

# The Usefulness of Applying Product and Service Innovations Through Quality Systems in the Food Industry

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## Abstract

Standardization and certification of management systems are an important part of the organizational culture in the food industry, which in modern business conditions should be a culture of quality, because the management of management systems and their certification is an important prerequisite for business success, even business excellence. The only certified management systems are systems based on ISO standards and safety, but there are other methodologies in the concept of quality management and safety, which due to their complexity, efficiency and high level of organizational performance, are also considered specified management systems. Businesses must continue to rapidly change environmental conditions and increase globalization and change in competition in today's world in order to maintain their existence and realize their visions. Economic theory has long recognized innovation as the most important driver of development and as the only sure recipe for overcoming the economic recessions of the food and global food industry. A country that wants to make a mark on the world market cannot achieve this without encouraging innovation in society. Innovation leads to the improvement of society and the economy, and an awareness of inventiveness can be raised by fostering entrepreneurship and technological innovation. The reason for every change in life should be sought in innovation. Innovation means the ability to transform existing ideas into useful inventions and products that will be used in the future.

**Keywords:** innovation, quality, standards, food industry and products and services.

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## 1. Introduction

Measuring the results of enterprises from the usefulness of the application of product and service innovations is a basic prerequisite for successful management and achievement of strategic goals in the dairy industry as an economic branch in the global Macedonian economy. Considering the new concept of process orientation, the center of attention is increasingly the management of business processes and the measurement of their results through the application of innovations in the quality system of products and services in the food industry.<sup>1</sup>This, in fact, represents a new challenge in the food industry that penetrates into the essence of the very processes of production of food products and performance of services and provides information on the costs and profits of enterprises from the dairy industry.<sup>2</sup>The goal is to obtain a measurement of their results from the usefulness of the application of product and service innovations through the quality system in the food industry, and the continuous improvement of innovations in the food industry, as well as meeting demands and creating value for consumers. When it comes to measuring the results of the usefulness of innovations through the quality system in the food

<sup>1</sup>Andrew, JP, Manget, J., Michael, DC, Taylor, A., & Zablit, H., Innovation: A return to Prominence and the Emergence of a New World Order. Boston, MA: Boston Consulting Group, 2010, p. 14

<sup>2</sup>Andrew, JP, Manget, J., Michael, DC, Taylor, A., & Zablit, H., Innovation: A return to Prominence and the Emergence of a New World Order. Boston, MA: Boston Consulting Group, 2010, p. 19

industry, the continuity of all innovative tools through all processes in the food industry should be monitored.<sup>1</sup>Recently, a system of measuring the results of the application of product and service innovations in the food industry through the production processes in the food industry is also used, which represents a special type of food system that should be used in process-oriented enterprises such as those above. The named. The quality systems that provide such information must be set up and developed to provide true and realistic quality information, as well as to enable communication that will help the food industry to transform more easily and successfully endure dynamic changes in the environment.<sup>2</sup>Enterprises from the food industry in conditions of globalization are constantly under pressure from competition that forces them to reconsider their business models and emphasize business processes.<sup>3</sup>The acceptance of the concept of process orientation through the quality system is of more recent date in theory and practice. The functional approach creates barriers to achieving customer satisfaction in the food industry and with a special emphasis on the dairy industry, and this is the reason why companies today, in order to remain competitive in the economy, are becoming more and more process oriented.<sup>4</sup>The production process in the food industry with a special emphasis on the dairy industry is part of the value chain and depending on the complexity can be divided into smaller parts, that is, sub-processes that take place with innovative changes.<sup>5</sup>The activity of business tasks in the food industry can show a relatively complex work task for the needs of a particular project on the usefulness of innovative changes through quality systems.<sup>6</sup>The management of innovative processes through the quality system includes an approach to operations based on modeling, measurement, analysis and improvement of performance for quality operations of dairy industries as part of the food sector. The new concept of applying innovations in the dairy industry, which is part of the food industry, implies successful business management through the management of its processes of quality and standardization of dairy products and the performance of services for them.<sup>7</sup>Therefore, the management of innovative processes in enterprises that support standardization and quality refers to systematic, structured approaches to analysis, with the aim of improving, controlling and managing the processes, in the direction of improving the quality of products and services in the food industry. Innovation management across businesses and quality systems is a structured approach to the analysis and continuous improvement of core activities such as marketing, production, communications and other major elements of enterprise operations, and relies on measuring the quality of enterprise activities. <sup>8</sup>This is done in order to assess the efficiency of each individual process, and the set of goals that are aimed at the usefulness of innovations and better modern quality systems.

## 2. Aims and tasks of the research

The main objective of the paper is shown through the visibility of the degree of innovation of products and services in the food industry using quality systems. For this purpose, the set tasks have been realized, which are in a worked out correlation for: an analysis of the theoretical assumptions about the innovations of products and services in the food industry has been made; innovative materials for quality control in the food industry are shown; innovative aspects and quality control in the food industry are related; the advantages of comparative and matrix weaknesses in the orientation towards consumers in the function of quality control and obtaining a marketable product have been determined; the full impact of the action of new aspects of innovation on innovative changes related to quality control of products, services and the system of safety and healthy nutrition in the food industry has been determined; an orientation of the model was made, how much consumers respect the satisfaction and fidelity of their shopping habits in the food industry; the factors in the field of innovative strategies have been determined as they will affect all stakeholders to obtain overall quality; the effects of evaluating the impact of individual factors on the success of economic entities through innovations in economic and non-economic activities in the territory of the Republic of North Macedonia in the food industry are shown. The model of ISO 9001 that works in the domain of quality and more specifically, what the organization should do for quality and standardization of products in the food industry is presented. Through the model, five principles of control, quality and standardization are presented, where each principle determines a set of requirements, procedures and processes that should be applied for the

<sup>1</sup>Audretsch, David B., Falck Oliver, Heblich Stephan, Lederer Adam, Handbook of Research on Innovation and Entrepreneurship, DIW Berlin Germany, 2010, p.98

<sup>2</sup>Cuervo, A., Ribeiro D., Roig S., "Entrepreneurship Concepts, Theory and Perspective", Springer Berlin Heidelberg New York, 2007, p.191

<sup>3</sup>Wang, Yonggui, Lo Hing-Po: Customer-focused Performance and the Dynamic Model for Competence Building and Leveraging. Journal of Management Development, Bradford: Emerald Group Publishing, Vol. 22, 2003, 6, p. 483-526

<sup>4</sup>Han Jin K, Kim Namwoon, Srivastava Rajendra K.: Market Orientation and Organizational Performance: Is Innovation a Missing Link?. Journal of Marketing, Chicago: AMA, Vol. 62, 1998, p.178

<sup>5</sup>Wang, Yonggui, Lo Hing-Po: Customer-focused Performance and the Dynamic Model for Competence Building and Leveraging. Journal of Management Development, Bradford: Emerald Group Publishing, Vol. 22 (2003), 6, p. 483-526

<sup>6</sup>Rodchua, S Comparative analysis of quality costs and organization sizes in the manufacturing environment. Quality Management Journal, 16(2), (2009), p. 34-43

<sup>7</sup>Han Jin K, Kim Namwoon, Srivastava Rajendra K.: Market Orientation and Organizational Performance: Is Innovation a Missing Link?. Journal of Marketing, Chicago: AMA, Vol. 62, 1998, p.179

<sup>8</sup>Wang, Yonggui, Lo Hing-Po: Customer-focused Performance and the Dynamic Model for Competence Building and Leveraging. Journal of Management Development, Bradford: Emerald Group Publishing, Vol. 22 (2003), 6, p. 483-526

implementation of the system in the food industry, among which we will focus on:<sup>1</sup>

- Presentation of general requirements of the quality management system and documentation;
- Application of responsibility, focus, policy, planning and management goals;
- Emphasizing how resources are managed and allocated for the food industry;
- Presentation of the achievements of product/service realization and process management in the food industry and,
- Demonstration of measurement, monitoring, analysis and continuous improvement of the quality of products and services in the food industry.

### 3. Research methods and materials

The theoretical part of the presented material is covered with research knowledge from domestic and international modern and practically applicable literature from renowned authors in the field of innovation and quality of products and services through their quality systems. Through a survey method, respondents were surveyed with a survey questionnaire for the questions asked and research was done with software in the food industry as a branch of the dairy industry, especially the Bitola dairy and other dairies across some cities in the territory of the Republic of North Macedonia. It is also taken into account a part of the use of data and analyzes from the personal experiences of the employees in the dairy industries - Bitola Dairy, Zdravje Radovo, Kumanovska Dairy, Tetovska Dairy and the others by choice. The processed results are shown graphically and mathematically with graphs and calculations. The data were processed, selected and calculated through the statistical method and computer software ifuse.

### 4. The concept of innovation of products and services in the Macedonian food industry

Innovation and how companies can measure innovation. We also see that innovation is not the privilege and benefit of large companies only – maybe you or we in our small or medium-sized enterprise are also developing innovations? All artificial changes in the world are the result of a tendency to seek something new and different. The desire to try something different is a typical human trait. There is no end to new ideas in the world, but only when these ideas create some value, then they become innovation for products and services in the food industry. We have no use for good ideas if they are not implemented in the food industry. Every now and then, innovation is done by taking an existing idea, concept or product and improving it.<sup>2</sup> However, it is even more significant when something completely new is invented, on top of what already exists. The pace of change is constantly accelerating. Any individual, in any enterprise in any branch of the food industry, can be innovative. Innovation is a process, not a destination, a process of structural and deep changes that bring the food industry towards the direction of quality and a high level of standardization.<sup>3</sup> Before introducing the definition of innovation, it is important to distinguish between innovation and invention. It is important to be clear that innovation is not an invention in the food industry. Innovation is the continuation of invention. A new or improved product becomes an innovation when it is introduced to the market. Identical or similar, new processes, marketing methods or organizational methods are innovations when they become an integral part of enterprise operations. Innovation activities vary greatly from enterprise to enterprise. Some enterprises carry out innovative projects, such as the development and introduction of a new product and service in the food industry, while others make continuous improvements to their products and services in the food industry.

#### 4.1. The utility of determining what is product and service innovation and what is not?

Multiple types of innovation in enterprises can be innovative. Innovation can consist of the implementation of one significant change or a series of smaller individual changes that together constitute a significant change for an improved product or service. Trading in new or improved products is generally not so-called. innovation of a new product for enterprises, and from the area of wholesale, retail or from the areas of transport and storage, but is an innovation in the food industry as part of the dairy industry.<sup>4</sup> Purchasing models identical to already installed equipment, or minor expansions and upgrades to existing equipment or software, are not process innovations. New equipment or upgrades must be both new to the establishment and include significantly improved specifications applicable to the food industry along with standardization.<sup>5</sup> Companies that engage in custom manufacturing make individual and often complex items to customer order. Unless the item shows significantly different attributes from previously made products, then it is not a new product innovation, but if it shows different value-added attributes

<sup>1</sup>Jeffery, AB Managing quality: Modeling the cost of quality improvement. Southwest Business & Economics Journal, 12(3), 2003, p.58.

<sup>2</sup>Suma, V., & Nair, TR Effective defect prevention approach in software process for achieving better quality levels. Engineering & Technology, 44(1), (2008), p.18

<sup>3</sup>Setó-Pamies, D. Customer loyalty to service providers: examining the role of service quality, customer satisfaction, and trust. Total Quality Management & Business-Excellence, -23(11/12), -1257-1271 doi:10.1080/14783363.2012.669551, (2012), p. 46

<sup>4</sup>Schmitt, PM The impact of a marginal cost increase on price and quality: Theory and evidence from airline market strikes. Marketing Management Journal, 20(2), (2010), p. 89

<sup>5</sup>Setó-Pamies, D. Customer loyalty to service providers: examining the role of service quality, customer satisfaction, and trust. Total Quality Management & Business-Excellence, -23(11/12), -1257-1271 doi:10.1080/14783363.2012.669551, (2012), p.52

of food industry products then it is an innovation achieved in the food industry. Innovation is a key driver of economic growth in the food industry. It also brings wider benefits to society. Innovation can reduce production costs, create new markets and increase competitiveness. In the food industry as part of the dairy industry, innovation can increase performance by strengthening profitability, generating employment and increasing market share and increasing the placement of products and services in the food industry as part of the dairy industry.<sup>1</sup>

#### **4.2. Application and types of innovation**

Innovation is closely related to financial performance, because successful innovations can reduce the cost of producing goods or services, in the food industry, open new market niches, introduce new products or services, which, in turn, will make small, medium and large enterprises in the future. Every company, organization and even individual can be innovative. Innovation is not limited to large businesses with the resources to employ an innovation manager or other highly skilled and specialized staff. Small businesses offer fertile ground for innovation. Many of the key products of the last century were introduced by small businesses, and today the sector continues to produce radical innovations. Innovation is vital to small businesses, and in the dairy industry it's small dairies. It is the source of energy for every successful small company, helping it to progress and be successful - a small business dairy with various products and services. Innovations vary in scope, time to completion, and organizational and societal impact. Categorization of any species usually involves areas of doubling, where the lines between one category and another overlap. Categorizing innovation is not an exact science and any innovation by different enterprises can be positioned in different categories. Four types of innovation are important:<sup>2</sup> innovations of new products and services, process innovations, marketing innovations and organizational innovations. A characteristic of organizational innovation, compared to other organizational changes in enterprises, is that it implies the implementation of an organizational method that was not previously applied. For example, as the first implementation of employee development practices and improving employee retention, such as education and training systems. And a second example, the first introduction of production or supply management systems, such as supply chain management systems, business reengineering and quality management systems are in operation to obtain a better quality product or service.

#### **4.3. Incremental, radical and revolutionary (breakthrough) innovations**

In the world economic literature, there are a plethora of classifications, each of which, with its share of role and meaning, gives its own contribution to individual industries in the global economy. The drivers of development in an enterprise expressed through the individual components of innovation in the economic sector are:<sup>3</sup> incremental, radical, evolutionary (breakthrough). Incremental innovations include modification, refinement, simplification, consolidation and improvement of existing products, processes, services and production and distribution activities in the economy of a global economy. Most innovations fall into this category. An example of incremental innovation: most cars, through small improvements on a yearly basis, which cumulatively provide significant benefits in terms of safety, efficiency and user comfort. Radical innovations involve the introduction of new products or services that grow into large new businesses or create new industries or cause significant changes in the entire industry and tend to create new values. An example of radical innovation: the banking business has gone through a complete metamorphosis – ATMs, funds available almost anywhere in the world with a suitable payment card. Revolutionary innovations surprise people. They are rare events that result from scientific or engineering endeavors. They are called "breakthroughs" because they address things that most people consider impossible. Breakthrough innovations create a new need or satisfy a previously unmet need.

#### **4.4. Division of innovations according to the source of innovations and the strategy of innovations**

According to enterprise innovation strategy, innovation can be divided into two groups: open innovation and closed innovation. Open innovation consists of strategies by which enterprises can acquire the technologies they need, as well as use the technologies they have developed. In open innovation, enterprises obtain technologies from multiple sources. Open innovation strategies require efficiency through effective partnership.<sup>4</sup>No one has ever created a breakthrough with open innovation.<sup>5</sup>Closed Innovation uses a strategy of hiring the brightest technical people in the industry. It is assumed that enterprises themselves must develop new own products and services and

<sup>1</sup>Schmitt, PM The impact of a marginal cost increase on price and quality: Theory and evidence from airline market strikes. *Marketing Management Journal*, 20(2), (2010), p. 89

<sup>2</sup>Rodchua, SComparative analysis of quality costs and organization sizes in the manufacturing environment. *Quality Management Journal*, 16(2), 34–43., (2009), p.98

<sup>3</sup>Zakic, N.; Jovanović, A.; Stamatovic, M.; External & Internal Factors Affecting the Product & Business Process Innovation, *Economics & Organization*, 2008, p. 201

<sup>4</sup>L. Barry and G. Jacobs: "Business succession planning: a review of the evidence" *Journal of Small Businesses and Enterprise Development*, No. 13, 2019, p. 214

<sup>5</sup>L. Barry and G. Jacobs: "Business succession planning: a review of the evidence" *Journal of Small Businesses and Enterprise Development*, No. 13, 2019, p. 214

be the first to sell them on the market. Usually, the leading enterprises in terms of R&D application are also the market leaders in the industries in the Republic of North Macedonia. Finally, it is assumed that an enterprise in the field of economic industries should hold fast to its intellectual property in order to prevent exploitation of its ideas by the competition.<sup>1</sup>In most enterprises in the Republic of North Macedonia, innovation usually comes from the top down or from the bottom up. An advantage of top-down innovation is that the people who manage it set the pace – they set the goals and targets and provide the funding. The implementation is then left to the appropriate personnel. Those working on the project as a segment in the food industry do not have to beg for funding.

#### 4.5. Measuring the innovativeness of enterprises from the food industry

Innovation metrics are organizational measurements that help classify companies' ability to innovate and record its success, and are important for a number of reasons. They are equally important for a small start-up company and for an established international company, because they influence the operations of the companies and help managers to make decisions based on objective data. Measuring success in innovation depends on the type of innovation and the companies' approach to measuring success. Because every innovation is different and every enterprise has different priorities and methods will differ. Some will focus entirely on measurable financial expectations, while others will use a mix of quantitative and qualitative measures.<sup>2</sup>Specific and quantitative measures facilitate the process of innovation and produce significantly more innovative results in industries such as economic activities that function to obtain a better quality product or service. Innovation can be thought of as having three distinct but related components:<sup>3</sup>inputs or resources, such as people and money; they feed processes that act on and transform input data; and outputs, or end results, which include both cash returns and indirect benefits, such as a strengthened brand and knowledge gained that can be applied to other purposes. All three components can and should be measured. For example, the following inputs can be measured:<sup>4</sup>you need to track the total number of people committed to the innovation process. But more importantly, we need to monitor how our key people are being used and the number of ideas generated and the expected return, and ideas are an important input – the fuel for innovation. Many companies feel that they lack ideas. However, if you don't measure, you'll never know. In addition, if it is determined that you really do not have enough big ideas, you will need to determine what you need to do and what steps to take to address the deficiency.<sup>5</sup>Research and development costs. How much do companies spend annually on providing external expertise for research and development? To answer this question, we need to consider these elements:<sup>6</sup>

-The funds spent per individual project and on average.

- The process must be both efficient and effective. Most companies can easily measure performance, so you can start there – but don't stop there.

- Consider the number of ideas that move from one stage of the process to the next.

Let's see if a process should work, does it work? What is happening in the process at any given moment? To exit, you can measure them in enterprises: we should emphasize both the number of new products or services introduced and incremental gains in revenue and profit. Whether the innovation concerns a process, a new product or an improved customer experience, the innovation must affect profits in the food sector and other industries. Return on investment in our innovative activities and their usefulness for enterprises from the food sector. There is a rule that innovation profitability is a key measure to determine how much to invest in innovation-in enterprises are in operation to get a better quality product or service.<sup>7</sup>The most commonly used measures of innovation are:<sup>8</sup>

-Percentage of sales in the current year due to new products released in the past N-years. A study shows that about 50% of companies use this measure.

-Expenses for research and development. This measure considers that the funds spent on research and development are in direct correlation with the number of innovative products, processes and services that are created and/or marketed.

- Creation of patents (but also trademarks, copyrights, articles). Some companies create patent after patent and brag about their innovation capabilities. For some enterprises this may be useful. But many of the enterprises do not patent their products and processes, but treat them as confidential. Once a patent is published, knowledge of

<sup>1</sup>L. Barry and G. Jacobs: "Business succession planning: a review of the evidence" Journal of Small Businesses and Enterprise Development, No. 13, 2019, p. 215

<sup>2</sup>Cuervo, A., Ribeiro D., Roig S., "Entrepreneurship Concepts, Theory and Perspective", SpringerBerlinHeidelbergNew York,2007, p. 182

<sup>3</sup>Kerstin, Wagner and Andreas Ziltener, The Nascent Entrepreneur at the crossroads: Entrepreneurial Motives as Determinants for Different Types of Entrepreneurs, Swiss institute for Entrepreneurship,UniversityofApplied Sciences Chur, 2008, p. 88

<sup>4</sup>David B. Audretsch, Steven Kleppere, Innovation, Economic Development and the Evolution of Industry, UK: Edgar Elgar Publishing Limited, volume III, 2000, p. 255

<sup>5</sup>Cuervo, A., Ribeiro D., Roig S., "Entrepreneurship Concepts, Theory and Perspective", Springer BerlinHeidelbergNew York,2007, p. 184

<sup>6</sup>David B. Audretsch, Steven Kleppere, Innovation, Economic Development and the Evolution of Industry, UK: Edgar Elgar Publishing Limited, volume III, 2000, p. 256

<sup>7</sup>Cuervo, A., Ribeiro D., Roig S., "Entrepreneurship Concepts, Theory and Perspective", Springer Berlin Heidelberg New York,2007, p. 185

<sup>8</sup>Kerstin, Wagner and Andreas Ziltener, The Nascent Entrepreneur at the Crossroads: Entrepreneurial Motives as Determinants for Different Types of Entrepreneurs, Swiss Institute for Entrepreneurship, University of Applied Sciences Chur, 2008, p. 90

the innovation becomes available to anyone who chooses to search the patent literature. An optimal solution is to have patents that add significant value. Innovation experts suggest that the ideal number, in all three elements of innovation, is between 8 and 12.

Today, many enterprises are trying to improve their innovation performance by having a clear insight into their current and potential innovation capability in industries in the Republic of North Macedonia. A common desire in the business world is to possess innovation capability in order to maintain or improve market position. Enterprises also recognize that successfully sustaining an innovation is a proven path to organic growth and impact on revenue, margins and stock value. However, innovation is a very complex subject and is not easy to measure and manage, especially not with traditional methods. The point of measuring or evaluating innovation is not only to collect data but to use some measures to improve the innovation process.<sup>1</sup>The rule says, "if you don't measure, you can't improve."<sup>2</sup>

#### **4.6. Innovation audit in enterprises from the food industry**

Innovation audit is a method for identifying the main needs of enterprises, possible weak and strong points, as well as opportunities and threats from all factors affecting innovation performance in the food industry. It is a fact-finding technique that identifies enterprise performance and indications of what is really needed.<sup>3</sup>The goal of the innovation audit is first to develop an appropriate set of criteria to better respond to the specific organizational context that affects the innovation performance of an enterprise, and then to obtain some quantitative and qualitative results by examining all relevant stakeholders involved in the innovation process. . The main goal is to analyze the results and provide a clear identification of the priority needs of the enterprises, as well as the advantages and opportunities that should be taken into account. The audit also helps enterprises to prioritize and identify the most important actions to adopt. It gives managers the opportunity to determine whether enterprises have the necessary resources, infrastructure, culture and processes in order to seriously consider or focus on or improve the current state of innovation in the industrial sector. Some of the specific objectives of the innovation audit are:<sup>4</sup>

- Understanding the current innovation performance in the main areas, such as strategy, processes and organization of operations in the food sector.
- Comparison of this performance with the best practices at the sector and overall level, as well as at the inter-sectoral level.
- Evaluating current capabilities before making costly changes. Determining how to improve the use of all resources involved in the innovation process.
- Developing an action plan or roadmap for implementation for future development.

Only with a validated, confirmed and integrated innovation audit that includes all relevant assessments, organizations can establish the basis for progress and achievement of their mission and vision of enterprises in the food sector. The goal is not only to perform the audit, but also to develop a program to solve the identified problems and make progress by taking advantage of new opportunities.<sup>5</sup>An innovation audit is a diagnostic tool and should contain questions or statements that cover all areas affecting innovation. When preparing for the audit, managers should be aware that there is no universal recipe for a successful audit that will suit all enterprises. However, it is possible to develop a number of measures and indicators that give some indication of the innovation capability of enterprises. Innovation management is important in all sectors, whether it is a high-tech or a traditional sector. The nature of innovation, being horizontal, can support many other business processes and areas, such as finance, manufacturing, supply chain, marketing, strategy, etc.<sup>6</sup>In addition, the effects that innovation can have on the overall performance of enterprises assure us that no sector should be excluded from the innovation audit process. In addition, we should not forget that innovation requirements can refer to a new management method or practice and therefore the audit can help all enterprises, regardless of their sector, size or other specific aspect.

#### **5. Innovative product testing strategies**

Food industry companies that are committed to rigorous product testing and continuous improvement are often

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<sup>1</sup>Kerstin, Wagner and Andreas Ziltener, *The Nascent Entrepreneur at the crossroads: Entrepreneurial Motives as Determinants for Different Types of Entrepreneurs*, Swiss institute for Entrepreneurship, University of Applied Sciences Chur, 2008, p.105

<sup>2</sup>Kerstin, Wagner and Andreas Ziltener, *The Nascent Entrepreneur at the Crossroads: Entrepreneurial Motives as Determinants for Different Types of Entrepreneurs*, Swiss Institute for Entrepreneurship, University of Applied Sciences Chur, 2008, p. 105

<sup>3</sup>Cuervo, A., Ribeiro D., Roig S., "Entrepreneurship Concepts, Theory and Perspective", Springer BerlinHeidelbergNew York,2007, p. 186

<sup>4</sup>David B. Audretsch, Steven Kleppere, *Innovation, Economic Development and the Evolution of Industry*, UK: Edgar Elgar Publishing Limited, volume III, 2000, p. 256

<sup>5</sup>Cuervo, A., Ribeiro D., Roig S., "Entrepreneurship Concepts, Theory and Perspective", Springer BerlinHeidelbergNew York,2007, p. 187

<sup>6</sup>David B. Audretsch, Steven Kleppere, *Innovation, Economic Development and the Evolution of Industry*,UK: Edgar Elgar Publishing Limited, volume III, 2000, p. 256

superior to their competitors.<sup>1</sup>Product superiority in turn ensures a strengthened brand, market share, enhanced positive effects of all marketing activities (advertising, promotion, sales, etc.) and often allows dictating the price of the superior product. Unfortunately, most companies do not devote enough time to product testing. Few companies understand the power of continuous product development and testing. Even fewer know how to do testing the right way or budget enough to support a serious product testing program. These deficiencies identified in most companies create opportunities for a small group of companies that are committed to continuous product improvement<sup>2</sup>. The purpose of product testing is to determine the applicability of the product before the final product is produced. It is important to distinguish between the types of testing applied at different stages of the product development process. The usefulness of testing is also reflected through the monitoring of potential threats arising from competitive products in order to determine the advantages and weaknesses in relation to the competition.<sup>3</sup>The benefit of product testing is also seen through formulating products with reduced costs and/or processing methods, maintaining product superiority and measuring the effects of aging on product quality.

Other benefits of product testing are:<sup>4</sup>

- Implicit measurement of the effects of price, brand name or packaging on the perceived performance and quality of the product;
- Direction of research and development in the creation of new products or the upgrading of existing products;
- Monitoring the quality of the product from different factories, through different distribution channels and from year to year;
- Predicting the acceptance of new products by consumers.

### **5.1. Where can innovative product testing be applied?**

Although most product testing is conducted in the food and beverage industry, the concepts and methods of product testing are applicable to almost any product category. Of course, the structure and enforcement mechanisms will vary greatly from one product category to another. For example, software, furniture, airline service, equipment prototypes, etc. can be tested. The ultimate benefit of product testing is competitive advantage. Product superiority is the surest way to dominate a product category or an industry. Food industry enterprises that are dedicated to product testing can achieve product superiority and gain a competitive advantage of great strategic importance.<sup>5</sup>Product testing can be used in all types of manufacturing and food industries – in any company that designs and/or manufactures a physical product.

### **5.2. How are the main methods (tests) applied to product testing?**

Depending on where you are in the design process, you can choose from three types of tests – exploratory, evaluation and validation tests. The fourth type, the comparison test, can be used at any stage of the design cycle.<sup>6</sup>Exploratory tests are applied in the early stages of the development process, when the problem is still being defined and potential solutions are being considered. They are best applied after the development team has a good understanding of the user profile and needs. The purpose of the exploratory test is to examine and explore the potential of preliminary design concepts and to answer some basic questions, including:<sup>7</sup>

What is the opinion of the users about the application of the concept?

Does the core functionality have an appropriate meaning for the user?

Is the user interface adequate and operational?

Are our assumptions about consumer demand correct?

Have we misunderstood any of the requirements?

Evaluation tests – Unlike an exploratory test that aims to investigate the suitability of a number of potentially competing solutions, an evaluation test examines a preferred solution in more detail and is applied at a slightly later stage of development. The main purpose of an evaluation test is to ensure that the assumptions are still relevant and that the more detailed and specific designs chosen are appropriate. This test focuses on applicability or the level of functionality offered and as such may in some cases be appropriate for evaluating early levels of

<sup>1</sup>Rodchua, SComparative analysis of quality costs and organization sizes in the manufacturing environment. Quality Management Journal, 16(2), 34–43., (2009), p. 95

<sup>2</sup>David B. Audretsch, Steven Kleppere, Innovation, Economic Development and the Evolution of Industry, UK: Edgar Elgar Publishing Limited, volume III, 2000, p.356

<sup>3</sup>David B. Audretsch, Steven Kleppere, Innovation, Economic Development and the Evolution of Industry, UK: Edgar Elgar Publishing Limited, volume III, 2000, p.358

<sup>4</sup>Wang, Yonggui, Lo Hing-Po: Customer-focused Performance and the Dynamic Model for Competence Building and Leveraging. Journal of Management Development, Bradford: Emerald Group Publishing, Vol. 22 (2003), 6, p. 483-526, p. 247

<sup>5</sup>David B. Audretsch, Steven Kleppere, Innovation, Economic Development and the Evolution of Industry, UK: Edgar Elgar Publishing Limited, volume III, 2000, p.358

<sup>6</sup>Rodchua, SComparative analysis of quality costs and organization sizes in the manufacturing environment. Quality Management Journal, 16(2), 34–43., (2009), p. 99

<sup>7</sup>David B. Audretsch, Steven Kleppere, Innovation, Economic Development and the Evolution of Industry, UK: Edgar Elgar Publishing Limited, volume III, 2000, p.359

performance. Assuming that an appropriate concept is chosen, in that case the evaluation test aims to ensure that the concept is effectively implemented and aims to answer more detailed questions, such as:<sup>1</sup>

Is the concept applicable?

Does the concept satisfy all the user's requirements?

How does the user apply the product and could it be more effective?

How will the product be assembled and tested, and can it be done better?

Can the user complete all tasks as intended?

Validation tests are conducted late in the development process to ensure that all product design goals have been achieved. These may include applicability, performance, reliability, maintainability, mounting methods and accuracy. Validation tests usually focus on evaluating the actual functionality and performance as expected from a given version of the product and, consequently, validation activities should be fully implemented. The validation test is the first opportunity to evaluate all components and elements of the product at once, although the elements may have already been previously tested, but individually.<sup>2</sup>Consequently, the product should be as close as possible to the final product, including packaging, documentation and manufacturing processes. The validation process also includes any formal evaluations required for certification, security requirements or legislation. It is recommended that the test be done independently of the design team, but with their input in defining standards and measurement criteria.

Benchmark tests compare user reactions to multiple instances of a tool or implementation. The test can be applied at any stage of the design process in order to compare radically different designs or implementations. This test is used to determine which design is the easiest to implement and what the advantages and disadvantages are between the designs.<sup>3</sup>When multiple designs are compared qualitatively, then this test becomes an exploratory test.<sup>4</sup>The usual result is one improved product that combines the best of several different ideas. Most often, the best results are obtained when comparing examples of completely different implementations.

## 6. Research results

In our research, a company from the dairy industry has been targeted as an object of observation and study. From the entire percentage structure of our country, 120 people registered as individual traders, small, medium and large enterprises were surveyed, the structure of representation for individual traders is with participation in this survey with 30%, for small enterprises 35% and for medium-sized enterprises 40%.

Table no.1. Type of enterprises according to the legal nomenclature for enterprises

Enterprises	Percentage Representation%
Sole trader	30%
Small enterprises	35%
Medium enterprises	40
In total	100%

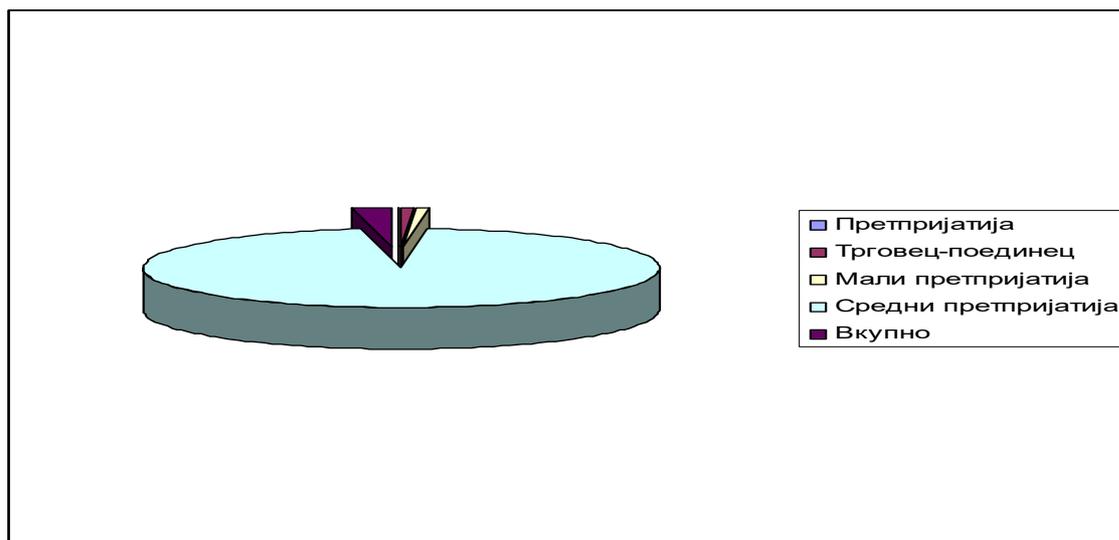
Source: Ifuse system

<sup>1</sup>Vandermerwe, Sandra: Customer-Minded Growth Through Services. Managing Service Quality,Bradford: Emerald Group Publishing, Vol. 13 (2003), p. 292

<sup>2</sup>Rodchua, SComparative analysis of quality costs and organization sizes in the manufacturing environment. Quality Management Journal, 16(2), 34–43., (2009), p. 100

<sup>3</sup>David B. Audretsch, Steven Kleppere, Innovation, Economic Development and the Evolution ofIndustry,UK: Edgar Elgar Publishing Limited, volume III, 2000, p.361

<sup>4</sup>Vandermerwe, Sandra: Customer-Minded Growth Through Services. Managing Service Quality,Bradford: Emerald Group Publishing, Vol. 13 (2003), p. 294



The table clearly shows that medium-sized enterprises from the dairy industry in the survey are represented by 40 percent, which is a good indicator of the representativeness of the section and the inclusion of all statistical units in the survey.

Table no.2. Percentage participation by activities and total representation of the industry with special emphasis on the dairy industry

Activities	Percentage Representation%
Industry	50%
Dairy industry	40%
Trade in the food industry	5%
Distribution in the dairy industry	5%
In total	100%

Source: Ifuse system

From the analysis, it can be seen that the target group as a whole is the total industry, of which the dairy industry covers 40%, trade in the food industry covers 5% and distribution in the dairy industry 5%. The dairy industry as a driving branch for the growth and development of the population of the total total participates with 40% together with 5% each of its trade and distribution in the food industry.

Table no.3. Age structure of the respondents

Respondents	20-30	31-45 years	46-55 years	-55 -60 years	Over 61.
Manager-Owner	8%	17%	38%	17%	14%
manager	14%	25%	35%	19%	13%
employee	10%	33%	34%	18%	7%

Source: Ifuse system

From the table and the calculations, it is clearly seen that the most active participation in the work by the managers-owners is at the age of 31-45 years, in the sense that they are the most productive and efficient in that period, as well as the independent managers who work under pressure - the pressure of their superiors and their various types of directors. The largest participation can be given at the age of 46-55 or expressed in percentage representation of our surveyed samples, it is 38%, and from the age of 20-30 they can give participation with 14% of the managers. Owners, managers and managers employed in institutions make a smaller contribution to the course of work in the dairy industry at the age of 20-30 years. what is realistic to become a manager with all the values and according to all the rules, laws and regulations and abilities and expressed participation in percentages is 8% for owner-managers, and 14 for managers.

Those employed in economic activities, the food industry with a part of the dairy industry such as trade, and their distribution make a contribution of 20-30 with a percentage of 105, aged 31-41 with 33%, aged 46-55 with 34%, from 55 with 18% to 60 and over 60 with 7%.

The most productive workforce in the dairy industry is from 46 to 55 years old, and that is employees with 34% and managers with 35%. Togach are the most relative, productive, economical and profitable, both employees and managers with acquired experience, expertise and applicable knowledge.

## 7. Results of questionnaire processing and research

With an intensity level of over 85%, a large number of small, medium and large enterprises from the food industry,

with a special emphasis on the dairy industry, apply in a percentage of 80%. With an intensity level of 5%, enterprises apply innovations less often. 10% of companies from the food industry apply the level of intensity to order or the third level of frequency calls. Enterprises from the food industry that do not apply innovations and work according to an old model for business and innovation and that do not innovate so much are 5%, and are in the function of obtaining a better quality of product or service.

When asked how much quality standards are represented in their enterprises, the following answers were received: The rare application of quality standards is expressed by only 3% of the total respondents who filled out the survey questionnaire or a very weak level of intensity as the first level. The strong frequency of the level of intensity is expressed by 85% that the enterprises of the food industry with a special emphasis on the dairy industry apply constant quality standards and this is the fourth level of the intensity are in operation to obtain a better quality of product or service. Respondents who express themselves with 10% are respondents who belong to the third level of intensity or 10% who use quality standards as needed. When there is a line of novelties, the second level of intensity is used or 5% of the respondents who received a questionnaire in their food industry declare 5% of the respondents Here in this answer we have to present that there were very few rounded answers and therefore such an indicator was obtained as percentage.

When asked at what level are the innovations of their managers in enterprises from the food industry with a special emphasis on the dairy industry, the following answers were received from the respondents: 12% percent of the respondents answered for a basic level of innovation, for an intermediate level of innovation 30% of the respondents Strategic level is with the fourth level of intensity 45% of respondents use innovations in food industry enterprises as a strategic tool for action and work in the direction of better product quality. Leader managers in the food industry with special emphasis on the dairy industry use a level of innovation of 23%, of these answers we have not answered enough and therefore the percentage is lower.

When asked what their experience is when applying quality systems to products in the food industry, the following answers were received: Enterprises from the food industry that have adopted and applied quality systems for a long time and are continuously applying quality systems are expressed with a fourth level of intensity. or over 85% of the respondents are in a function to get a better quality product or service. Respondents who did not have the opportunity for long-term application are with 10% first level of intensity. Respondents with 5% belong to the answers that they apply as needed according to the activities.

When asked what types of innovations are applied by companies from the food industry with a special emphasis on the dairy industry, the respondents expressed their opinion through the following answers: Radical innovations are represented by over 50% of the answers of the respondents and are aimed at obtaining a better quality product or service. Open innovation with 20% of responses. Closed and breakthrough innovations are represented in the food industry with special emphasis on the dairy industry with 25%. The indicator of incremental innovations is small, only 5%.

On the question of which quality systems are used in the enterprises of the food industry with a special emphasis on the dairy industry, the following knowledge was obtained expressed through movement indicators, namely: Management systems for quality management, quality management system in the food industry with a special emphasis on the dairy industry industry and ISO standard in the food industry, the usefulness is over 90% by the employees, managers, directors, leaders and the entire staff in the enterprises of the food industry are in function to get a better quality of product or service. The representation of internal checks of the management system - a tool for self-control in the food industry is about 10%, but even in this answer there were many unrounded modalities, the data is a little frequent.

To the question of whether an Integrated Quality Management System is represented in the food industry enterprises, the answers are as follows: Constant application of the food industry enterprises with a special emphasis on the dairy industry, 60% of the respondents declare for the use of an integrated quality management system. The usefulness of this system as needed is 10%. When a new product is applied, an integrated quality management system is also used by about 25%. And this kind of system is rarely applied expressed by only 5%.

Process innovation in the dairy industry is represented by over 40% by top managers and strategic decision innovators. Marketing innovation and organizational innovation are represented by over 30% of respondents' answers. The input of new goods or services and new improved raw materials for obtaining a quality final product expressed through the innovation of a new product is represented by about 29%. From this, we conclude that in a large percentage of companies, they strive and aim for good product quality.

When asked what are the benefits of applying product and service innovations in the dairy industry, they are: better quality, acceptable price, market balance, maintained competition, higher ranking, obtaining an attractive product, a product with a suitable design, greater consumption, affirmation of the Macedonian products, satisfied and legal standardization, certified product, branded product, protected Macedonian product, recognizable product, affirmed product, exported product, product that protects domestic production.

All enterprises from the dairy industry try and work with a strategic tactic to save money by obtaining an improved already produced product with 60% and with 40% they are oriented in the dairy industry towards a new

product and in function of a better quality product or service.

## Conclusion

A technology, invention, device or new product does not have to be an innovation in itself. For something to be technically innovative it has to offer new value and a new, better way of doing things. Invention is not the same as innovation. Invention is only one part of the process of creating innovation. Innovation is the process of bringing an invention to market where it can be used. Innovations span the entire process and they create changes in the way people do things. Of course, innovation is not valuable in itself – it gains value when someone pays for it. The ultimate success of the dairy industry product as part of the food industry is assessed based on the degree of its acceptance by consumers in the market. In the paper, due to the frequent and accelerated placement of new/modified products within different industries and markets, the theory of "diffusion of innovations" is analyzed in more detail. The process of acceptance and adoption of the product in the market known as diffusion is actually a process of communicating the innovation through certain channels (mass media and interpersonal channels), over time, between members of a certain social system. For enterprises from the food industry with an emphasis on the dairy industry, when placing new products on the market, it is important to know the basic factors that condition the acceptance of the innovation and accelerate the rate of acceptance. The diffusion process also implies knowledge and prediction of consumer behavior. In this direction, it is of particular importance to analyze the behavior of different types of consumers when accepting new products. In contemporary economic literature, innovation is not exclusively linked to high technologies. On the contrary, innovation and entrepreneurial behavior today are also a factor of real restructuring and production-technical 97 revitalization of the old, traditional economic sectors. In contemporary economic literature, innovation is not exclusively linked to high technologies. On the contrary, innovation and entrepreneurial behavior today are also a factor of real restructuring and production-technical revitalization of the old, traditional sectors of business. In general, it can be said that when conquering the market, it is necessary to adapt the marketing strategy to the segment that accepts the product at that moment, which usually means a greater offer of information and greater support for the product over time, because the base of consumers after the acceptance curve shifts toward late adopters, who need a lot of information to make a purchase decision. The members of the segments also vary depending on the category of the product they are buying, whereby products that do not carry a high risk in the purchase may happen to have less resistance in their acceptance. However, ultimately the product will be accepted as much as it is adapted to the needs and demands of the consumers. Quality is a group of characteristics of a certain product that determine its desirability and that can be controlled by the manufacturer to meet certain demands from consumers. From the point of view of the consumer, the degree of fulfillment of the requirements for the necessary features, the price and 98 "likeability" determine the level of product quality. From the manufacturer's point of view, quality is the structure of the characteristics of the materials used to create a certain product. While the higher or lower quality compared to the competition is determined as an oscillation from the average value for the same materials used to produce the analyzed product. It is noticeable that there are different definitions of quality on the part of the consumer and the producer, which causes great problems in communication between the two parties. Often, manufacturers in marketing campaigns communicate "Our product is of the highest quality!", but in internal communication they add "... but the consumer doesn't see it", which confirms the theory that quality is a category viewed differently by the parties involved. In the research percentage structure in the Republic of North Macedonia, 120 people registered as individual traders, small, medium and large enterprises were surveyed, the structure of representation for individual traders is with participation in this research with 30%, for small enterprises 35% and for the middle 40%. The important group as a total of the research is the total industry, of which the dairy industry covers 40%, trade in the food industry covers 5% and distribution in the dairy industry 5%. The management of human resources as a potential of the group of managers-owners is most pronounced at the age of 31-45 years, meaning that in that period they are the most competitive and efficient, as well as individual managers who work under pressure - pressure from their superiors and their various types of directors. Managers aged 46-55 can participate the most, or expressed in percentage representation from our surveyed samples, it is 38%, and from 20-30 years old they can participate with 14% of managers. The most appropriate perception of quality by the consumer is described with the word "liking", because if he likes one product more than the other, it is of higher quality for the consumer himself, regardless of the actual structure of the materials used in its production. In addition, the higher price contributes to the desire to own the product being higher or the "likeability" increases, which again directly affects the level of quality. The problem actually arises when the price is added as a variable to everything previously stated as a factor in evaluating the quality itself. Although, a large number of consumers publicly and directly do not qualify as individuals who have 99 prejudices about "price - quality", the largest percentage of them define quality as a consequence of price. According to the analyzes carried out by Insider ID, the consumer's perception of the prices in a sales location directly affects the perception of the quality of the products that are offered there. There are groups of products whose quality does not fluctuate, that is, the very structure of the quality of the ingredients is approximate, but the products that have a higher price are perceived as higher quality, which

is really debatable whether it is real or not. On the other hand, which is also of great importance, for the consumer, the price is in many situations decisive for the purchase or not of a certain product, no matter that he perceives it to be of higher quality. In that case, if the companies have a high price, there is a probability that the products will be desired and seen as high quality, but they will not make sales because the price exceeds the consumer's budget. Again, if manufacturers use high quality manufacturing materials, the product will have a high price and again will be perceived as high quality, but also high price. Enterprises from the food industry that constantly use, practice and apply quality systems and continuously apply quality systems are expressed with a fourth level of intensity or over 85% of the respondents are correlated to get a better competitive quality of a product or service. Respondents who did not have a chance to apply in the long term are with 10% first level of intensity. Respondents with 5% belong to the answers that they apply as needed according to the activities regarding the quality of products and services. Continuous practice of enterprises from the food industry with a special emphasis on the dairy industry, 60% of the respondents declare for the use of an integrated quality management system. The usefulness of this system as needed is 10%. When a new product is implemented, a quality management system is used and integrated by about 25%. And this kind of system is used less often, expressed only by 5%. Process innovation in the dairy industry is applicable with over 40% by top managers and strategic decision innovators. Marketing innovation and organizational innovation are adapted by over 30% of respondents' answers. The introduction of new goods or services and new improved raw materials for 100 obtained high-quality final products are effected through the innovation of a new product, represented by about 29%. From this, we conclude that in a large percentage of companies, they strive and aim for good product quality. For successful positioning of the product, it is necessary to achieve an ideal balance between the price, the quality of the materials used and the consumer's budget for the corresponding product category.

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