



Technological Innovation

Mohammad Aziz Azimi^{1*}; Mohammad Sharif Hasanzoy²

1, Department of Business Administration, Faculty of Economics and Administrative Sciences, Selcuk University, Konya Turkey

2Department of English And Literature, Faculty of Education, Kunduz University

**Corresponding Email: aziz.azimi2009@gmail.com Phone Number: 00905069267578*

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Abstract

In today's world, technology plays a vital role in various parts of our lives and accelerates activities, particularly in the workplace. Most companies use the latest version of technology to accelerate their production and goods. The purpose of this research is to examine the role of using the latest version of technological innovation in production companies. One of the secrets to the success of the world's most famous companies today is technological innovation. The materials for this study were collected from different sources such as research articles, journals, books in various libraries as well as some documentary reports. Data was analyzed manually based on themes and main topics. The result of the study indicates that companies with the latest technology can capture the entire market by producing goods and services at lower prices and with the highest quality. Technological innovations play a major role in the success of the company, so companies should always try to use the latest technology to compete with their competitors in the market.

Keywords: Goods, Company, Services, Technological innovation and Work.

Introduction

Rapid changes in technology and customer expectations and demands have increased as a result of globalization. However, in today's dynamic and rapidly developing world, technological changes and increasing competition have transformed organizational structures, operations, and innovation perspectives. In the face of fierce competition and increasing uncertainty, it is inevitable for organizations to keep up with change and achieve a sustainable competitive advantage over their competitors to survive. Generating new ideas and making them innovative is the best way to manage change. In other words, today's businesses need to be innovative to survive in increasingly competitive conditions and to survive in the changing economic structure (Gürsoy, 2014) .

Today, the most important component that increases the competitive power of companies and nations in the globalizing world is technology. Most of the time, this component plays

an important role in the plans of companies. Technological developments can be an important component of a competitive tactic. An approach based on technological developments will separate and differentiate the company that follows this approach from its competitors. Technological developments do not only affect companies but can also create radical changes in the sector. The results they create show the importance of companies and nations benefiting from technological innovations. Since technological innovation is so important, the technological innovation process and the elements in this process are also very important. When you examine the process, it is possible to talk about many factors affecting technological developments and their effects at different rates. The underlying purpose of all factors is the same, regardless of their numbers. In addition, the desire to acquire knowledge and develop it (Teknoloj & Enst, 2008). This research aims to assess the use of the latest version of technology in companies for the production of high-quality goods/products. Many companies' owners perceived that using the latest version of technology in a company plays a significant role in producing the best products for the market.

Material and Method

The study used qualitative research and descriptive methods to collect data from various sources. Data was collected from different sources such as journal articles, books, documentary reports, etc. Data was analyzed manually based on themes and main topics. Each theme with relevant information has been described accordingly in the following paragraph.

Concept, Definition, and Importance of Technology

Throughout history, the scope and definition of technology has evolved significantly. Before defining technology, it is useful to dwell on the content and scope of this concept, which is of strategic importance in gaining a competitive advantage for organizations. Different people define technology in different ways, especially when experts are involved.

The word technology means tools to some people. However, the term tool is more likely to refer to something physical. For example, robots are a type of technology that is really advanced and used to do things because of their physical structure. However, public transportation cannot be considered without the "technical knowledge" required to use it effectively. The ability to program computers to use them effectively, there is a need for skilled personnel. In other words, the physical aspects of technology are taken into account, but the non-physical aspects are not. Many organizational problems in new technology applications arise because of this simple neglect (Mahmut TEKİN, 2010).

If only the physical and information aspects of technology are considered, the concept is not sufficient. We should not ignore the "social" aspects of new technologies. Societies and organizations, called socio-technical systems, are places where new technologies are used. Organizations not only can be considered as an area where different resources come together; it should not be forgotten that it also has people who interact with each other in various corporate roles. The use of a new technology in a company can disrupt the existing corporate system. For example, a company's hiring of a new job group, such as programmers, may reduce the importance of the company's traditionally manual, skilled workforce. Finally, leaders must also take into account the social and cultural factors that

influence the process of technological development in the organization (Mahmut TEKİN, 2010).

The above explanations show that technology is a concept that has information, physics, and social areas. In this case, some definitions made about technology may include some or all of these dimensions. These definitions include:

Technology:

"The methods used in production",

"These are methods developed by the individual to change his environment by using the means of production",

"It is the process, method, and knowledge developed as a result of the application of techniques obtained as a result of research and development to production",

"It is the production knowledge, process, and technique that allows the production of a new good or service or the production of existing products at a lower cost and with better quality".

It is possible to define technology in general as follows, emphasizing the importance of knowledge in particular:

"Technology involves incorporating information into business processes to meet human needs more effectively."

It is also possible to categorize technology as process technology or product technology. In addition to new goods or services, product technology it covers operations for the development of products. Technologies designed by designers or engineers in products are final product technologies. For example, automatic washing machines and automatic transmission systems such as ABS and DBS in cars show developments in product technology. Process technologies are developed by companies shows the status of tools, equipment, and machinery in use. In other words, process technologies consist of technologies that support manufacturing processes (such as automated placement of chips on integrated circuits). As advances in process technology enable higher-quality products to be produced, product technology is also improving. It is possible to categorize technology as both product and process technology, but these two categories are often confused. Automated placement of integrated circuits onto chips can be accomplished by robots. In this case, the robot is part of the process technology, but it serves as product technology for the manufacturer. High-tech enterprises, such as microelectronics, are often referred to as "high-tech." As with many technology classifications, it is difficult to define what is meant by high tech and low tech. Defining high tech as technology that requires a lot of research and development can make this classification clearer and simpler (Mahmut TEKİN, 2010). Simple and complex technology is another definition of technology. According to this distinction, an expert cannot understand the details of a technology, nor can he understand the details between experts according to time and space. If information cannot be transferred, it is technically complex. Many of today's technologies consist of complex technologies.

However, it is also possible to divide technology into two categories: existing and strategic technologies. While it encompasses the existing technologies of organizations, strategic technologies provide long-term organizational advantages and competitive advantage (Mahmut TEKİN, 2010).

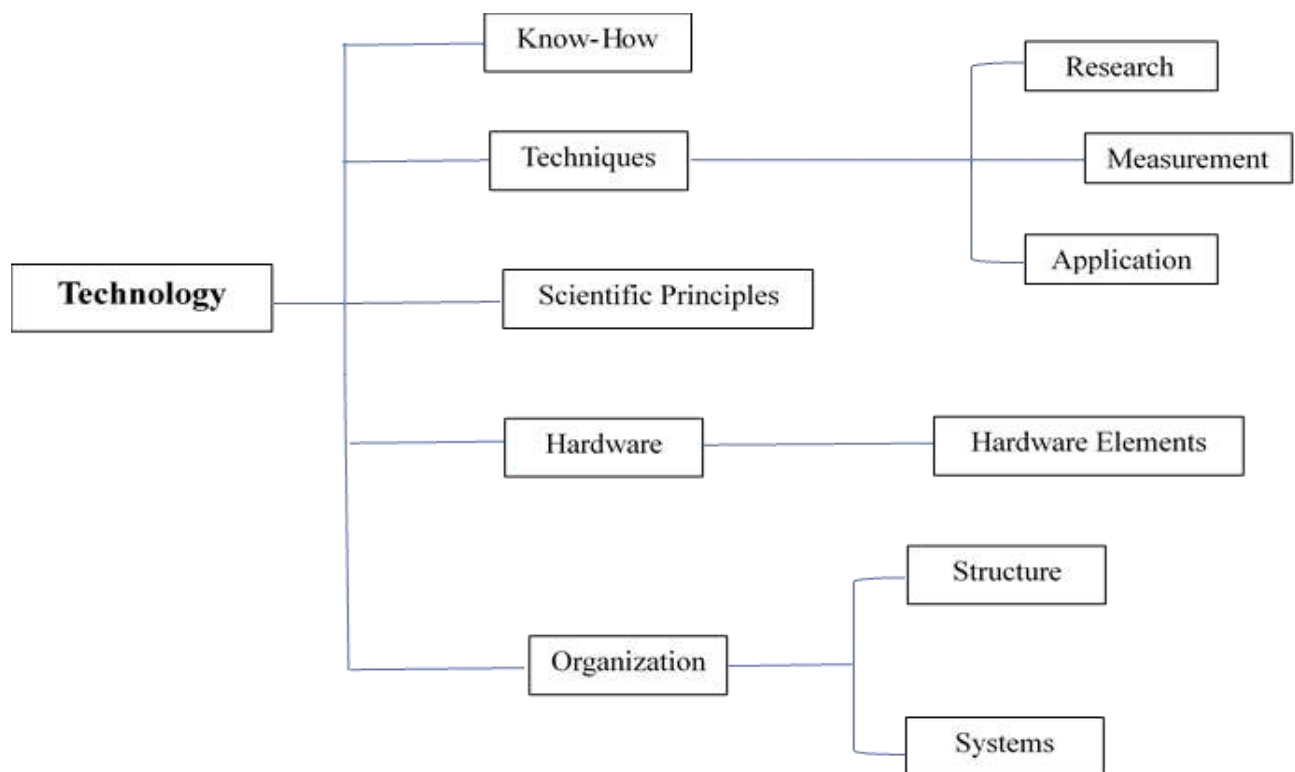


Figure 1.1 Basic Components of the Concept of Technology (Erdal, 2008).

Types of Technology

There are three categories of technology such as engineering technologies mainly Numerically Controlled Machines. For instance, digital control can be defined as a form of programmable automation that uses numbers, letters, and symbols to control a process. Here, numbers, letters, and symbols are used to create a program that contains the commands needed to perform a specific task or tasks. In addition, robots "Mental maintenance tasks, environmentally hazardous tasks, and repair and assembly of space station components will be performed by robots. "Personal robots will appear in homes by 2010." (Cetron and Davis wrote, 2001). Computer Aided Design such as autocat program. Computer Aided Manufacturing means the direct or indirect use of a computer system in the planning, management, and control processes of a production system. Furthermore, Computer Integrated Manufacturing organizes the entire company. In addition to tasks such as design, process control, manufacturing, quality control, transportation, and storage, the control of the machines and tools that enable these tasks to be carried out are among the tasks of this organization. According to Aydoğan and Semiz (2004), BTÜ provides receiving orders, receiving materials, and planning production using commercial data transactions. Automatic Material Handling Computer-aided material handling is the use of computers to control and direct how materials move within a factory. Group Technology (Cellular Manufacturing) It is the process of producing a certain family of parts with similar production characteristics within the system, in which groups of people and especially machines are present or formed. Moreover, Flexible Manufacturing Systems function in

various parts sent randomly to the system are detected by the system and sent to the necessary machines to perform the necessary tasks.

Innovation

The ability to innovate, which is part of adapting to the environment, is the most important difference that separates humans from other living beings. This has allowed humans to develop and improve themselves for centuries. Businesses, as part of the human civilization system, are the most important place where innovation occurs. When considered from the perspective of businesses, innovation plays an important role in the general strategy for survival, competitiveness, and gaining a place in the market. Innovation is like an umbrella. Entrepreneurship, research and development, legal regulations, and financing resources are under this umbrella. Many new ideas must be developed for the system to work smoothly. For this, entrepreneurs must be trained, patents must be obtained and financial support must be provided.

Features of Innovation

Innovation allows both individual and societal needs to be better met (health, rest, work, transportation, etc.). The entrepreneurial spirit depends on innovation: every new initiative results in a process aimed at bringing about a certain innovation.

All enterprises are constantly innovating to remain competitive. This is also true for countries. They must quickly translate new ideas into commercial and technical success to maintain their economic growth, competitiveness, and employment opportunities.

Innovation means innovation. However, not every innovation is innovation. Innovation has the condition to add value to the company and to be useful. For example, you decided to open your store at eight in the morning instead of ten in the morning like everyone else does, or you had a new bedroom decorated. Unfortunately, although they are innovative, they do not fit the concept of innovation. To be considered an innovation, the individual or organization that develops it must differentiate itself from all alternatives in the market and must be able to change the purchasing behavior of consumers in its favor. Therefore, customers must be willing to buy more of this innovation or pay more than other options. In general, it should make more money. In this context, we can redefine innovation as “innovation that makes money” or “creativity that differentiates.”

Innovation consists of three main components:

- A new market, technology, or approach,
- The successful implementation of this innovation and
- It benefits the company.

Innovation does not have to involve a completely new idea. The idea of being new to the company or application is enough to spur innovation.

Innovation is the use of new or existing knowledge in a new way or as part of it. Knowledge can be acquired through innovation activities (e.g. in-house research and development) or from external sources (e.g. purchase of new technology). Innovative efforts that may differ from standard routines are necessary for the use of new knowledge or the combination of existing knowledge (Köksal & Küheylan, 2008).

Innovation Process

Innovation begins with the successful introduction of a new idea to the market or ends with a company developing a new production process. This process results in the retention of the product or service in the market. Basic research and applied research are usually distinguished between research types. Basic research is the effort to find new ideas, events, and areas in the company. Basic research of a suitable product or process is known as applied research. The development of technical knowledge is the goal. Customers, scientists, competitors, employees, channel members, and top management are usually the sources of new ideas and products. Erol Eren defines the innovation process as follows: The innovation process is the appropriate collection and evaluation of information, techniques, and tools, ideas are developed and then these ideas are transformed into design production tools and methods. Although the number and importance of the stages that make up the innovation process vary in various explanations, the process progresses in a logical flow. The innovation process does not only have scientific and technical aspects. The innovation process is affected by individual and group behaviors in environmental conditions such as internal conditions related to the formal structure, markets, government aids, cultural level, and legal regulations. The new product should contain a component that balances technological, social, and economic aspects.

Types of Innovation

The innovation phenomenon, which we define as the philosophy of innovation, is an effort to create an idea, application, process, or tangible object that is considered new for an individual, group, organization, industry, or society. It is a planned effort to produce new products and services or to provide new areas of use for existing products and services. Classifying innovation according to its degree (radical or incremental) and its focus (product and process innovations) are the two most commonly used types of classification in the literature.

Types of Innovation by Degree

When we want to classify the concept of innovation according to its degree, most authors divide it into two categories: radical innovation and gradual innovation. Incremental (Continuous) innovation aims to innovate by using the existing technological resources of the company and making some eliminations and purges of traditional-ongoing production designs and methods. In addition, incremental innovations mean that they allow continuous innovation rather than allowing only certain parts of the organization to be affected. This allows the organization to move forward. They aim to increase the functionality of existing technology to improve performance measures such as quality, cost, and time. Additionally, Radical (Discontinuous) innovations are innovations that are the result of intensive development efforts and are completely new to the customer or industry. The company that adopts and implements such innovation will experience significant changes in its business practices. Refers to fundamental product or procedural improvements that lead to significant changes in an industry. Often made by entrepreneurial individuals or organizations, not within the industry.

Types of Innovation by Focus

Under the heading of innovation types according to focus, emphasis will be placed on whether the implemented innovation will focus on products, processes, or something else. Increasing the efficiency of a business's product or service is directly related to product innovation. Product innovation can help a company increase its sustainability and competitiveness in the market. New products are seen as a clear indicator of innovation in the market. At this point, process innovation is also of strategic importance. Being able to do something that no one else can do or being able to do it better than anyone else is an important advantage.

Product or service innovations are examples of innovations that are directly related to customer needs. A new product is simply called a new product because it means anything new. However, very few new products actually fall into the category of new products.

Process innovation is essentially about increasing an organization's ability to create value. A new or improved method for producing or delivering a product or service is known as a process innovation. Process innovation can be radical, such as a company implementing just-in-time (JIT) manufacturing, or improvements in the way a bolt is tightened. Product innovation refers to changing the final product or service a company produces, while process innovation refers to changing how the final product or service a company produces is made.

Organizing production or service activities and creating new production processes is known as process innovation. Process innovations also reduce the company's costs. The work done will prevent significant cost losses throughout the process and provide significant gains. In general, the development of industrial or service businesses will allow the value offered to the customer to increase through the improvement of quality and reliability. Likewise, marketing innovation is a new marketing approach that significantly changes the design or packaging, positioning, promotion, or price of a product. Marketing innovations aim to better respond to customer needs, open new markets, or position the company's product in a new way in the market to increase a company's sales. Changes that a company makes in its marketing tools are the use of a marketing method that has never been used before. This is what distinguishes the company from others. This should be part of a new marketing concept or strategy that is completely different from the company's current marketing strategies. An innovative company can create a new marketing strategy for existing and new products or get help from other companies.

Organizational Innovations

Organizational innovations can occur in the form of significant changes in the organizational structure, innovative management approaches, and the implementation of new strategies. An organizational innovation, unlike other organizational changes, is an organizational method (business practices, workplace organization, or external relations) that is a result of strategic decisions taken by management.

Table 1. 1of Innovations and Some Examples (Erdil et al., 2016)

Types of innovation	Selected Examples
Product and Service Innovation	Sticky small note papers (Post-it) Reversible pants MP4 player Spotify Facebook & Twitter
Process Innovation	Assembly line Just-in-time production Stockless operating systems
Marketing Innovation	Amazon.com Ebay.com
Organizational Innovation	Kaizen (Continuous improvement)
Social Innovation	Microcredit implementation Toms Shoes One-for-One program Open Education Faculty

Technological Innovation

Technological developments are the use of cutting-edge technologies to produce goods or services or to perform their functions. The OECD's Oslo Manual (2005) divides technological innovations into two categories: Process, product, and innovation. This can be a production or distribution process. Technological product innovations apply to products with new features or products created using new technologies. Technological process innovations can also be completely new processes or processes developed using new technologies.

Research on creativity defines innovation as both a technical component and a social act. The characteristics of social innovation are perceived to stimulate new models and

perspectives on progress. This is a significant advance in previous research based on technological innovation. The most important difference between social innovation and technological innovation is the intended outcomes. Studies in the fields of innovation, management, and technology examine its success in improving the economy. In 2010, Dawson and Daniel that two critical components make innovation possible. However, social innovation brings about social change that cannot be the basis of current practices. While the fundamental goals of the two types of innovations are different, improving the quality of life of social groups is a common goal.

The success of social innovation must be culturally acceptable, financially sustainable, and technologically feasible. Social enterprise and technological innovation must develop at the same pace. However, as a result, social benefits are harder to measure and understand because they take longer to understand than economic and technological advances. This is where a large number of people accept examples of social innovation. Comparable long term. The non-material nature of social innovation is another difference. Finally, social innovation aims to create a set of social practices to promote the institutionalization of social practices, while technological innovation focuses on developing new products in line with the developments achieved.



Figure 1.2. Technology Innovation (Weber et al., 2013)

Technological Innovation and R&D

The research and development efforts of companies are one of the most obvious sources of technological innovation. Research and development are often interrelated. These two activities represent different types of investment activities concerning innovation. It includes both basic and applied research. Basic research is process management for understanding a subject or field without any commercial consideration. This research aims to produce scientific knowledge that may or may not be commercially usable in the long term.

Applied research is the process of learning more about a subject to meet a specific need. Development refers to activities that use knowledge to create useful tools, materials, or processes. Thus, research and development refer to a range of activities from the discovery of an idea to specific business applications.

Studies show that research and development (R&D) activities are the most important sources of innovation for companies. This result is supported by the impact of the firm's sales and research and development expenditures. Research and development intensity, which represents R&D expenditures as a percentage of a firm's revenue, is strongly correlated with the rate of growth of its sales, sales from new products, and profitability. Table 1.2 shows the order of importance of resources used in research and development activities (Feraý ODMAN ÇELİKÇAPA, 2010).

Table 1.2 Prioritization of R&D Resources by Businesses

Order of Sources Used in Research Studies	Ranking of Resources Used in Development Studies
1. In-house research 2. Department of Internal Science and Technology 3. Financing university research 4. Student-centered research in companies 5. Continuing Education 6. Programs affiliated with universities 7. Contract R&D Consultants 8. Collaborations	1. In-house R&D Department 2. Internal research 3. Technology from suppliers 4. Collaborations 5. License agreements 6. User technology 7. Continuing Education 8. Purchase of goods

Types of Technological Innovations

In almost every industry or service sector, small, incremental innovations are spontaneous innovations. There is no institutional research and development activity for these developments. The impact of a single innovation is small, but the cumulative effect is large. Radical innovations are those that involve major changes in product or production technology and require institutional research and development efforts. For example, simple innovations that increase productivity in cotton yarn production are considered to be the previous innovations, whereas the invention of nylon is extremely new. Radical innovations are important for a particular business or sector but are generally small and local.

Changes in the technology system occur through a combination of radical and sustained innovations that affect many sectors of the economy or give rise to new industries, along with organizational and managerial innovations.

"Technological Revolutions" refer to changes in the technological economic paradigm. Changes in the technological system affect not a single product or service, but the entire economy. These changes, known as the change of the Techno-Economic Paradigm, will have an impact throughout history and will also cause institutional structures to change.

Among the types of innovation, incremental innovations and radical innovations are more commonly implemented and stand out as the most important goals of businesses. The difference between radical innovation and breakthrough innovation may not always be clear. Many innovations are made by changing already existing functions. But some developments completely change the order of objects and the techniques used are completely old. In such cases, the difference becomes more obvious.

Herbig stated that there are three types of incremental innovations. They are continuous, modified, and continuous innovations. Products are constantly modified. An example is the

growth of the product line. Modified innovations are disruptive innovations, such as the introduction of a new technology that performs the same basic tasks. Computer software is a good example of a modified innovation. Process innovations involve changes in the manufacturing process of an existing product. Changes such as computer-aided design or total quality management fall into this category.

Radical innovations are superior innovations used to create new industries, products, or markets. These involve significant technological advances. Old technology does not become competitive in any way in terms of design, scale, or efficiency. Radical innovations allow any sector and market to emerge, develop, or disappear. Radical innovations, whether carried out internally or externally, develop and change the company's technological processes, as well as open up new markets and product applications. According to Herbig Tushman and Anderson, radical innovations can be defined as strategic changes in the markets where products or services are worked and technological developments are used in providing a service or producing a product based on significant innovations.

Sources of Technological Innovation

Radical innovation and its sources have been addressed in many theoretical studies, including innovation research. Discussions in institutional theory and technology assessment focus on firm- and industry-oriented reasoning for radical technological developments to encompass a broader picture of the organization's environment, technology, and market characteristics. Based on a combination of theories, five factors have been identified that explain the emergence of radical technological change. On the other hand, entrepreneurs who are not constrained by habits are candidates for developing new projects. In addition to entrepreneurs, there may be powerful external stakeholders who are interested in radical technology. The traditional limitations of technology mean that new initiatives by entrepreneurs and external stakeholders can lead to radical work.

External Shocks or Crises

“Occasional events” that disrupt long-standing balances can cause shocks. Shocks are important mechanisms for managing the volatility of current work. There is uncertainty that encourages unconventional experimentation. However, companies and sectors need to come up with radical solutions. The third source of radical change is the performance characteristics and learning curve of the technology compared to the technology it replaces. For example, radical technologies may be more expensive and complex than established technologies, but they may meet expectations of long-term benefits. Changing market demands can challenge existing work and technologies. Market changes can result from demand for improved performance or from new options offered by new technologies. As market demands change, technology-push mechanisms can lead to the development of radical technologies. Competition between companies in the same industry can create significant change. Radical technologies can provide an advantage in the market. New entrants can find many opportunities to gain more market share. Industry competition can lead to more radical innovations to gain first-mover benefits. This is a phenomenon related to incremental innovation.

Technology Innovation Process

Technological innovation is the totality of inventions that enable products, services, and processes that contain new technology to enter the market. The innovation process includes the technology development process that must demonstrate the company's capacity to use its internal and external assets effectively. This process begins with researching relevant technologies, communicating with external assets, and emerging new ideas. The project structure is prepared by considering product features and customer requests in the second stage.

Technological progress began with an invention. This invention must first meet the needs of the market. According to the theory known as "pull market/push technology", the product in the market must be compatible with new technology, be of high quality and provide a competitive price advantage. To turn technology into a competitive advantage;

- Product differences
- A high-quality, low-cost leadership approach should be adopted.

Rapid developments in technology have transformed the price competition based on price formation in the classical economy into technological competition based on marketing and new products. When the conditions for competition in the market are fully present, market prices are directly affected and companies use new technologies and new management approaches to produce quality products and services at low prices.

There are five main management principles in Akbank's technological innovation strategy:

- Must have a competitive business system feature
- They must be able to estimate the potential of new technology.
- Planned technology approaches must be feasible.
- It must be able to meet new products and technology needs in the market.
- Business strategy and technology strategy must come together.

Porter (1986), in his study known as "Competitive Advantage of Nations", emphasized that seeing technology as a component of competition contributes to business systems. In the same study, he states that competitive advantage is provided by the following elements:

- Change, innovation, and creativity
- Taking into account the entire value system, that is the entire chain of activities that occur during the creation and use of a product.
- Relentless progress and development
- A global planning approach

Different technological innovations and research and development strategies are used by companies to compete and increase their market share. To determine a company's technological innovation (innovation) and research and development (R&D) strategy, three main issues should be examined:

- Analysis of external technological, economic, and social environment
- Analysis of business resources and current internal structures
- Determining the overall business strategy

Technological innovation and research and development strategies are closely related to the general strategy of the company. They need to be able to foresee the threats that new technologies and new products may pose to their markets and products, evaluate the life cycle of technological innovations and new products in the market, and determine which strategy to implement.

Organizations engaged in management and technological innovation activities should be able to answer the following questions clearly and concisely:

- What are the company's goals? Has this vision been understood and disseminated by all employees?
- What are the company's strengths and weaknesses? What does SWOT Analysis tell about a person's strengths, weaknesses, and potential advantages?
- The company;
 - a. Macro environment
 - b. Other competitors
 - c. Changes and developments in technology
 - d. Trends in the market and economy
 - e. Changes in the goods and services that the company offers to the market
 - f. Customer changes

What are their abilities to gather, process, and interpret information and news on various topics?

- To what extent do the company's technological strengths and technical innovations affect the industry?
- Are experts in a company's technology, marketing, finance, strategic planning, and manufacturing effectively represented as members of the management team?
- How can one be aware of the technological changes occurring in the market?
- Does the company have technology management practices?
- Are forecasts and technological risk analyses made for technological innovation? (Yokus, 2005).

Conclusion

As we have seen above, technology plays a vital role in every field today, especially in the business field. Most previous experiences and studies expressed that using the latest version of technology accelerates and increases the amount of goods and products as well as saves time for better achievements. Companies with the latest technology are at the top today and always have the first say. Companies with the latest technology can take over the entire market by producing goods and services at lower prices and with the highest quality. One of the secrets to the success of the most famous companies in today's world is technological innovation. The performances of companies with the latest technology and those without the latest technology are completely different. Technological innovations play an important role in the success of the company, so companies should always try to use the latest technology to compete with their competitors in the market.

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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