



IMPACT OF CORPORATE ACTIONS ON THE PARAMETERS OF SELECTED INNOVATION DIFFUSION MODELS

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ABSTRACT

The study aims to identify relationships between organisational actions supporting Kaizen-based improvement initiatives and the parameters of selected innovation diffusion models. The paper presents the differences between innovation and the pursuit of excellence in the Kaizen approach, and the similarities in the dissemination of such ideas within organisations.

A case study method was applied, combined with an analysis of the mathematical structure of innovation diffusion models. A comparison was made between activities typical of management system improvement under the Kaizen methodology and, more broadly, Lean management.

The study outcome is the linking of improvement activities with innovation diffusion models in mathematical terms. This provides the ability to rationally steer organisational impact and to develop management systems based on well-established innovation diffusion models.

The proposed solution may be particularly useful for representatives of development and improvement departments, whose task is to increase employee engagement in reporting and adopting new methods, techniques, and ways of working. It also enables forecasting the impact of corporate actions on the outcomes related to the acceptance and application of selected methods.

KEY WORDS

innovation diffusion, Kaizen, innovation diffusion models

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INTRODUCTION

Enterprises across most sectors of the economy are currently undergoing dynamic development. This development is visible not only in core operational areas, such as procurement, production, and distribu-

tion, but also in areas related to occupational safety, information security, and the security of communication between customers and suppliers. As a result, organisations increasingly use a wide range of methods, techniques, and management philosophies to improve the quality and efficiency of their processes. Improvement initiatives may take the form of strate-

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gic innovations or smaller-scale solutions generated by employees through bottom-up initiatives.

In organisations seeking sustained performance improvement, approaches that transform employees' everyday experience into practical improvements are becoming increasingly important. One of the most widely recognised paradigms in this area is Kaizen, understood as continuous improvement through small, iterative changes made close to where value is created. In practice, Kaizen programmes include channels for submitting ideas as well as mechanisms for their selection, implementation, standardisation, and integration into operational routines. Although individual Kaizen initiatives may be limited in scope, their cumulative effect can significantly influence productivity, quality, safety, and customer satisfaction. At the same time, business and management research has developed approaches that explain how new ideas and solutions spread within socio-economic systems. A particularly important role is played by the concept of innovation diffusion, which describes the adoption of novelties over time, the importance of communication, the influence of group norms, and differences among participants in their readiness to adopt new solutions. This perspective helps explain why some solutions gain support quickly, while others encounter resistance despite their potential benefits. It also draws attention to the attributes perceived by users, such as usefulness, compatibility with existing practices, and the possibility of testing a solution before its wider implementation.

The Kaizen and innovation diffusion perspectives converge in the question of how ideas become widely adopted organisational practices. Kaizen may be interpreted as a stream of micro-innovations whose value emerges when they are repeated, refined, and adopted by a larger number of employees or organisational units. In turn, the diffusion perspective provides a conceptual and analytical language for describing how improvements move from initiators to subsequent users, what role opinion leaders play, how communication channels shape adoption, and how attitudes towards a new solution evolve as it becomes more widely disseminated.

In many enterprises, the main challenge is not the absence of ideas, but their effective circulation and adoption. Therefore, questions arise about how to design the pathway from idea submission to implementation, how to ensure rapid feedback, how to align bottom-up initiatives with strategic priorities, and how to avoid situations in which improve-

ments remain limited to individual workstations rather than being disseminated across the organisation.

This article is organised as follows. The literature review presents the theoretical foundations of innovation, innovation diffusion, Lean management, and Kaizen, and discusses the similarities and differences between innovation-oriented change and continuous improvement. The section on research methods explains the case study approach and the analytical procedure used to link organisational practices with selected innovation diffusion models. Results and discussion identify actions supporting the dissemination of Kaizen-based improvement ideas and interpret their potential influence on the parameters of the Bass model, the source model, the contact model, and the contact-source model. Finally, the conclusions summarise the main findings, discuss the implications of the proposed conceptual framework, and indicate the study's limitations.

1. LITERATURE REVIEW

Innovation refers to new solutions, ideas, or technologies introduced into a company to improve products, services, processes, or business models. Their implementation is critical to enhancing competitiveness, efficiency, and long-term company development, regardless of industry or size (Al-Hanakta et al., 2023; Aslam et al., 2023; Ayinaddis, 2023; Cywiński, 2020; Garrido-Moreno et al., 2024). Innovations enable firms to reduce costs, optimise resource utilisation, improve service quality, and better respond to changing customer needs, thereby translating into higher profits and market share (Al-Hanakta et al., 2023; Ayinaddis, 2023; Garrido-Moreno et al., 2024). Active innovation management, encompassing all areas of the organisation, promotes the creation of competitive advantages and ensures financial stability and growth. Ultimately, innovation is a prerequisite for sustainable development, increased competitiveness, and smooth operation in a dynamic market environment (Al-Hanakta et al., 2023; Camilleri et al., 2023; Karaś et al., 2021).

The diffusion of innovation describes how new ideas, technologies, or processes spread within organisations and influence adaptation and further development (Guidolin & Manfredi, 2023; Rogers, 1983; Torma & Aschemann-Witzel, 2023). Rather than a simple, one-way flow from innovators to users, contemporary perspectives emphasise a dynamic,

ecosystem-based process. In this process, all actors (employees, departments, external partners, and customers) contribute to and benefit from innovation (Palm, 2022; Torma & Aschemann-Witzel, 2023; Vargo et al., 2020). This often requires institutional and cultural changes within the company. The impact of innovative activities on internal operations is significant: effective diffusion can streamline processes, improve knowledge sharing, and promote continuous improvement (Gruenhagen & Parker, 2020; Hassan et al., 2024). However, success depends on factors such as organisational structure, openness to change, and alignment of innovation with corporate objectives. Innovation diffusion is not limited to the introduction of new tools but also includes the implementation of new working methods, which may lead to organisations becoming more efficient, flexible, and competitive (Gruenhagen & Parker, 2020; Hassan et al., 2024; Vargo et al., 2020).

Lean and Kaizen are management philosophies originating in Japan that focus on improving business performance through continuous incremental changes (Chen et al., 2023; Ciliberto et al., 2021; Lakshmanan et al., 2023; Simonsen et al., 2023). Lean emphasises the elimination of waste and the maximisation of value, while Kaizen focuses on continuous improvement involving employees at all levels. This is achieved through the principle of 3M and the division of waste into eight categories (Chen et al., 2023; Ciliberto et al., 2021; Cusumano et al., 2021; Hartanti et al., 2022; Lakshmanan et al., 2023; Simonsen et al., 2023). Together, these two approaches foster a culture that achieves significant long-term improvements in productivity, efficiency, and quality through small,

regular enhancements. The implementation of Lean and Kaizen can reduce costs, improve product quality, simplify processes, and bring benefits such as reduced inventory, shorter lead times, and increased employee engagement (Kumar et al., 2018; Sousa et al., 2021).

Importantly, Kaizen is considered a driving force of innovation because it encourages employees to identify and solve problems, adopt new technologies, and improve processes. This can lead to novel solutions and a sustainable competitive advantage in the market. The success of these philosophies depends on strong leadership, effective communication among employees, and their active involvement. This means that Kaizen and Lean are not merely a set of tools, but transformational cultural changes within organisations (Chen et al., 2023; Ciliberto et al., 2021; Hartanti et al., 2022; Simonsen et al., 2023).

There is a similarity between implementing innovations and activities based on Kaizen and Lean. Both concepts are associated with improving processes or systems to achieve higher profits, greater efficiency, market competitiveness, or brand recognition among customers. Nevertheless, these approaches differ in many other respects, which may stem, among other things, from different management styles. The Japanese (creators of Kaizen) focus on product and process excellence, whereas Europeans and Americans emphasise product modernity (Franken et al., 2021; Garrido-Moreno et al., 2024; Malinova et al., 2022; Sahmi & El Abbadi, 2024).

Table 1 provides a structured comparison between innovation and the Lean/Kaizen approach, emphasising the distinct mechanisms through which

Tab. 1. Comparison of differences between innovations and the Kaizen approach

DIFFERENCE	INNOVATION	KAIZEN / LEAN
Mode of change	A sudden change that employees must accept and start applying.	Change is introduced gradually by all employees.
Implementation effect	Desire to achieve rapid results and profits - effect oriented towards strategic gains.	Kaizen is introduced in the long term so that the approach can be utilised in the company for as long as possible.
Pace of implementation	Fast and abrupt; large-step approach.	Gradual and steady; small-step approach.
Participation	Selected individuals from the company, specialists, and external firms.	All employees of the organisation.
Approach	Individualism and the expertise of specialists from a given field.	Emphasis on teamwork and the knowledge of individuals with a general profile.
Subject of change	New inventions, technologies, production techniques, etc.	Expanding and improving the existing infrastructure.

Source: author's elaboration on the basis of (Franken et al., 2021; Garrido-Moreno et al., 2024; Malinova et al., 2022; Sahmi & El Abbadi, 2024).

each concept supports organisational development. The table shows that innovation is commonly linked with discontinuous, technology-driven change implemented in a relatively short time horizon and often coordinated by selected experts or external specialists to achieve rapid, strategic outcomes. In contrast, Lean/Kaizen is based on continuous improvement through incremental modifications embedded in everyday work practices and broadly supported by employees across the organisation. Consequently, while innovation tends to reconfigure processes through substantial and abrupt interventions, Kaizen primarily strengthens performance by systematically refining existing structures and routines over the long term.

Examples of activities undertaken within Lean and Kaizen, whose diffusion within the organisation closely resembles the spread of innovations through innovation diffusion, include the 5S method, SMED, and Six Sigma. These three techniques will be outlined concisely to show how their operational logic shares many common features, particularly in the areas related to work improvement, waste elimination, and process organisation. Presenting them in a single overview makes it possible to emphasise that, despite their different applications and tools, they all support the development of an environment conducive to bottom-up improvement initiatives. At the same time, such a comparison is intended to facilitate the understanding that even simple changes can be implemented by a wide group of employees, which constitutes an important stimulus to undertake similar daily actions.

The 5S method is used for the proper and rational management of resources at the workplace or in its immediate environment (shared spaces, corridors, social rooms, etc.). Its name derives from the five steps that must be taken in the correct order to introduce order and efficiency in the organisation of the workplace. The method consists of the following actions: sort, set in order, shine, standardise, sustain (Bogdan et al., 2021; Manzanares-Cañizares et al., 2022; Mazur et al., 2024; Moro, 2024). In the 5S method, the human factor is of critical importance. The successful implementation and maintenance of this method depend on people. Therefore, it is essential for management and those responsible for Lean within the company to take action to encourage employees and to forecast the implementation timelines (Manzanares-Cañizares et al., 2022; Mazur et al., 2024).

The SMED method (Single-Minute Exchange of Die) is a concept aimed at reducing machine change-

over and setup times to a maximum of nine minutes. It should be noted that such a short time will not always be physically achievable; however, the proper application of this method can significantly reduce changeover times (Garcia-Garcia et al., 2022; Junior et al., 2022; Kose et al., 2022; Niekurzak et al., 2023). The SMED method can be divided into four main stages implemented by employees responsible for maintenance. The process involves employees identifying all changeover activities, then categorising them as external or internal. In subsequent stages, they consider how to accelerate changeovers and, in the long run, continuously seek improvement solutions (Dąbrowska & Jokiel, 2023; Garcia-Garcia et al., 2022; Hys & Domagała, 2021; Kose et al., 2022; Maalouf & Zaduminska, 2019; Niekurzak et al., 2023). Proper implementation and sustainability of this method require the involvement of a significant number of employees and specialists, whose engagement and willingness to perform their duties must be ensured.

Six Sigma differs slightly from the Lean and Kaizen concepts. It focuses primarily on achieving the highest possible quality and minimising defects. Of course, all these approaches share the same main goal: increasing the efficiency of the entire enterprise, boosting profits, and enhancing customer satisfaction (Fan, 2024; Gomaa, 2023). An inseparable part of the Six Sigma method is DMAIC, which is aimed at optimising existing business processes. It consists of stages related to defining tasks and objectives, measuring necessary indicators, analysing numerical data, improving processes, and continuous monitoring (Gomaa, 2023; Sasikumar et al., 2023; Wolniak & Grebski, 2023).

The identified research gap primarily concerns aspects related to specifying the activities that enhance the dissemination of Kaizen ideas within departments and across entire enterprises. As can be observed from the description of the selected techniques, each of them requires an approach based on convincing as many people as possible to begin a new practice and to change their habits. This process closely resembles innovation diffusion, which involves spreading information about an innovation through various channels. Although numerous studies describe improvements in operational performance - such as reductions in cycle time, increases in productivity, or decreases in the number of defects - these indicators refer to the magnitude of effects rather than to the temporal dynamics of how Kaizen innovations disseminate across organisational units,

hierarchical levels, or processes. The literature therefore lacks clear guidance on how specific actions may support or hinder the spread of information about Kaizen activities and how these actions influence the effectiveness of Kaizen implementations.

From a theoretical perspective, this study attempts to bridge two research streams that are rarely analysed together. On the one hand, the literature on Lean management and Kaizen focuses primarily on operational improvements and organisational culture. On the other hand, innovation diffusion research concentrates on the mechanisms through which new ideas spread within social systems.

The present study connects these two perspectives by interpreting typical Lean and Kaizen activities as organisational mechanisms influencing the parameters of innovation diffusion models. In this way, actions undertaken within enterprises can be understood as factors affecting the dynamics of innovation dissemination described by classical diffusion models. Such an approach makes it possible to interpret micro-level managerial practices through the lens of formal diffusion theory.

There is a need to develop an evaluation framework for assessing the diffusion potential of organisational improvement initiatives based on the Kaizen methodology, using achievements from the field of innovation diffusion. This would allow the application of well-established approaches to innovation diffusion while leveraging the benefits these methods offer, namely, forecasting, risk analysis, and the anticipation of consequences in the field of organisational development based on Lean techniques and the Kaizen approach.

The objective of the study is exploratory in nature and focuses on identifying possible analogies between organisational practices and the parameters of selected innovation diffusion models. Rather than aiming at statistical generalisation, the study seeks to interpret how typical managerial actions related to Kaizen initiatives may influence the mechanisms described in classical diffusion models. This will be achieved through the following research questions:

1. Which models of innovation diffusion best describe the diffusion of Kaizen ideas?
2. What are the most commonly used measures to support the spread of Kaizen ideas within an organisation?
3. How do the taken measures affect the parameters of mathematical models of innovation diffusion?

2. RESEARCH METHODS

The case study method was applied to analyse the functioning of the Kaizen approach as a method supporting organisational innovation processes. Case studies, as a monographic research approach, are commonly used in qualitative social research to provide an in-depth description and interpretation of complex organisational phenomena (Matejun, 2011). This method is widely applied in economics, sociology, and management sciences, particularly when the research aims to understand mechanisms occurring in real organisational contexts (Czakon, 2006; Donajewska, 2016; Matejun, 2011; Mielcarek, 2014; Pizło, 2009).

In the present study context, the case study method was used primarily as an exploratory research strategy. The objective of the research was not to obtain statistically representative results but to identify typical organisational practices that may influence the diffusion of improvement ideas within enterprises. In management sciences, case studies are frequently used to analyse complex managerial processes and to develop conceptual links between observed practices and theoretical constructs. Therefore, the purpose of applying this method in the present study was to identify mechanisms that may influence the dissemination of Kaizen initiatives and to interpret these mechanisms using selected innovation diffusion models.

The empirical part of the study focused on three manufacturing enterprises. The research was conducted between 2022 and 2024 and involved observing improvement activities, analysing internal documentation related to Kaizen programmes, and conducting informal interviews with employees responsible for operational excellence initiatives. The companies operate in the industrial sector and represent medium-sized organisations employing several hundred employees. Their production systems are characterised by small-batch linear production supported by logistics, product development, and customer service functions. Each organisation has implemented Lean management principles and maintains internal structures responsible for coordinating continuous improvement initiatives.

The companies were selected intentionally to ensure a comparable organisational context in terms of production structure, organisational size, and the level of implementation of Lean practices. Such a selection made it possible to focus on identifying

typical mechanisms supporting the dissemination of improvement initiatives rather than analysing differences resulting from structural characteristics of the enterprises.

To examine the functioning of improvement activities within these organisations, several qualitative research techniques were applied. These included observation of improvement-related activities, participant observation, workday observation, and the analysis of internal documentation related to Lean and Kaizen initiatives. These methods allowed the researchers to capture both formal and informal practices supporting the dissemination of improvement ideas within the organisations.

Based on these analyses, a set of organisational actions to accelerate the spread of improvement ideas within enterprises was identified. The identification of these actions was based on qualitative analysis combining several sources of information, including internal documentation related to Lean initiatives, observation of the work of departments responsible for operational excellence, and discussions with employees involved in Kaizen programmes. The analysis focused on identifying recurring practices that explicitly aimed to increase the dissemination of improvement ideas within the organisation.

In addition to the empirical analysis, the study also applied an analytical approach based on innovation diffusion models. The purpose of this analysis was to interpret the identified organisational practices through the lens of formal models describing the diffusion of innovations (Brdulak et al., 2021; Fant et al., 2023; Kot et al., 1993; Mahajan, Muller, & Bass, 1990; Mahajan, Muller, & Srivastava, 1990; Mahajan & Peterson, 1985; Mitra et al., 2020).

To achieve the aim of the study, the organisational actions identified in the analysed enterprises were interpreted in relation to the parameters of selected innovation diffusion models (Brdulak et al., 2021; Fant et al., 2023; Kot et al., 1993; Mahajan, Muller & Bass, 1990; Mahajan, Muller & Srivastava, 1990; Mahajan & Peterson, 1985; Mitra et al., 2020; Ramírez-Solis & Rodríguez-Marin, 2022). This made it possible to analyse how specific managerial practices may influence the mechanisms described by these models and how organisational actions can potentially affect the parameters responsible for the speed and effectiveness of innovation diffusion.

Thus, the methodological approach adopted in the study combines empirical observations from real organisational environments with theoretical analysis based on mathematical models of innovation diffusion.

3. RESEARCH RESULTS

To identify relevant practices, a review of documentation and observation of the work of departments supporting Lean philosophy activities were conducted. As a result, 19 action types aimed at accelerating the spread of ideas within the organisation were identified. These actions represent a synthetic set of the most frequently recurring practices observed in the analysed enterprises and were selected because they explicitly aimed to support the dissemination of improvement ideas within the organisation. The purpose of identifying these practices was not to provide an exhaustive catalogue of possible actions but to illustrate typical organisational mechanisms that may influence the dynamics of innovation diffusion within enterprises.

The identification of these actions was based on a qualitative analysis combining several sources of information, including internal documentation related to Lean initiatives, observation of improvement activities carried out by departments responsible for operational excellence, and discussions with employees involved in Kaizen programmes.

This set of actions is very broad. One group that can be distinguished involves relatively simple and almost automatic initiatives that can be implemented within a company. Within this group, the following actions were identified: employee mailing with descriptions of new solutions, posting information about new solutions, introduction of Kanban boards, introduction of idea submission programmes, meetings for presenting new solutions, inclusion of employee feedback in the idea creation process, and regular meetings and brainstorming sessions about ideas.

On the other hand, more complex actions were also identified, such as increasing the size of project teams, rewarding employees for encouraging colleagues to adopt new solutions, creating an online platform for idea submission, establishing coworking spaces, co-financing training, creating platforms for idea gamification, introducing an innovation day within the company, implementing employee rotation between departments, organising recurring Lunch & Learn sessions, increasing the budget for generating and supporting employee ideas, introducing cross-departmental shadowing programmes, and organising training and lectures between department members. Such initiatives require significantly greater financial resources as well as additional involvement

from those responsible for innovation and new solutions. To implement them, Lean-supporting departments within the organisation must secure additional funding and carry out supplementary projects, from which these initiatives emerge.

The identified actions also differ in terms of the degree of management or development department involvement. For example, activities such as establishing coworking spaces, cross-departmental training, or employee rotation between departments create interactions exclusively among staff members. Management initiates such actions but does not participate directly. This means that the flow of knowledge and experience regarding new solutions and innovations occurs horizontally, i.e., among employees at the same level. This approach facilitates and simplifies communication while stimulating cooperation and knowledge sharing. Such modes of action will also be reflected in the impact on specific parameters of innovation diffusion models.

Another activity type is initiated and carried out by management or development departments. These include, for example, employee mailings about changes, co-financing of training, regular meetings with management, and brainstorming sessions. Through such activities, vertical communication occurs, i.e., from management to employees. This communication is more formal and contains more detail than the horizontal communication described above, but it may not be as impactful as peer-to-peer experiences. Such activities will be reflected in the coefficients responsible for the level of innovativeness and the effectiveness of managerial actions.

There are also activities that combine the above approaches. The best example is the use of platforms or applications for gamification. Gamification involves introducing elements of competition, known from computer games, into the business environment. Through gamification platforms, management can convey information to employees and promote implemented approaches. At the same time, communication among the participants (i.e., co-workers) is also possible.

As can be seen, there are many activities introduced in enterprises to increase the effectiveness of new solutions and innovations. It should also be emphasised that more advanced solutions take the form of projects, the outcomes of which must also be promoted within the company. This means that for employees to begin using the aforementioned gamification platform, it must first be properly promoted through other activities.

In the literature, numerous formal approaches to innovation diffusion can be found; however, in research and implementation practice, models with the simplest possible structure, unambiguous parameter interpretation, and good adaptability across industries and types of technologies most often recur. For this reason, the article adopts four approaches considered the most universal: the Bass model (Brdulak et al., 2021; Guidolin & Manfredi, 2023; Mahajan & Peterson, 1985; Sharif & Ramanathan, 1982; Singhal et al., 2019; Skiadas, 1985), the source model, the contact model, and the contact-source model (Kot et al., 1993). Their popularity stems from several shared features.

First, these are models with a small number of parameters that have a clear behavioural and managerial interpretation. Owing to this, they are suitable both for academic research and for forecasting applications within organisations. In these models, parameters can be linked to adoption mechanisms: external influence (e.g., marketing, regulations, and communication media) and social influence (e.g., recommendations, user observation, pressure). Such interpretability is one of the reasons why these constructs are widely used in diffusion research (Brdulak et al., 2021; Guidolin & Manfredi, 2023; Mahajan, Muller, & Bass, 1990; Mahajan & Peterson, 1985; Ramírez-Solis & Rodríguez-Marin, 2022).

Second, all four models adequately describe the typical temporal pattern of adoption, that is, the increase from the early phase to saturation, often observed as an S shaped curve. Regardless of whether the subject is a consumer product, an industrial technology, or a digital solution, the mechanism of transition from “potential users” to “users” usually leads to a slowdown in growth as the saturation level of the population is approached. Although the applied equations differ in their assumptions, they all formalise this intuitive representation of diffusion precisely.

In the article, other classes of models - such as econometric time-series models (Kotthoff & Hamacher, 2022), Kinetic Innovation Diffusion (Masali et al., 2025), and network-based threshold and independent-cascade models (Guidolin & Manfredi, 2023) - were excluded. The reason is that the study is qualitative and aims to show the direction of the enterprise's influence on meaningfully interpretable diffusion parameters, rather than to fit the adoption trajectory to data. Econometric and statistical models are primarily predictive tools based on estimation from a sequence of observations; they therefore require time-series data and model structure

Tab. 2. Mathematical descriptions of innovation diffusion

MODEL NAME	EQUATION	EQUATION NO.
Bass model	$\frac{dN(t)}{dt} = p[m - N(t)] + \frac{q}{m} N(t)[m - N(t)]$ where: • N(t) - number of users adopting the technology at time t, • t - time, • m - maximum number of technology users, • p - innovation coefficient, • q - imitation coefficient.	(1)
Source model	$\frac{dy}{dt} = k(n - y)$ where: • y - number of users adopting the technology at a given time, • t - time, • n - size of the considered population, • k - proportionality coefficient.	(2)
Contact model	$\frac{dy}{dt} = ay(n - y)$ where: • y - number of users adopting the technology at a given time, • t - time, • f - effectiveness of persuading innovation supporters, • l - number of contacts per individual per unit of time, • $a = \frac{fl}{n} = \text{const.}$	(3)
Contact-source model	$\frac{dy}{dt} = ay(n - y) + k(n - y)$	(4)
		(5)

Source: author's elaboration on the basis of (Fant et al., 2023; Guidolin & Manfredi, 2023; Kot et al., 1993).

Tab. 3. Description of the coefficients of selected innovation diffusion models

MODEL NAME	COEFFICIENT NAME	THEORETICAL DESCRIPTION
Bass Model	Imitation Coefficient (Q)	Represents the influence of interactions among members of society and the effectiveness of word-of-mouth marketing.
	Innovation Coefficient (P)	Represents the impact of organisational marketing activities on society.
Source Model	Proportionality Coefficient (K)	Represents the susceptibility of the population to the influence of the source.
Contact Model	Persuasion Probability (F)	Effectiveness of persuading innovation supporters (expressed as persuasion probability).
	Number of Contacts (L)	Number of contacts made by an individual per unit of time.
Contact-source model	Combination of coefficients from the source and contact models	

Source: author's elaboration on the basis of (Fant et al., 2023; Guidolin & Manfredi, 2023; Kot et al., 1993; Mahajan, Muller, & Bass, 1990).

selection, and their parameters describe statistical relationships (autocorrelation, seasonality, and the influence of explanatory variables).

Thanks to the analyses, participant observations, and comparison of individual case studies, it was possible to prepare a summary outlining the occur-

rence of specific actions and their correlation with the coefficients of innovation diffusion models (Table 4).

In this summary, the mixed (contact-source) model was omitted, since it represents only a combination of the source and contact models. If a particu-

Tab. 4. Examples of actions and their impact on the coefficients in selected innovation diffusion models

No.	ACTIONS	BASS MODEL		SOURCE MODEL	CONTACT MODEL	
		IMITATION COEFFICIENT (Q)	INNOVATION COEFFICIENT (P)	PROPORTIONALITY COEFFICIENT (K)	PERSUASION PROBABILITY (F)	NUMBER OF CONTACTS (L)
1.	Mailing to employees with a description of new solutions		✓ Influence on employees by management	✓ Influence on employees by management		
2.	Posting information about new solutions		✓ Influence on employees by management	✓ Influence on employees by management		
3.	Increasing the size of project teams					✓ Increasing team size raises the number of contacts between employees.
4.	Rewarding employees for persuading colleagues to adopt new solutions	✓ Greater interaction between employees and word-of-mouth marketing.			✓ Increased likelihood of recommendations through reward mechanisms.	
5.	Introduction of Kanban boards		✓ Direct managerial influence on employees.	✓ Management action aimed at informing employees.		
6.	Introduction of an idea submission programme	✓ Exchange of information increases interaction between employees.			✓ Higher persuasion effectiveness upon programme implementation.	
7.	Creation of an online platform where every employee can submit ideas	✓ Exchange of information increases interaction between employees.			✓ Higher persuasion effectiveness upon programme implementation.	
8.	Meetings for the presentation of new solutions	✓ Exchange of information increases interaction between employees.			✓ Higher persuasion effectiveness upon programme implementation.	✓ Meetings can involve a larger number of employees.
9.	Creation of coworking spaces	✓ Exchange of information in coworking areas increases interaction between employees.				✓ Coworking spaces provide opportunities for a greater number of contacts.
10.	Funding of training programmes		✓ Direct managerial influence on employees.	✓ Direct managerial influence on employees.		
11.	Platforms for idea gamification	✓ Exchange of information on the platform increases interaction between employees.	✓ Direct managerial influence on employees.	✓ Direct managerial influence on employees.	✓ Increased persuasion effectiveness among colleagues on the platform.	✓ The platform provides opportunities to expand contacts among employees.

No.	ACTIONS	BASS MODEL		SOURCE MODEL	CONTACT MODEL	
		IMITATION COEFFICIENT (Q)	INNOVATION COEFFICIENT (P)	PROPORTIONALITY COEFFICIENT (K)	PERSUASION PROBABILITY (F)	NUMBER OF CONTACTS (L)
12.	Introduction of an Innovation Day in the company		✓ Direct managerial influence on employees.	✓ Direct managerial influence on employees.		✓ Additional interactions possible during Innovation Day.
13.	Employee rotation between departments	✓ Exchange of information between departments increases interaction among employees.				✓ Rotation enables employees to establish new contacts across departments.
14.	Considering employees' feedback in the idea generation process				✓ Actions consulted with employees have a greater chance of persuading others.	
15.	Lunch & Learn sessions	✓ Sessions facilitate information exchange between employees.			✓ Sessions increase the likelihood of persuading colleagues to adopt new ideas.	✓ Sessions generate new contacts among employees.
16.	Increasing the budget for idea creation and support		✓ Direct managerial influence on employees.	✓ Direct managerial influence on employees.		
17.	Regular meetings and brainstorming sessions on ideas		✓ Direct managerial influence on employees.	✓ Direct managerial influence on employees.		
18.	"Shadowing" programme between departments				✓ Higher persuasion effectiveness upon programme implementation.	✓ Programme participation can involve a larger number of employees.
19.	Organisation of inter-departmental lectures and training	✓ Training improves information exchange among employees.			✓ Training increases the likelihood of persuading colleagues to adopt new ideas.	✓ Training generates new contacts among employees.

Source: elaborated by the authors.

lar action influences the value of a coefficient, then as the effectiveness of that action increases, the given coefficient will also rise. This translates into greater effectiveness of the diffusion of a given idea. Not all

actions affect all coefficients, but for each coefficient, it was possible to identify at least one influencing action.

In the table cells located at the intersection of actions and the corresponding coefficients of innova-

tion diffusion models, it is indicated whether a given action can be used to determine particular coefficients. For each identified relationship between an action and a coefficient, the reason for considering this link significant is also provided.

4. DISCUSSION OF THE RESULTS

The above table does not illustrate all the activities undertaken by enterprises, but only those that are currently the most popular in the economic environment and were identified in the analysed companies. The most common methods appear to be those related to rewarding employees who submit ideas, introducing Kanban boards, as well as conducting training and increasing budgets for such initiatives. The table indicates whether a given activity has a positive impact on a particular coefficient of selected diffusion models. This distribution varies and depends on the methodological approach.

The results presented in the article are qualitative and focus on how organisational actions may strengthen or weaken the parameters of classical diffusion models (the Bass model, the source model, the contact model, and the contact-source model). This perspective is consistent with a stream of research in which differential equation models serve not only forecasting purposes but also provide a structured description of the mechanisms driving the spread of innovations. Guidolin and Manfredi (2023) indicated that historically, formal approaches to diffusion have often been based on epidemiological analogies and extensions of the Bass model, while attention has remained focused on diffusion barriers, the role of social communication (word of mouth), and the influence of managerial and public interventions on the course of the process.

In the interpretation adopted by Brdulak et al. (2021), the actions undertaken by an enterprise are treated as factors that shift the intensity of external and social influence, corresponding respectively to the components of innovativeness and imitation. This way of thinking aligns well with how the Bass model is frequently applied in scenario-based studies. The authors, combining Rogers's concept with the Bass model, construct diffusion scenarios for e mobility across different country groups, emphasising that diffusion parameters can be interpreted through the lens of market conditions, communication, and user readiness.

Palm (2022) proposed the Diffusion Innovation System (DIS) framework, noting that diffusion approaches often insufficiently account for the context of institutions, infrastructure, and supply side factors, while diffusion itself co shapes these elements through feedback loops. In DIS, particular emphasis is placed on areas such as institutional adjustment, infrastructure expansion, the emergence of market segments, and the formation of value chain modules. The findings discussed in the article align with this line of reasoning but shift the focus to the level of the enterprise. Kaizen is, by its nature, an internal and operational practice and therefore does not replace the systemic components of DIS, such as regulations or infrastructure.

CONCLUSIONS

As demonstrated in this study, many techniques used in Lean and Kaizen implementation exhibit mechanisms similar to those observed in innovation diffusion processes. The outcomes of these activities must be promoted within part or all of the organisation. This implies that the results of Lean and Kaizen methods undergo diffusion processes similar to those of innovations. The feature linking these two approaches is enterprises' ability to take various actions that accelerate diffusion. In the case of innovation diffusion in the market, such actions can be directly referred to as marketing, while in the case of intra-organisational activities, they take the form of development initiatives or support actions.

This fact was also observed under real-world conditions during the analyses, participant observations, and case comparisons conducted in selected manufacturing enterprises. Within these activities, a range of practices was identified to increase the speed of information diffusion within the company. These practices can be divided into three categories: those supporting the exchange of experience among employees, those promoting solutions "from the top," and those combining both approaches.

An analysis of mathematical innovation diffusion models identified different approaches to diffusion. These can be described using various models (in this study: the Bass model, the source model, the contact model, and the mixed contact-source model) as well as through different coefficients that correspond to specific organisational behaviours. In this study, the identified practices supporting the spread of information within companies were matched with the indica-

tors of selected mathematical innovation diffusion models.

Analysing the results concerning the impact of corporate actions on accelerating innovation diffusion allows several conclusions to be drawn about the actions themselves and their effects on diffusion.

In the Bass model, the values of the innovation coefficient (P) and imitation coefficient (Q) are not influenced by a large number of possible actions. However, if we consider that each action impacts the model as a whole, it turns out that more than 80% of the identified actions may affect the values of the parameters in the Bass model. This demonstrates a certain universality and simplicity of the model and confirms why it is so frequently cited in the literature as a good reflection of reality.

By contrast, both the source model and the contact model proved to have the least coverage across the identified actions, since fewer than half of the possible actions influence each of the three parameters in these models. This indicates low flexibility and limited practical applicability. However, considering the mixed contact-source model as a combination of the two, it turns out that each of the identified actions translates into one of the parameters: proportionality coefficient (K), persuasion probability (F), or number of contacts (L).

Some actions may also positively affect several parameters simultaneously, thereby exerting an even stronger impact on diffusion. Altogether, this indicates that the mixed contact-source model constitutes the best approach for representing the process of innovation diffusion under real conditions. Its structure is sufficiently flexible to allow the shaping of parameter values in a way that enables the model to accurately reflect real-world relationships.

The range of actions supporting the diffusion of ideas is very broad. They not only improve the level of communication about new initiatives among employees but also enhance their innovativeness. While informing about novelties is a relatively simple activity, building an innovation- and idea-driven approach is more challenging. It requires significant financial and human resources - additional training, sessions, programmes, and platforms are necessary. However, merely creating such conditions does not guarantee success, as the main factor driving innovation is the employees themselves. An additional action that could be included in the previous table is the effectiveness of the HR department, since it largely determines which employees are hired and what (positive

or negative) impact they will have on the development of innovation and ideas.

When representing the process of innovation diffusion using proprietary models that assume different coefficients and varying impacts on the flow process, it is essential to ensure the appropriate selection of these parameters. For this purpose, it is necessary to use historical data collected by the enterprise, based on which it is possible to choose such a combination of input parameters that will reproduce historical results.

A limitation of the presented approach, shown in the form of the summary in Table 4, which aligns typical improvement actions with the coefficients of innovation diffusion models, is the lack of a clear indication of the degree of influence that each action exerts on the diffusion process. It is difficult to determine coefficient values without knowledge of the current realities of the enterprise, such as organisational culture, employee integration level, or ongoing initiatives supporting diffusion.

All estimations of diffusion speed should therefore be carried out by simulating different scenarios with various input parameters, which should be defined in advance based on historical data. Such an approach also makes it possible to calculate the difference between the expected benefits and the costs to be incurred. In this way, the most advantageous strategy can be selected.

The presented analysis has an exploratory character and is based on a limited number of case studies. Therefore, the results should be interpreted primarily as a conceptual framework illustrating possible relationships between organisational practices and the parameters of innovation diffusion models rather than as statistically generalisable findings. The study does not estimate diffusion parameters empirically; instead, it proposes a conceptual mapping between organisational practices and model coefficients.

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