thus, we can talk about the influence of corporate culture on other components of intellectual capital—innovation, partner, and network capital. The study of the influence of corporate culture on the innovative efficiency and innovative capital of the organization was the objective of this paper.

The next subject of discussion is the values and beliefs of the members of the organization, which form the core of the corporate culture.

Theoretical work in the field of innovation values focuses on providing moral support and inspiration to innovators. The accusatory corporate culture is denied, in which the authors of unsuccessful projects are made guilty. It is proposed to consider mistakes as an opportunity for learning and development of the company [49]. Some companies try to build a corporate story as a success story of individual employees who make new proposals and move the company forward. The main motivating factor is the desire of a person to "leave a mark in the world" and gain recognition from colleagues and bosses [50].

However, studying the successful experience of the world's largest innovative corporations brings to the forefront other factors in creating an innovative climate [51]. Representatives of the vast majority of successful foreign innovative companies consider the most important corporate values to be:

1. Strong relationships with consumers [52]. This implies not only focusing on the consumer in the usual sense of the word, but also including the consumer in the process of developing innovation, studying and actively shaping their needs, and considering the opinions of consumers in the process of choosing options and modifying product samples.
2. Pride in one's own products and company [52]. Let us focus on the ways of organizing labor and structures for supporting the innovation climate and in-house entrepreneurship.

Recently, the largest amount of attention has been paid to the need to allocate a certain amount of working time and a certain limit of financial resources for the implementation of the own ideas of employees, experimentation, and creativity [53]. Indeed, innovative corporations demonstrate a high level of trust in employees and implement the principles of diversity, teamwork, and the availability of ideas in the conditions of special campuses.

However, a more detailed study of the experience of successful innovative companies [54] makes it possible to supplement these guidelines with conditions for their effectiveness:

- Careful, thought-out selection of employees who are engaged in the formation of corporate innovative values.
- Selection and invitation of people who have not only professional experience, but also an individual initiative to use the allocated money and time resources to implement their projects in accordance with the general goals of the organization, as well as "sell" the results of their projects to management and other members of the organization. The employees of an innovative company must be creative, be able to apply a non-standard, sometimes paradoxical approach, quickly adapt to the business environment, conduct a systematic analysis of existing relationships, barriers, and problems, and have a

holistic conceptual vision of the strategy, an ability for effective self-organization, and an ability to manage team motivation.

- A specific strategy for creating creative teams of employees with different experiences and basic education, which could ensure the implementation of ideas on a collective basis. The most important way to support the innovative spirit is to discuss the goals and vision with employees, keeping them involved in the innovation process. For this, the objectives of the company must be clear and consistent with the general mission of the company, i.e., the general goal of the activity in terms of public benefit.

Lately, in the business community, the creativity of employees is perceived as a standard business tool. The leading global corporations, such as Toyota and Kawasaki Engineering, receive more than 2 million innovation proposals a year, most of which concern improving product quality and reducing production costs [55]. This degree of employee involvement is provided primarily by two factors [56]:

- A thought-out system of material incentives for authors of innovative ideas and all members of the organization who successfully implement innovations.
- Availability of a special innovation support infrastructure.

The first factor includes flexible systems for the payment of rewards and bonuses, including the percentage of revenue growth from the market sale of new products or a reduction in company costs, as well as various forms of participation of innovators in the ownership of companies. It is also possible for the authors of innovative proposals to create their own subsidiaries, with equity participation of the corporation.

The second factor includes the organization of a system for considering, selecting, and supporting innovative proposals. There is a practice to organize innovation committees that regularly consider innovative proposals of employees, allocate innovative funds, and organize innovative meetings of employees. All these forms of innovation support should be provided with the physical infrastructure, such as separate rooms where such meetings could take place and rooms for individual concentration.

A critical review of the concept of open innovation was also presented in [57]. They opined that the scientific community did not give enough credit to previous researchers who described, analyzed, and advocated most of the principles on which open innovation is based, long before the term for this new model was coined. Firms and the R&D community have embraced this concept so readily because it is simple (it is attractive because it is simple and keeps a linear view of market science). Open and closed innovation systems are presented as two alternatives faced by firms. This instills confidence in the broader argument, giving the impression that the options are mutually exclusive when they are not. The sharp polarization of openness and closeness of innovative systems does not allow any middle level.

Since the process of introducing innovations is related to changes in the organization, it is necessary to overcome resistance to change. For this purpose, explanatory work with employees is carried out to reduce the fear of losing their job or being overburdened. It is necessary to create an open atmosphere for discussing the ongoing changes, which reduces excitement and a sense of uncertainty. In the case of successful implementation of innovations, all indirect participants in the process should receive material and moral encouragement.

6. Conclusions

The theoretical and methodological approach to the process of assessing resistance to open innovation as an integrated component of strategic change management, which is represented by a linear sequence of actions of the management system of a company (strategic change teams) has been substantiated. It includes the determination of the purpose of resistance assessment, formulation of its goals and objectives, identification of the reasons for resistance to open innovations at the individual, group, and system levels, assessment of resistance using expert methods, determination of the level of lability to open innovations and establishment of the level of dependence of resistance to changes on the

corporate culture of the enterprise, and the development and implementation of measures to overcome resistance to open innovations.

It has been proven that the typology of resistance to open innovations in the enterprise is closely related to the levels of corporate culture (artifacts, values, and basic ideas) that influence the creation of resistance—the process of resistance due to the prevailing type of corporate culture.

The estimated values of the general level of corporate culture in relation to open innovation for Polish branches of international automotive companies allowed for stating that the corporate culture of the enterprises can be identified as a culture of the fiduciary type: The corporate culture of Volkswagen is the most developed in terms of OI, and that of Toyota is the least developed. In general, the results of the analysis demonstrate the relationship between the level of resistance to open innovation and the corporate culture of the companies under study, which proves the feasibility of developing measures to overcome OI resistance using the tools of the corporate culture.

Summing up the results of the study, we would like to dwell on the methods of influence that the most significant factors have on innovative activity, innovative capital, and, as a result, the growth of the company value. Our study confirms the opinion of researchers that the mission (the goal of the organization from the point of view of public benefit) and the vision (the methods of achieving this goal) are inspiring factors for the innovative business team and a condition for the application of extraordinary efforts necessary for the promotion of innovation. The general vision, which has motivating potential, allows one to achieve significant growth of innovative capital, which is expressed in an increase in the quantity and quality of technological and organizational know-how and new business concepts.

A favorable business atmosphere is an important factor in the formation of the organization's ability to reach agreements and cooperation. It improves the quality of relations between the company management and personnel, within the company, and relations with counterparties, owners, and the state. One can say that a favorable atmosphere contributes to the assets of the quality of relations, which are a component of the company value.

The main limitation of the authors' research, in our view, is testing the authors' methodology only on companies in the automotive industry in Poland. To overcome this limitation, as research development, indicators were calculated for other industries with the aim of discovering the tendency of personnel opposition to open innovations, identifying the influence of various groups of factors, especially social ones. It is also possible to compare the obtained results with those of member countries of various unions including Poland: EU and the Visegrád Group (V4).

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Appendix A

Questionnaire to assess the type of corporate culture of the company in relation to open innovation.

Characteristic	Points					
	1–2	**3–4**	**5**	**6–7**	**8–9**	**10**
1. Characteristic of "strong–weak" corporate culture						
The level of personnel awareness of the values, principles, mission of the enterprise						
The level of agreement with the values, principles, mission of the enterprise						
The level of personnel satisfaction with the conditions of activity and implementation of job functions at the enterprise						
The qualitative assessment of the process of implementation and support of initiatives						
The qualitative assessment of the process of forming the desired models of work behavior and the perception of initiatives for change of activities						
2. Characteristic of "adaptive–non-adaptive" corporate culture						
The extent to which the organization culture emphasizes the need to adapt to changes in the external environment						
The level of consumer orientation in the activity						
The presence of the organization training as an integrated component of change management						
The general assessment of the quality of marketing services						
The general assessment of the quality of monitoring the environment of change						
3. Characteristic of "ethical–unethical" corporate culture						
The level of ethicality in relation to the consumers of products/services of a department						
The level of ethicality of relations with the workers of the enterprise						
The level of ethicality towards external agents of change						
The assessment of the internal code of ethics of the workers 4. Characteristic of "developed–latent" corporate culture						
The measure of consideration of the values of the worker in his functional activities						
The level of representation of attributive symbols in the activity						
The level of support for attributive symbols						
The level of communication channels and their reliability						
The social integration of the individual at the mental level in the activity						
5. Characteristic of "harmonious–inharmonious" corporate culture						
The development of business culture						
The development of material culture						
The level of support for individual values						
The level of support for group values and interests						
6. Characteristic of "creative–bureaucratic" corporate culture						
The opportunities for human potential development						
The level of personnel orientation to finding and introducing new ideas						
The level of internal brand competition						
The level of leadership development						
The efficiency of teamwork						
7. Characteristic of "controlled–spontaneous" corporate culture						
Recording the code of ethics in official documents						
The measure of awareness of the head of the presence and degree of importance of organizational culture						

Characteristic	Points					
	1–2	**3–4**	**5**	**6–7**	**8–9**	**10**
The effectiveness of the implementation of the functions by the person responsible for the practical implementation of enterprise policy in the field of organizational culture management						
The extent to which the head of the enterprise personally supports the activities related to the management of organizational culture and is directly involved in them						
Diagnostics of organizational culture						
8. The level of lability to open innovations						
The level of influence of open innovations on the general corporate culture						
The level of influence of open innovations on group corporate culture						
The measure of the rhythmicity of negative reactions to changes on the part of groups						
The level of habitualness of open innovations for individuals						
The level of habitualness of open innovations for groups of workers						

Appendix B

Generalization of the results of calculating the level of lability to the introduction of open innovation in the Polish branches of the international automotive companies in 2016–2020.

Company	2016/2017	2017/2018	2018/2019	2019/2020
Changing the level of corporate culture, %				
Fiat	101.52	101.45	99.70	100.32
Opel	99.94	100.87	99.98	100.74
Toyota	101.57	101.18	101.84	101.69
Volkswagen	100.82	101.08	101.23	100.69
Volvo	101.25	100.55	102.27	98.46
Changing the level of resistance, %				
Fiat	101.67	99.55	98.58	96.38
Opel	105.18	97.14	100.07	96.56
Toyota	102.84	98.31	98.28	106.24
Volkswagen	107.55	95.74	97.12	100.29
Volvo	102.89	101.13	97.35	99.04
Index of lability to open innovations (values)				
Fiat	1.00	0.98	0.99	0.96
Opel	1.05	0.96	1.01	0.96
Toyota	1.01	0.97	0.97	1.04
Volkswagen	1.07	0.95	0.96	1.00
Volvo	1.02	1.01	0.95	1.01
Value of the level of lability to open innovation				
Fiat	P	NL	NL	NL
Opel	L	NL	L	NL
Toyota	L	NL	NL	L
Volkswagen	L	NL	NL	P

Company	2016/2017	2017/2018	2018/2019	2019/2020
Volvo	L	L	NL	L

Note: L—corporate culture labile to the introduction of open innovations; P—parabiosis of corporate culture; NL—not labile corporate culture of the enterprise, which does not affect the level of change and resistance to the introduction of open innovations.

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