

# Metrics for Measuring Innovation in Food Industry Enterprises From Romania: Key Performance Indicators

Ioana Maria Popescu (Iacobescu)<sup>1</sup>, Rodica Pamfilie<sup>2</sup>, Iuliana Zavatin (Chilea)<sup>3</sup>  
and Rodica Ștefănescu (Lupu)<sup>4</sup>

<sup>1)2)3)4)</sup> Bucharest University of Economic Studies, Bucharest, Romania.

E-mail: popescuim@yahoo.com; E-mail: rodica.pamfilie@com.ase.ro

E-mail: iuliana.chilea@gmail.com; E-mail: rodica.lupu@loopoperations.ro

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## Abstract

The process of innovation within the food sector is very complex, requiring the empowerment of employees, interdepartmental collaboration, and engagement from senior management. Next to a well-defined strategy, the implementation of a tracking system for key performance indicators (KPIs) has the potential to facilitate a successful path to business development. This approach facilitates the convergence of individuals with varying perspectives, enabling the exchange of ideas and strategies. The objective of the paper is to highlight the key performance indicators for measuring the impact of innovations in business to support food organizations in Romania. For that we will analyze the conclusions of an empirical research on the concepts of design and innovation, next to models of business for performance growth through innovation and the conclusions of a comparative analyze on small, medium and big enterprises from Romanian food industry. As part of our project, we will identify the main factors that should be considered for defining the key performance indicators. Indicators for evaluating the impact of innovation in organizations include, revenues brought by innovative products or services, market share increase, feedback from consumers, operational efficiency, costs reduction, number of patents obtained and employee satisfaction. In the second part of indicators description, we will detail the discussion on the innovation share indicator, defined by OSLO manual, applied to food sector. In a previous comparative analysis, we have identified the opportunities and risks for business development through innovation, and corroborating all the analyzes carried out, we want to point out the main indicators for measuring innovations in food production businesses. Possible practical implications could be the use of the KPIs in the development of a model for evaluating and monitoring the performances generated by innovation in businesses from food industry. This Model is intended to be applicable to food enterprises of all sizes.

## Keywords

Innovation, innovation measurement, process innovations, turnover growth, business development.

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## Introduction

Romania is considered a moderate innovator country with good and encouraging elements related to innovation. In the previous article regarding the development of Romanian businesses and the impact of innovations in their development, after analyzing the available data from the National Statistical Institute, we have concluded that innovative companies consistently contribute to the overall increase of companies' turnover and 82% of turnover growth is attributed to innovative companies (Popescu (Iacobescu), 2021).

Even if Romania has poor performance in its research and development (R&D) system, with patent applications below the average, it excels in exporting technologically advanced services or products. One possible reason for this phenomenon could be attributed to the impact of foreign direct investments on exports (Adam, 2014). At the same time, upon examining the Romanian food industry, it becomes noticeable that it is primarily dominated by small companies that lack the capacity to expand and increase

their product availability. Meanwhile, there is a steady rise in product imports, while investments in expansion are primarily made by large companies that already possess superior national distribution.

Exploratory research was conducted in Romania (Popescu (Iacobescu et al., 2023) to examine the approach to innovation in food organizations. The research focused on five key themes: the definition of innovations by organizations, the types of innovations developed, the implementation and management of innovation, the methods used to measure the impact of innovations in business, and the strategy for managing innovation.

A comparison analysis was conducted after the completion of the investigation, with a focus on the size of the organizations. The analysis was conducted on both small and medium firms and large organizations simultaneously. The investigation aimed to discover advantageous components of innovation management.

The study identified 14 similarities and 10 distinctions in the definition and process of innovation across small and medium-sized firms and large organizations. (Popescu (Iacobescu) et al., 2023).

One additional factor that requires our attention is the safeguarding of ideas from competitors and the promotion of more patent applications (Kim and Mauborgne, 2005). In addition to this, the promotion of the philosophy "high class with low cost" can be achieved through the optimization of processes, reduction of production costs, and the attainment of products that are both of high quality and affordable. Ensuring the security of innovations and local enterprises can be effectively achieved by prioritizing execution, as highlighted by Doerr (2018).

## 1. Review of the scientific literature

In the realm of innovation management, the following elements should be taken into account: the design of project management, an integrated approach, portfolio management, accurate organization description, competence management, support, knowledge management, technical intelligence, network administration, collective education, innovation and creativity, and customer relationship management (Boly et al., 2014).

Innovation in society manifests as novel methodologies and activities that tackle many societal requirements, including the labor market, working circumstances, education, health, and community development. Organizations can enhance the performance of their innovation processes by focusing on using external innovation resources and implementing innovation principles (Olaru et al., 2015). Unlike the typical revenue growth rates of 5% to 10%, innovation projects generate an additional revenue of 6 to 30%, with an average of nearly 20%. Good innovation management provides a significant advantage (Maier, et al., 2019).

Through product innovation, the business can obtain a competitive edge, boost demand, and generate chances for growth by differentiating its manufacturing and improving the quality and variety of its products (Suzianti, 2005; Brad, 2010; Camisón and Villar López, 2010). According to Takacs (2018) and Koc (2007), effective innovation management is important, and it necessitates the allocation of resources towards strategic thinking methodologies and the cultivation of diverse cultural environments. In addition to this, a well-defined strategy and innovation KPIs monitoring are important for the organization development. (Becheikh, et al., 2006).

In this study, the definition of innovations was outlined using the OSLO Manual definition, which, starting from 2018, categorized innovation into two distinct groups. 1) Product innovation; 2) Process innovation (OECD, 2018). The prior guidebook encompasses many types of process innovations, namely organizational, marketing, and process innovation. Based on the OSLO Manual published by the OECD in 2005, innovations were categorized into four distinct groups prior to 2018. These categories included product innovation, process innovation, marketing innovation, and organizational innovation.

## 2. Research methodology

In order to study the way innovation is approached by the food organizations in Romania, we will analyze the conclusions from comparative empirical research between organizations in the food industry that have innovation identified as a pillar of development, on the Romanian market.

The empirical research was conducted, between, December 2022 until March 2023, the data were gathered over a period of three months, from a total of 54 organizations. The survey was administered to businesses operators in the Romanian food industry, consisting of a total of 26 questions. The primary objective of the study was to enhance comprehension regarding the conceptualization and execution of innovation inside Romanian enterprises.

The study was organized into five distinct sections:

- Defining innovations: the process of defining innovation inside enterprises
- Classification of Innovations: An examination of implemented innovations within organizational contexts.
  - The management and implementation of innovation
  - The measuring of innovations: an examination of the employed measurement methodologies.
  - The strategic approach in the management of innovation.

### 3. Results and discussion

The research was carried out on a sample of 54 firms, with 18.5% classified as micro enterprises (comprising less than 10 employees), 22.2% as small enterprises (comprising 10-49 employees), 31.5% as medium-sized organizations (comprising 50-249 employees), and 27.8% as large enterprises (comprising more than 250 people). In terms of turnover, 48% of the enterprises surveyed had a turnover exceeding 2 million Euros, while the remaining 52% have a revenue below 2 million Euros.

By examining how food sector organizations handle innovation, we uncover important factors that need to be considered when setting the main key performance indicators for innovation performance.

- The organization's vision regarding innovation and the treatment of innovation within the company have been influenced by the implementation of a quality management system or another system that supports quality management in its processes. 85% of the interviewed companies consider that they are innovative, 69% have a quality management system implemented.

- Enacting strategic modifications to foster innovation. In relation to organizational typologies, it is advisable for organizations to consider incorporating groups or multifunctional working teams alongside regular brainstorming sessions to facilitate the generation of ideas for business enhancements. In our research, according to companies' management, innovation is considered: strategic and was included in the planning process by 34% of the companies, a permanent activity by 45% of the companies or a sporadic activity, without planning by 21% of the companies.

- When it comes to the types of new products launches, it is important for all organizations to consider both standardized products, which are offered in a uniform manner to diverse consumers, and products that are specifically designed to meet the demands of individual consumers through customization.

- The primary focus of the company should be on introducing new products.
- Innovation within a business, as perceived by its management, should be regarded as a strategic activity that is incorporated into the annual planning process.
- Innovation refers to the introduction of new products within the past 2-3 years.
- Innovation is a continuous and ongoing activity.

The post-launch analysis of new products includes the examination of several variables, including:

- revenues and quantitative sales
- market share growth
- numerical and weighted distribution of new products
- shelf rotation of new items
- the influence of marketing activities
- financial outcome

Revenues refer to the monetary worth produced by recently introduced products or services and it is advisable to track them monthly. It is recommended to engage in revenue planning for innovations and subsequently compare the actual values with the planned values.

Market share growth is a metric that serves as an indicator of the level of market acceptance relating to newly introduced products. Monitoring can be conducted several months after the introduction, and it is advisable to emphasize the impact of the newly launched products on the market. To enhance clarity, a more comprehensive analysis might be conducted over an extended duration, potentially crossing a year,

contingent upon the level of market maturity in which the new products or services are introduced and executed. Penetration, which refers to the number of consumers, customers, or households that have purchased the new product, is another influential aspect that impacts market execution and the development of market share.

The acquisition and satisfaction of customers play a crucial role in the advancement and success of new products or services. User feedback holds significant value and can be obtained through several methods such as surveys, online reviews, discussion groups, or direct encounters with users. Feedback offers valuable understanding of consumers' perceptions and usage of products, and comprehending their requirements and experiences can inform subsequent enhancements and the creation of new features. Feedback and customer satisfaction serve as valuable mechanisms for leveraging existing achievements and can also serve as catalysts for fostering future advancements. The ongoing practice of actively engaging with customers and adjusting strategies to meet their demands plays a significant role in constructing a portfolio that aligns with consumer preferences and fostering the creation of new and inventive product concepts.

Operational efficiency can be enhanced by the implementation of innovative strategies. In the context of companies, operational efficiency refers to the capacity to effectively utilize existing resources in order to accomplish predetermined goals while minimizing expenses and maximizing outcomes. The enhancement of operational efficiency within an organization encompasses various strategies such as process optimization and workflow improvement, utilization of appropriate technologies and information technology systems for process automation, enhancement of operational accuracy and speed, cultivation of employee skills, and fostering a collaborative work environment. These measures aim to expand quality, customer satisfaction, and adaptability to dynamic changes within the business environment. The implementation of a comprehensive and strategic approach that encompasses all levels and departments within the organization. The introduction of innovations can have a substantial impact on an organization by reducing costs and enhancing efficiency. This, in return, can contribute to the maintenance of quality and the long-term success of the company.

Cost reduction can be achieved through various strategies, such as process automation, supply chain optimization, adoption of advanced materials for enhanced production efficiency, and reduction of costs associated with raw materials and production processes. Additionally, the implementation of online collaborative solutions can offer cost savings by enabling remote access to resources and facilitating collaboration. Creating a favorable atmosphere that promotes the exchange of knowledge and engagement with external stakeholders in the context of open innovation has also the potential to generate new ideas and inventive approaches aimed at cost reduction.

The number of patents or newly acquired intellectual property is frequently employed as a metric for innovation, serving as an indicator of research and development endeavors inside a business or industry. When interpreting this indicator, it is crucial to consider various factors. These factors include the quality of innovations, particularly the impact and relevance of patents within the relevant industry, as well as the organization's capacity to effectively convert innovations into successful products or services. Patents serve as a valuable tool for competitive benchmarking and evaluating an organization's capacity for innovation.

Employee retention and satisfaction serve as strong markers of an organization's creative culture. Employees who are provided with possibilities for professional advancement and enhancement are more disposed to have a sense of involvement and contentment, and their contributions are acknowledged and valued. An organizational culture that fosters a culture of trial-and-error learning facilitates the growth and advancement of individuals in both personal and professional domains. An innovative organizational culture has the potential to foster work-life balance, hence enhancing employee happiness and mitigating stress levels. To enhance employee happiness and commitment, it is imperative to include employees in the decision-making process within the firm.

It is imperative for all innovative enterprises to assess the effects of their innovations on business operations. The most straightforward approach is to utilize the identical Key Performance Indicator (KPI), which quantifies the proportion of the value sales generated by the new goods in relation to the overall turnover of the organization.

Within organizations, in addition to the usual and basic metrics of innovation, simple to quantify such as the number of new products, we could add a new measurable indicator that could be monitored, namely the innovation rate as the percentage of total sales represented by the new products. A measure of how innovative a company is in terms of new or improved products, services, or processes. *"A quantitative output indicator for product innovation is the number of product innovations during the observation period. This needs to be measured cautiously because respondents can find it difficult to estimate innovation counts,*

*particularly for large firms with multiple innovations, highly complex products containing several sub-systems, or multiple products that can be subject to substantial or minor variations.”*

Measures the share of revenue with new/improved products or services relative to total revenue. Share of turnover from product innovations and new-to-market product innovations:

$$\text{Innovation rate} = \frac{(\text{New products revenue})}{(\text{Total company revenue})} \quad (1)$$

*Source: OSLO Manual, p. 169, 227*

The innovation rate indicator is calculated differently from one organization to another. It depends a lot on the type of business, the structure of the market where the products are distributed and how the innovations are implemented. Many companies started monitoring this indicator after the 3M company started reporting this many years ago.

In relation to the frequency at which the assessment of the effects of innovations in the business is conducted, it is imperative that this assessment be conducted on a quarterly basis, utilizing annual data, or even monthly.

In our research, the activities to measure the impact of innovation were carry out mainly annually, based on planning, by 43% of the questioned companies, 36% were tracking the impact of innovations monthly and regarding the benchmark against which the questioned companies measure innovation impact, the most used one is the value calculated in the previous period, used by 68% of the respondents. Another benchmark is the value calculated by a research organization for the share of innovation in the relevant market, used by 6% of the questioned companies. The rest of 28% did not report any benchmark.

In relation to the utilization of a benchmark for assessing innovation within the organization, it is advisable to employ pre-established numerical values, or a category or industry-level value furnished by market research firms.

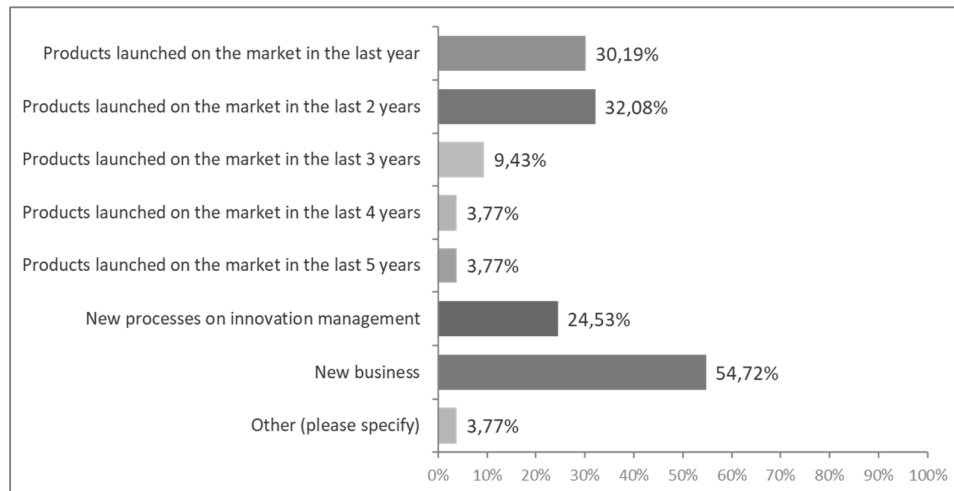
In relation to the utilization of standards within the company's operations, based on the conducted analysis, we propose the frequent adoption of standards.

After thoroughly analyzing the similarities and differences in the definition and process of innovation between small and medium organizations and large organizations, we have determined that it is logical to consider all the recommendations outlined in the key performance indicators setting for the innovation impact measurement.

For the innovation rate indicator, it is crucial to define, calculate, and monitor it in the company's current activity. Specifically, it must be clearly defined what is an innovation, or how it is defined within the company, and whether only products or also services and processes are included.

It is also vital to determine whether all sorts of innovations—disruptive, advanced incremental, basic incremental—are included in the innovation rate calculation and their exact definitions. Innovation is defined as products or services launched in the recent three, five, or 10 years. This affects the outcome and interpretation very much. In our research we have the following findings:

- 32% of the questioned companies consider innovation, products launched in the last 2 years
- 30% consider innovation products launched in the last year
- 9% consider innovation products launched in the last 3 years
- 4% consider innovation products launched in the last 4 years
- 4% consider innovation products launched in the last 5 years.



**Figure no. 1. Definition of innovations**

Source: Popescu (Iacobescu) et al., 2023

Setting and monitoring innovation rates, we can consider innovation share a new KPI and aim to improve its tracking and calculation.

The process is as follows:

1. The procedure could begin with a comparative analysis of the finest companies in the field of activity and the representative market area to calculate and identify their innovation rate and build an industry reference point. The calculating methodology, chronology, and scope of how these companies determine their innovation rates could be the base for the measurement process.
2. Establish calculating rules and definitions in the second stage. We refer to the standards for calculating innovation rate in total sales, innovation levels and scope. This step has no right or wrong. The most important requirement is to ensure that calculating and assessing innovation is consistent, systematic, and relevant to the organization and its industry.
3. Calculating the organization's genuine innovation rate is advised at the third stage because the calculation procedures can be applied to current data. The current quarter and last year's percentage innovation rate must be measured. Because perspective was different since this rule was implemented.
4. Analyses and honest discussions regarding what, when, and how to monitor and measure validate the calculating approach in the fourth stage. They must understand that this assessment and analysis might validate recommendations for more innovation and more effort to increase innovation efficiency. More innovation or better-implemented inventions with greater results are win-win scenarios.
5. In the next stage, the organization establishes the measures to raise the innovation rate after determining the frequency of measurement and reporting, usually quarterly.
6. Finally, initiatives and measures must be created to increase innovation and satisfy organizational goals. To set a value objective for the innovation rate, measure its status and create objectives based on implementable measures. Setting a reasonable innovation rate is crucial. If there is an industry benchmark, choosing a value for this indicator is easy. Otherwise, the organization can determine the value based on the historical data.

## Conclusions

The main objective of the paper was to highlight important criteria to consider when creating key performance indicators for innovation measurement in food sector organizations from Romania. The main KPIs identified were the revenues of innovative product or service, the market share growth, the customer feedback, operational efficiency, cost reduction, patents, and employee satisfaction, next to the OSLO manual's innovation rate indicator which was defined for the food sector.

The identified KPIs can be used individually or combined depending on the strategic objectives of the organization. There is no certified way on how to define and measure the innovation rate. When employed as a pivotal metric for assessing innovation, it is crucial to adopt an equitable and pragmatic approach in

determining the methods and rationale behind its measurement, as well as its implications within the context of an organization's innovation strategies. It can be applied to the total company revenues, to specific segments or specific business categories.

The importance of measuring the impact of innovations in business development is evident, as it allows for the identification of ways to enhance or address shortcomings or enhance the effectiveness of innovation activities. However, currently, only a limited number of firms use any measurement technique. The reasons would be the time required for these analyses, the costs they entail or even the fear that they might discover certain inadvertences (James et al., 2008; Zubizarreta, 2017).

In the future, besides the identification of main KPIs for innovation measurement, there should be emphasized the importance of innovation measurement projects next to the importance of innovation in the business' development. The development of an Innovation Management Model for evaluating and monitoring the performances generated by innovation in businesses from food industry, based on the country and industry particularities, could contribute to have more successful innovations and more successful businesses.

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