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EFFECT OF ISO 56002 INNOVATION MANAGEMENT SYSTEM FUNDAMENTAL PRINCIPLES ON CORPORATE PERFORMANCE COMPONENTS: RESEARCH WITHIN THE SCOPE OF THE PERCEPTION OF THE R&D EMPLOYEES

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Abstract

The main purpose of this research is to determine the effect of ISO 56002 innovation management system fundamental principles on corporate performance components within the scope of R&D employee perceptions. In this context, the survey form prepared for the research was applied between March 2023 and July 2023, over face-to-face and teams on 29 employees (managers and specialists) of the R&D and Innovation company which has 37 employees and was entitled to be certified by successfully passing the ISO 56002 Innovation Management System Certification audit for the first time in Turkey. Within the scope of the ISO 56002 innovation management system, nine factors (Profitability, Productivity, Productiveness, Effectiveness, Efficiency, High Quality, Customer Satisfaction, Expectation and Attitude, Strategic and Operational Success and Human Resources Behavioural Dimensions) are determined for the effect of innovation management system fundamental principles on corporate performance components. These factors are perceived as very high concern by the participants. On the other hand, very high, high and medium correlations emerged among the factors positively. Consequently, it is observed that ISO 56002 innovation management system fundamental principles affect corporate performance components. According to the research findings, it is noteworthy that companies should have a robust innovation system as a strategic priority and main driving force,especially to achieve success in corporate performance management. It can be remarked that the internationally accepted ISO 56002 Management System standard forms a basis for establishing, implementing, and maintaining an innovation system for providing better services through innovation in their products and services,achieving customer satisfaction and continuous improvement.

Keywords: Innovation, ISO 56002 Innovation Management System, Corporate Performance Components
Jel Classification: M10, M12, M13, M14

ISO 56002 İNOVASYON YÖNETİM SİSTEMİ TEMEL PRENSİPLERİNİN KURUMSAL PERFORMANS BİLEŞENLERİNE ETKİSİ: AR-GE ÇALIŞANLARI KAPSAMINDA BİR ARAŞTIRMA

Öz

Bu araştırmanın temel amacı, ISO 56002 inovasyon yönetim sistemi temel prensiplerinin kurumsal performans bileşenlerine etkisinin çalışan algıları çerçevesinde belirlenmesidir. Bu kapsamda araştırmaya yönelik hazırlanan anket formu, Mart 2023– Temmuz 2023 tarihleri arasında, Türkiye'de bir ilk olarak ISO 56002 İnovasyon Yönetim Sistemi Belgelendirme denetimini başarılı şekilde geçip belgelendirilmeye hak kazanan ve toplam 37 çalışanı olan, uluslarası platformda enerji sektöründe faaliyet gösteren bir grupla ile entegre şekilde faaliyetlerde bulunan Ar-Ge ve İnovasyon şirketinin 29 çalışanı (yönetici ve uzman) ile birebir yüzyüze ve teams aracılığı ile uygulanmıştır. ISO 56002 inovasyon yönetim sistemi kapsamında inovasyon yönetim sistemi temel prensiplerinin kurumsal performans bileşenlerine etkisine yönelik 9 faktör (Karlılık, Verimlilik, Üretkenlik, Etkililik, Etkinlik,Yüksek Kalite, Müşteri Memnuniyeti, Beklenti ve Tutum, Stratejik ve Faaliyet Başarı ve İnsan Kaynakları Davranışsal Boyutları) belirlenmiştir. Bu faktörler katılımcılar tarafından ileri düzeyde önemli olarak algılanmaktadır. Diğer taraftan faktörler arasında pozitif yönde çok yüksek, yüksek ve orta düzeyde korelasyonlar ortaya çıkmıştır. Sonuç olarak ISO 56002 inovasyon yönetim sistemi temel prensiplerinin kurumsal performans bileşenlerine etkisi olduğu görülmektedir. Araştırma bulgularına göre şirketler, özellikle kurumsal performans yönetiminde başarıya ulaşmak için stratejik öncelik ve temel itici güç olarak sağlam bir inovasyon sistemine sahip olması gerekliliği dikkat çekmektedir. Uluslararası kabul görüş gören ISO 56002 Yönetim Sistemi standardının İnovasyon Yönetim Sistemi oluşturmak, uygulamak, sürdürmek ve kuruluşların ürün ve hizmetlerinde inovasyon yoluyla daha iyi hizmetler sunmaları, müşteri memnuniyeti elde etmeleri ve sürekli iyileştirmeleri için bir temel oluşturduğu belirtilebilir.

Anahtar Kelimeler: İnovasyon, ISO 56002 İnovasyon Yönetim Sistemi, Kurumsal Performans Bileşenleri
Jel Sınıflaması: M10, M12, M13, M14

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1. Introduction

Digitalization and the use of new technologies pave the way for the machines that exchange information and organize themselves, combine processes in all value chains and production becomes more efficient, more flexible and cost-effective combining the physical and digital world because of its automation. It can be said that these tendencies may cause a wide range of changes for both companies and employees. At this point, with revolutionary industry 5.0 carrying this forward via developed automation and feedback to form a service-based model people may focus on adding value for the last users. The differences between the fourth and fifth industry revolution show how to use modern technology to introduce a more homocentric, more flexible and environmentally-conscious, sustainable future, to direct the work among human, hi-tech and artificial intelligence robots to enhance workplace processes

Considering transitions between these two revolutions Industry 4.0 can be defined to be technology-driven whereas Industry 5.0 is people oriented. Rather than productivity and profit, Industry 5.0 turns the related business into a part of the solution with developed world-oriented benefits including the employees; breaks new ground with the dimensions of quality, performance and innovation. When the historical process is examined to recognize the essentials of how innovation and quality work together and how these powers have to be used together, it would be useful to turn back at times and to see the distance covered. For example, the modern classic "A Brief History of Time 1" (1988) by Stephen Hawking precedes a short brief of individuals who form quality history, issues and events with the dimension of quality. At this point where it engages with developing discipline and way of thinking, it will be observed how innovation has to be. It is admitted that the modern quality movement gathered after a great deal of negative processes and emerged after World War II. It is known that during this process in 1945 United Nations, in 1947 International Organization for Standardization (ISO) and 1946 American Society Quality Control (ASQC) were established. When ASQC and ISO membership became increased new funds of knowledge reached until today via the ISO series. During innovation generation, in today's business world, it can be observed that isolation recoveries fall short in some directions of management and organization. A holistic strategy is needed for competitive advantage and by this exit strategy, common relations among quality, innovation and performance cognitive dimensions are analysed and integrated with cognitive dimension. (Walker, Damanpour, Devece, 2010).

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Concordantly, determining the effect of the innovation management system and fundamental principles on corporate components within the frame of employee perception forms the main purpose of this research.

The survey study which is performed included 29 employees (managers and specialists) of an R&D and innovation company with a total of 37 employees who broke new ground by passing ISO 56002 Innovation Management System Audit successfully and entitled to certification applied using one-to-one and teams are expected to contribute literature with analysis and findings.

2. Literature Review

2.1. Innovation Management System: ISO 56002

Innovation is a process in which an area, a product or service is renewed and updated by applying new processes, offering new methods or developing successful ideas to create a fresh value (Roberts,1998). New or changed entity realizing or redistributing value (ISO 56000, 2021). Innovation management is a focal point for many businesses today. An Innovation management system consists of a range of interrelated factors that enable the organization to determine the innovation policy, strategy and vital processes to achieve the expected innovation results. These activities include determining the changing conditions on its own and replying, following the new opportunities, increasing the knowledge and creativity of in-home employees and other related ones and encouraging a culture that supports innovation activities (Griffith, 2006).

Innovation management or an innovation management system can be defined as a process of managing new ideas from energising without forming ideas to realising these ideas (Maxwell, 2010). This approach has four various steps: (1) Constitution: brainstorm and employee input to discover confidential ideas. (2) Catch: recording the ideas in a manner that they can be shared with key shareholders. (3) Assessment: discussing and criticizing innovative ideas to see if they conform to the needs or not. 4. Prioritisation: determining which of the innovative ideas could be applied to maximize the time and other resources in business (Kimpimäki, Malacina and Lähdeaho, 2022).

Innovation management informs senior business objectives that create important value for the corporations. While specific actions and applications follow the innovation as a reply to innovation management systems and business vision and emergent problems, also directs the innovation-oriented developments (Khan, Johl and Johl, 2021).

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Accordingly, the ISO series related to innovation management represent a significant factor for an organization's innovative ability, sustainable growth and long-term survival. The purpose of the innovation management system is to guide how to establish an organization and what has to be done to fund an innovation management system. Standards are aimed to be practicable for all sizes of organizations especially SME-based ones (private, public and NGO) and all kinds of innovations (products, methods, services, procedures, organizational and business models). Research performed by PwC shows that better-than-average innovative companies grow %16 faster than others (PwC, 2015). Besides other points, especially innovative companies achieve higher growth in terms of sales, profit and market capitalisation (Truffer and Coenen, 2012).

The concepts of innovation and standard can be seen as a dilemma heuristically. While innovation is associated with the concepts like creativity and flexibility, standard rules mean order and routines. Since bright ideas are one of the main essentials of successful innovations, gathering these two is meaningful for the companies. More to the point is to actualize these ideas. This is proved by the reality that selecting the right ideas, insufficient coordination and long-time development are the major obstacles to successful innovations (Lopes et al., 2022).

ISO series gives a chance to discuss innovation research systematically through a system perspective and may act as a catalyst in innovation management for the integration of theory and practice.

ISO 56000 is a range of ten-section standards and mentor documents designed to help organizations apply, continue and continuously improve an innovation system successfully forming a general frame. Contrary to the ISO 9000 series for quality and ISO 14000 series for environment management and other ISO standards constituted for many years, the 56000 series is at the beginning stage and published partly. Until today ISO series related to innovation management includes the following six published documents and mentors. 1.ISO 56000: Rudiments and terms, 2. ISO 56002: Innovation management system: Guidance, 3.ISO 56003: Tools and methods for innovation partnerships, 4. ISO/TR 56004: Innovation management assessment, 5.ISO 56005: Tools and methods for IP management, 6.ISO 56006: Tools and methods for strategic knowledge management. Additionally, four documents are actually under development. 1.ISO 56001: Innovation management system; Necessaries, 2. ISO 56007: Tools and methods for knowledge management, 3. ISO 56008: Tools and methods for measuring innovation processes, 4. ISO/DTS 56010: Explanatory samples for ISO 56000 (Lopez, 2021).

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The International ISO56002 standard for the management of innovation systems that constitutes the research subject was published in 2019. According to Tidd (2022), who discusses the reason, main features and proof basis of this new standard, the primary purpose of the standard is to encourage professionalization providing a frame for an organizational application. The standard has been developed by a great variety of shareholders including consultants and professional associations therefore, it includes most of the factors expected from this high-level, general approach: strategy, organization, leadership, planning, support, process, performance assessment and reformation are discussed as basic dimensions. Tidd (2022) analyses each of the components on an empirical basis, confirms some critical deficiencies in linear modelling and criticises the lack of special tools that support the application or the processes of important varieties according to sector or context. Finally, how the standard could be developed and practised is committed (Tidd, 2022).

The core of ISO 56000 family is ISO 56002 which guides for setting up, maintaining and continuous improvement of an innovation management system. The principles of ISO 56000 management consist of eight major topics; realization of value, future-oriented leadership, strategic tendency, culture, benefit from insight, uncertainty management, adaptability and system approach. This approach uses the frame of management systems developed by ISO as a base. Therefore, it can be applied together with other management system standards easily (e.g. ISO 9001). Nevertheless, using other ISO standards is not a prior condition for the application of ISO 56002, thereby, it can be adapted as a guide by itself (ISO 56000, 2021; Lopez, 2021).

ISO primarily aims at settled organizations no matter what their types, industries or size are. However, the standard can be applied by start-up companies and other businesses since the frame is unforeseen about detailed activities, requirements, special tools or procedures for innovation activities. Additionally, ISO 56002 is proper for all kinds of innovation without considering innovation approaches (e.g. interior or open innovation) and innovation levels (e.g. products, processes). According to ISO, an innovation management system is figured out as a range of interrelated or interactive factors that aim to create value. These factors do not need to be applied at the same time; the standard also allows gradual application. However, all the elements of the system have to be applied to realize the full potential of the standard. The innovation management system declared in ISO 56002 consists of four areas: 1. Context of the organization, 2. Leadership, 3.Support and 4. PDCA (Plan-Do-Check-Act) cycle (Kahl, Jhol and Jhol, 2021).

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On the contrary of ISO standards, 56002 includes not necessaries but instructions. Since the standard chooses the correct approach and tools considering the market, culture and objectives of the organization, it has a wide range of possibilities. Another attractive point of ISO 56002 is about principles the standard is based. They lead the work to sustainability and can meet the continuous change in the market. Besides, these principles support the whole activities actualized by the company. These are as follows (Tidd, 2022)

- Realization of value
- Future-focused leaders
- Strategic direction
- Culture
- Exploiting insights
- Managing uncertainty
- Adaptability
- Systems approach (Tidd, 2022).

The application process of ISO 56002 consists of five main steps; application methodology, assessment, innovation committee, internal audit and documentation audit. While it is not necessary, it can be stated that ISO 56002 documentation has weight and importance, especially in the international markets.

2.2. Corporate Performance Management and Basic Components

Corporate Performance Management is a business process that aims to close the gap among strategy planning, application and measurement. Having an identified process helps the decision makers to gain a global mentality about various courses including financial and operational planning for estimating performance gaps, consolidation of the processes and increase of productivity. Performance Management is a one-year process based on the communication between the employee and the director to plan, observe and review the employee's performance, objectives and contribution to the organisation. (Demartini, 2014)

Fundamentally, performance management is something that is assumed to make organizations achieve success and maintain competitive advantage. The main purpose of performance management is to encourage the atmosphere in which individuals and teams embrace the development of their own and the organization. Specifically, performance management is about enabling personal objectives and providing each employee to work goal-directed in corporate environments. Businesses may face an essential rupture between financial planning and

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performance measurement. Finance and profit centres do not reflect how the decisions are taken throughout the business. Corporate Performance Management clears up this rupture (Waxin and Bateman, 2009).

On the contrary, corporate performance management, with the performance reporting dimension has to provide to correlate the operational activities and decision-making process by gaining the strategy. It gives the background information to the organizations to make more confident and effective decisions (Murphy and Cleveland, 1995).

Corporate Performance Management consists of three main propositions. Those are: Planning, Budgeting and Estimation which have to serve the business to understand how the ongoing activities go toward actualising future long-term strategy. It assigns scarce resources in line with the strategic goals of the business. In response to changing conditions, provides planning activities that will help to achieve strategic targets. Performance reporting supports the organizations to turn their data into sensible, relevant and promptly management knowledge. This knowledge takes place in the centre of supporting fact-based decision-making. Profitability and cost analysis have to be developed to provide cost-utility threshold, income and profitability at multiple levels throughout the organization. This approach is contrary to traditional profit and cost centres. That modern analysis of the business complies with the part at which strategic decisions are taken (Hutchinson, 2013).

Businesses have to combine these three main factors to direct corporate performance improvement and strategy planning dynamically. An effective corporate management system is necessary for the employees to evaluate, measure and understand where they are. As people feel worth, motivation and being supported they show the best performance and it is what performance management aims to succeed (Paladino, 2011).

According to Gallup (2012), in research results, 2 of 10 employees declared that their performance is managed towards motivating them to do wonderwork. While most organizations use performance systems one way or another, too many employees cannot accept that performance management aims to encourage positive workplace behaviours which improve productivity and success. Components of corporate performance management include the followings:

- Planning
- Monitoring
- Developing

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- Rating and promoting

Corporate performance management includes a series of tools and processes that organizations may use to measure performance, achieve goals and make data-based decisions. These tools help the leaders to manage the operations, projects and products of the organizations. Understanding KPM may help us to apply it effectively for making Bu pabetter business decisions and strengthen our ability to cooperate with other companies. An effective corporate performance management system enables orientation for the changing market conditions modelling business processes firmly and flexibly. This means the existence of modelling tools helps to create the right representation of business processes included in problem-solving. A system like that may satisfy a good deal of data types and needs to support the operational requirements of an organization. Sound modelling abilities, also provide for creating existing system-based models and transferring data inside and outside from the other systems (Hutchinson, 2013). A perfect corporate performance management system software may be integrated with other systems like human resources, finance and customer services. A corporate performance management system is important since it works together with other software systems and integrates with existing business processes without suspending the current system. Integration abilities, enabling a trouble-free transition help cost reduction and increase productivity. Besides, it provides you using current data and knowledge and opens access to all companywide employees (Wall, 2002).

The best corporate performance management system is a complete and measurable solution that provides tools including all financial information, customer data and employee details for business management. It extinguishes the difficulties of using only one platform, single accessing for whole information and maintaining it. A reliable corporate performance management system can be scaled in terms of size and complication to easily meet the demands of a growing company. Both completeness and scalability of a system enable expansion with minimum interruption length that increases productivity. An effective corporate performance management system enables users to create flexible and comprehensive reports as they hear. A flexible reporting structure enables the information to be reported in various forms including reports, panels and warnings. Comprehensive data collection enables registering all necessary information from more than one source. These features provide various users to understand the data and make conscious decisions (Camardella, 2003).

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In an organization benefits of using a corporate performance management system are as follows: 1. Tenders flexibility. Since corporate performance management system software collects significant data from different departments,

It may express insight related to changing models in a company or sector. Leaders may change the parameters of corporate performance management system software to comply with changing objectives and conditions. For example, if any organization verifies its product portfolio, a corporate performance management system may monitor income from various product categories and may offer new insight that monitors income and costs of new products. 2. Provides in-depth visualization. A corporate performance management system enables in-depth data visualization and analysis that help you to make better decisions. This information can be used to determine the issues, measure the performance and find out the customers' demands. While these kinds of software allow the company to observe its own performance, also helps them to understand the customer reactions towards various marketing efforts. The advantage of data visualization also provides to identify areas of the products or services that need to be improved. 3. Develop cooperation. Since a corporate performance management system includes data collection, analysis and sharing, may help to advance interdepartmental cooperation and result in more productive business processes. For example, a corporate performance management system may observe how often the customer support department communicates to the customers and which questions they ask. This information may help to see how customer services will be improved. Besides, it provides a high road to see how the work of employees is in line with the company objectives. 4. It helps making better decisions. A corporate performance management system enables data collection from various departments, analysis and visualization. This system also increases the value of these data providing them to be related (Wall, 2002).

A corporate performance management system is an integration of analytically integrated control and reformation methods. Among the methods strategy map, equal scorecards, pricing (price floored cost management included), budgeting, estimate and source capacity requirements planning take place. These methods feed solutions like customer relations management, supply chain management and human capital management systems as well as other fundamental solutions like lean management and Six Sigma attempts (Cokins,2015).

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2.3. Relationality between ISO 56002 Innovation Managements System and Corporate Performans Management System Conceptually

Tangible factors that measure effectiveness and success rate are needed for an innovation management system to answer the purposes. And this is discussed as a hard issue (Zhou, Govindan and Xie, 2020). Harrington and Benraouane (2022) remark it has to be expressed that consolidation of this idea and clear definition of the applications in a well-organized operational innovation management system is a distinctive factor between failure and sustainable growth. Moreover, expressing that innovation management has to be aware of the characteristics of each company could be an adopted approach since the size, pre-existing technological progress levels, industry type, consumer market, strategies and organizational factors intervene with the innovation management system substantially.

Concordantly, the ISO 56002 standard has been accepted as an important tool for the configuration, implementation, maintenance and continuous improvement of innovation management systems (Zhou, Govindan and Xie, 2020). Hyland, Karlsson and Kristiansen (2023) point out that ISO 56002 provides a common language and frame to create an innovation ability. Since it is an important tool for systematic innovation search, and allows the companies to add value to business models enabling innovation processes to be managed more integrated, systematically and effectively, it is also expressed that ISO 56002 standard has been accepted as a worldwide reference around corporate management systems.

According to Harrington and Benraouane (2022), it is estimated that more than 75% of innovative projects start with an Innovation Management System that fails or cannot produce expected results. The largest wastage most mid and large-scale companies face is waste of money, time, prestige, opportunity and income that are caused by these failures. ISO 56002:2019 provides a step-by-step procedure about how a medium or large-scale project, program or product will be performed following a pre-used Management Systems Standard that considers the guide in innovation. Generally, the most complicated, difficult and hardest system used in an organization is the Management System Standard. However it is most important system, because it is the system that produces most of the value added products and includes the key processes. In time, probability of failure and effect on the organization are critic and generally it means the gap between achievement and bankrupt. Throughout the innovation cycle, it elaborates high intensity inputs and activities which are needed to process individual projects/programs/products. Discusses how medium and large scaled projects, programs and products proceed and also determines the frame to be used for small organizations and simple

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innovation activities. Essentially, maximum change between small and large scaled innovation projects is that small projects can take higher risk, need less formal documentation, use simpler communication systems and necessitate less sources (Hyland and Karlsson, 2023).

Hyland and Karlsson (2023) tried to supply an overall analysis to find out what is necessary from the moment an opportunity is realized till the customer use the innovation by a book prepared for professionals responsible for directing innovative projects and programs in order to get a comprehensive management strategy and step by step plan and ISO 56004 Innovation Management Assessment using ISO 56002:2019- Innovation Management- Innovation Management System- Guidance. The book also introduces a new innovation modelling cloud service that provides to descend to particulars of 5 levels from system level to job definition and allows free access to most of the best application process models. It provides guidance for establishing, applying, maintaining and continuous improvement of an innovation management system for the purpose of being used through including ISO 56002, 'Innovation Management- Innovation Management System- Guidance' SME. It is a guide generic, applicable to all types of organizations and innovations (e.g. a product, service, process, business model) from incremental innovations to radical ones. During this process increasing corporate performance is also discussed as a significant indicator.

Another research by Kesikbaş, Vural and Savcı (2022) remarking Defence and Aerospace Industry (DAI) is one the critic sectors where the most important technologic developments take place, according to the report with the title "2020 Global Aerospace and Defence Industry outlook" by Deloitte, while the world-wide concentration of security threats continue, technologic developments and innovations form DAI because of increasing military expenditures. Today, innovation management is in the front line of global competition that forms international security environment. Concordantly, defence industry investments of Turkey in the recent period became a significant topic to be examined in terms of innovation management. The research aims to provide factual information about implementation of an innovation management system around the companies affiliated with OSTİM (Defence and Aerospace Group) and their organizational abilities about adaptation of ISO 56002 standards for innovation management and search the relation level with corporate performance.

A systematic literature review has been performed about relations between conceptual innovation and performance, a search has been made through Web of Science and Scopus databases and 172 articles has been chosen. Results show that there is a positive relation among quality management, product and process innovation (gradual and radical), operational and

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financial performance and direct and indirect relations. According to the results, a range of direct or indirect relation has been suggested among these variables. The study completes a few previous research about these common relations (Zhou, Govindan and Xie, 2020).

ISO 56002 standards have several advantages. Some of these advantages can be listed as: to make the company market reference having an innovation based management system, a better skill for coping with uncertainty, lower costs, less waste, increasing profitability, consumers, suppliers, more satisfaction between investors and others about the business, making easier to take the employees' fancy and retention, offer an area for employees to be creative and develop ideas, provide the company a good reputation, make it possible to do business with larger organizations, more ways for increasing income, more credibility in market and a developed company image in the field of self activity, better accordance with the regulatory standard of market, forming an increasing capacity to catch partners, employees and financing (Hyland and Karlsson, 2023).

Corporate performance management is a technology based process which uses direct measurement and analysis of business processes to follow, evaluate, support and improve the productivity of an organization. Strategy uses data analysis and visualization tools in order to provide a real time level leadership about organization performance and analyse all business processes and activity information. Corporate performance management methods help management to follow the in-house groups, sections and departments in order to improve finance, operations and human capital abilities continuously (Camrdella, 2003).

However, corporate performance management brings a holistic view to performance of an organization and provides instructions that help actualising long and short term financial objectives of the business. the general opinion behind using innovation management system is to use experimental proofs in order to confirm the results of organizational policies, programs or decisions. The aim is to provide users confidence about the information obtained from business systems and on the basis of this information to ensure them making the best decision. Large companies and government agencies use this method to measure employee performance and to help the employees to achieve these goals more productively. When it is examined with in-depth-analysis, ISO 56002 control process has the chance to determine the potential points that the company needs to proceed in innovation projects with performance dimension and this is the best, the cheapest and the fastest way for the companies to think about and prepare for the faster one. Therefore, ISO 56002 certificate provides the ability of being ready for the future management by management systems proper for global conversion (Hyland., Karlsson and

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Kristiansen, 2023). Therefore, company does not have to abide by the standard, instead standard abides by the company. Standard has various opportunities of choosing the best approach and tools for the organization considering the market, culture and objectives of the company.

ISO 56002 has been formed to guide the organizations about defining vision, strategy, policy and innovation objectives, provide guides and structures for improvement of innovation management systems continuously and to determine a common language and standard (Harrington and Benraouane, 2022).

In this context, within a literature review because of limited number of sources in dimension of relational between ISO 56002 innovation management system and corporate performance management, it can be expressed that the study titled "Effect of ISO 56002 Innovation Management system Fundamental Principles on Corporate Performance Components" will contribute the literature with taking R&D employees into the research, research analysis, findings and commends.

3. Research

3.1. Purpose of the Research

The main purpose of this research is to determine the effect of ISO 56002 innovation management system fundamental principles on corporate performance components within the scope of employee perceptions.

3.2. Data Collecting Tools

As a data collecting method, a survey is applied with the Simple Random method. As a result of the Profession literature review, a survey form is prepared based upon the various measurement tools. In the survey consisting of 72 questions within the scope of 9 main dimension the studies by Khan, Johl and Johl (2021), TS EN ISO 56000 (2021), TS EN ISO 56002 (2021), Akdemir, vd. (2012), Reyane, Djenouhat and Kherbachi (2023), Çeliktaş (2008), Vatan (2010), Ibarra (1993), Demirtaş (2003) take place in literature.

3.3. Data Collection and Analysis

The survey form prepared as a result of the literature review has been applied using face-to-face and through teams methods on 29 employees (managers and specialists) of the R&D and Innovation company which is active in energy sector with 37 employees and entitled to be certified by successfully passing the ISO 56002 Innovation Management System Certification

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audit for the first time in Turkey, between March 2023 and July 2023. Teams interview registers are archived. Within the research, necessary written permissions documents, ethics committee approvals, approval forms have been arranged.

Consequently, this study has been performed for the first time in an R&D innovation company that concluded Innovation Management system documentation successfully and consists of 37 employees. In other words, number of employees who work within the mentioned framework is only 37. Therefore, population of the study includes 37 individuals. 29 (13 women and 16 men) of these 37 individual have been interviewed by face to face and teams. Thus, a random participation about 78% (29/37) has been provided. Data gathered as a result of the research have been analysed with SPSS software.

3.4. Fundamental Hypotheses of the Research

The fundamental hypotheses of the research are as follows:
H1: …factors are noticed by the participants. f1:Profitability, f2:Productivity, f3:Performance, f4:Effectiveness, f5: Efficiency, f6:High Quality, f7:Customer Satisfaction, Expectation and Attitude, f8:Strategic and Operating Performance, f9:Human Resources Behavioural Dimensions (perception, attitude, expectation, behaviour, motivation, learning and improvement, job satisfaction, organizational commitment, overcoming the stress, positive human relations etc.)

H2: There is a direct relation between … factors. (f1:Profitability, f2:Productivity, f3: Productiveness, f4:Effectiveness, f5: Efficiency, f6:High Quality, f7:Customer Satisfaction, Expectation and Attitude, f8:Strategic and Operating Performance, f9:Human Resources Behavioural Dimensions (perception, attitude, expectation, behaviour, motivation, learning and improvement, job satisfaction, organizational commitment, overcoming the stress, positive human relations etc.)

4. Findings

4.1. Findings Towards Independent Variables

It is observed that general age average of survey participants (n=29) and standard deviation age average (min-max=25-64) is 37,1 ± 4,78. Age average of women (n=3) and standard deviation is 33,9± 4,45 an men's (n= 29) age average and standard deviation is 42,1± 5,58. 44,8% of participants (n=13) women and 55,2% men(n=16), 31,0% (n=9) executives and 69,0% (n=20) specialists. In table 1. findings towards variable analysis have been offered.

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Table 1. Distribution by Socio-Demographic (Independent) Variables (Demographic Characteristics of Participants) (n=29)

Demographic Information		n	%	Demographic Information		n	%
Gender	Woman	13	44,8	Educational Level	Bachelor's Degree	10	34,5
	Man	16	55,2		Postgraduate	10	34,5
	Total	29	100,0		Doctorate	9	31,0
Position	Manager	9	31,0		Total	29	100,0
	Specialist	20	69,0	Age	25-35	11	38,0
	Total	29	100,0		36-45	15	51,7
					46-64	3	10,3
					Total	29	100,0

4.2. Findings Towards Reliability/Validity and Factors of Measurement Tool

For the structure forms from propositions with 72 expressions Kaiser-Meyer-Olkin value 0,904 and Bartlett Globalization Test result are found meaningful (χ^2=168,198, sd=4,p=.00). H_0: (correlation matrix is unit matrix) is refused. Diagonal values of anti image correlation matrix take reading about 1000. Based on these findings, the proposition consist of 72 expressions is confirmed to be proper for factor analysis and as a result of factor analysis, 9 factors that explain the total variance at the rate of 78,149%. Cronbach Alpha value is 0.962. Internal consistency is provided in analysis. According to this result, it is determined that the factors pointed by the propositions in the survey explain the case at a higher up reliable level. Factor analysis is actualized within the frame of fundamental components. According to the total variances, nine factor total variance is being explained at level of76,02 %. The fist factor explains the total variance at the rate of 36,847%, the second factor 29,777 %, the third factor %24,543, the fourth factor 21,147 %, the fifth factor 19,628 %, the sixth factor 16,543 %, the seventh factor 14,259 %, the eighth factor 12,145 % and the ninth factor 10,784 %. Within this frame, factors and their names are like f1:Profitability, f2:Productivity, f3:Performance, f4:Effectiveness, f5: Efficiency, f6:High Quality, f7:Customer Satisfaction, Expectation and Attitude, f8:Strategic and Operating Performance, f9:Human Resources Behavioural Dimensions (perception,

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attitude, expectation, behaviour, motivation, learning and improvement, job satisfaction, organizational commitment, overcoming the stress, positive human relations etc.) (Table 2

Table 2. Factor Analysis and Descriptive Statistics (Validity and Reliability of Measurement Tool)

N=29		**Component**									**Cronbah Alfa General =,962**	
Expressions	**Factor Dımensionss**	f1	f2	f3	f4	f5	f6	f7	f8	f9		
Realization of value	Profitability	**,968**	,453	,126	-,339	,420	-,025	-,325	,420	-,025	,954	,956
Future-focused leaders		**,912**	,448	-,055	-,413	,475	,049	-,421	,475	,049	,936	
Strategic direction		**,901**	,160	,183	-,401	,501	,145	-,401	,501	,145	,924	
Culture		**,876**	,453	,126	-,462	,487	,108	-,402	,487	,108	,915	
Exploiting insights		**,868**	,448	-,055	-,417	,332	,131	-,417	,332	,131	,951	
Managing uncertainty		**,862**	,048	,535	-,375	,191	,111	-,375	,191	,111	,937	
Adaptability		**,859**	-,059	,201	-,179	,107	-,115	-,179	,107	-,115	,809	
System Approach		**,849**	,211	,128	-,073	-,102	-,445	-,073	-,102	-,445	,849	
Realization of value	Productivity	-,077	**,887**	,176	-,286	,343	,001	,223	,126	,126	,909	,959
Future-focused leaders		-,011	**,774**	,200	-,312	-,038	-,210	-,046	,274	,274	,756	
Strategic direction		,211	**,755**	,128	-,347	,149	-,041	,123	,124	,124	,798	
Culture		-,077	**,751**	,176	,453	,126	,025	-,139	,045	,045	,724	
Exploiting insights		,035	**,745**	-,072	,035	-,072	,035	,055	,088	,088	,789	
Managing uncertainty		,098	**,734**	-,050	,098	-,050	,098	-,105	,176	,176	,957	
Adaptability		,056	**,725**	-,073	,056	-,073	,056	,157	,126	,126	,936	
System Approach		,022	**,712**	,051	,022	,051	,022				,824	
Realization of value	Productiveness	,011	,011	**,945**	,011	,021	,011	,131	-,217	,332	,815	,942
Future-focused leaders		-,247	-,247	**,938**	-,247	-,024	-,247	,201	,201	,201	,889	
Strategic direction		-,312	-,312	**,822**	-,312	-,014	-,312	,128	,128	,128	,737	
Culture		,084	,084	**,814**	,084	,132	,084	,176	,176	,176	,709	
Exploiting insights		,223	,223	**,802**	-,016	,024	,243	,200	,200	,200	,849	
Managing uncertainty		,058	,058	**,774**	-,044	,076	,079	,128	,128	,128	,909	
Adaptability		,034	,034	**,755**	-,041	,232	-,163	,176	,176	,176	,756	
System Approach		-,092	-,092	**,751**	-,017	,295	,055	-,072	-,072	-,072	,798	
Realization of value	Effectiveness	,223	,132	,084	**,915**	,024	,243	-,050	-,050	-,050	,950	,954
Future-focused leaders		-,046	,024	,243	**,885**	,118	,231	-,073	-,073	-,073	,930	
Strategic direction		,123	,132	,084	**,879**	,098	,535	-,247	,332	,131	,951	
Culture		-,139	-,177	,453	**,855**	,094	,495	-,312	,191	,111	,943	
Exploiting insights		,055	-,074	,035	**,714**	,067	,586	,084	,107	-,115	,809	
Managing uncertainty		-,105	,365	,098	**,698**	-,083	,400	,223	-,102	-,445	,812	
Adaptability		,157	,299	,056	**,583**	-,106	,320	,058	,343	,001	,782	
System Approach		,141	,345	,055	**,576**	-,045	-,323	-,247	-,038	-,210	,950	
Realization of value	Efficiency	,006	,005	-,105	,076	**,887**	-,254	,332	,131	-,417	,880	,927
Future-focused leaders		-,100	,126	,157	,232	**,774**	-,398	,191	,111	-,375	,746	
Strategic direction		-,077	,274	,141	,295	**,755**	-,338	,107	-,115	-,179	,782	
Culture		,066	,124	,006	,024	**,751**	-,323	-,102	-,445	-,073	,725	
Exploiting insights		-,260	,045	-,100	,118	**,745**	-,290	,343	,001	,223	,926	
Managing uncertainty		-,183	,088	-,077	,163	**,734**	-,155	-,038	-,210	-,046	,812	
Adaptability		-,027	,176	,055	-,012	**,725**	-,274	-,312	-,014	-,312	,723	
System Approach		,114	,008	,126	-,155	**,887**	,191	,084	,132	,084	,850	
Realization of value	High Quality	,161	-,168	,274	-,274	-,440	**,876**	-,016	,024	,243	,792	,958
Future-focused leaders		-,015	-,366	,124	-,247	-,461	**,868**	-,044	,076	,079	,830	
Strategic direction		-,084	-,125	,045	-,330	-,208	**,862**	-,041	,232	-,163	,819	
Culture		-,104	,202	,088	-,301	-,404	**,859**	-,017	,295	,055	,843	
Exploiting insights		-,025	-,325	,420	-,025	-,025	**,849**	-,312	-,014	-,312	,957	
Managing uncertainty		,049	-,421	,475	,049	,049	**,774**	,084	,132	,084	,936	
Adaptability		,145	-,401	,501	,145	,145	**,755**	-,016	,024	,243	,824	
System Approach		,108	-,402	,487	,108	,108	**,751**	-,044	,076	,079	,815	
Realization of value	Customer Satisfaction, Expectation and Attitude	-,366	-,417	,332	,131	,453	-,041	**,935**	,232	-,163	,889	,949
Future-focused leaders		-,125	-,375	,191	,111	,035	-,017	**,928**	,295	,055	,737	
Strategic direction		,202	-,179	,107	-,115	,098	-,312	**,810**	-,014	-,312	,709	
Culture		-,325	-,073	-,102	-,445	,056	,084	**,809**	,132	,084	,849	
Exploiting insights		-,421	,223	,126	,126	,055	-,016	**,802**	,024	,243	,948	
Managing uncertainty		-,401	-,046	,274	,274	-,105	-,044	**,774**	,076	,079	,936	
Adaptability		-,402	,123	,124	,124	,157	-,041	**,755**	,232	-,163	,824	
System Approach		-,366	-,325	,420	-,025	,141	-,017	**,751**	,295	,055	,815	
Realization of value	Strategic And Operating	-,366	,124	-,247	-,461	-,366	,124	,223	**,898**	-,461	,909	,958
Future-focused leaders		-,125	,045	-,330	-,208	-,125	,045	-,046	**,868**	-,208	,756	
Strategic direction		,202	,088	-,301	-,404	,202	,088	,123	**,862**	-,404	,798	
Culture		-,325	,420	-,025	-,025	-,325	,420	-,139	**,859**	-,025	,724	

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Exploiting insights		-,421	,475	,049	,049	-,421	,475	,055	**,849**	,049	,789	
Managing uncertainty		-,401	,501	,145	,145	-,401	,501	-,105	**,774**	,145	,957	
Adaptability		-,402	,487	,108	,108	-,402	,487	,157	**,755**	-,461	,936	
System Approach		-,417	,332	,131	,453	-,417	,332	,141	**,751**	-,208	,824	
Realization of value	Human Resources Behavioural Dimensions	-,375	,191	,111	,035	-,375	,191	,223	-,301	**,945**	,815	,912
Future-focused leaders		-,179	,107	-,115	,098	-,179	,107	-,046	-,025	**,885**	,889	
Strategic direction		-,073	-,102	-,445	,056	-,073	-,102	,123	,049	**,879**	,737	
Culture		,223	,126	,126	,055	,223	,126	-,139	,145	**,855**	,709	
Exploiting insights		-,046	,274	,274	-,105	-,046	,274	,055	,108	**,714**	,909	
Managing uncertainty		,123	,124	,124	,157	,123	,124	-,105	,131	**,698**	,756	
Adaptability		-,325	,420	-,025	,141	-,325	,420	,157	,111	**,583**	,798	
System Approach		-,366	,124	-,247	-,461	-,366	,124	,141	-,115	**,550**	,724	

According to one sample t-test findings practised within the scope of participants, H_1 hypothesis is accepted in 9 factors. According to one sample t-test findings, it is determined that each factor is considered important. Within this scope, f1:Profitability, f2:Productivity, f3: Productiveness, f4:Effectiveness, f5: Efficiency, f6:High Quality, f7:Customer Satisfaction, Expectation and Attitude, f8:Strategic and Operating Performance, f9:Human Resources Behavioural Dimensions (perception, attitude, expectation, behaviour, motivation, learning and improvement, job satisfaction, organizational commitment, overcoming the stress, positive human relations etc.) hypothesis is accepted within each single factor (Table 3).

Table 3. One Sample t-Test within the scope of Factors

N=29		$\bar{x} \pm s$	**One Sample t test (Test Value 3 ≤ μ)**	
			t	**p**
f1	Profitability	3,9±,55	25,278	,000
f2	Productivity	3,8±,54	14,317	,000
f3	Productiveness	3,7±,53	21,842	,000
f4	Effectiveness	3,9±,54	23,421	,000
f5	Efficiency	3,7±,55	19,656	,000
f6	High Quality	3,7±,56	17,736	,000
f7	Customer Satisfaction, Expectation and Attitude	3,6±,57	24,278	,000
f8	Strategic and Operating Performance	3,7±,55	16,317	,000
f9	Human Resources Behavioural Dimension	3,7±,52	20,842	,000

According to r value and correlation coefficient takes value between -1 and +1, taking values close to +1 shows that there is a positive relation. N=29 and "Sig. (2-tailed)" having 000 value for p shows that correlation coefficients are meaningful. Pearson correlation coefficient between f1 and f2 is found out as r=0,885. Pearson correlation coefficient between f1 and f3 is found out as r=0,686. Pearson correlation coefficient between f1 Profitability and f4 is found out as r=0,765. Pearson correlation coefficient between f1 and f5 is found out as r=0,647,

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Pearson correlation coefficient between f1 and f6 is found out as r=0,697, Pearson correlation coefficient between f1 and f7 is found out as r=0,597, Pearson correlation coefficient between f1 and f8 is found out as r=0,647 and Pearson correlation coefficient between f1 and f9 is found out as r=0,596. Concordantly, a linear relation is observed among , f1:Profitability, f2:Productivity, f3:Performance, f4:Effectiveness, f5: Efficiency, f6:High Quality, f7:Customer Satisfaction, Expectation and Attitude, f8:Strategic and Operating Performance, f9:Human Resources Behavioural Dimensions (perception, attitude, expectation, behaviour, motivation, learning and improvement, job satisfaction, organizational commitment, overcoming the stress, positive human relations etc).

The hypothesis H2 that there is a linear relation between ISO 56002 Innovation management system fundamental principle variables and corporate performance component factors (Table 4.).

Table 4. Pearson Correlation Analysis

Correlations										
		f1	f2	f3	f4	f5	f6	f7	f8	f9
f1	Pearson Correlation	1	,885**	,686**	,765**	,647**	,697**	,597**	,647**	,596**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000
	N	29	29	29	29	29	29	29	29	29
f2	Pearson Correlation	,885**	1	,397**	,410**	,622**	,656**	, 676**	,622**	,697**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000
	N	29	29	29	29	29	29	29	29	29
f3	Pearson Correlation	,686**	,397**	1	,621**	,578**	,527**	,597**	,578**	,797**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000
	N	29	29	29	29	29	29	29	29	29
f4	Pearson Correlation	,765**	,410**	,621**	1	,560**	,523**	,623**	,669**	,621**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000
	N	29	29	29	29	29	29	29	29	29
f5	Pearson Correlation	,647**	,622**	,578**	,560**	1	,592**	,692**	,692**	,621**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000
	N	29	29	29	29	29	29	29	29	29
f6	Pearson Correlation	,697**	,,656**	,527**	,523**	,592**	1	,592**	,592**	,527**

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	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000
	N	29	29	29	29	29	29	29	29	29
f7	Pearson Correlation	,597**	, 676**	,597**	,623**	,692**	,592**	1**	,578*	,578*
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000
	N	29	29	29	29	29	29	29	29	29
f8	Pearson Correlation	,647**	,622**	,578**	,669**	,692**	,592**	,578*	1	,527**
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000
	N	29	29	29	29	29	29	29	29	29
f9	Pearson Correlation	,596**	,697**	,797**	,621**	,621**	,527**	,578*	,527**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000
	N	29	29	29	29	29	29	29	29	29
**. Correlation significance level 0.01 (2-tailed)										

5. Discussion And Conclusion

Significance of innovations for innovation management, achieving the growth targets and guarantee the existence of companies has been emphasized by various researches. On the other hand, a great number of studies underline the difficulties companies face while applying innovations. ISO 56000 series represent an important factor for innovative ability of a company, sustainable growth and long term maintaining. ISO 56000 is accepted as standards and guide series consist of ten parts which is designed to help the companies to apply, maintain and improve an innovation management system forming a general frame. The first area of ISO 56002 innovation management system is to sum up the frame for establishing and prosecution of the system.(Willams, 2002)

Within this scope, the effect of ISO 56002 innovation management system fundamental principles on performance components within the frame of employee perceptions is determined in this research. The surveys that applied over one to one and teams throughout 29 (executive and specialist) employees of an R&D and innovation company with totally 37 employees which broke new ground passing ISO 56002 Innovation Management System Documentation inspection successfully and entitled to certification and the results were analysed.

In consequence of one sample T-Test, it is specified that each factor has been noticed on highest degree as corporate performance management system components while the correlations are examined in general, the relations among factors emerge at high-mid level and positive. Therefore, it can be remarked that "value realization, future-oriented leadership, strategic

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tendency, culture, benefit from insights, uncertainty management, adaptability, system approach" which are the fundamental principles within the scope of factors of Profitability, Productivity, Productiveness, Effectiveness, Efficiency, High Quality, Customer Satisfaction, Expectation and Attitude, Strategic and Operating Performance, Human Resources Behavioural Dimensions are considered at high level by participants and the relation among them has a high level importance.

Consequently, although setting standards about innovation and applying seems conflicting and annoying in the beginning, ISO 56000 series give substantial opportunities to create a successful innovation management system. Forming a frame structured with ISO 56000 and holistic, helps the companies to develop a joint innovation perceptive and in this way, it makes internal and external cooperation simpler. Additively, the standard throws light on too many elements and conditions necessary to create a successful innovation management system sustainably. As well, redundant restriction of the organizations about innovation activities is prevented avoiding tangible and detailed specifications of tools and activities. It can be remarked to be effective at the point of providing the whole personnel to work together towards an objective by its effect on performance.

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