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TABLE OF CONTENTS

Manuscript received: 13.3.2025
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International Journal of Economics, Management and Tourism
Vol. 5, No. 1, pp. 7-19
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THE USE OF QUALITY MANAGEMENT METHODS AND TECHNIQUES

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Abstract

This research aims to present various methods and techniques for improving business processes through proactive management. The contemporary approach to process management requires a rapid response to enhance or halt the production process, with quality control emerging as an operational activity primarily focused on process improvement, rather than merely an activity that monitors the current state. For manufacturers to meet consumer expectations, they must adjust the design of the production process, the performance of machines, acquire necessary equipment and technology, use appropriate materials, ensure skilled workers with continuous training and supervision, all while applying Total Quality Management (TQM). Process management, as a key factor in customer acquisition, involves a continuous search for the best technical, technological, marketing, and other improvements. To achieve this, all phases of the process—from the input elements of production and the production process to the creation of the new product—are controlled.

The central question addressed in this paper is: How can methods such as Failure Mode and Effect Analysis (FMEA) and other approaches be optimally applied to eliminate errors in industrial processes to improve quality and productivity?

The aim of this paper is not only to analyze the application of FMEA but also to identify the most effective strategies for implementation, best practices, and possible improvements in business processes.

Key words: management, quality, optimization, business processes, improvement.
JEL Classification: O32 Management of Technological Innovation and R&D

INTRODUCTION

Organizations are constantly faced with changes in the market, ownership changes, and societal changes. Due to the process of globalization and regionalization of the market, companies must think more urgently about strengthening their competitiveness. Macedonian enterprises have yet to realize that a competitive position is achieved only through continuous improvement of product/service quality to meet the needs of customers. The path to the advancement of domestic enterprises must be sought in embracing new philosophies, appropriately utilizing new strategies, concepts, and knowledge. Changes in the environment and within the organizations, on one hand, and the growth and development of the organization, on the other, can be complementary factors if a dynamic process of internal changes is established within the organization, providing responses to external changes and ensuring market competitiveness for the organization. This process of internal changes, which provides effective responses to external changes, is embedded in the new Total Quality Management (TQM) strategy. To adopt the new TQM philosophy, it is necessary to change the existing culture, a process that sometimes occurs very successfully (although it requires significant energy and time), and sometimes only leads to the adjustment of the existing culture (Mitreva, 2011).

The movement for Total Quality Management (TQM) is based on the understanding that quality is not created where the product is controlled but is created within business processes, in all organizational units of the enterprise, and therefore must be controlled

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everywhere. In this way, the quality of the product is the responsibility of not only the Production Department but also the Procurement Department for raw materials and spare parts, energy, machines, machine maintenance, the Commercial Department for concluding sales contracts, the Development Department, Marketing, Sales, Packaging, etc. With this strategy, control goes beyond the production department and expands throughout all areas of the organization, and quality takes on new dimensions—not only product quality but also the quality of operations and the organization of operations (Dervitsiotis, 2000).

The message of this strategy is: “Do not control quality to remove the error, but to remove the cause so the error does not repeat. A repeated error is shameful.” Control deals with consequences, while management deals with causes (Campanella, 1999).

Proactive work begins with the analysis of business organization, then continues through the analysis of internal and external customer requirements, and ends with a detailed definition of the process. The everyday practice of each employee should not only be control in their work but employees must be trained to act preventively and not be preoccupied with detection; they must be empowered to correct their own mistakes and to report any quality-related problems they discover (Sasaoka, 1995).

Designing a Total Quality Management system in its development sets the following requirements (Mitreva, et al., 2019):

- Achieving the highest quality.
- Involving the greatest number of employees in achieving quality.
- More efficient, more rational, and more economical control.

In this way, a comprehensive approach to quality is created, but this process is a long-term effort, an obligation of top management, and a self-reliance to fulfill these obligations. One of the first steps for the implementation of this strategy is the reengineering of business processes. Organizations reengineer business processes to improve quality, productivity, and efficiency. When vital business processes are reengineered, new ways of managing and controlling are required. Similar to quality management, the essence of reengineering is the improvement of business processes through radical redesign, the use of new technologies, and motivating all employees to apply them. This paper presents methods and techniques for process management within the industry and provides examples for evaluating them in real conditions. A review of literature on methods for error elimination in industry follows.

LITERATURE REVIEW

The role and significance of methods and techniques for quality, as well as activities for quality improvement, are emphasized in the ISO 9004-4 standard, noting that the application of any of these methods will lead to significant improvements in business processes, products/services quality (Mitreva, et al., 2008; Kratsu, 1995; Fahy, 2002).

The evolution of defect removal methods in the industry has been shaped by the need for increased efficiency, reduced costs, and improved quality. Historically, manufacturers relied on inspection-based approaches, but over time, various methodologies were developed, each designed to identify, analyze, and eliminate defects in the production process. These techniques are typically classified into two categories: proactive and reactive methods. While proactive methods focus on preventing defects before they arise, reactive methods address defects once they occur. The management team in an enterprise, with their persistence and goodwill, should involve all human resources, forming teams from different profiles and integrating their knowledge, in order to fully master quality in all business processes at the lowest operating costs. This will enable the timely prevention of possible defects, prompt resolution of problems, and elimination of root causes. The usual resistance and fear of

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change are quickly overcome, and a strong desire for change in the existing situation is born, with a new approach to quality and full commitment to the client, employees, the environment, and the state (Mitreva, et al., 2019; Luburić, 2014; Heleta, 2010).

An analysis conducted in enterprises engaged in the metalworking industry in the United Kingdom shows that the main reasons why companies do not apply quality methods and techniques are ignorance and lack of experience in their application. However, the most common issue lies in the definition and proper application of these methods (Parashar and Singh, 2005; Ojwaka, 1999).

Stoiljković and others (2009) emphasize that the development of quality methods and techniques began with the emergence of the first elements of statistical theory in inspection. They cite the example of the well-known company Lucas Engineering & Systems, where three out of thirteen key principles for the development, application, and success of the total quality management strategy are related to quality methods and techniques, confirming their significant role. According to the authors, the benefits of applying these methods in organizations include:

- Raising the quality of all business processes in the organization;
- Reducing all types of costs;
- Lowering the price of products;
- Building trust with customers/users;
- Raising employee knowledge.

According to these authors, applying these methods and techniques results in increased motivation among employees, higher productivity, market expansion, and other positive effects.

An analysis of the application of quality methods and techniques in automotive parts manufacturers by Sugiyama (1996) reveals the following benefits:

- Achieving competitive products that meet the quality required by customers/users;
- Reducing costs;
- Improving the skills and knowledge of employees;
- Possibility to transfer knowledge and experience to contractors and suppliers in applying quality tools;
- Increasing process efficiency.

Jayaram and others (1997) conducted research in Brock and Brock with about 50 quality methods and techniques, proposing 26 methods for application. They cite the view of Modaress and Ansari, based on empirical research into causes of errors, omissions, and defects in American companies, where quality methods and techniques are considered a necessity in all business processes within the quality system (Jayaram, et al., 1997).

Lascelles and Dale (1991), in their research based on data from the UK motor industry, emphasize that the application of quality methods and techniques is a key tool for implementing quality improvement activities and creating competitive advantages for the enterprise.

Groenendijk and Dopheide (2003) distinguishe 98 methods and techniques for quality that can be applied in the global industry for quality improvement, but many of them do not have practical application.

Analyzing the methods and techniques for quality represented in the series of ISO standards, as well as those analyzed by various authors, an optimal number (about 30) has been reached that have a wide range of applications in industrial practice.

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APPLICATION OF SIGNIFICANT QUALITY METHODS AND TECHNIQUES

The process-oriented organization places the greatest emphasis on organizing processes to increase efficiency, which also leads to improved business results. Proper management of business processes provides the best picture of the quality of the company's operations, as it accelerates the process of implementing the business strategy and enables the achievement of business goals at the highest level of satisfaction for the organization's top management.

Processes are described through Standard Operating Procedures (SOP) and guidelines, which can be presented through Flowcharts or block diagrams, in which the Deming Circle, based on a circular flow, is integrated: Plan-Do-Check-Act, and the CE (Cause and Effect) approach, or the QC-CE model. When writing documents, changes in form and content lead to changes in the organizational structure, reengineering of business processes, all to adapt the company to new requirements. These changes primarily relate to new ways of grouping organizational units, delegating tasks and responsibilities, coordination, and communication.

What does applying the QC-CE model in designing business processes mean?

For effective use of the quality system, it is essential to build and use appropriate methods. A starting methodology for designing the quality system is the combination of the QC concept (Quality Circle) and the CE approach (Cause and Effect). The foundation of the QC concept is Deming's Circle, whose philosophy is based on the circular flow: Plan-Do-Check-Act (Чепујноска, 2009).

Each of the four steps in the PDCA cycle includes:

• Plan
= setting goals and intentions;
= determining methods to achieve the goals;
= utilizing resources.
• Do
= education and ability to implement the plan;
= implementation of the plan.
• Check
= comparison of the realized with the planned.
• Improve - Act
= reassessment of the results of the check;
= proposing measures for improvement.

Each activity must be carefully planned. The activity should be carried out in this manner, and the results should be checked to see if they match expectations. If not, corrective actions must be taken and incorporated into the first activity—planning. The cycle then starts again.

The basis of the QC concept is *Deming's Circle*, and the CE approach (Cause and Effect) is best suited to encompass all elements and factors essential for performing each task in the system. The CE diagram (Cause-Effect) allows consideration of all influences on task execution, including: What? Who? When? How? Where? To whom? (Chepujnoska, et al. 2008; Mitreva, 2011).

Methods for quality improvement include: concepts, techniques, methods, studies, tools, or all efforts directed toward improving quality (Pareto Diagram, Regression Analysis, 5 Whys, Control Charts, Cause and Effect Methods, Studies of Precision, Accuracy, and

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Process Stability as integral parts of quality management), according to the company's defined policies, goals, and responsibilities.

The classification of quality methods and techniques according to their place of application in the business system is crucial, as it provides guidance on which methods should be included in the implementation of specific business systems.

The methodology for improving quality involves applying corrective and preventive measures, so, according to the nature of their action, quality methods and techniques can be divided into corrective and preventive (Mitreva and Filiposki, 2012).

Corrective action methods and techniques include: data collection forms, control charts, Cause and Effect methods, data analysis and processing, studies of precision, accuracy, and stability, cumulative value methods, input, process, and output control, while other relevant quality methods and techniques have a preventive effect.

The basic quality methods and techniques are easy to use in the direction of their successful application, unlike complex ones, for whose application prior experience with basic methods is necessary. An example is the application of the QFD (Quality Function Deployment) method, or Quality Function Development as a complex quality tool. The implementation of this method requires knowledge of data collection forms, brainstorming methods, benchmarking strategies, Pareto analysis, matrix diagrams, control charts, etc.

Companies first introduce basic quality methods and techniques, which lead to the improvement of business processes, but at the same time, the need arises for the introduction of methods that support decision-making processes in the business system, known as management methods. Management methods and techniques serve to collect and process numerical data. These are tools, methods, and techniques for supporting company management, aimed at improving business processes, products/services.

Why the application of Statistical Process Control (SPC) is necessary

A quality system that does not have the concept of Statistical Process Control (SPC) developed and applied will not provide sufficient guarantee for its survival. On the other hand, applying SPC without a developed system for data recording and SOP (Standard Operating Procedures) has no logic, and the application will be reduced to error documentation. For all of this, well-trained teams are necessary. The use of SPC is one of the requirements of ISO 9001:2015.

The essence of Statistical Process Control is to ensure the stability of processes and predictability in production with deviations of three standard deviations (SD) from the average value of a given property. All variations can move within defined intervals, known as tolerance limits. If the process is a series of cases and conditions and a series of phases where the input value is expected to provide the desired output with minimal variations, we can say that the process is stable. Prevention and reduction of property variations should begin much earlier in the "life" of the product.

For other authors, Statistical Process Control is a methodology for reducing variability as part of the Total Quality Management (TQM) strategy for permanent quality improvement. It helps in deciding which data is important and how to extract maximum insights from them to avoid nonconformities, analyze ongoing issues, and so on (Taskov and Mitreva, 2015).

Although many statistical methods and techniques are used in manufacturing enterprises, they have broad applications in service industries, according to Xiao and others (2011). The statistical concept of quality management is based on four fundamental principles:

- The results of any process are variable, they scatter, and follow one of the laws of distribution;

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- Errors are always possible and always present;
- Data is always collected, and corrective action is taken based on it;
- Data must be presented with defined origin, the method of obtaining them, so that they can be used in the right direction.

In today's highly competitive industrial environment, maintaining high-quality standards and operational efficiency is essential for businesses aiming for long-term success (Westcott, 2014). The presence of defects in manufacturing processes can lead to increased costs, production delays, customer dissatisfaction, and damage to the company's reputation. As a result, industrial organizations must apply systematic methods to identify, analyze, and eliminate potential failures before they affect the quality of the final product. One of the most effective methodologies for achieving this goal is Failure Mode and Effects Analysis (FMEA), a structured approach to risk assessment and defect prevention.

ANALYSIS OF THE METHOD AND IMPACT OF ERRORS (FMEA)

FMEA (Failure Mode and Effects Analysis) represents a proactive tool used in various industries such as automotive, pharmaceutical, aerospace, and electronics. The methodology enables a systematic assessment of potential failure modes, their impact on production, and the implementation of corrective actions to reduce risks. When FMEA is integrated with continuous improvement frameworks, such as the DMAIC model (Define, Measure, Analyze, Improve, Control) from Six Sigma, it significantly improves process reliability, reduces defects, and increases overall efficiency of production systems.

This paper explores the application of error elimination methods in industrial conditions, with a particular focus on FMEA as a key strategy for improving quality and efficiency. Through an analysis of relevant techniques for identifying and eliminating defects, as well as a comparative review of various methodologies, the most effective approaches for minimizing risks in production processes will be evaluated. Additionally, the real effectiveness of FMEA and the most common challenges in its implementation will be investigated.

FMEA is a systematic method for assessing potential failure modes in a product or process and determining their impact on quality and efficiency. By identifying risks early in the design and production phases, FMEA helps prioritize corrective actions to prevent failures before they occur (Vusić, 2007).

During the 1980s, FMEA analysis became a tool for implementing the philosophy of Total Quality Management (TQM), and by the 1990s, it was also used in the Six Sigma strategy. The automotive industry (AIAG - Automotive Industry Action Group) and the American Society for Quality Control (ASQC - American Society for Quality Control) protected the copyright for the application of FMEA standards in February 1993.

The application of this method, when considered in the short term, provides an overview of potential risks, identifies the criticality of their consequences, and determines the priority for corrective actions. However, if considered in the long term, it develops a criterion for planning the testing process of the system, ensures documentation for future feasibility analysis in case of design changes, provides a foundation for planning preventive maintenance, and creates a basis for qualitative and quantitative analysis for system security. Furthermore, FMEA allows for risk evaluation of systems, processes, and products.

From another perspective, if FMEA is more precisely defined, it can be said that it is a procedural methodology for the creation of the product design, the production process, and the system in such a way that (Sharma and Srivastava, 2018):

- It identifies and evaluates failure modes, the potential causes of failure, and the effects of that failure;

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- It defines actions that eliminate or reduce the likelihood of a cause that would lead to a failure;
- It calculates the risk of the failure occurrence;
- It documents the entire process.

Typically, this methodology is used in the development phase for defining the product, the production process, and the system, but its use is not excluded even in the serial production phase, due to the probability that possible indicators and causes for failure may arise during serial production.

Today, FMEA is part of:

- Advanced Product Quality Planning (APQP);
- Production Part Approval Process (PPAP);
- Quality System QS 9001 and ISO/TS 16949 and other management systems (MS);
- FMEA is integrated into the quality system (VDA) applicable for companies that are part of the German automotive industry.

It can easily be said that today, the application of this method is often a customer requirement.

What does the FMEA method represent?

The FMEA method answers two main questions: What could go wrong in a business process, i.e., what potential errors might arise, what is the likelihood of their occurrence, and what are the consequences that might result from these errors. By definition, this method ensures customer satisfaction at the highest level by fully or partially eliminating potential errors (Nouri and Soltani, 2017).

This method is based on teamwork, where all team members have equal rights in decision-making. FMEA is used to analytically evaluate the design of a new or modified product. The goal of applying this method is to avoid errors before they occur.

Through this method, the following are detected early:

- Potential errors in each operation;
- Potential consequences of these errors;
- Potential causes of the errors.

By calculating the Risk Priority Number (RPN), effective corrective measures are proposed to improve quality (using the Pareto approach). After implementing corrective activities, the new status is checked.

Conditions for implementing FMEA in business processes:

- A procedure for implementing the FMEA method and all necessary forms must be created;
- A flow chart of the production process for a specific product must be available;
- Modular Quality Circles (MQC) must be recognized, and their members must be identified;
- A decision must be made regarding the selection of the FMEA team and guidelines for each team member regarding the activities they need to complete;
- A coordinator for the team must be appointed, usually the head of the Testing Department;
- The team members should be introduced to the work process.

Before implementing the FMEA method, it is essential to define what the customer requires, which in this case might not necessarily be the end consumer but can be an employee in the next step of the process.

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Types of FMEA analysis for the mode and impact of errors

FMEA is a universal and flexible method that can be used to analyze different types of problems an organization might face. It can be applied in any organization, regardless of its size or business profile. Literature lists several types of FMEA analysis, which are categorized based on the area of application or, more simply, the type of system the FMEA method applies to.

The following types of FMEA analysis are mentioned in literature:

Design FMEA (Design Failure Mode and Effects Analysis): This is applied during the design process of specific systems or products. Its purpose is to predict and eliminate potential errors during the design process and during the use of equipment throughout its lifecycle until it is completely decommissioned.

Process FMEA (Process Failure Mode and Effects Analysis): Focuses on the manufacturing process, the functioning of production equipment, maintenance, and the defects that arise from the functioning of this equipment. Process FMEA is used to analyze the process itself, where input and output requirements, control measures, and necessary resources are defined for each step of the process.

System FMEA (System Failure Mode and Effects Analysis): Deals with research, prediction, and prevention of defects and potential problems in relatively large processes, such as entire production lines. System FMEA is used to analyze the system and subsystems during the early stages of design concept development.

Service FMEA: Applied to services provided to users, such as in hotels, hospitals, etc.

Software FMEA (Software Failure Mode and Effects Analysis): Focuses on identifying potential errors in information technology systems. Software FMEA is used to analyze services before they are offered to the customer. This method highlights the different understandings of the concept of quality from the customer's perspective, expressed through their subjective feelings of satisfaction or dissatisfaction with the provided service.

Environmental FMEA (Environmental Failure Mode and Effects Analysis): Focuses on identifying potential environmental impacts.

The most commonly used FMEA types in companies are product, process, and system FMEA. System FMEA also covers service and software.

Costs of Implementing FMEA

To define the basic settings for the application of this method, the following key questions need to be answered:

- What is the goal of conducting the mode and impact analysis of errors?
- What are the short-term and long-term goals that need to be achieved through preventive and improvement measures?
- What is the task of the FMEA team, and what are the boundaries of their actions?
- Will the results be applied in practice, or will they serve as projections for potential unnecessary costs?
- Are there archival data on how to implement the analysis?

Primarily, the FMEA method provides a list of potential errors in the system and environment. By applying this method, it ensures that all potential errors are considered during system design.

Application of the FMEA Method in Product Development Process

The application of the FMEA (Failure Modes and Effects Analysis) method is beneficial right from the design phase of a system and all its subsystems. Once the analysis is

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completed, a hierarchical ranking of the system and the components that comprise it is obtained. The analysis is compared before making specific technical decisions, allowing the user of the method to assess the probability of errors occurring in individual components. This way, the user is less likely to find themselves in a situation where individual subsystems or components need to be modified after the entire system is completed, as corrections are made during the design and testing stages. An even greater issue is the need to incorporate a safety element that could have been anticipated earlier.

Applying the method through an analysis of error modes and their impacts is crucial, though not the only condition for reducing costs in production and product sales. It is a fact that the FMEA method always reduces production and sales costs, but not completely, as in practice, it is not always possible to predict a complete or zero probability of errors occurring.

From the individual definitions, it can be concluded that the primary characteristic that distinguishes the FMEA method is its focus on preventing all potential errors, completely eliminating them, or reducing these problems to the lowest level possible.

The analysis of error modes and their effects, in addition to the benefits it brings, also entails costs categorized as quality costs. If a company's policy is to reduce the possibility of errors, it is essential to completely or partially eliminate the root causes of these errors. This is particularly important, as the later an error is detected, the greater its consequences and, consequently, the costs involved (Bouti and Kadi, 1994; Dighe and Bezold, 1996; Foster, 2001).

By applying statistical process control for defect-free production, analyzing quality costs, and introducing continuous employee education, high-quality production can be achieved with the lowest operational costs.

Steps of the FMEA Analysis

FMEA analysis is conducted through the following steps:

- Defining and tabulating potential errors, their criticality, as well as the likelihood and probability of detection.
- Setting the objective of the study, which should involve the interaction between components or individual processes throughout the entire production flow, followed by a detailed analysis.
- Identifying potential errors in the product, process, or system (including issues, corresponding corrective actions, and opportunities for continuous improvement).
- Identifying the consequences of errors on other components within the system, sequential processes, operations, customers, and legal regulations.
- Identifying the root causes of errors.
- Defining the method/procedure/system.
- Quantitative ranking of the significance/criticality of the potential errors' effects.
- Estimating the frequency of occurrence of potential errors.
- Assessing the likelihood of detection of potential problems.
- Calculating the risk priority number (RPN).
- Taking corrective actions.

Due to its relative simplicity and clarity, FMEA analysis is suitable for a quick preliminary assessment, after which a more detailed evaluation can follow.

Composition of the FMEA Analysis Team

FMEA analysis produces the best results when performed as a team effort, with members having diverse profiles yet possessing relevant knowledge about the system under

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analysis. Although it is beneficial for all team members to have at least a basic understanding of the analysis method itself, the most important factors are knowledge and experience in solving issues within the system being analyzed.

In addition to knowledge and experience, it is crucial that team members collaborate in the development of the analysis by offering suggestions and ideas. The team should have a leader, who will oversee the entire FMEA analysis process. The leader must have a good understanding of the analysis method and practical experience in its application. It is also important to note that the motivation of team members is a key factor influencing the success of the analysis.

The team leader's goal is to engage individuals with specific profiles who possess a degree of patience, precision, motivation, and a desire to improve the system they are working on. Additionally, the team leader should maintain a high level of interest among team members throughout the analysis.

FMEA analysis is applicable in various industrial sectors. While the method itself remains consistent, there are requirements that may differ depending on the industry.

General Information about Process FMEA (P-FMEA) Analysis

As mentioned earlier, P-FMEA encompasses all the production steps of the manufacturing process. The more potential failure causes are identified in the process, the more errors are made. This results in defining more actions to eliminate or prevent errors. Ultimately, it can be concluded that the deeper the exploration into the manufacturing process, the better the full understanding of it.

P-FMEA covers the following areas:

- Focuses on potential failure modes in the manufacturing processes caused by deficiencies that affect the execution of the business or manufacturing process.
- Assumes that the product design is finalized.
- The product-related errors are already defined in the Design/Product FMEA analysis.
- Assumes that errors may occur but are not necessarily guaranteed.
- Analyzes manufacturing and other business processes within the entire system, subsystems, or levels for the assembly of individual components.
- Defines actions aimed at eliminating the main causes of errors.

Input and Output Information for Process FMEA (P-FMEA) Analysis

Just like any process that needs to be functional, P-FMEA requires defined input information that, when processed, results in appropriate output information.

The input information for P-FMEA analysis includes:

- Process Flow Diagram (PFD).
- Design/Product FMEA analysis.
- Technical procedures (technical drawings, work procedures, and instructions).
- Cause-and-effect analysis or Ishikawa Diagram.
- Customer requirements.
- Quality standards requirements.

Processing the input information results in the creation of the P-FMEA analysis. The output information derived from this analysis includes:

- A list of potential failure modes.
- A list of confirmed specific and critical characteristics that must be added to the process control plan.
- The foundation for creating the process control plan.

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- Preventive actions that will prevent the occurrence of potential failure causes.
- Detection actions that will detect the occurrence of failure modes.
- Archiving and access to the data that is part of P-FMEA.

General Goals of Process FMEA (P-FMEA) Method

P-FMEA aims to achieve the following general goals:

- Improve the quality, reliability, and safety of the process.
- Create potential for reducing process risk and the costs of assembly or manufacturing processes.
- Help engineers prioritize, i.e., focus on eliminating or reducing failure modes.
- Evaluate the process from a different perspective.
- Continuously improve customer satisfaction with the use of the product/service.

Eliminating process risk should be a responsibility for all employees within an organization.

In order to achieve the required quality in manufacturing a product, risk analyses of the manufacturing process are crucial. In the automotive industry, P-FMEA, as one of the core risk analysis methods, is part of two standards: TS16949 and VDA. The implementation of P-FMEA must be performed in line with the design and implementation of the integrated part of the ISO standard intended for the automotive industry – TS16949.

Preventive Maintenance of the Manufacturing Process

Preventive maintenance of the manufacturing process is in the interest of any organization, whether the production process is stable or not. There is always a risk in the manufacturing process, and for that reason, every organization strives to minimize it. When planning annual production, planning for preventive maintenance of the manufacturing process is also done using the P-FMEA methodology. The number of regular FMEA sessions to be held annually is planned. This does not mean that strict adherence to the annual planning is necessary, as if needed, an FMEA session can be held outside the planned schedule with timely notification to all involved participants. The organization of these FMEA sessions is in the hands of the FMEA leader (moderator). Their task is to design the content of the FMEA session based on the process risk statistics and inform all participants in time so that they can come prepared. The purpose of these FMEA sessions is to define new preventive and detection actions, after which a 100% effective recalculation of the process risk can be performed, minimizing the risk.

On Customer Request

Each customer requires a guarantee of the established quality of the manufacturing process and product from their supplier. To maintain consistent quality in the manufacturing process, preventive actions need to be taken to eliminate potential indicators and causes of errors. Almost every visit or official audit by the customer includes discussing the P-FMEA analysis for the specific manufacturing process. The customer wants to have knowledge or an overview of the process risk. In special situations (increased number of complaints), the customer may request the mandatory use of the P-FMEA methodology to stabilize the manufacturing process to a certain extent. To avoid such unpleasant situations with the customer, most organizations define the use of the P-FMEA methodology, as mentioned in these situations.

In Case of Internal or Customer Complaints

Regardless of whether the complaints are internal or from the customer, it is necessary to define corrective actions first. After the error has been corrected, preventive and detection actions must be defined to eliminate the potential indicator or cause of the complaint. This

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refers to preventive maintenance of the manufacturing process to prevent recurring defects. By using P-FMEA in such situations, process risk and recurrence of complaints can be minimized. Although the purpose of the P-FMEA methodology is to prevent defects from occurring, it is also used to completely eliminate the repetition of the same type of defect.

Conclusion

The application of cost optimization methodologies has shown to be very significant for management, as they allow the achievement of defined quality with minimal defects and cost losses. These methods and techniques for defect-free operation in various industries have enabled the achievement of defined quality, protection of customers/users from defective products, and an increase in the company's competitiveness, profitability, quality improvement, reduced defects, and operational costs, as well as increased satisfaction and employee participation in decision-making. This indicates the universal application of these methodologies in practice, regardless of the industry the companies belong to. By applying these methods, effective process control can be established while achieving defined quality with minimal operating costs. For many companies, the implementation of these methodologies means quality improvement through examining organizational processes not only in terms of process definition, improvement, and design but also improving productivity and optimizing costs. Competitive advantages are often decisive for the development and use of the quality assurance system (Hammer, 1990)

Employees' daily practices should not only involve self-control but they must also be trained to act preventively. They should be responsible, correct their mistakes, and raise any issues regarding quality that they discover. The decision to develop a quality assurance system can go hand in hand with the company's growth and the mature concept of Total Quality Management (TQM). Therefore, Total Quality Management implies the existence of a formal quality assurance system that controls and constantly improves the processes. The application of the TQM strategy means: the company identifies the problems, as opposed to the previous case with the design and implementation of ISO 9001:2015, where external institutions and experts were used.

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TRAFFIC INFRASTRUCTURE OF THE MUNICIPALITY OF PRILEP

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Abstract: With this scientific paper we want to show the key role, i.e. the importance of the traffic infrastructure for the transport of passengers and goods in the city to the villages and neighboring municipalities, in the function of developing tourism and the economy of the municipality of Prilep. The geographical position of the municipality of Prilep within North Macedonia is given. The municipality of Prilep is presented on a geographical map with the areas of all 58 rural settlements as well as the type of roads that pass through the municipality itself and the connection with neighboring municipalities. The scientific paper provides a traffic map for city bus transport in the city of Prilep. Furthermore, the scientific paper covers a growing number of objects and provides an overview of the entire road and rail traffic infrastructure that exists in the municipality of Prilep. The entire road infrastructure is presented both in the city and to 58 rural settlements and neighboring municipalities according to the category of the road, traffic transport companies, bus transport companies, bus stations, car services, auto electrical services, auto tire repairers, road towing services, gas stations, taxi companies and railway transport in the municipality of Prilep. Each transport company has a specific purpose for which it exists, and the management has the responsibility to use and combine organizational resources in the most optimal way, thus achieving the goal of the transport companies.

Key words: traffic, infrastructure, companies, goals, profitability, economy, tourism
JEL Classifikation: R4-Transportation economics. R41 Transportation: Demand, Supply, and Congestion • Travel Time • Safety and Accidents • Transportation Noise

INTRODUCTION

The traffic infrastructure in the municipality of Prilep has a long history, something that is confirmed by the Peutinger map made for the needs of the Roman Empire as early as the 4th century BC, where settlements located in the Pelagonia Valley are included. One of the most developed and most common types of traffic in the studied municipality of Prilep is road, rail and lake traffic expressed through its use and mass of individual cars, buses, vans, motorcycles, bicycles, intercity, public city bus, rail transport and lake traffic on the Prilep Lake. In the municipality of Prilep, by 2024, out of 58 rural settlements, 38 rural settlements will be connected with asphalt, while 20 villages still have dirt road infrastructure. The municipality of Prilep is located in the northern part of the Pelagonia Valley, which is the largest valley in North Macedonia. By area, the municipality of Prilep is the largest municipality in North Macedonia with 1,194.44 km^2 and has a population density of 69.27 inhabitants per km^2. The municipality of Prilep in 2021 had 69,125 inhabitants, of which 34,208 (49.5%) were men and 38,817 (50.4%) were women. Its borders extend across the central, southern and southwestern parts of the country. Rural areas are spread across the northern and northwestern parts of the upper catchment area of the Raechka River, the southern slopes of the Babuna Mountain, as well as part of the Prilep Plain, to the southeast it extends into the territory of Mariovo, and to the southwest and west it occupies a large part of the Prilep Plain. The municipality of Prilep has a northwest-southeast extension. It borders the municipalities of Krivogaštani, Dolneni and

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Original scientific paper

Čaška to the northwest and north, the municipality of Kavadarci to the east, the Sobota region in Greece to the southeast, and the municipalities of Novaci and Mogila to the southwest and west. The municipality of Prilep has a very favorable geographical position and transport connections.

Figure 1. Geographical location of the municipality of Prilep within North Macedonia.
Source: https://mk.wikipedia.org

MATERIAL AND METHODS

For the purposes of this research, the survey method was used, during which surveys were conducted in all living rural settlements. In the preparation of the scientific paper, the following were used: books, scientific literature, magazines, reports, publications, statistical yearbooks, on-line databases, as well as various published materials on the traffic infrastructure in the municipality of Prilep. A survey questionnaire of 12 questions was developed and more than 98 residents who permanently live in rural settlements and have solid information about the traffic road, railway infrastructure and water and lake traffic were surveyed. The survey questionnaire contains questions on whether the area of the village has: road infrastructure both in the city and to 58 rural settlements and neighboring municipalities according to the category of the road, traffic transport companies, bus transport companies, bus stations, car services, auto electrical services, auto tire repairers, road towing services, gas stations, taxi companies, railway and lake traffic in the municipality of Prilep. To obtain more complete information, discussions were held with the residents of the villages. Research on the traffic infrastructure in the city of Prilep and rural settlements was carried out during 2023 and 2024 and they have been processed and presented in a table.

RESULTS AND DISSCUSION

Traffic infrastructure in the municipality of Prilep and its structure

Below is the road and railway infrastructure in the municipality of Prilep.

Figure 2. View of the road infrastructure in the municipality of Prilep
Source: Geographical and tourist map of the Republic of Macedonia 1: 260 000, Culture, Gizi Map, (16.03.2025), photo: C. Koteski.

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Original scientific paper

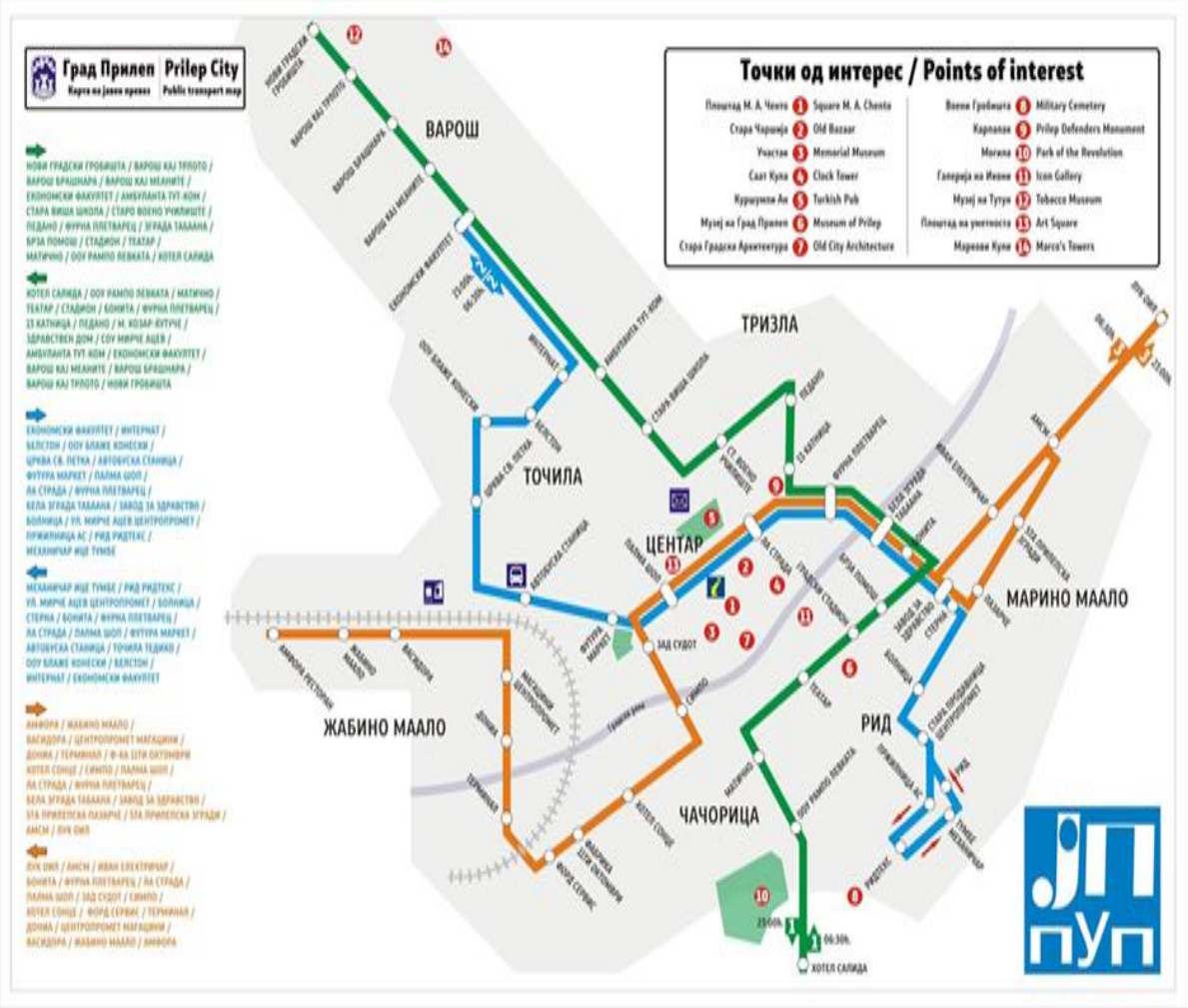

Figure 3. Overview of bus transport and routes in the city of Prilep

The following roads pass through the municipality of Prilep:

A roads:

- A1: Gradsko-Prilep section.
- A3: Ohrid-Resen-Bitola-Prilep-Veles-Stip-Kocani-Makedonska Kamenica-Delchevo-Bulgarian border.

R1 regional roads:

- Regional road 1101: Prilep-Bitola-Makazi-Tsarev Dvor.
- Regional road 1107: Gradsko-Rosoman-Kavadarci-Vitolishte-Novo Lagovo.
- Regional road 1303: Prilep-Makedonski Brod-Kicevo.

Despite the territorial size of the municipality of Prilep, it still does not have a department for the development of urban and rural tourism..

- Regional road 1306: Prilep-Krivogastani-Krushevo-Sladuevo.
- Regional road 1312: Veles-Izvor-Prilep.

R2 regional roads:

- Regional road 2338: Medzitlija-Germijan-Staravina-Gradesnica-Besishte.
- Regional road 2339: Novo Lagovo-Galicani-Obrsani-Buchin-Graishte.

R29 regional roads:

- Regional road 29172: Belovodica-Dunje.
  Regional road 29374: Varosh-Monastery of the Holy Virgin (Treskavec).

Railway traffic in the municipality of Prilep: Prilep is connected by railway line to Veles to

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Original scientific paper

the north and Bitola to the south. In addition to the city of Prilep, there are railway stations in the villages of Galicani, Zagorani and Trojkrski. In the period before World War II, due to the economic development in the region, many activities were undertaken to build the railway network. During that period, the Prilep - Bitola railway was put into operation on 07.04.1931, and somewhat later, the Veles - Prilep railway on 20.01.1936.
In the further part of the scientific paper, the entire road, rail and lake traffic and infrastructure in the municipality of Prilep will be presented in Table 1.

Table 1. Overview of the traffic infrastructure in the municipality of Prilep

No.	Types of traffic infrastructure and services	No.	Places where there is and is not traffic infrastructure
1.	Asphalt road	38	Alinci, Belovodica, Berovci, Beshishte, Bonche, Veprchani, Veselchani, Vitoliste, Volkovo, Galichani, G. Radobil, G. Konjari, Dunje, Erekovci, Zagorani, Kadino Selo, Kalen, Kanatlarci, Klepach, Krushevica, Lenishta, Lopatica, Mazuchishte, M. Konjari, Manastir, Novo Lagovo, Oreovec, Pletvar, Podmol, Prilep, Prilepec, Selce, Staro Lagovo, Topolchani, Trojkrsti, Chanishte, Chepigovo, Shtavica.
2.	Dirt road	20	Vrpsko, Gu̇akovo, Dabnica, Dren, Živovo, Kokre, Krstec, Mal Radobil, Malo Ruvci, Marul, Nikodin, Pēstani, Polčište, Prisad, Rakle, Smolani, Toplica, Trojaci, Carevic, Chumovo, Sheleverci,
3.	Transport companies in the municipality of Prilep	17	Amigos, AN-D Spanex, Arslan Tours, Va-N Travel, VIB Racing, Dino Travel, EU Lindy, Lasta Tours, Noki Trans Nova, Rama Tours, Roz-Rub, Runa Mak, Stella, Tam Trans, Tram Tours, Uni Tours, Chibuk Travel.
4.	Bus transportation companies	9	Adnan Reisen Dahl, Benetton, Bran, Byzant Tours, City Transport, Pelagonia Trans, Roman, Uni-Tours, Chibuk Travel.
5.	Bus stations	2	New Bus Station, Old Bus Station.
6.	Multi-storey garages	2	Prilep 2-Old bus station, city market.
7.	Car services	24	Autoservice Dragi, Autojoker 2007, Auto Control, Auto Antonio, Auto Dino, Auto Krsteski, Auto Sashe, Auto Stella, Ae Ivan Komerc, Alfa Auto, Angromehanika, Ace Zdravche, AMSM-AMD Prilepec, Babarko, Bal-Tal, Bojo i Goce, Bojan Pilot, Bushmano DS, BM. 12-ti Avgust, Vlatko.Nov Servis Johnny-Berovci, Kanatlarci 2 services, Novo Lagovo 1
8.	Auto-electrical services	21	Automoto Zoki, Auto-Stella, Ae Ivan Komerc, Anna Marie, Drexler Mayer, I-S-I, Climatronic, Macheto, Peco, Sime Komerc, Fil-Zo, Champion, Schema Elektronik, Autoelectrica Vego 2018, Autoelectronics, Autohouse Tome, Autolux KTN, Auto Control, Autohouse Vace, Auto Style, Kanatlarci 1.

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Original scientific paper

9.	Auto vulcanizers	12	Algos Commerce, Best Auto, Goce, Dunlop, Euro Tip-Top, Indra Plus, Motocentar, Nikola 2020, Pirelli, Tabay Protect, Togo Trade, Chizmata.
10.	Towing services	6	Angromechanika, AMSM-AMD Prilepec, Vulko Prilep, Malibro, Palma Shop, Shinde.
11.	Gas stations	13	Bm Oil-Prilep, Bm Oil-Topolchani, Bm Oil-Prilep, Bm Oil-Prilep, Eco Petrol-Pletvar, Lukoil-Prilep, Makpetrol-Buchila-Berovci, Makpetrol-Kanatlarci, Makpetrol-Prilep, Makpetrol-Prilep, Makpetrol-Prilep, Makpetrol-Prilep, Matador 2002-Prilep, Medio Petrol.
12.	Taxi companies	11	At-Iva, Millennium 13-373, Nova 13-311, Pet-13-777, 13-888, Roman, Sg Isidora, Taxi Prilep 13-131, Daniel, Radio Taxi Nova 133 11 Taxi Leader, V Tahi.
13.	Railway stations	4	Prilep, Galicani, Zagorani and Trojkrsti
14.	Lake traffic	1	Prilep Lake
15.	Sports airport	1	Village of Malo Konjari
Total		181	

Source: Field research by the authors in the period 2023-2025.

According to the data in Table 1, we conclude that the following traffic infrastructure exists in the municipality of Prilep: 38 villages are connected by asphalt roads, 20 villages still have dirt roads. In the municipality of Prilep, there are 17 transport companies, 9 are bus transport companies, 2 are bus stations, 2 multi-storey garages, 24 car services, 4 of which are located in the villages, 21 auto-electric services, 1 of which is located in the village, 6 towing services, 13 gas stations, three of which are in the villages, 11 are taxi companies, 4 are railway stations, three of which are in the villages, 1 lake facility for lake traffic that takes place on the Prilep lake with several private speedboats and boats, and 1 sports airport.

CONCLUDING REMARKS

The necessary measures that need to be taken in the coming period for a more successful development of the traffic infrastructure, the transport of passengers, goods, and a more successful development of the economy and tourism in the municipality of Prilep are: 1. To asphalt all 20 dirt roads to the villages in the municipality of Prilep; 2. Connection with neighboring municipalities and countries through the construction of new expressways and highways; 3. Increasing the number of multi-storey garages, parking lots and bus transport companies; 4. Greater marketing and improvement of services and increasing the number of auto mechanic and electrical services in the city and villages; 5. Mapping and preparation of a new traffic tourist map for the municipality of Prilep in several foreign languages; 6. It is necessary to increase and improve the overall road signaling infrastructure in the municipality of Prilep; 7. Placing road signs on the roads in several foreign languages; 8. Improvement and increase in the number of new towing services, gas stations, taxi companies especially in the villages; 9. Greater marketing and presentation of the sports airport in the village of Malo Konjari with various sports. 10. Better development of passenger and goods transport, economy and tourism both at the local and national level.

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REGIONAL VALORIZATION OF TOURIST POTENTIAL IN THE R.N. MACEDONIA

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Abstract
The main goal of the paper is to present the tourist valorization of natural and anthropogenic attractive motifs in the R.N. of Macedonia by planning regions. In the research, we evaluate 400 tourist attractions, of which 160 are natural and 240 are anthropogenic motifs. In the evaluation, all eight planning regions are represented by 50 tourist attractions, of which 20 are natural and 30 are anthropogenic. We carry out the valorization process through 10 parameters and evaluate each one with three numerical values. The conclusion presents the main specificities of the tourism potentials for each region separately and for the R.N. Macedonia as a whole.

Key words: natural, anthropogenic, attractiveness, valorization, regions
JEL Classification: Z32 Tourism and Development; Z39 Tourism: Other

INTRODUCTION

The R.N. Macedonia is small in area, but a great treasure trove of natural rarities and cultural and historical monuments from the oldest times to the present day. The development of tourism and the economic benefits from it are variable every year. Namely, viewed by planning region, in terms of tourism, in recent years, the southwestern region has once taken the lead, then the Skopje region, the southeastern region is developing rapidly, then the Pelagonia region, then the Vardar region, and the other regions are less dynamic. (Dimitrov, Petrevska, 2023; Dimitrov, & Mitreva & Serafimova, 2017; Dimitrov, 2021; Dimitrov, 2020; Dimitrov & Koteski, 2015 and 2022; Tourist guide, 2015)

The paper we present confirms the specificities of the regional development of tourism in the country. Namely, in the paper we evaluate a total of 400 tourist potentials, that is, we evaluate the most important tourist potentials, namely 160 natural attractive motifs (mountains, caves, springs, rivers, lakes, waterfalls, etc.), and 240 anthropogenic motifs (archaeological and cultural-historical sites, monuments, museums, various events, etc.). Each planning region is represented by 50 tourist attractions, of which 20 are natural and 30 are anthropogenic.

METODOLOGY AND METHODS

The tourist valorization of resources represents one of the most significant and complicated issues of tourism development, both in theoretical, methodological and practical terms. In the valuation methodology, we use relevant literature on tourism in RNM and the analysis and synthesis method. (Dimitrov, & Petrevska, 2023; Dimitrov , & Mitreva, & Serafimova, 2017) The valorization process is for each attractive tourist element with a weighting value from 1 to 3. We evaluate 10 parameters important for tourism development.

Table 1.: Display of ten parameters with their values

PARAMETER		NUMERICAL VALUE		
		1	2	3
1	Tourist position	poor	medium	good

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Vol. 5, No. 1, pp. 25-49
Online: ISSN **2671-3810**
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Original scientific paper

2	Tourist equipment	poor	medium	good
3	Infrastructural equipment	poor	medium	good
4	Transport connection	poor	medium	good
5	Accessibility	poor	medium	good
6	Specificity	low	medium	high
7	Content	poor	medium	good
8	Significance	local	regional	national
9	Seasonality	one season	two seasons	all year round
10	Visit rate	low	medium	high

RESULTS AND DISCUSSION

In the paper, through a sublimated text and sixteen tables, we evaluate a total of 400 tourist potentials, that is, we evaluate the most important tourist potentials, namely 160 natural attractive motifs and 240 anthropogenic motifs. In the evaluation, each region is represented by 20 natural attractive motifs and 30 anthropogenic attractive motifs. For each region, two tables are provided (one for natural and one for anthropogenic motives) or a total of 16 tables of evaluated tourism potentials.

Each planning region has its own specific characteristics, so for this reason we add a figurative name to each region. Thus, the Vardar region is a wine region (domination of grape plantations, wineries and production of various wines), then the Eastern region is Bregalnica (because the Bregalnica River flows through the entire region); The southwestern region is lake-cultural (domination of Lake Ohrid and diverse cultural heritage); the southeastern region is lake-spa (domination of Lake Dojran, Bansko spa and Negorski spa); The Pelagonia region is cultural (with a predominance of various cultural and historical monuments); the Polog region is ski (dominated by mountain winter tourism - ski centers Popova Shapka and Mavrovo); The Northeastern region is traditional (museums and monuments) and the Skopje region is urban (tourism dominates in the city of Skopje).

Table 2.: Sequential overview of the most important natural tourist resources in the Vardar wine region

Ordinal number	Attractiveness	Tourist position	Tourist equipment	Infrastructure	Trafiic connections	Accessibility	Specificity	Conetent	Significance	Seasonality	Visition	Total: General
1.	Lake Tikvesh	3	3	3	3	3	3	3	3	3	2	2,9
2.	Lake Mladost	3	3	3	3	3	3	3	3	3	2	2,9
3.	Nature Reserve Lake Tikvesh	3	2	3	3	3	3	3	3	3	1	2,7
4.	Demir Kapija Gorge	3	2	3	3	3	3	3	3	3	1	2,7
5.	Mount Jakupica	3	2	2	3	3	3	3	3	3	2	2,7
6.	Solunska Glava Peak - Jakupica	3	2	2	3	3	3	3	3	3	2	2,7
7.	Picnic Area - Vitačevo	3	2	2	3	3	3	3	3	3	1	2,6
8.	Mount Dautica	3	2	2	3	3	3	3	3	3	1	2,6
9.	Lake Lisice	3	2	2	3	3	3	3	3	3	1	2,6

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10.	Fariško - Drenovo Gorge	3	2	2	3	3	3	3	3	3	1	2,6
11.	Skochivir Gorge	3	2	2	3	3	3	3	3	3	1	2,6
12.	Taor Gorge	3	2	2	3	3	3	3	3	3	1	2,6
13.	Gradište - an island in Lake Tikvesh	3	2	3	2	2	3	3	3	3	1	2,5
14.	Bela Voda Cave	3	1	2	3	3	3	3	3	3	1	2,5
15.	Waterfall - The Source of the Babuna River	3	2	2	3	3	3	2	2	3	1	2,4
16.	Stone figures - Konopishte	2	1	2	2	2	3	3	3	3	1	2,2
17.	Salakovsky Lakes	2	1	2	2	2	3	3	3	3	1	2,2
18.	Moklish Lake	2	1	2	2	2	3	3	2	3	1	2,1
19.	Zmeovec Cave	2	1	2	2	3	2	3	2	3	1	2,1
20.	Makaroec Cave	2	1	2	2	3	2	3	2	3	1	2,1
Sum		55	36	45	54	56	58	59	56	60	24	503
Average		2,7	1,8	2,3	2,8	2,8	2,9	2,9	2,8	3,0	1,2	2,52

Table 2 shows that the Vardar Planning Region has various natural attractions: (mountains, peaks, rivers, waterfalls, lakes, reserves, gorges, caves, etc.). The highest general tourist value is possessed by the artificial lakes Tikveško and Mladost with a value of 2.9, followed by reserves, gorges, mountains, caves, etc. The total sum of the tourist value of all 20 natural resources or attractions in the Vardar wine region is 503 with an overall average of 2.52.

Table 3.: Sequential overview of the most important anthropogenic tourist resources in the Vardar wine region

Ordinal number	Attractiveness	Tourist position	Tourist equipment	Infrastructure	Trafiic connections	Accessibility	Specificity	Conetent	Significance	Seasonality	Visition	Total: General tourist value
1.	Archaeological Site of Stobi	3	3	3	3	3	3	3	3	3	3	3,0
2.	National Museum of Veles	3	3	3	3	3	3	3	3	3	2	2,9
3.	Tikves Winery	3	3	3	3	3	3	3	3	3	2	2,9
4.	Stobi Winery	3	3	3	3	3	3	3	3	3	2	2,9
5.	Popova Kula Winery	3	3	3	3	3	3	3	3	3	2	2,9
6.	Kocho Racin Memorial House	3	3	3	3	3	3	3	3	3	2	2,9
7.	Varnalii Complex	3	3	3	3	3	3	3	3	3	1	2,8
8.	Memorial Ossuary	3	3	3	3	3	3	3	3	3	1	2,8
9.	Vasil Glavinov Memorial House	3	3	3	3	3	3	2	3	3	1	2,7
10.	Kasapov Memorial House	3	3	3	3	3	3	3	2	3	1	2,7

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11.	Memorial House of Jordan Hadzi Konstantinov Dhinot	3	3	3	3	3	3	3	2	3	1	2,7
12.	Wine Museum - Negotino	3	3	3	3	3	3	2	3	3	1	2,7
13.	Museum - Gallery - Kavadarci	3	3	3	3	3	3	2	2	3	1	2,7
14.	Event "Racinovi sredbi"	3	3	3	3	3	3	3	3	1	2	2,7
15.	Event "Tikveshki grozdober"	3	3	3	3	3	3	3	3	1	2	2,7
16.	Festival of ancient drama "Stobi"	3	3	3	3	3	3	3	3	1	2	2,7
17.	Church of St. Panteleimon - Veles	3	2	3	3	3	3	3	2	3	1	2,6
18.	Painting and Carving Colony "Papradiški majstori"	3	3	3	3	3	3	3	3	1	1	2,6
19.	Monastery of St. Dimitrija - Veles	3	2	2	3	3	3	2	3	3	2	2,6
20.	Church of St. Cyril and Methodius - Veles	3	2	3	3	3	2	3	2	3	1	2,5
21.	Church of St. Athanasius the Great - Negotino	3	2	3	3	3	3	2	2	3	1	2,5
22.	Museum of Demir Kapija	3	3	3	3	3	2	2	2	3	1	2,5
23.	Clock Tower - Veles	3	3	3	3	3	2	2	2	3	1	2,5
24.	Monument of the Horseman - Veles	3	2	3	3	3	2	2	2	3	2	2,5
25.	Veles Regatta "Gemidzhii"	3	3	3	3	3	3	2	2	1	2	2,5
26.	Monastery of St. John the Baptist - village of Vetersko	2	2	2	3	3	3	2	3	3	1	2,4
27.	Church of St. Bogorodica - Veles	3	2	2	3	3	2	2	2	3	2	2,4
28.	Church of St. Nicholas - Sveti Nikole	3	2	2	3	3	2	2	2	3	1	2,3
29.	Mark's Tower - Kavadarci	3	2	2	3	3	2	2	2	3	1	2,3
30.	Monastery of Polog - St. George	2	2	2	1	1	3	3	3	3	1	2,1
Sum		88	80	84	88	88	83	77	77	80	44	789
Average		2,9	2,7	2,8	2,9	2,9	2,8	2,6	2,6	2,7	1,5	2,64

Table No. 3 shows that in the Vardar planning region there are various anthropogenic (archaeological sites, museums, wineries, cultural monuments, memorial houses, cultural events, monasteries, churches, memorials, etc.). The highest general tourist value is the archaeological site of Stobi 3.0, the National Museum in Veles with 2.9, the wineries "Tikveš", "Stobi", "Popova Kula", the Memorial House of Kocho Racin, all with a value of 2.9, followed

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by the remaining anthropogenic attractive tourist resources in the region with lower values. The total sum of the tourism value of all 30 anthropogenic resources or attractions in the Vardar wine region is 789 with an overall average of 2.64.

Table 4.: Sequential overview of the most important natural tourism resources in the East - Bregalnica region

Ordinal number	Attractiveness	Tourist position	Tourist equipment	Infrastructure	Trafiic connections	Accessibility	Specificity	Conetent	Significance	Seasonality	Visition	Total: General
1.	Osogovo Mountains	3	2	2	3	3	3	3	3	3	2	2,7
2.	Ponikva	3	3	3	3	3	2	3	2	3	2	2,7
3.	Kežovica - Shtip	3	2	3	3	3	3	2	3	3	2	2,7
4.	Berovo Lake	2	3	3	3	3	2	2	2	3	2	2,5
5.	Kaliman Lake	3	1	2	3	3	3	2	3	3	2	2,5
6.	Lesnovski Crater	2	2	2	2	3	3	3	3	2	3	2,5
7.	Kočansko Pole	3	2	2	3	3	2	2	3	2	1	2,3
8.	Istibanjska Klisura	3	1	2	3	3	3	2	3	2	1	2,3
9.	Tsarev Vrv - Ruen	3	1	1	2	3	3	3	3	2	1	2,2
10.	Kukulje - Istevnik	1	2	2	2	3	3	3	3	2	1	2,2
11.	Oak in the village of Beli	2	2	2	2	3	2	3	2	3	1	2,2
12.	Lovishte Polaki	2	2	2	2	3	2	3	3	2	1	2,2
13.	Plackovica	2	2	2	2	2	2	3	3	2	2	2,2
14.	Lake Gradce	2	3	2	3	2	2	2	1	3	2	2,2
15.	Melovite	2	1	2	2	3	3	3	3	2	1	2,2
16.	Lake Mantovo	2	2	2	3	2	3	2	2	3	1	2,2
17.	Suvi Laki	1	2	2	3	3	2	2	2	3	2	2,2
18.	Osojnica	2	2	2	3	3	2	2	2	2	1	2,1
19.	Zletovska Klisura	2	1	2	3	2	3	3	2	2	1	2,1
20.	Lovishte Konce	2	2	2	2	3	2	2	3	2	1	2,1
Sum		45	38	42	52	56	50	50	51	49	30	463
Average		2,2	1,9	2,1	2,6	2,8	2,5	2,5	2,6	2,5	1,5	2,32

Table 4 shows that the Eastern Planning Region has various natural attractions: (mountains, lakes, peaks, gorges, reserves, etc.). The highest general tourist value is in the Osogovo Mountains, the mountain locality Ponikva, Kežovica with a value of 2.7, followed by reserves, gorges, etc. The total sum of the tourist value of all 20 natural resources or attractions in the eastern - Bregalnica region is 463 with an overall average of 2.35.

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Table 5.: Sequential overview of the most important anthropogenic tourist resources in the East - Bregalnica region

Ordinal number	Attractiveness	Tourist position	Tourist equipment	Infrastructure	Trafiic connections	Accessibility	Specificity	Conetent	Significance	Seasonality	Visition	Total: General tourist value
1.	Museum Shtip	3	3	3	3	3	3	3	3	3	2	2,9
2.	Vinica Museum	3	3	3	3	3	3	3	3	3	1	2,8
3.	"Cetrse" - Shtip	3	3	3	3	3	3	3	3	1	3	2,8
4.	Makfest - Shtip	3	3	3	3	3	2	3	3	2	3	2,8
5.	Lesnovski Monastery	2	3	3	3	3	3	2	3	3	3	2,8
6.	Pastrmajlijada - Shtip	3	3	3	3	3	3	3	2	1	3	2,7
7.	St. Bogorodica - Novo Selo	3	3	3	3	3	3	2	2	3	2	2,7
8.	St. Nikola - Shtip	3	3	3	3	3	3	2	2	3	2	2,7
9.	Vinica Kale	3	3	2	3	2	3	3	3	3	1	2,6
10.	Isar - Shtip	3	3	2	3	2	3	2	3	3	2	2,6
11.	Fashion Days in Shtip	3	3	3	3	3	2	3	2	2	1	2,5
12.	Kochani Museum	3	3	3	3	3	2	2	2	3	1	2,5
13.	Delchevo Museum	3	3	3	3	3	2	2	2	3	1	2,5
14.	Ethno - house in Morodvis	2	3	3	3	3	2	3	2	3	1	2,5
15.	PijanechkoMaleshev. Wedding	3	3	3	3	3	3	3	2	1	1	2,5
16.	Bargala - Karbinci	2	2	2	3	3	3	2	3	3	2	2,5
17.	St. Archangel Michael-Berovo	2	2	3	3	3	2	2	3	3	2	2,5
18.	Drama amateur.Fest-Kochani	3	3	3	3	3	2	2	2	2	2	2,5
19.	Stip cultural summer	3	3	3	3	3	2	2	2	2	2	2,5
20.	Ethno fest - Berovo	3	3	3	3	3	2	3	2	1	2	2,5
21.	Kochani rice days	3	3	3	3	3	3	2	2	1	2	2,5
22.	Istibanjskozdravozhivo	3	3	3	3	3	2	2	2	2	1	2,4
23.	Art Colony Lesnovo	3	3	3	3	3	2	2	2	2	1	2,4
24.	Rice harvest	3	3	3	3	3	3	2	2	1	1	2,4
25.	Bezisten - Shtip	3	2	2	3	3	2	2	2	3	2	2,4
26.	Berovo Museum	3	2	2	3	3	2	2	2	3	2	2,4
27.	Novo Selo - Shtip	3	1	2	3	3	3	2	2	3	2	2,4
28.	Rozh.naPr.Bogorod.-Berovo	3	2	2	3	3	2	2	2	3	1	2,3
29.	Church - Morodvis	2	2	2	3	2	3	2	3	3	1	2,3
30.	St. Bog. Balaklija - Delchevo	3	2	2	3	3	2	2	2	3	1	2,3
Sum		85	81	81	90	87	75	70	70	72	51	762
Average		2,8	2,7	2,7	3,0	2,9	2,5	2,3	2,3	2,4	1,7	2,53

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Table 5 shows that the Eastern Planning Region has various anthropogenic attractions (museums, events, monasteries, archaeological sites, cultural monuments, etc.). The highest general tourist value is the Stip Museum with 2.9, followed by four sites with values of 2.8, etc. The total sum of the tourist value of all 30 anthropogenic resources or attractions in the eastern - Bregalnica region is 762 with an overall average of 2.53.

Table 6.: A sequential overview of the most important natural tourist resources in the Southwestern Lakes and Cultural Region

Ordinal number	Attractiveness	Tourist position	Tourist equipment	Infrastructure	Trafiic connections	Accessibility	Specificity	Conetent	Significance	Seasonality	Visition	Total: General
1.	Lake Ohrid	3	3	3	3	3	3	3	3	3	3	3,0
2.	Banja Banishte	3	3	3	3	3	3	3	3	3	3	3,0
3.	Galicica National Park	3	3	3	3	3	3	3	3	3	2	2,9
4.	Lake Debar	3	3	3	3	3	3	3	3	3	1	2,8
5.	Lake Globocica	3	3	3	3	3	3	3	3	3	1	2,8
6.	Bay of Bones	3	3	3	3	3	3	3	3	2	2	2,8
7.	Nature Reserve "Jasen"	3	3	2	3	3	3	3	3	3	2	2,8
8.	Duvski Waterfall	3	3	2	3	3	3	3	3	3	2	2,8
9.	Reserve and Springs "Ostrovo"	3	2	2	3	3	3	3	3	3	2	2,7
10.	Lake Kozjak	3	2	2	3	3	3	3	3	3	2	2,7
11.	Biljanini Springs	2	2	2	3	3	3	3	3	3	2	2,6
12.	Vevchanski Springs	2	2	2	3	3	3	3	3	3	2	2,6
13.	Mount Jablanica	2	2	2	3	3	3	3	3	3	1	2,5
14.	Lake Vevcani	2	2	2	3	3	3	3	3	2	1	2,4
15.	Cave "Samoska Dupka"	3	2	3	3	3	2	2	2	3	1	2,4
16.	Belichki Springs on Belichka River	2	2	2	3	3	2	3	3	3	1	2,4
17.	Cave "Peshna"	3	1	2	3	3	3	2	3	2	2	2,4
18.	Labunishki Lakes	2	2	2	2	2	3	3	3	3	1	2,3
19.	Podgorsko Lake	2	2	2	2	2	2	3	3	3	1	2,2
20.	Spring of Treska River	2	2	2	3	2	2	2	2	3	1	2,1
Sum		52	47	47	58	57	56	57	58	57	33	522
Average		2,6	2,3	2, 3	2,9	2, 9	2,8	2,9	2,9	2,9	1,6	2,61

Table No. 6 shows that the Southwestern planning region has various natural attractions: (lakes, mountains, peaks, springs, rivers, waterfalls, national park, nature reserves, caves, etc.). The highest overall tourist value is achieved by Lake Ohrid and Banja Banjište with 3.0, followed by the Galicica National Park, then Lake Debar, etc. The total sum of the tourist value of all 20 natural resources or attractions in the Southwestern - Lakes and Cultural Region is 522 with an overall average of 2.61.

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Table 7.: Sequential overview of the main anthropogenic tourist resources in the Southwestern Lakes Cultural Region

Ordinal number	Attractiveness	Tourist position	Tourist equipment	Infrastructure	Trafiic connections	Accessibility	Specificity	Conetent	Significance	Seasonality	Visition	Total: General tourist value
1.	Samuil's Fortress - Ohrid	3	3	3	3	3	3	3	3	3	3	3,0
2.	St. Naum Monastery - Ohrid	3	3	3	3	3	3	3	3	3	3	3,0
3.	St. John Bigorski Monastery	3	3	3	3	3	3	3	3	3	3	3,0
4.	Bay of Bones Museum	3	3	3	3	3	3	3	3	3	3	3,0
5.	Ancient Theater - Ohrid	3	3	3	3	3	3	3	3	3	3	3,0
6.	St. Panteleimon Church - Ohrid	3	3	3	3	3	3	3	3	3	3	3,0
7.	St. John of Kaneo - Ohrid	3	3	3	3	3	3	3	3	3	3	3,0
8.	St. Sophia Cathedral - Ohrid	3	3	3	3	3	3	3	3	3	3	3,0
9.	St. Virgin Mary Perivlepta Church - Ohrid	3	3	3	3	3	3	3	3	3	3	3,0
10.	Robevci House - Ohrid	3	3	3	3	3	3	3	3	3	3	3,0
11.	Stara Čaršija - Ohrid	3	3	3	3	3	3	3	3	3	3	3,0
12.	"Ohrid Summer" - Ohrid	3	3	3	3	3	3	3	3	2	3	2,9
13.	"Ohrid Swimming Marathon" - Ohrid	3	3	3	3	3	3	3	3	2	3	2,9
14.	"Vodici or Epiphany" - Ohrid	3	3	3	3	3	3	3	3	2	3	2,9
15.	"Struga Poetry Evenings" - Struga	3	3	3	3	3	3	3	3	2	3	2,9
16.	"Vevchani Carnival"Vevchani	3	3	3	3	3	3	3	3	2	3	2,9
17.	Gallery of icons at the church of St. Mother of God Perivlepta - Ohrid	3	3	3	3	3	3	2	2	3	3	2,8
18.	National Museum - Ohrid	3	3	3	3	3	2	2	3	3	3	2,8
19.	National Museum "Dr. Nikola Nezlobinski" - Natural History Museum - Struga	3	3	3	3	3	3	2	2	3	3	2,8
20.	Memorial House of Grigor Prlichev - Ohrid	3	3	3	3	3	2	3	2	3	2	2,7
21.	Church "St. Erasmus" - Ohrid	3	3	3	3	3	3	2	2	3	2	2,7
22.	"Prlichev Sermons" - Ohrid	3	3	3	3	3	3	3	2	2	2	2,7
23.	Church of St. George - Struga	3	3	2	3	3	3	3	2	2	2	2,6

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Original scientific paper

24.	Museum of Slavic Literacy - Ohrid	3	2	3	3	3	3	2	2	3	2	2,6
25.	"Museum of Western Macedonia in the National Liberation Front" - Kichevo	3	2	2	3	3	3	2	2	3	2	2,5
26.	Church of St. Archangel Michael - village of Radožda	3	2	2	3	3	2	3	2	3	2	2,5
27.	Monastery of St. Virgin Mary of Kichevo - Kichevo	2	2	3	3	3	2	3	2	3	2	2,5
28.	Monastery of St. George the Victorious - village of Rajčica (Raički Monastery) - Debar	3	2	2	3	2	3	2	3	3	2	2,5
29.	Cathedral Church of St. Peter and Paul - Kichevo	2	2	3	3	3	2	3	2	2	2	2,4
30.	"Porečki Easter Towers" in Makedonski Brod	3	2	2	3	3	2	3	2	1	2	2,3
Sum		88	83	85	90	89	84	83	78	80	79	839
Average		2,9	2,8	2,8	3,0	2,9	2,8	2,8	2,6	2,7	2,6	2,79

Table No. 7 shows that the Southwestern planning region has various anthropogenic attractive tourist resources (archaeological sites, museums, wineries, cultural monuments, memorial houses, cultural events, monasteries, churches, memorials, etc.). Eleven anthropogenic localities have the highest general tourist value with 3.0 (Samoilova Tvrdina, St. Naum Monastery, St. Jovan Bigorski, Bay of Bones Museum, Ancient Theater, etc.), five attractions have a value of 2.9, and then follow with lower values the remaining anthropogenic attractive tourist resources in the region. The total sum of the tourist value in the Southwestern - Lakes Cultural Region of all 30 anthropogenic resources or attractions in the Vardar wine region is 839 with an overall average of 2.79.

Table 8.: Sequential overview of the most important natural tourist resources in the southeastern - lake spa region

Ordinal number	Attractiveness	Tourist position	Tourist equipment	Infrastructure	Trafiic connections	Accessibility	Specificity	Conetent	Significance	Seasonality	Visition	Total: General tourist value
1.	Dojran Lake	3	3	3	3	3	3	3	3	3	3	3,0
2.	Negorski Banji	3	3	3	3	3	3	3	3	3	3	3,0
3.	Bansko Spa	3	3	3	3	3	3	3	3	3	3	3,0
4.	Kozhuf Mountain (Kozhuf Ski Center)	3	3	2	3	3	3	3	3	3	2	2,8
5.	Smrdliva Voda	3	3	2	3	3	3	3	3	3	2	2,8
6.	Smolarski Waterfalls	3	3	2	3	3	3	3	3	3	2	2,8
7.	Koleshinski Waterfalls	3	3	2	3	3	3	3	3	3	2	2,8

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Vol. 5, No. 1, pp. 25-49
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Original scientific paper

8.	Lake Paljurci - Bogdanci	3	3	3	3	3	3	2	2	3	2	2,7
9.	The Naked "Man Plant" - "Gol Chovek" Kozhuv	3	2	2	3	3	3	3	3	3	1	2,6
10.	Mountain Belasica	3	2	2	2	3	3	3	3	3	1	2,5
11.	Pilav Tepe - Radovish	2	2	2	3	3	3	3	3	3	1	2,5
12.	Lake Mantovo-Konce	3	2	2	3	3	3	2	3	3	1	2,5
13.	Gevgelija - Valandovska Valley	3	3	2	3	3	2	2	3	3	1	2,5
14.	Bel Kamen Peak - Plachkovica	2	3	2	2	3	3	3	3	3	1	2,5
15.	Dosnica River	2	2	2	3	3	3	2	3	3	1	2,4
16.	Zelen Breg Peak - Kozuf	2	2	2	3	3	3	2	2	3	1	2,3
17.	Turia Dam	2	2	2	2	3	3	2	3	3	1	2,3
18.	Gabrovo Waterfalls	2	2	2	2	3	2	3	2	3	1	2,2
19.	Konjska River - Gevgelija	2	2	2	2	3	2	2	3	2	1	2,1
20.	Monospitovsko Blato	2	2	2	2	2	2	2	2	3	1	2,0
Sum		52	50	44	54	59	56	52	56	59	31	513
Average		2,6	2,5	2,2	2,7	2,9	2,8	2,6	2,8	2,9	1,6	2,56

Table 8 shows that the Southeast Planning Region has various natural attractions: (lakes, spas, mountains, waterfalls, peaks, rivers, reserves, etc.). The highest general tourist value is given to Dojran Lake, Negorski Banji and Bansko Spa with a value of 3.0, followed by mountains, waterfalls, reserves, etc. The total sum of the tourist value of all 20 natural resources or attractions in the southeastern - Lakes and Spa region is 513 with an overall average of 2.56.

Table 9.: A sequential overview of the most important anthropogenic tourist resources in the Southeast - Lake Spa Region

Ordinal number	Attractiveness	Tourist position	Tourist equipment	Infrastructure	Trafiic connections	Accessibility	Specificity	Conetent	Significance	Seasonality	Visition	Total: General tourist value
1.	Monastery Complex of St. Leontius in the village of Vodoča	3	3	3	3	3	3	3	3	3	3	3,0
2.	Monastery of St. Mother of God Eleusa in Veljusa	3	3	3	3	3	3	3	3	3	3	3,0
3.	St. Ascension of Christ – St. Spas - Gevgelija	3	3	3	3	3	3	3	3	3	2	2,9

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Original scientific paper

4.	Archaeological Site "Vardarski Rid" - Gevgelija	3	3	3	3	3	3	3	3	3	2	2,9
5.	National Museum of Gevgelija	3	3	3	3	3	3	3	2	3	3	2,9
6.	“Carevi Kuli” - Strumica	3	3	2	3	3	3	3	3	3	2	2,8
7.	Church of St. Panteleimon of Tiberiopolis - Strumica	3	2	3	3	3	3	3	2	3	3	2,8
8.	"Strumica Carnival" - Strumica	3	3	3	3	3	3	3	3	1	3	2,8
9.	Church of the Holy Trinity - Radoviš	3	2	2	3	3	3	3	3	3	2	2,7
10.	Church of St. Elijah - Dojran	3	3	3	3	3	3	2	2	3	2	2,7
11.	Archaeological site "Isar" - Marvinci	3	2	2	3	3	3	3	3	3	1	2,6
12.	Church of St. Cyril and Methodius - Strumica	2	2	3	3	3	3	3	3	3	1	2,6
13.	Church of St. Athanasius - Bogdanci	3	2	3	3	3	2	2	3	3	2	2,6
14.	"Smokvijada" - Gevgelija	3	3	3	3	3	2	3	2	1	3	2,6
15.	"Rakijada" - Valandovo	3	3	3	3	3	3	2	2	1	3	2,6
16.	"Dojran Handshakes" Dojran	3	3	3	3	3	3	2	2	1	3	2,6
17.	"Folk Fest" - Valandovo	3	3	3	3	3	3	2	2	1	3	2,6
18.	"Strumica Open Festival"	3	3	3	3	3	2	3	2	1	3	2,6
19.	Village of Smolare	3	3	2	3	3	2	2	3	3	1	2,5
20.	Festival of Chamber Theater "Risto Shishkov" - Strumica	3	3	3	3	3	3	3	2	1	2	2,5
21.	Church of St. Stephen in the village of Konce	3	2	2	3	3	3	3	2	3	1	2,5
22.	Village of Sermenin - Gevgelija	3	2	2	3	3	3	2	2	3	1	2,4
23.	Monastery of St. Martyr George - Valandovo	2	2	2	3	3	3	2	3	3	1	2,4
24.	"Leek Day", village of Gradashorci - Vasilevo	3	3	3	3	3	3	2	2	1	1	2,4
25.	Children's Festival "Kalinka" - Gevgelija	3	3	3	3	3	2	2	2	1	2	2,4

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Vol. 5, No. 1, pp. 25-49
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Original scientific paper

26.	International Strumica Colony - Strumica	3	3	3	3	3	2	2	2	1	1	2,3
27.	"May Day Races in the village of Stojakovo", Bogdanci	3	3	2	3	3	3	2	2	1	1	2,3
28.	Manifestation "Warm Cultural Wave" - Konce	3	3	2	3	3	3	2	2	1	1	2,3
29.	"Festival of Original Folklore Bagpipe", village of Injevo	3	2	2	3	3	3	2	2	1	1	2,2
30.	"Festival of the Smolar Chestnut" - Novo Selo	3	2	2	3	3	2	2	2	1	1	2,1
Sum		88	80	79	90	90	83	75	72	62	58	776
Average		2,9	2,7	2,6	3,0	3,0	2,7	2,5	2,4	2,1	1,9	2,58

Table No. 9 shows that the Southeast Planning Region has various anthropogenic attractive tourist resources (monasteries, archaeological sites, museums, cultural monuments, events, monasteries, churches, etc.). The monasteries in the villages of Vodoča and Veljusa have the highest general tourist value with 3.0, followed by the remaining anthropogenic attractive tourist resources in the region - archaeological sites, museums, events, etc., with lower values. The total sum of the tourist value of all 30 anthropogenic resources or attractions in the southeastern - Ezersko Banja region is 776 with an overall average of 2.58.

Table 10.: A sequential overview of the most important natural tourist resources in the Pelagonia cultural region

Ordinal number	Attractiveness	Tourist position	Tourist equipment	Infrastructure	Trafiic connections	Accessibility	Specificity	Conetent	Significance	Seasonality	Visition	Total: General tourist value
1.	Lake Prespa	3	3	3	3	3	3	3	3	3	3	3,0
2.	Mount Baba	3	3	3	3	3	3	3	3	3	2	2,9
3.	Pelister National Park	3	3	3	3	3	3	3	3	3	2	2,9
4.	Galicica National Park	3	3	3	3	3	3	3	3	3	2	2,9
5.	Pelister Peak	3	2	3	3	3	3	3	3	3	2	2,8
6.	Pelister Waterfalls	3	3	2	3	3	3	3	3	3	1	2,7
7.	Lake Prilep	3	3	3	3	3	3	2	2	3	1	2,6
8.	Ezerani - Nature Reserve	3	3	2	2	3	3	3	3	3	1	2,6
9.	Skochivir Gorge	3	2	2	3	3	3	3	3	3	1	2,6
10.	Mount Nidze	3	2	2	2	3	3	3	3	3	1	2,5
11.	Big Lake Pelister	3	2	2	2	3	3	3	3	3	2	2,6
12.	Small Lake Pelister	3	2	2	2	3	3	3	3	3	2	2,6

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Vol. 5, No. 1, pp. 25-49
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Original scientific paper

13.	Strezhevo Lake	3	2	2	2	3	3	2	3	3	1	2,4
14.	An elephant (Saint) Stork of Markovi Kuli	2	2	2	2	3	3	3	3	3	2	2,5
15.	Kajmakcalan Peak	3	2	2	2	2	3	3	3	3	1	2,4
16.	Magaro-Galicica Peak	2	2	2	3	3	2	2	3	3	1	2,3
17.	Ramnishte Cave	2	2	2	3	3	2	3	2	3	1	2,3
18.	Source of Crna Reka	2	2	2	3	3	2	2	2	3	2	2,3
19.	Brnicki Waterfall Mariovo	2	2	2	2	3	2	3	2	3	1	2,2
20.	Golem Grad Island	2	1	2	1	1	3	2	3	3	1	1,9
Total		54	46	46	50	57	56	55	56	60	30	510
Average		2,7	2,3	2,3	2,5	2,8	2,8	2,7	2,8	3,0	1,5	2,55

Table No. 10 shows that the Pelagonia Planning Region has various natural attractions: (lakes, mountains, peaks, springs, rivers, waterfalls, national parks, reserves, gorges, etc.). The highest general tourist value is given to Lake Prespa with a value of 3.0, followed by the national parks Pelister, Galichica, and Mount Baba with a value of 2.9, followed by other attractions with lower values. The total sum of the tourist value of all 20 natural resources or attractions in the Pelagonia cultural region is 510 with an overall average of 2.55.

Table 11.: A sequential overview of the most important anthropogenic tourist resources in the Pelagonia cultural region

Ordinal number	Attractiveness	Tourist position	Tourist equipment	Infrastructure	Trafiic connections	Accessibility	Specificity	Conetent	Significance	Seasonality	Visition	Total: General tourist value
1.	Heraclea Lyncestis	3	3	3	3	3	3	3	3	3	3	3,0
2.	Ilinden Monument - Krusevo	3	3	3	3	3	3	3	3	3	3	3,0
3.	Shirok Sokak - Bitola	3	3	3	3	3	3	3	3	3	3	3.0
4.	Mechkin Kamen - Krusevo	3	2	3	3	3	3	3	3	3	3	2,9
5.	Church of St. Dimitrija - Bitola	3	3	3	3	3	3	3	3	3	2	2,9
6.	Monastery of St. Archangel Michael (Varoski Monastery)	3	2	3	3	3	3	3	3	3	2	2,8
7.	Markovi Kuli	3	3	3	3	3	3	3	2	3	2	2,8
8.	Bezisten in Bitola	3	3	3	3	3	2	3	3	2	3	2,8
9.	Archaeological site Stibera	3	3	3	3	3	3	3	3	3	1	2,8

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Original scientific paper

10.	International Film Festival "Manaki Brothers" - Bitola	3	3	3	3	3	3	3	3	1	3	2,8
11.	"Prilep Carnival Prochka"	3	3	3	3	3	3	3	3	1	3	2,8
12.	"Beer Fest" in Prilep	3	3	3	3	3	3	3	3	1	3	2,8
13.	"10 Days of the Krusevo Republic" - Krusevo	3	3	3	3	3	3	3	3	1	3	2,8
14.	Church of St. Bogorodica - Bitola	3	3	3	3	3	2	3	2	3	2	2,7
15.	"Ilinden Days" - Bitola	3	3	3	3	3	2	3	3	1	3	2,7
16.	NU Institute and Museum Bitola	3	3	3	3	3	2	2	2	3	3	2,7
17.	Tobacco Museum in Prilep	3	3	2	3	3	3	2	2	3	2	2,7
18.	Clock Tower in Bitola	2	2	3	3	3	3	3	2	3	3	2,7
19.	Museum of the Ilinden Uprising and the Krusevo Republic	3	3	3	3	3	2	2	2	3	2	2,6
20.	Resenski Saraj	3	3	2	3	3	3	2	2	3	2	2,6
21.	Church of St. Nicholas - Krusevo	3	2	3	3	3	2	2	2	3	3	2,6
22.	International Children's Art Colony - "Little Bitola Montmartre"	3	3	3	3	3	3	2	2	1	3	2,6
23.	Monastery of St. Bogorodica - Treskavec	3	2	2	3	2	3	2	3	3	2	2,5
24.	Monastery of St. Preobrazhenie - Zrze village	2	2	2	3	3	3	2	3	3	2	2,5
25.	Jeni Mosque - Bitola	3	2	3	3	3	2	2	2	3	2	2,5
26.	Monastery of St. George - Velushina	3	2	2	2	3	2	3	2	3	1	2,3
27.	Monastery of St. Elijah, Mariovo	2	2	2	3	2	3	2	3	3	1	2,3
28.	Church of St. George - Kurbinovo	2	2	2	3	3	2	2	3	3	1	2,3
29.	St. John the Forerunner Demir Hisar	3	2	2	3	3	2	2	2	3	1	2,3
30.	St. Athanasius of Alexandria, village Zhurche - Demir Hisar	2	2	2	3	3	2	2	2	3	1	2,2

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Vol. 5, No. 1, pp. 25-49
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UDC: 338.483.11/.12(497.7)
Original scientific paper

Sum	85	78	81	89	88	79	77	77	77	68	800
Average	2,8	2,6	2,7	2,9	2,9	2,6	2, 6	2,6	2,6	2,3	2,66

Table No. 11 shows that the Pelagonia planning region has various anthropogenic attractions (archaeological sites, memorials, museums, monasteries, cultural events, etc.). The archaeological site of Heraclea Lyncestis, the "Ilinden" Monument in Krusevo and "Shirok Sokak" - Bitola all have the highest general tourist value, all with a value of 3.0, followed by the remaining anthropogenic attractive tourist resources in the region, with lower values. The total sum of the tourist value of all 30 anthropogenic resources or attractions in the Pelagonia - cultural region is 800 with an overall average of 2.66.

Table 12.: A sequential overview of the most important natural tourist resources in the Polog ski region

Ordinal number	Attractiveness	Tourist position	Tourist equipment	Infrastructur e	Trafic connections	Accessibility	Specificity	Conetent	Significance	Seasonality	Visition	Total: General
1.	Popova Shapka	3	3	3	3	3	3	3	3	3	2	2,9
2.	Mavrovo Lake	3	3	3	3	3	3	3	3	3	2	2,9
3.	Mavrovo National Park	3	3	3	3	3	3	3	3	3	2	2,9
4.	Djonovica Cave – Bukovic's Beauty	3	3	3	3	3	3	3	3	3	1	2,8
5.	Titov Vrv - Shar Planina	3	2	3	3	3	3	3	3	3	2	2,8
6.	Poloska Valley	3	2	2	3	3	3	3	3	3	1	2,6
7.	Vrutok The Source of the Vardar	3	2	3	3	3	3	2	2	3	2	2,6
8.	Sharkova Dupka Cave - Bistra	3	2	2	3	3	3	2	3	3	1	2,5
9.	Golem Korab	3	1	2	3	3	3	2	3	3	1	2,4
10.	Dlabok Dol Waterfall	2	2	2	2	3	3	3	3	3	1	2,4
11.	Duf Waterfall	2	2	2	2	3	3	3	2	3	2	2,4
12.	Radika River	2	1	2	2	3	3	3	3	3	2	2,4
13.	White Lake - Shar Mountain	3	1	2	2	2	3	3	3	3	1	2,3
14.	Karanikolic Lake	2	1	2	2	3	2	3	3	3	1	2,2
15.	Black Lake - Shar Mountain	2	1	2	3	2	3	3	2	3	1	2,2
16.	Mal Korab	2	1	2	3	3	3	2	2	3	1	2,2
17.	Bogovinsko Lake	2	1	2	2	3	2	3	2	3	1	2,1
18.	Korabsko Lake	2	1	2	3	3	2	2	2	3	1	2,1
19.	Lake Lokuv - Deshat	2	1	2	3	3	2	2	2	3	1	2,1
20.	Lake Sveta Nedela - Deshat	2	1	2	3	3	2	2	2	3	1	2,1
Sum		50	34	46	54	58	55	53	52	60	27	489
Average		2, 5	1,7	2,3	2,7	2,9	2,7	2,6	2,6	3,0	1,3	2,44

Table No. 12 shows that the Polog planning region has various natural attractions: (mountains, lakes, national park, peaks, springs, rivers, waterfalls, etc.). The highest general tourist value

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Original scientific paper

is given to Popova Shapka, Mavrovo Lake, and Mavrovo National Park with a value of 2.9, followed by attractions with lower values, caves, peaks, waterfalls, etc. The total sum of the tourist value of all 20 natural resources or attractions in the Polog ski region is 489 with an overall average of 2.44.

Table 13.: A sequential overview of the most important anthropogenic tourist resources in the Polog ski region

Ordinal number	Attractiveness	Tourist position	Tourist equipment	Infrastructure	Trafiic connections	Accessibility	Specificity	Conetent	Significance	Seasonality	Visition	Total: General tourist value
1.	St. Athanasius – Lešočki Monastery	3	3	3	3	3	3	3	3	3	2	2,9
2.	St. Cyril and Methodius Cathedral Church - Tetovo	3	2	3	3	3	3	3	3	3	2	2,8
3.	St. Mother of God Church - Tetovo	3	2	3	3	3	3	3	3	3	2	2,8
4.	St. Naum Monastery on Popova Šapka	3	2	3	3	3	3	3	3	3	2	2,8
5.	Sharena Mosque - Tetovo	3	2	3	3	3	3	3	3	3	2	2,8
6.	Arabati – Baba Teke - Tetovo	3	2	3	3	3	3	3	3	3	2	2,8
7.	Galichka Wedding	3	3	3	3	3	3	3	3	1	3	2,8
8.	"Sharplanin Ski Cup" - Popova Šapka	3	3	3	3	3	3	3	3	1	2	2,7
9.	St. Dormition Church - Gostivar	3	2	3	3	3	3	3	3	3	1	2,7
10.	Snow City (Children's Resort "Bunec")	3	3	3	3	3	3	3	3	2	1	2,7
11.	Tetovo Festival	3	3	3	3	3	3	3	3	1	2	2,7
12.	Tetovo Fortress	3	2	3	3	3	2	3	3	3	1	2,6
13.	Gostivar Clock Tower	3	2	3	3	3	3	2	3	3	1	2,6
14.	St. Nicholas Church - Gostivar	3	2	3	3	3	3	3	2	3	1	2,6
15.	International Cross-Country Skiing Competition - "Mavrovski Memorial"	3	3	3	3	3	3	3	3	1	1	2,6
16.	Lesoch Folk Fest	3	3	3	3	3	3	3	3	1	1	2,6

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Vol. 5, No. 1, pp. 25-49
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UDC: 338.483.11/.12(497.7)
Original scientific paper

17.	Tetovo Choir Responses	3	3	3	3	3	3	2	3	1	1	2,5
18.	Traditional Mountaineering Climb on Korab	3	3	3	3	3	2	2	2	2	2	2,5
19.	Traditional Climb on Titov Vrv - Shar Planina	3	3	3	3	3	2	2	2	2	2	2,5
20.	International Festival "Days of Naim" - Tetovo	3	3	3	3	2	3	2	3	1	1	2,4
21.	Museum of the Tetovo Region	2	2	3	2	3	2	3	2	3	2	2,4
22.	Theatre Festival in Tetovo	2	2	2	2	2	2	2	2	2	2	2,0
23.	Poetry Festival "Days of Naim"	2	2	2	2	2	2	2	2	2	2	2,0
24.	Sheep and Goat Breeders' Day	2	2	2	2	2	2	2	2	2	2	2,0
25.	Children's Festival "Apple"	2	2	2	2	2	2	2	2	2	2	2,0
26.	Old Bazaar Tetovo	2	2	2	2	2	2	2	2	2	2	2,0
27.	Old Town Albanian Songs Tetovo	2	2	2	2	2	2	2	2	2	2	2,0
28.	Film Festival Tetovo	2	2	2	2	2	2	2	2	2	2	2,0
29.	"Literary Sparks" - Gostivar	2	2	2	2	2	2	2	2	2	2	2,0
30.	Miniature Museum in the Village of Dzepcishte	2	2	2	2	2	2	2	2	2	1	1,9
Sum		80	71	81	80	80	77	76	77	64	51	737
Average		2,7	2,3	2,7	2,7	2,7	2,6	2,5	2,6	2,1	1,7	2,46

Table No. 13 shows that the Polog planning region has various anthropogenic attractions (monasteries, churches, mosques, museums, cultural events, etc.). The highest general tourist value is the Lesok Monastery with a value of 2.9, followed by the remaining anthropogenic attractive tourist resources in the region with lower values. The total sum of the tourism value of all 30 anthropogenic resources or attractions in the Polog ski region is 737 with an overall average of 2.46.

Table 14.: Sequential overview of the most important natural tourist resources in the Northeastern - traditional region

Ordinal number	Attractiveness	Tourist position	Tourist equipment	Infrastructure	Trafiic connections	Accessibility	Specificity	Conetent	Significance	Seasonality	Visition	Total: General tourist value
1.	Katlanovska Banja	3	3	3	3	3	3	3	3	3	2	2,9
2.	Kumanovo Banja – village of Proevce	3	3	3	3	3	3	3	2	3	1	2,7

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3.	Stone dolls "Kuklica"	3	2	2	3	3	3	3	3	3	2	2,7
4.	Kokino - megalithic observatory	3	2	2	3	3	3	3	3	3	2	2,7
5.	Lake Lipkovo	3	2	2	3	3	3	3	3	3	1	2,6
6.	Basalt slab – "Kostoperska rock" Mlado Nagoričane	3	2	2	3	3	3	3	3	3	1	2,6
7.	Kumanovo Valley	3	2	3	3	3	3	3	2	3	1	2,6
8.	Strnovac Spa - Staro Nagoričane	3	2	2	3	3	3	3	2	3	1	2,5
9.	Pchinja River	3	1	2	2	3	3	3	3	3	1	2,4
10.	Kriva Reka	3	1	2	3	3	2	3	3	3	1	2,4
11.	Lake Glaznja	3	1	2	2	3	3	3	3	3	1	2,4
12.	Kratovska River	3	1	2	3	3	3	2	3	2	1	2,3
13.	Kumanovska River	3	2	3	3	2	2	2	2	3	1	2,3
14.	“Cocev Vrv” - Osogovo Mountains	3	1	2	2	3	3	3	2	2	1	2,2
15.	“Cocev Kamen”	2	2	1	2	2	3	2	3	3	1	2,1
16.	Bistrica River	2	1	1	2	2	2	2	2	2	1	1,7
17.	Mount German	2	1	1	2	2	2	1	2	2	1	1.6
18.	Mount Kozjak	2	1	1	2	2	2	1	2	2	1	1,6
19.	Skopje Montenegro	2	1	1	2	2	2	1	2	2	1	1,6
20.	Bilina Mountain	2	1	1	2	2	2	1	2	2	1	1,6
Sum		54	32	38	51	53	53	48	50	53	23	455
Average		2,7	1,6	1,9	2,6	2,6	2,6	2,4	2,5	2,6	1,2	2,27

Table No. 14 shows that the Northeast Planning Region has various natural attractions: (spas, mountains, peaks, rivers, lakes, reserves, etc.). The highest general tourist value is Katlanovska Banja with a value of 2.9, followed by the other natural attractions with lower values. The total sum of the tourism value of all 20 natural resources or attractions in the northeastern traditional region is 455 with an overall average of 2.27.

Table 15.: Sequential overview of the most important anthropogenic tourism resources in the Northeastern - traditional region

Ordinal number	Attractiveness	Tourist position	Tourist equipment	Infrastructure	Trafiic connections	Accessibility	Specificity	Conetent	Significance	Seasonality	Visition	Total: General tourist value
1.	Monastery Complex of St. Joachim Osogovski - Kriva Palanka	3	3	3	3	3	3	3	3	3	2	2,9
2.	National Museum of Kumanovo	3	3	3	3	3	3	3	2	3	2	2,8
3.	Memorial Center of ASNOM - Pelince	3	2	3	3	3	3	3	2	3	2	2,7
4.	Monastery of St. Bogorodica - village	3	2	3	3	3	3	3	3	3	1	2,7

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	of Majteche, Kumanovo											
5.	Church of St. George - Staro Nagoricane	3	2	3	3	3	2	3	3	3	2	2,7
6.	Clock Tower - Kratovo	3	2	3	3	3	2	2	3	3	3	2,7
7.	"Comedy Days" - Kumanovo	3	2	3	3	3	3	3	3	2	2	2,7
8.	International Jazz Festival - Kumanovo	3	2	3	3	3	3	3	3	2	2	2,7
9.	International Art Solony - “Kumanovo”	3	3	3	3	3	3	3	3	1	1	2,6
10.	Hadzi - Kostova Tower - Kratovo	3	2	3	3	3	3	2	3	3	1	2,6
11.	Cultural event "Roma Tumba Fest" Kumanovo	3	3	3	3	3	3	3	2	1	2	2,6
12.	Yokshirski (Svinski) Bridge - Kratovo	3	2	3	3	3	3	2	2	3	2	2,6
13.	Ossuary "Zebrnjak" - Kumanovo	3	2	2	3	2	3	3	3	3	1	2,5
14.	Church of St. George of Kratovo	3	2	3	3	3	3	2	2	3	1	2,5
15.	City Museum in Kriva Palanka	3	3	2	3	3	2	2	3	3	1	2,5
16.	St. John the Forerunner - Kratovo	2	2	2	3	3	3	2	3	3	2	2,5
17.	Radin Bridge - Kratovo	2	2	3	3	3	2	3	2	3	2	2,5
18.	Museum of the City of Kratovo	3	3	2	3	3	2	2	2	3	2	2,5
19.	"Golden Days" in Kratovo	3	3	3	3	3	3	2	2	1	2	2,5
20.	Folklore Festival "St. Joachim Osogovski"	2	2	3	3	2	3	3	3	2	2	2,5
21.	Art Colony "St. Joachim Osogovski"	2	2	3	3	2	3	3	3	2	2	2,5
22.	Monastery of the Holy Virgin Mary - Karpinski - village of Orah	3	2	2	3	3	3	3	2	2	1	2,4
23.	St. Nicholas the Wonderworker Kratovo	2	2	2	3	3	3	2	3	3	1	2,4
24.	Simik Tower - Kratovo	2	2	3	3	3	2	2	3	3	1	2,4

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25.	Zlatkova Tower - Kratovo	2	2	3	3	3	2	2	3	3	1	2,4
26.	Krsteva Tower - Kratovo	3	2	3	3	3	2	2	2	3	1	2,4
27.	Čarshiski Bridge - Kratovo	2	2	3	3	3	2	2	2	3	2	2,4
28.	Grofčanski Bridge - Kratovo	2	2	3	3	3	2	2	2	3	1	2,3
29.	Argulicki Bridge - Kratovo	2	2	3	3	3	2	2	2	3	1	2,3
30.	Archaeological Site "Gradište" - village of Konjuh	2	2	1	2	2	3	2	3	2	1	2,0
Sum		79	67	82	89	86	79	74	77	78	47	758
Average		2,6	2,2	2,7	2,9	2,9	2,6	2,5	2,6	2,6	1,6	2,52

Table No. 15 shows that the Northeastern Planning Region has various anthropogenic attractions (monasteries, museums, memorials, cultural events, towers, bridges, archaeological sites, etc.). The highest general tourist value is the monastery complex of St. Joachim Osogovski with a value of 2.9, followed by the remaining anthropogenic attractive tourist resources in the region with lower values. The total sum of the tourism value of all 30 anthropogenic resources or attractions in the northeastern - traditional region is 758 with an overall average of 2.52.

Table 16.: Sequential overview of the most important natural tourist resources in the Skopje urban region

Ordinal number	Attractiveness	Tourist position	Tourist equipment	Infrastructure	Trafiic connections	Accessibility	Specificity	Conetent	Significance	Seasonality	Visition	Total: General tourist value
1.	Lake Matka	3	3	3	3	3	3	3	3	3	2	2,9
2.	Matka Canyon	3	3	3	3	3	3	3	3	3	2	2,9
3.	River Vardar-Skopje	3	3	3	3	3	3	3	3	3	2	2,9
4.	Mount Vodno	3	2	3	3	3	3	3	3	3	2	2,8
5.	Vrelo Cave	3	2	3	3	3	3	3	3	3	2	2,8
6.	Lake Kozjak	3	2	3	3	3	3	3	3	3	1	2,7
7.	Skopje Basin	3	3	3	3	3	2	3	3	3	1	2,7
8.	Skopjska Crna Gora	3	2	3	3	3	3	3	2	3	1	2,6
9.	Dona Duka Cave	3	2	3	3	3	3	2	3	3	1	2,6
10.	Gazi Baba Forest Park	2	2	3	3	3	3	3	2	3	1	2,5
11.	Krshtalna Cave	3	2	2	3	3	3	2	3	3	1	2,5
12.	Ostrovo Locality	2	2	3	3	3	3	2	2	3	2	2,5
13.	Ezerce Locality	2	2	3	3	3	3	2	2	3	2	2,5
14.	Rašče Spring	3	1	2	3	3	2	2	3	3	1	2,3
15.	River Treska	3	1	2	3	3	3	2	3	2	1	2,3
16.	Dervenska Gorge	3	2	3	2	2	2	3	2	3	1	2,3
17.	Shishevska Gorge	2	1	3	3	2	3	3	2	3	1	2,3
18.	Kačanička Gorge	2	1	3	2	3	2	3	2	3	1	2,2
19.	Badarska Gorge	2	1	3	2	3	2	3	2	3	1	2,2

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20.	Katlanovsko Blato	2	1	2	3	3	2	3	2	3	1	2,2
	Sum	53	38	56	57	58	54	54	51	59	27	507
	Average	2,6	1,9	2,8	2,8	2,9	2,7	2,7	2,6	2,9	1,4	2,53

Table No. 16 shows that the Skopje planning region has various natural attractions: (lakes, canyons, caves, rivers, mountains, peaks, springs, rivers, gorges, etc.). The highest general tourist value is possessed by Lake Matka, Matka Canyon, and the Vardar River with a value of 2.9, followed by other natural attractions with lower values. The total sum of the tourist value of all 20 natural resources or attractions in the Skopje-urban region is 507 with an overall average of 2.53.

Table 17.: Sequential overview of the most important anthropogenic tourist resources in the Skopje urban region

Ordinal number	Attractiveness	Tourist position	Tourist equipment	Infrastructure	Trafiic connections	Accessibility	Specificity	Conetent	Significance	Seasonality	Visition	Total: General tourist value
1.	Cathedral of St. Clement of Ohrid - Skopje	3	3	3	3	3	3	3	3	3	3	3,0
2.	Stone Bridge - Skopje	3	3	3	3	3	3	3	3	3	3	3,0
3.	Old Skopje Bazaar	3	3	3	3	3	3	3	3	3	3	3,0
4.	Millennium Cross - Skopje	3	3	3	3	3	3	3	3	3	3	3.0
5.	St. Spas Monastery - Skopje	3	3	3	3	3	3	3	3	3	3	3.0
6.	Mother Teresa Memorial House	3	3	3	3	3	3	3	3	3	3	3,0
7.	Soldier on Horseback - Monument to Alexander the Great with Fountain - Skopje	3	3	3	3	3	3	3	3	3	3	3,0
8.	Archaeological Museum - Skopje	3	3	3	3	3	3	3	3	3	3	3,0
9.	Museum of the Macedonian Struggle Skopje	3	3	3	3	3	3	3	3	3	3	3,0
10.	Archaeological Site Skupi	3	3	3	3	3	3	3	3	3	2	2,9
11.	Kale Fortress - Skopje	3	3	3	3	3	3	3	3	3	2	2,9
12.	Mustafa - Pasha Mosque	3	3	3	3	3	3	3	3	3	2	2,9

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13.	Natural History Museum and Zoo - Skopje	3	3	3	3	3	3	3	3	3	2	2,9
14.	St. Andrew's Monastery Matka	3	3	3	3	3	3	3	3	3	2	2,9
15.	Prehistoric Settlement Tumba Madzari	3	3	3	3	3	3	3	3	3	1	2,8
16.	Macedonian Ethno Village Nerezi	3	3	3	3	3	3	3	3	3	1	2,8
17.	St. Panteleimon Monastery in the village of Gorno Nerezi	3	2	3	3	3	3	3	3	3	1	2,7
18.	Archaeological site Gradishte village Taor	3	2	3	3	3	3	3	3	3	1	2,7
19.	"Skopje Summer" - Skopje	3	3	3	3	3	3	3	3	1	2	2,7
20.	"May Opera Evenings" - Skopje	3	3	3	3	3	3	3	3	1	2	2,7
21.	"Kurshumli An" - Skopje	3	3	3	3	3	3	2	2	3	1	2,6
22.	"Daut - Pasha's Hamam" - Skopje	3	3	3	3	3	3	2	2	3	1	2,6
23.	"Mark's Monastery of St. Dimitrija" in the village of Sušica	3	2	2	3	3	3	3	3	3	1	2,6
24.	"Bezisten" - Skopje	3	3	3	3	3	3	2	2	3	1	2,6
25.	"Aqua Park" - Skopje	3	3	3	3	3	3	3	3	1	1	2,6
26.	"Basker Fest" - Skopje	3	3	3	3	3	3	3	2	1	2	2,6
27.	Holocaust Memorial Center of the Jews of Macedonia - Skopje	3	3	3	3	3	2	2	2	3	2	2,6
28.	St. Demetrius Church - Skopje	3	3	3	3	3	2	2	2	3	1	2,5
29.	Roman Aqueduct - Skopje	3	2	2	3	2	3	3	3	3	1	2,5
30.	St. Archangel Michael Monastery in the village of Kuceviste	3	2	3	3	2	2	3	2	3	1	2,4
Sum		90	85	88	90	88	87	85	83	82	57	835
Average		3,0	2,8	2,9	3,0	2,9	2,9	2,8	2,8	2,7	1,9	2,77

Table No. 17 shows that the Skopje Planning Region has various anthropogenic attractions (religious temples, churches, monasteries, mosques, memorials, museums, archaeological sites, cultural events, etc.). The highest general tourist value is held by 9 anthropogenic attractions with a value of 3.0, followed by the remaining anthropogenic attractive tourist resources in the region with lower values. The total sum of the tourism value of all 30

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anthropogenic resources or attractions in the Skopje urban region is 835 with an overall average of 2.77.

CONCLUDING

In all planning regions, 162 natural and anthropogenic attractions (49 natural and 113 anthropogenic) have the highest values from 3 to 2.7. The South-West region has the most of these attractions, with a total of 32 attractions (10 natural and 22 anthropogenic), The Skopje region has 27 attractions (7 natural and 20 anthropogenic), Veles 22 (6 natural and 16 anthropogenic), Southeast 18 (8 natural and 10 anthropogenic), Polog 16 (5 natural and 11 anthropogenic) and Northeast with 12 (4 natural and 8 anthropogenic).

Table No. 18 shows that the Southwest region has the largest number and highest average value of attractiveness with 2.70, followed by Skopje with 2.65, Pelagonia with 2.60, Veles with 2.58, Southeast with 2.57, etc.

In general, the regional valorization of tourism potentials in the Republic of Macedonia has an average value of 2.54 (natural 2.47 and anthropogenic 2.62). This means that natural and anthropogenic attractions have resources that are underutilized in terms of tourism.

We appreciate that by valuing part of the tourism resources, we are taking a step forward in recognizing and supporting tourist attractions as valuable potential for promoting and increasing tourist visits to the R.N. Macedonia.

Table 18.: Number, percentage and average value of attractions by planning regions

Planning region	Numerical value			Percentage value		
	natural	anthropogenic	toral	natural	anthropogenic	Average value
1. Vardar	503	789	1292	2,52	2,64	2,58
2. Eastern	463	762	1225	2,32	2,53	2,42
3. Southwestern	522	839	1361	2,61	2,79	2,70
4. Southeastern	513	776	1289	2,56	2,58	2,57
5. Pelagonia	510	800	1310	2,55	2,66	2,60
6. Polog	489	737	1226	2,44	2,46	2,45
7. Northeastern	455	755	1210	2,27	2,52	2,39
8. Skopje	507	835	1342	2,53	2,77	2,65
Total	3962	6293	10255	2,47	2,62	2,54

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NORMATIVE BELIEFS AS A FACTOR FOR DEVELOPMENT OF THE ENTREPRENEURIAL INITIATIVE AMONG YOUNG PEOPLE

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Abstract In order to find the real essence of youth entrepreneurial behaviour, the paper investigates those determinants that are part of social environment and have the greatest influence on the decision of young people to undertake an entrepreneurial venture. The paper is based on theoretical postulates of the Theory of Planned Behaviour. The conclusions are drawn from the primary data obtained from empirical research conducted in the Republic of North Macedonia among young students aged 18 to 29 years. The findings show that young people recognize *the acceptance of the business community* as the most important factor for an entrepreneurial decision**.**

Key words: youth entrepreneurship, entrepreneurial behaviour, Theory of planned behaviour
JEL Classification: L26, A120

INTRODUCTION

Taking into account that young people according to their age and interests differ from others, it is the interest of each country to identify those factors that motivate them in order to have a positive impact on the economy. The importance of entrepreneurship for the development of the economy is enormous. That is why there are numerous attempts to define entrepreneurship and ways of developing it are constantly sought. Exactly in this context, there are numerous definitions about his essence, contributing factors etc., after all, in general it is usually associated with recognition of business opportunity in environment, risk taking, creativity and innovation, allocation of resources etc. (Agarwal, 2023; Fiti et al, 2007; Serafimovska and Popovski, 2017; Iversen et al., 2008; Casson, 2003)

It is known that entrepreneurship opens up the greatest opportunities for self-employment, which should be recognized by others, especially the youth of a country. It is one of the ways to reduce unemployment, which young people often face after completing their education. If we refer to the fact that unemployment rate among young people in Macedonia in 1-st quarter of 2023 was 25.7 percent for people aged 15-29 and 13.4 percent for people aged 15-64, than the reasons for this situation and the ways can be exceeded deserve attention. (State Statistic Office – Republic of North Macedonia, 2023)

Regarding self-employment, the situation is also alarming! The perception of young people about self-employment is disturbing given the fact that 70,1 percent of young people *against their will* are self-employed. In realty, only three out of ten young people are self-employed, and this decision is a result of their unsuccessful attempt to find a paid job (job for salary). As an essential problem for business owner is financial recourses. 46,8 percent of self-employed people emphasized the financial resources at the start-up phase of business as a challenge. After that the market competition and the regulation follow. (Elder et al., 2013)

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Table 1 - Unemployment at regional level compared to the EU

	2021	***2011-2021***
		High points
EU - 28	***7,1%***	***11,4% (2013)***
Montenegro	***16,6%***	***19,7% (2012)***
North Macedonia	***15,7%***	***31,4 (2011)***
Albania	***11,6%***	***17,5% (2014)***
Serbia	***11,1%***	***24,1 (2012)***
Turkey	***12%***	***13,7% (2019)***
Bosnia and Herzegovina	***17,4%***	***28,2% (2012)***
Kosovo	***20.6 %***	***35,3% (2014)***

Source: Eurostat statistics explained (2023). *Enlargement countries - labour market statistics,* accessed 15.08.2023, available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Enlargement_countries_-_labour_market_statistics#Unemployment_rates

What is the meaning of the entrepreneurship for employment, especially for self-employment is well known. Table 1 shows the challenges faced by Macedonia in terms of unemployment a decade ago and how the efforts to improve the situation progressed compared to the surrounding countries. In fact, the entrepreneurship is the largest provider of employment, as the SME's sector absorbs most of the unemployed through the self-employment opportunities it opens up. On the other hand, the data above shows that it's possible that the young people in Macedonia have not enough awareness about the power of entrepreneurship, either courage, or motivation and the opportunity for self-employment is not the wanted one. It can be seen from the fact even that small part of self-employed are against their will. That's why the research about developing the entrepreneurial attitude among the youth in Macedonia is important. Considering the fact that the social environment, the factors of the environment in which we live play a big role on our attitudes, thoughts, decisions and behavior, it's crucial for state policy to know what are the main factors of social environment, that motivate or inhibit entrepreneurial behavior among young people and their attempts at self-employment. The paper is based on the theoretical postulates of the Theory of Planned Behaviour, especially on the set of determinants that are part of social standards, well known as *normative beliefs.* The remaining two pillars (Behavioral beliefs and Control beliefs) are the subject of separate research.

PLANNING AS A DIMENSION OF ENTREPRENEURIAL BEHAVIOUR

Trying to understand the way and nature of entrepreneurial behaviour, it's natural to look first in the context of general behaviours and the reasons that provoke behavioural diversity in individuals, and then to find the factors that operate within entrepreneurship.

According to Ajzen and Fishbein's theory, human behaviour is guided by three basic determinants classified as: *behavioural beliefs* (which produce favourable/unfavourable attitudes toward behaviour), *normative beliefs* (which result with perceiving of social pressure from the established social standards) and *control beliefs* (which give perceived behavioural control).(Kolvereid & Espen, 2012) If these three segments together lead to the creating of intention for certain behaviour (Ajzen, 2005; Armitage & Christian, 2004; Yanamandra & Indiran, 2023), then in the area of entrepreneurship there are certainly specific elements within the proposed determinants that result exactly in the entrepreneurial type of behaviour.

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Original scientific paper

From general point of view, the defined general determinants of planned behaviour in the area of entrepreneurship generally could be divided into groups that refer to (Weber, 2012):

1. **The first determiner of entrepreneurial behaviour (Behavioural beliefs)** would cover the conclusions and differences arising from subjective perceiving and evaluation of opportunities, or in other words, summarizing the benefits arising from the possibility of owning a business, i.e. self-employed entrepreneur or being employed in an organization.
2. **The second determiner of entrepreneurial behaviour (Normative beliefs)** related to social standards would be the pressure from other people on the entrepreneur on the road to start the entrepreneurial career, i.e. pressure of the environment on making an entrepreneurial decision.
3. **The third determiner of entrepreneurial behaviour (Control beliefs)** contains a subjective assessment of the so-called control factors for starting your own business and its successful realization such as: knowledge, resources etc.

Entrepreneurship can be viewed by different standpoints. The youth is especially interesting to be studied because of the future development of the entrepreneurship. Specifically, the problem we are investigating, i.e. the age group we treat, is covered in the Theory of Planned Behaviour by the additional variables that affect behaviour, among which, in addition to personal dispositions, demographic characteristics were predicted: age and gender of the respondents.

Trying to determinate those factors that affect youth as a group with special interests, lifestyle, worldviews etc. in our research we have singled out the following individual moments typical for young people, and yet within the established determinants of Normative beliefs as a part of Planned Behaviour Theory:

I – Normative beliefs

- Young entrepreneurs are accepted by the business community
- Young entrepreneurs are respected from social environment
- The opinion of parents and their approval is important for making an entrepreneurial decision for a new business
- The approval from friends is important for new business start
- Starting a business is considered a real opportunity for self-employment
- Risks taking and starting new ideas is considered justified and common
- Positive state's campaign to encourage business

MATERIAL AND METHODS

The aim of this empirical research is to discover the key factors that affect youth entrepreneurial attitude, i.e. to discover those characteristics of social environment that are crucial for youth to make an entrepreneurial decision. Using quantitative research method we collected all required data to make the necessary conclusions. The survey, as a research technique, was applied face to face with respondents. 147 respondents were covered. The research was aimed exclusively at the young population aged 18 to 29 years.

The sample was defined according to the general categorization of young people, but was adapted to the needs of the research and the conditions in Macedonia. The most common definition of "youth" includes young people ages 15 to 24, but this research covers respondents aged 18 to 29 years. Young people over the age of 18 are full of age, can be found registered in the labour market and look appropriate for this research, instead of those under the age of 18. The upper limit was also moved from 24 to 29 years old people, because of the fact that the young people mostly remain in the educational process even after the age of 24. (Elder et al., 2013) The main reason for this is high unemployment rate (especially among young people) and the hope that in education they will get the necessary skills and

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qualifications for easy employment. According to the data from State Statistic Office in Republic of Macedonia (State Statistic Office – Republic of North Macedonia, 2023), in 1-st quarter of 2023 the unemployment rate was 25,7 percent for people aged 15-29 and 13,4 percent for people aged 15-64.

The respondents were students from first and second cycle of studies at Goce Delcev University in the Republic of North Macedonia. Students from all over Macedonia gravitated to this University, but it predominantly covers the main part of this population from the central and eastern part of Macedonia. The respondents were from different faculties and different professional orientation in future.

In terms of demographic characteristics, the study included respondents of different genders and different socio-economic status (employed/unemployed).

It is a simple random sample, which allows evaluation of the characteristics of the entire population to which the sample belongs. The obtained data are analyzed by applying descriptive-analytical methodology which selects the relevant knowledge that gives answer of the essential issue posed in the research. The conclusions are drawn with both, induction and deduction.

Impact of social environment, (so called Normative beliefs as a part of Theory of planned behaviour), was represent as 7 determinates - features of social environment. They described the environment from different point of views, for example: impact of business community, friends, family etc.

Each respondent had an opportunity to choose three most influential determinants, according his own belief. These characteristics are the ones that would have the greatest impact on making decisions about a new entrepreneurial venture.

Figure 1 – Descriptive statistics

Descriptive Statistics

	N	Mean		Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
bizaed21	147	.65986	.039208	.475374	-.682	.200	-1.556	.397
opkruz22	147	.25170	.035917	.435474	1.156	.200	-.673	.397
roditeli23	147	.45578	.041218	.499744	.179	.200	-1.995	.397
prijatel24	147	.17007	.031093	.376977	1.775	.200	1.165	.397
samvrab25	147	.57823	.040871	.495530	-.320	.200	-1.924	.397
voobica26	147	.36735	.039897	.483730	.556	.200	-1.714	.397
kampawa27	147	.51020	.041372	.501605	-.041	.200	-2.026	.397

Source: Analysis of data from own research

From Figure 1, that contains data of Descriptive statistics, it can be seen that of all offered options, the highest value of the mean (0.65986) has the determinant *Acceptance by the business community*, thereupon is *Opportunity for self-employment* (0.57823), *Positive campaign* (0.51020) and so on. Opposite them, the lowest value of mean has *Approval from friends* (0.17007).

Regarding the diversity of answers, the highest value of standard deviation (0.501605) was observed in the determinants *Positive campaign*, and (0.499744) *Parental approval*. The lowest value of the standard deviation was observed in the determinant *Approval from friends* (0.376977).

Data of normal distribution testing can be seen from Figure 2 (Normal distribution data) and Skewness and Kurtosis values Figure 1 (Descriptive statistics). A Skewness/Kurtosis values and values for Shapiro-Wilk's test ($p > .05$), for both males and females show that distribution of data is non-normal. Precisely because of the lack of normal distribution, we were

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limited to use non-parametrical tests to determine the relationships and connection between individual determinants. (Newbold et al., 2007)

Figure 2 – Normal distribution data

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	pol	Statistic	df	Sig.	Statistic	df	Sig.
bizaed21	maz	.396	54	.000	.619	54	.000
	zena	.437	93	.000	.583	93	.000
opkruz22	maz	.471	54	.000	.531	54	.000
	zena	.463	93	.000	.545	93	.000
roditeli23	maz	.358	54	.000	.635	54	.000
	zena	.365	93	.000	.633	93	.000
prijatel24	maz	.462	54	.000	.546	54	.000
	zena	.524	93	.000	.376	93	.000
samvrab25	maz	.368	54	.000	.632	54	.000
	zena	.387	93	.000	.624	93	.000
voobica26	maz	.406	54	.000	.612	54	.000
	zena	.409	93	.000	.610	93	.000
kampawa27	maz	.339	54	.000	.637	54	.000
	zena	.348	93	.000	.636	93	.000

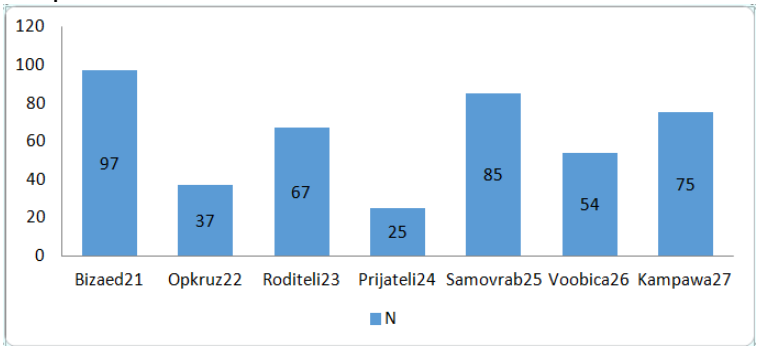
a. Lilliefors Significance Correction

Source: Analysis of data from own research

RESULTS AND DISCUSSION

The processing of the data from the survey showed that the respondents decided mostly on the following determinants: *Acceptance by the business community, Possibility of self-employment and Positive campaign.* (Graph 1). These features show highest frequencies, they stand out from the rest, and they appear to be key in area of normative beliefs.

Graph 1: Results from the research about the determinants of Normative beliefs



Source: Analysis of data from own research

Analysis of the impact of demographic characteristics on preferences

Based on the statistical progressing of the survey data, it was concluded that from all offered determinants *Acceptance by the business community* is considered the most important factor for young people to start a business. Figure 3 shows that with 95% probability, from 65% to 79% of the population consider this determinant as a factor for starting one's own business.

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Original scientific paper

Figure 3 - Confidence interval

One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
bizaed21	16.830	146	.000	.659864	.58237	.73735
opkruz22	7.008	146	.000	.251701	.18072	.32269
roditeli23	11.058	146	.000	.455782	.37432	.53724
prijatel24	5.470	146	.000	.170068	.10862	.23152
samvrab25	14.148	146	.000	.578231	.49746	.65901
voobica26	9.207	146	.000	.367347	.28850	.44620
kampawa27	12.332	146	.000	.510204	.42844	.59197

Source: Analysis of data from own research

Concerning the link between demographic characteristics of the respondents and their thinking, i.e. to determine how much the gender as a demographic factor has an impact on the selection of determinants by respondents, was used Chi-square test for independence. We decided to apply this independence test precisely because of the results of the data obtained from empirical research didn't show normal distribution. (Grubisic, 2004)

Further, we will try to determine the relationship between the determinants selected as the most influential on the one hand, and gender of the respondents on the other. The assertion is set in the form of hypotheses, while the correlation is tested by applying Chi-Square test of independence.

Figure 4 - Chi square test for independence for H_1

bizaed21 * pol

Crosstab

Count

		pol		
		maz	zena	Total
bizaed21	ne	21	29	50
	da	33	64	97
Total		54	93	147

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.904[a]	1	.342		
Continuity Correction[b]	.593	1	.441		
Likelihood Ratio	.897	1	.344		
Fisher's Exact Test				.370	.220
Linear-by-Linear Association	.898	1	.343		
N of Valid Cases	147				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 18.37.

b. Computed only for a 2x2 table

Source: Analysis of data from own research

H_1 - There is no dependence between the gender of the respondents and the opinion that *the acceptance of young entrepreneurs by the business community* is important for starting own business.

From the conducted Chi-square test of independence (Figure 4) is obtained the value X^2=0.904 at level of 1 degree of freedom and the value of p=0.342 (probability level 0.900-0.100)

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Original scientific paper

Because 0.904<3.85 the **hypothesis H_1 is accepted. It can be concluded that there is no dependence between the gender of the respondents and the opinion that *the acceptance of young entrepreneurs by the business community* is important for starting own business.**

Figure 5 - Chi square test for independence for H_2

samvrab25 * pol

Crosstab

Count

		pol		
		maz	zena	Total
samvrab25	ne	24	38	62
	da	30	55	85
Total		54	93	147

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.180[a]	1	.671		
Continuity Correction[b]	.063	1	.802		
Likelihood Ratio	.180	1	.672		
Fisher's Exact Test				.730	.400
Linear-by-Linear Association	.179	1	.672		
N of Valid Cases	147				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 22.78.

b. Computed only for a 2x2 table

Source: Analysis of data from own research

H_2 - There is no dependence between the gender of the respondents and the opinion that *the Opportunity for self-employment* is a motivator for starting own business.

From the conducted Chi-square test of independence (Figure 5) is obtained the value X^2=0.180 at level of 1 degree of freedom and the value of p=0.671 (probability level 0.900-0.100)

Because 0.180<3.85 the **hypothesis H_2 is accepted. It can be concluded that there is no dependence between the gender of the respondents and the opinion that the *Opportunity for self-employment* is a motivator for starting own business.**

Figure 6 - Chi square test for independence for H_3

kampawa27 * pol

Crosstab

Count

		pol		
		maz	zena	Total
kampawa27	ne	27	45	72
	da	27	48	75
Total		54	93	147

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.036[a]	1	.850		
Continuity Correction[b]	.000	1	.986		
Likelihood Ratio	.036	1	.850		
Fisher's Exact Test				.866	.493
Linear-by-Linear Association	.035	1	.851		
N of Valid Cases	147				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 26.45.

b. Computed only for a 2x2 table

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Original scientific paper

Source: Analysis of data from own research

H_3 - There is no dependence between the gender of the respondents and the opinion that *the Positive state's campaign for business encouraging* is a motivator for starting own business.

From the conducted Chi-square test of independence (Figure 6) is obtained the value X^2=0.036 at level of 1 degree of freedom and the value of p=0.850 (probability level 0.900-0.100)

Because 0.036<3.85 the **hypothesis H_3 is accepted. It can be concluded that there is no dependence between the gender of the respondents and the opinion that *the Positive state's campaign for business encouraging* is a motivator for starting own business.**

CONCLUDING REMARKS

In an attempt to determine the basic factors that influence the formation of the intention for youth entrepreneurial behaviour, we referred to Theory of Planned Behaviour. According this theory, people usually behave in accordance with conclusions drawn from the available information. Thus, the intentions and behaviour are function of three basic determinants, i.e. information that is extracted firstly from *the personal nature* of individual, then reflection of *the social impact* and *the control issue*. In the aim of this research, we identify only those determinants that are part of the social environment and according to the respondents' responses, have the greatest impact on building an entrepreneurial attitude. This includes the attitudes, opinion and acceptance of young entrepreneurs by friends, family, the business community, the attitudes of the general environment on certain issues related to business, etc.

The results of the research showed that the determinant *Acceptance of new entrepreneurs by the business community* has a higher frequency in the answers of all offered determinants.

This influence of the wider environment, social norms and pressures, in the research were covered by the determinants categorized as normative beliefs. From them it can be noticed that the *business community and its relation* are important factor that can discourage or encourage young entrepreneurs to start their own business. The perception that entrepreneurship is an excellent *opportunity for self-employment* is one more reason that contributes to the strengthening the entrepreneurial attitude which is further developed with the help of positive business campaigns. *A positive business campaign* is recognized as a relevant and important factor that can contribute to changing of young people's awareness and it should be used to stimulate entrepreneurial mood in society.

The results of the research showed that when it comes to making a business decision, influence of the immediate environment (relatives, friends), their attitudes and thoughts are less important. What stimulate the entrepreneurial spirit of young people are general conditions in society, the opportunities it provides and the business community.

What is also important and is part of additional variables that can have an impact on the selection of answers and result of research is gender of the respondents. Gender as a demographic characteristic can have an impact on respondent's preferences precisely because of the differences in thoughts, ambitions and necessities that may arise from the two different sexes. We considered it important to check the connection of the prominent priorities with the gender of respondents. The analysis of the data showed that there is generally no connection between these two categories. Specifically, the preferences regarding the motives for doing business are experienced equally by both, men and women.

The results obtained from the research have significant social implications, because the priorities selected by young people are part of the social environment. In order to achieve significant progress in the field of youth entrepreneurship this knowledge should be

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Original scientific paper

implemented in the field of economics and public policies. Exactly perceptions of the certain categories of people (business environment, wider environment, friends, etc.) participate in building of general mood that influences the entrepreneurial attitude of young people. In this, great part takes mechanisms for building of public opinion which must be aimed at encouraging young people to think independently, creatively and entrepreneurially, to build their own vision and to realize it.

Certainly, the initiative of the youth should be supported by a set of quality economic measures, permanent improvement of the economic policy of the country and provision of necessary resources for successful realization of the entrepreneurial ideas.

There is also the issue of the unemployment rate in the country. If we take into account the youth unemployment rate (as we have seen before the rate is quite high), the reasons for unemployment, the attitude of young people towards self-employment as a form of employment and their willingness to start up their own business, etc. the results of this research are significant in many ways. They can be used in a way to raise awareness among young people about the importance of entrepreneurship, the opportunities it opens up and the solutions it can provide.

The paper is significant not only for the results presented in the conclusion, but also for the opportunities it opens for future research. How much does the state meet the expectation of the youth in terms of the priorities set by this research, what are the relationships in the business communities, what forms of association, communication and support are applied, how can they be improved, what is the perception of their current quality, the conditions for doing business in the country, etc. are just some of the questions that may be part of the future researches. There is also an opportunity for comparative research on how the priorities set by youth in role of entrepreneurs in developing economy differ from the priorities of the young people in developed country. All this leave enough space for revealing the weaknesses of the economic policies in the Republic of North Macedonia and an opportunity for their improvement.

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OPTIMAL TAXATION IN BEN-PORATH MODEL

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Abstract

This paper is about Ben-Porath model of human capital investments and non-trivial labor supply decisions throughout the lifetime of the individual. In Ben-Porath model without taxation: The time allocation condition ensures optimal trade-offs between leisure, work, and investment in human capital. Shadow price of human capital is increasing over time. In Ben-Porath-Huggett model Mirrlees taxation is the best option when skill is private knowledge, Ramsey taxation requires subsidies to prevent human capital stagnation. Pareto taxation is the second-best solution when redistribution is a goal. Ramsey taxation yields highest government revenues, Mirrlees and Pareto taxes yield highest utility.

Keywords: human capital investments, Mirrlees, Pareto, Ramsey, incomplete markets

JEL codes: J24, H21

Introduction

The process of human capital acquisition has been studied in an economic literature, starting with Becker(1964), Ben-Porath (1967), and Heckman (1976). This paper will focus on Ben-Porath (1967) model where the principal analytical assumption in this paper is that human capital operates like Harrod neutral[1] endogenous technical progress in augmenting time. On the other hand optimal taxation literature since Mirrlees(1971) and later developed by Saez,E.(2001), Kocherlakota (2005), Albanesi and Sleet (2006), Golosov, Tsyvinski, and Werning (2006), Battaglini and Coate (2008) , Farhi,Werning (2013), Golosov, Troshkin, and Tsyvinski (2013) typically assumes exogenous ability, thus abstracting from endogenous human capital investments, see Stantcheva (2017). Bovenberg and Jacobs (2005) and Stantcheva (2017) have extended the optimal taxation jointly with educational policies that considered educational decisions. Since Mirrlees(1971),optimal tax theory mostly has worked with a static model that treats heterogeneity of economic agents and uncertainty symmetrically, since redistribution can be seen as insurance behind the veil of ignorance, see Farhi,Werning (2013).Conventional wisdom in the human capital literature (at least by Ben-Porath (1967),suggests that income taxes do encourage human capital accumulation. Heckman (1976) challenged previous view stating that income tax depresses interest rate and

[1] Harrod-neutral technical change (also called labor-augmenting technical change) refers to a form of technological progress that increases the productivity of labor without affecting the marginal productivity of capital.Here $Y = K^{\alpha}(A_L L)^{1-\alpha}$ where $A_L(t) = A_{L0}e^{gt}$,where g is the growth rate of labor augmenting technology. The human capital accumulation equation now becomes:$\dot{h}(t) = A_L(t) \cdot f\big(e(t), h(t)\big)$ which implies that human capital grows faster over time due to exogenous labor-augmenting technology growth.

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lowers the cost of borrowing, and because forgone earnings[2] "cost of investment may be written off when incurred, higher tax rates encourage human capital investments. On contrary a study by Trostel (1993) the study found a significant negative effect of proportional income taxation on human capital. Previous research has indicated that human capital is an important component of national wealth (see Davies,J. Whalley,J.(1991) study that suggested that stock of human capital is as three times higher than a stock of physical capital). Solow's (1956) seminal paper suggested that differences in the rates at which capital is accumulated could account for differences in output per capita. In Lucas (1988), human capital disparities were given a central role in the analysis of growth and development[3].According to Stantcheva (2017) there is two way interaction between human capital and the tax system. First, investments in human capital are influenced by tax policy which was previously recognized by Schultz(1961)[4].Taxation on labor income discourages investment in human capital by capturing part of the return to human capital but it also helps reducing the earning risk by insuring against it, thereby encouraging investment in risky human capital. Capital taxes are affecting the choice between physical and human capital. Either way investment inhuman capital affect directly tax base. Consumption taxes have an ambiguous effect: Can reduce investment if education is taxed but may encourage savings[5].Ramsey taxes effect on human capital accumulation is likely favorable[6].Also, according to Reis (2019) result which also is a common sense in accordance with Atkinson-Stiglitz theorem (see Atkinson,Stglitz (1976)) : In a Ramsey model of optimal taxation, if human capital investment can be observed separately from consumption, it is optimal not to distort human or physical capital accumulation in the long run, and only labor income taxes should be used. Jones et al. (1997) and Judd (1999) showed that "if the government can distinguish between pure consumption and human capital investment, then it can use this information to offset the distortion that labour taxation causes on human capital accumulation" see Reis(2019).Though Reis (2019) article derived that government cannot distinguish between final consumption and expenditures on human capital. So, the tax on consumption must be the same as the tax on human capital, and human capital accumulation will in general be distorted in the long run. The effect of having unobservable investment in human capital in heterogeneous agents' models has been discussed by Kapička (2006) and Kapička (2015).First paper shows that Kapička (2006) shows that the optimal income tax is significantly reduced when there is endogenous unobservable human capital[7].Kapička (2015) proves that if both ability and human capital

[2] Foregone earnings are potential earnings that could've been achieved but are absent due to charged fees, expenses, or lost time

[3] Klenow and Rodríguez-Clare (1997); Hall and Jones (1999); Parente and Prescott (2000); and Bils and Klenow (2000) argue that most of the cross-country differences in output per worker are not driven by differences in human capital (or physical capital); rather they are due to differences in a residual, total factor productivity (TFP),see also Manuelli, R. E., & Seshadri, A. (2014).

[4] Our tax laws everywhere discriminate against human capital. Although the stock of such capital has become large and even though it is obvious that human capital, like other forms of reproducible capital, depreciates, becomes obsolete and entails maintenance, our tax laws are all but blind on these matters,see Schultz (1961).

[5] Substitution Effect: Since a consumption tax discourages current consumption, households might save more. If the return to savings includes human capital investment (e.g., education, training), consumption taxes could increase human capital accumulation.Income Effect: Higher consumption taxes reduce disposable income, making education and training more expensive in real terms, which may reduce human capital investment.Intertemporal Trade-offs: If future consumption is also taxed, individuals may shift their income toward untaxed or lower-taxed investments, possibly reducing incentives to invest in human capital if wages are highly taxed.

[6] Minimizes distortions, often favoring lower taxes on human capital. Ramsey taxation might prefer higher capital or consumption taxes over direct human capital taxation, assuming labor supply and education investment are more responsive to tax policy.If labor and capital are complements in production, taxing capital (or consumption) too heavily can still reduce human capital investment indirectly

[7] Labor tax also taxes human capital this makes tax more distortionary thus reducing optimal tax.

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investment are non-observable, the optimal tax rates decrease with age, contrary to what happens if human capital is observable. Jacobs and Bovenberg (2010) discuss how a positive tax on capital income may alleviate the distortions of the labor tax on human capital accumulation in a two-period life-cycle model. Stantcheva (2015), discuss the features of the optimal subsidy for human capital expenses when these are observable. In the dynamic life cycle model by Stantcheva (2015),,there is an additional interaction between contemporaneous training and future labor supply, which is the mirror image of the interaction with the contemporaneous labor supply. This paper will draw on the theory of human capital acquisition provided in Ben-Porath (1967), and will investigate the effects of taxes human capital accumulation.

Ben-Porath model

The Ben-Porath (1967) model is a structural model of investment on the job. The model is setup as follows:Finite lived to time T,continuous time,interest rate r,earnings $E(t)$.So, people make human capital investment decisions to maximize the present value of income

equation 1

$$\int_0^T e^{-rt}E(t)dt$$

We assume that earnings take the form:

equation 2

$$E(t) = H(t)\,[1 - I(t)] - D(t)$$

$I(t)$: time spent investing in human capital $H(t)$: Human capital itself $D(t)$: Direct costs of human capital investment. Thus, the present value of earnings can be written as:

equation 3

$$\int_0^T e^{-rt}(H(t)[1 - I(t)] - D(t))$$

The human capital production function is defined as

equation 4

$$\dot{H} = A(IH)^{\alpha}\ D^{\beta} - \sigma H$$

where σ is the rate of depreciation in human capital. The one other thing we need to solve this model is the initial level of human capital $H(0)$. Now we can write down the Hamiltonian as

equation 5

$$\mathcal{H} = e^{-rt}\left(H(t)[1 - I(t)] - D(t)\right) + \mu(t)\left[A(IH)^{\alpha}\ D^{\beta} - \sigma H\right]$$

FOCs:

equation 6

$$I: e^{-rt}H = \mu\alpha AI^{\alpha-1}H^{\alpha}D^{\beta}$$
$$D: e^{-rt} = \mu\beta A(IH)^{\alpha}D^{\beta-1}$$
$$\dot{\mu} = -\frac{\partial\mathcal{H}}{\partial H} = -e^{-rt}(1-I) - \mu\left[\alpha AI^{\alpha}H^{\alpha-1}D^{\beta} - \sigma\right]$$

Take the ratio of the first two first order conditions:

equation 7

$$H = \frac{\mu\alpha AI^{\alpha-1}H^{\alpha}D^{\beta}}{\mu\beta A(IH)^{\alpha}D^{\beta-1}} = \frac{\alpha D}{\beta I} \rightarrow D = \frac{\beta}{\alpha}IH$$

Since direct costs of investment D are just a multiple of time costs IH, the distinction between the two is not interesting (of course with borrowing constraints this would no longer be true).That is we can redefine the model so that:

equation 8

$$I^{*} = \left(1 + \frac{\beta}{\alpha}\right)I;\ \alpha^{*} = \alpha + \beta$$

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$$A^* = A\left(\frac{\beta}{\alpha}\right)^{\beta}\left(\frac{\alpha}{\alpha+\beta}\right)^{\alpha+\beta}$$

With this notation we can see that:

equation 9

$$A^*(I^*H)^{a^*} = A\left(\frac{\beta}{\alpha}\right)^{\beta}\left(\frac{\alpha}{\alpha+\beta}\right)^{\alpha+\beta}\left(\left(1+\frac{\beta}{\alpha}\right)IH\right)^{\alpha+\beta}$$

$$= A\left(\frac{\beta}{\alpha}\right)^{\beta}(IH)^{\alpha+\beta}$$

$$= A(IH)^{\alpha}\left(\frac{\beta}{\alpha}IH\right)^{\beta} = A(IH)^{\alpha}(D)^{\beta}$$

Thus there is no need to worry about D Lets abstract from it by using the redefined model (without the * notation). Then we have first order conditions:

equation 10

$$e^{-rt} = \mu\alpha A I^{\alpha-1}H^{\alpha-1}$$

$$\dot{\mu} = -e^{-rt}(1-I) - \mu\left[\alpha A I^{\alpha}H^{\alpha-1}D^{\beta} - \sigma\right] = -e^{-rt} + \sigma\mu + I\left[e^{-rt} - \mu\alpha A I^{\alpha-1}H^{\alpha-1}\right]$$
$$= -e^{-rt} + \sigma\mu$$

Define:

equation 11

$$g(t) = e^{rt}\mu$$

Then:

equation 12

$$\frac{\partial g}{\partial t} = re^{rt}\mu + e^{rt}\mu = re^{rt}\mu - 1 + e^{rt}\sigma\mu = (r+\sigma)g - 1$$

We want to solve for this differential equation, but we don't know $g(0)$. However, we do know that $\mu(T) = 0$ which implies that $g(T) = 0$ .This is straight forward to solve, it yields:$g(T) = 0$;$g(t)$ is strictly decreasing with t.From the first order condition for investment:

equation 13

$$I(t)H(t) = \left(\alpha A g(t)\right)^{\frac{1}{1-\alpha}} \Rightarrow I(t) = \frac{\left(\alpha A g(t)\right)^{\frac{1}{1-\alpha}}}{H(t)}$$

investment IH, is decreasing with t :IH doesn't depend on $H(0)$ (Ben-Porath neutrality), Investment is decreasing with H What happens to $H(t)$ depends on investment versus depreciation. It makes sense to impose that Investment time is bounded from above by 1

Agents' Objective

Agents maximize their lifetime utility:

equation 14

$$U = \int_0^T e^{-\rho t}\, u\big(c(t), l(t)\big)dt$$

$c(t)$ consumption at time t,$l(t)$: leisure at time t,$u(c,l)$ instantaneous utility function $u(c,l) = \frac{c^{1-\sigma}}{1-\sigma} + v(l)$,$\rho$: subjective discount rate ,T; time horizon .

Human Capital Dynamics

Human capital $h(t)$ evolves according to:

equation 15

$$\dot{h}(t)f\big(h(t), s(t)\big)$$

$\dot{h}(t)$ is the rate of human capital accumulation;$f(h(s)$ production function for human capital;$s(t)$ time spent investing in human capital ;$h(t)$ current level of human capital.

Agents face a budget constraint:

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$$c(t) \leq w(t)h(t)\big(1 - s(t) - l(t)\big)$$

Where: $w(t)$ is wage rate per unit of human capital

Time Constraint

The time allocation constraint is:

equation 16

$$s(t) + l(t) + n(t) = 1$$

Where $n(t)$ is time spent working.

2. Formulating the Optimization Problem

The problem is to choose $c(t), l(t), n(t)$;Human Capital Dynamics $\dot{h}(t)f\big(h(t), s(t)\big)$; Budget constraint:$c(t) = w(t)h(t)n(t)$;Time constraint: $s(t) + l(t) + n(t) = 1$;Initial human capital: $h(0) = h_0$.

Lagrangian Formulation

The Lagrangian is:

equation 17

$$\mathcal{L} = \int_0^T e^{-\rho t} u\big(c(t), l(t)\big)dt + \int_0^T \lambda(t)\big[fh(t), s(t) - \dot{h}(t)\big]dt$$

Where $\lambda(t)$ is a costate variable (shadow price of human capital).

3. First-Order Conditions

Differentiating the Lagrangian with respect to the control variables $c(t), s(t), l(t)$ and state variable $h(t)$ gives the following FOCs : Consumption Euler equation: $\frac{\partial U}{\partial c} = \lambda(t)h(t)w(t)$;Leisure :$\frac{\partial u}{\partial l} = \lambda(t)h(t)w(t)$;Human capital investment:$\lambda(t)\frac{\partial f}{\partial s} = w(t)h(t)\lambda(t)$;Costate Equation:$\dot{\lambda}(t) = \rho\lambda(t) - \lambda(t)\frac{\partial f}{\partial h}$;Transversality Condition:$\lambda(T)h(T) = 0$.

Demand price for human capital in Ben-Porath (1967) is given as:

equation 18

$$P_t = a_0 \int_t^T e^{-(r+\delta)v} dv = \frac{a_0}{r+\delta}\big[1 - e^{-(r+\delta)(T-t)}\big]$$

Where $a_0 = \frac{Y_t}{K_t}$, here K_t is human capital,Y_t is maximum services of human capital the individual can offer at market valued by rental a_0.Discounted shadow price of human capital q is given as:

equation 19

$$\dot{q} = -\frac{\partial H}{\partial K} = -e^{-rt}(1 - s)a_0 - q\left(\beta_1 \frac{Q}{K} - \delta\right)$$

In previous s_t is the fraction of the available stock of human capital allocated to the production of human capital,δ is exogenously given rate of deterioration,Q is the flow of human capital produced and:

equation 20

$$Q = \beta_0 (s_t, K_t)^{\beta_1} D_t^{\beta_2}$$

Where $\beta_1, \beta_2 > 0, \beta_1 + \beta_2 < 1$,D is the quantity of purchased input. The objective of each individual is to maximize the present value of his disposable earnings:

equation 21

$$W = \int_t^T e^{-rv}[a_o K(v) - I(v)]dv$$

$I(v)$ are the investment costs. And investment costs with two components are given as:

equation 22

$$I_t = a_0 s_t K_t + P_d D_t$$

P_d is the price of purchased inputs,D_t is the quantity of purchased inputs.

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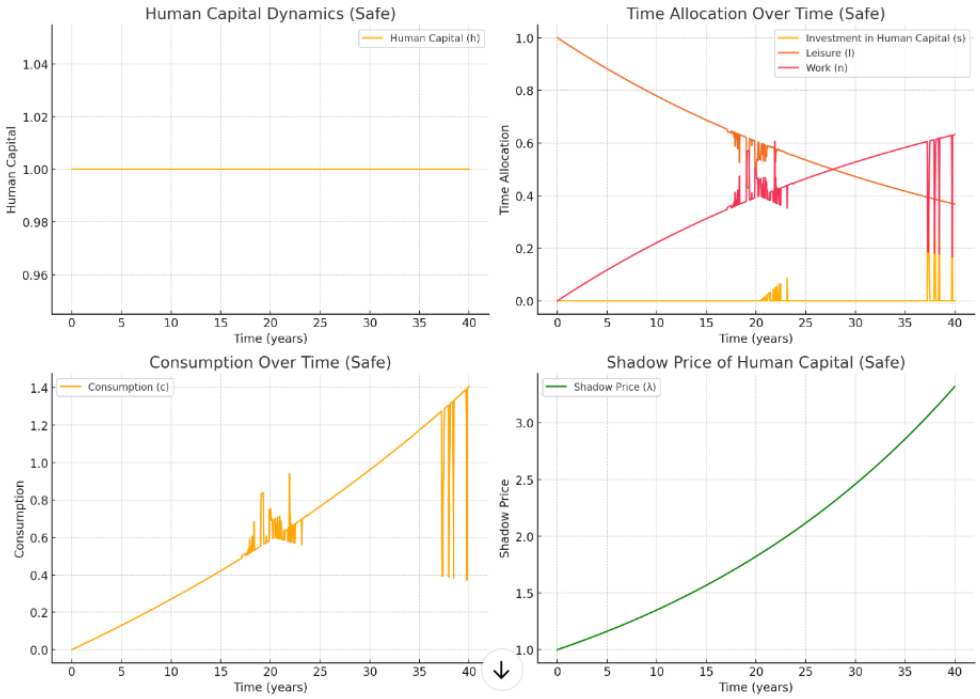

Figure 1Ben-Porath model source:Author's own calculation

From previous plots: The Euler equation balances the marginal utility of consumption with the shadow price of income derived from human capital. The costate equation describes how the value of human capital evolves over time, incorporating the discount rate and productivity. The time allocation condition ensures optimal trade-offs between leisure, work, and investment in human capital. Shadow price of human capital is increasing[8], it means that the economic value of acquiring additional skills, education, or experience grows as time progresses.

Separation theorem

Features of this theorem are:

- ✓ Partial equilibrium schooling decisions.
- ✓ Continuous time.
- ✓ Schooling decision of a single individual facing exogenously given prices for
- ✓ human capital.
- ✓ Perfect capital markets.

Theorem 1 Separation theorem: with perfect capital markets, schooling decisions will maximize the net present discounted value of wages of the individual.

Suppose $u(\cdot)$ is strictly increasing. Then the sequence $\left[\hat{c}(t), \hat{s}(t), \hat{h}(t)_{t=0}^{T}\right]$ is a solution t the maximization of

equation 23

$$max \int_0^T \exp(-(\rho + v)t)u\big(c(t)\big)dt$$

Where discount rate $\rho > 0$ and a constant flow of death $v \geq 0$ $u(c)$ is instantaneous utility and T is planning horizon $T = \infty$ is allowed. Capital markets are perfect. Previous maximization is subject to :

Evolution of human capital:

equation 24

$$\dot{h} = G\big(t, h(t), s(t)\big)$$

[8] It means that the economic value of acquiring additional skills, education, or experience grows as time progresses.

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Original Scientific Paper

And $s(t) \in [0,1]$ so that only full-time schooling would be possible. Exogenous sequence of wage per unit of human capital given by $[w(t)]_{t=0}^{T}$, so that his labor earnings at time t are

equation 25

$$W(t) = w(t)[1 - s(t)][h(t) + \omega(t)]$$

Here $1 - s(t)$ is the fraction of work time and $\omega(t)$ is non-human capital labor, with $[w(t)]_{t=0}^{T}$. Perfect capital markets: borrowing and lending at constant interest rate equal to r

So the life time budget constraint is given as:

equation 26

$$\int_0^T \exp(-rt)c(t)dt \leq \int_0^T \exp(-rt)w(t)[1 - s(t)]\,[h(t) + \omega(t)]dt$$

If and only if $\left[\hat{s}(t), \hat{h}(t)\right]_{t=0}^{T}$ maximizes:

equation 27

$$\int_0^T \exp(-rt)w(t)[1 - s(t)][h(t) + \omega(t)]dt$$

Subject to $\dot{h} = G\big(t, h(t), s(t)\big)$ and $s(t) \in \mathcal{S}(t) \subset [0,1]$ and $[\hat{c}(t)]_{t=0}^{T}$ maximizes $max \int_0^T \exp(-(\rho + v)t)u\big(c(t)\big)dt$ subject to $\int_0^T \exp(-rt)c(t)dt \leq \int_0^T \exp(-rt)w(t)[1 - s(t)]\,[h(t) + \omega(t)]dt$ given $\left[\hat{s}(t), \hat{h}(t)\right]_{t=0}^{T}$. That is, human capital accumulation and supply decisions can be separated from consumption decisions.

Proof:

The consumption problem is:$max \int_0^T e^{-(\rho+v)t}u\big(c(t)\big)dt$ s.t.

inequality 1

$$\int_0^T e^{-rt}c(t)dt \leq \int_0^T e^{-rt}w(t)(1 - s(t)[h(T) + w(t)]dt$$

Human capital and labor supply problem:

equation 28

$$\max \int_0^T e^{-rt}w(t)(1 - s(t)[h(T) + w(t)]dt$$

subject to the human capital accumulation constraint:

equation 29

$$\dot{h} = G\big(t, h(t), s(t)\big), s(t) \in S(t) \subset [0,1]$$

Hamiltonian for Human Capital and Labor Supply

Define the Hamiltonian for the human capital accumulation problem:

equation 30

$$\mathcal{H}_h = e^{-rt}w(t)(1 - s(t)[h + w] + \lambda G(t, h, s)$$

where λ is the costate variable associated with human capital.

The necessary first-order conditions (FOCs) for optimal human capital accumulation and labor supply are:

Optimality with respect to$s$:

equation 31

$$e^{-rt}w(t)[h + w] + \lambda \frac{\partial G}{\partial s} = 0$$

Rearranging:

equation 32

$$\lambda \frac{\partial G}{\partial s} = e^{-rt}w(t)[h + w]$$

Costate equation for human capital:

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Original Scientific Paper

equation 33

$$\dot{\lambda} = r\lambda - e^{-rt}w(t)(1-s)$$

These equations determine the optimal path of human capital $h(t)$ and labor supply $s(t)$ independently of consumption decisions.

Consumption Optimization

For consumption, we use the budget constraint:

equation 34

$$\int_0^T e^{-rt}c(t)dt = \int_0^T e^{-rt}w(t)(1-s(t)[h(T)+w(t)]dt$$

Define the Lagrangian for the consumption problem with a multiplier μ:

equation 35

$$\mathcal{L}_c = \int_0^T e^{-(\rho+v)t}uc(t)dt + \mu\left(\int_0^T e^{-rt}w(t)(1-s(t)[h(T)+w(t)]dt - \int_0^T e^{-rt}cdt\right)$$

FOC for c is:

equation 36

$$e^{-(\rho+v)t}u'c - \mu e^{-rt} = 0$$

Rearranging :

equation 37

$$u'c = \mu e^{(r-\rho-v)t}$$

This equation determines optimal consumption $c(t)$ independently of human capital and labor supply.■

Separation theorem II

Setup:

equation 38

$$\max \int_0^T e^{-(\rho+v)t}u\big(c(t)\big)dt$$

s.t.

evolution of human capital

equation 39

$$\dot{h}(t) = G(t, h(t), s, (t))$$

$h(t)$ is human capital,$s(t) \in [0,1]$ is the fraction of time allocated to schooling, ad $G(\cdot)$ is a human capital accumulation function.

Lifetime budget constraint is :

equation 40

$$\int_0^T \exp(-rt)c(t)dt \leq \int_0^T \exp(-rt)w(t)[1-s(t)]\,[h(t)+\omega(t)]dt$$

Sub-problem of human capital :

equation 41

$$\max \int_0^T e^{-rt}w(t)[1-s(t)][h(t)+\omega(t)]dt$$

s.t.

evolution of human capital:

equation 42

$$\dot{h} = G\big(t, h(t), s(t)\big)$$
$$s(t) \in [0,1]$$

Sub-problem for consumption

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Original Scientific Paper

equation 43

$$\max \int_0^T \int_0^T e^{-(\rho+v)t} u\big(c(t)\big) dt$$

s.t. lifetime budget constraint:

equation 44

$$\int_0^T \mathrm{e}^{-rt}\ c(t)dt \leq \int_0^T \mathrm{e}^{-rt}\, w(t)[1-s(t)]\,[h(t)+\omega(t)]dt$$

Where $s(t)$ and $h(t)$ are given by the evolution of human capital maximization problem.

Proof:

Lagrangian for the combined problem is :

equation 45

$$\mathcal{L} = \int_0^T e^{(-\rho+v)t} u\big(c(t)\big)dt - \lambda\left[\int_0^T e^{-rt}c(t)dt - \int_0^T e^{-rt}w(t)[1-s(t)][h(t)+\omega(t)dt\,]\right]$$

FOCs:

Consumption $c(t)$ from the Lagrangian:

equation 46

$$\frac{\partial \mathcal{L}}{\partial\big(c(t)\big)} = e^{(-\rho+v)t} u'\big(c(t)\big) - \lambda e^{-rt} = 0$$

$$\Rightarrow u'\big(c(t)\big) = \lambda e^{-(r-\rho-v)t}$$

This Euler eq. shows that $c(t)$ depends on ρ, v, r and λ and not on $s(t) \vee h(t)$

Time allocation $s(t)$ from the human capital sub-problem :

equation 47

$$\frac{\partial}{\partial\big(s(t)\big)}\left[e^{-rt}w(t)[1-s(t)][h(t)+\omega(t)dt\,]\right] = -e^{-rt}w(t)[h(t)+\omega(t)] + \frac{\partial G\big(t,h(t),s(t)\big)}{\partial s(t)} = 0$$

This determines $s(t)$,the fraction of time allocated to schooling, independently of $c(t)$

Human capital $h(t)$ the evolution of $h(t)$ is determined by :

equation 48

$$\dot{h}(t) = G\big(t,h(t),s(t)\big)$$

1. The **consumption problem** involves maximizing utility given a lifetime budget constraint. This budget constraint is determined by the optimal paths of $s(t)$ and $h(t)$, but the optimization itself does not influence those paths.
2. The **human capital and time allocation problem** involves maximizing lifetime earnings, independent of how those earnings are allocated to consumption.

Thus, the two problems are independent and separable under perfect capital markets.■

Some theory behind Pareto efficient taxation (due to Werning (2007)) [9]

Now, let ε_w^* represents the compensated elasticity of labor supply with respect to real wage.

Distribution of income is given as:

equation 49

$$h(w) = k(w)^{-k-1}\underline{w}\,k \; for\; w \geq \underline{w} \; and \; k > 0$$

[9] See also lecture notes by Prof. James Poterba, Prof. Iván Werning: https://ocw.mit.edu/courses/14-471-public-economics-i-fall-2012/

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linear flat tax rate would be : $t(w) = t + \tau(w)$ .Where τ represents marginal tax rate and intercept t.Here we assume that ε_w^* [10]does not vary across individuals. This will be true in the case of this utility function[11]:

equation 50

$$u(c, w, \theta) = c - w\theta^{\alpha}$$

Now, starting from a general test for Pareto efficiency we will derive inequality for τ, ε_w^*, k. The starting point here is this inequality which states that marginal tax rate must be lower than 100% :

inequality 2

$$\frac{\tau(\theta)}{1-\tau(\theta)}\frac{\varepsilon_w^*}{\Phi}\left(-\frac{dlog\frac{\tau(\theta)}{1-\tau(\theta)}}{dlogw} - 1 - \frac{dlog\left(\varepsilon_w^*(w)\right)}{dlogw} - \frac{dlog(h^*(w)}{dlogw} - \frac{\partial MRS}{\partial c}w\right) \leq 1$$

the logarithm of Pareto income density is given as: $\log\left(h \cdot (w)\right) = \log\, k - (k\, +\, 1)\log w\, +\, k\log \underline{w}$. First of this log density with respect to income gives:

equation 51

$$\frac{d\log(h^*(w)}{d\log w} = \frac{d(\log\, k - (k+1)\log w + k\log\, \underline{w})}{d\log\, w} = \frac{-(k+1)d\log\, w}{d\log w} = -(k+1)$$

So the first inequality in this part $\frac{\tau(\theta)}{1-\tau(\theta)}\frac{\varepsilon_w^*}{\Phi}\left(-\frac{dlog\frac{\tau(\theta)}{1-\tau(\theta)}}{dlogw} - 1 - \frac{dlog\left(\varepsilon_w^*(w)\right)}{dlogw} - \frac{dlog(h^*(w)}{dlogw} - \frac{\partial MRS}{\partial c}w\right) \leq 1$ would become:

inequality 3

$$\frac{\tau(\theta)}{1-\tau(\theta)}\varepsilon_w^* k \leq 1$$

The parameter k has been estimated by Saez (2001) to be of value 1.6[12]. The thicker the tail of the distribution, the smaller is a.[13] Given that $\Phi(w) = 1 + we_w^*(w)\frac{\tau''(w)}{1-\tau'(w)} > 1$ .Now we have that:

equation 52

$$\frac{dlog(h^*(w)}{dlogw} = \frac{dlog(h^*(w)\Phi(\mathrm{w})^{-1}}{dlogw}$$

Now the upper bound on marginal tax rate is :

equation 53

$$\tau'(\theta) = \frac{1}{\frac{\varepsilon_w^*}{\Phi}\left(-\frac{dlog\frac{\tau(\theta)}{1-\tau(\theta)}}{dlogw} - 1 - \frac{dlog(h^*(w)}{dlogw}\right)}$$

In Werning (2007) the marginal tax rate for the Pareto optimal taxation in dual Mirrlees (1971) optimization problem is:

[10] The compensated elasticity of labor supply with respect to real wage ε_w^* has been estimate approximately to be 0.5 see Gruber, Saez (2002). So that $\frac{1}{\varepsilon_w^*} \in \left[\frac{1}{6}; \frac{10}{3}\right]$ or $\frac{1}{2*3} = \frac{1}{6}$ and $\frac{1}{0.2*1.5} = \frac{10}{3}$

[11] θ represents every individual's characteristics e.g. ability

[12] This value is approx.. for US incomes above 0.3 m.

[13] Pareto distribution is given as PDF lower CDF and upper CDF [13].PDF (probability density function) :$f(x, x_m, \alpha) = \frac{\alpha x_m^{\alpha}}{x^{\alpha+1}}$

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equation 54

$$\tau(\theta) = t'\big(y(\theta)\big) = 1 + \frac{u_y(c(\theta), y(\theta), \theta)}{u_c(c(\theta), y(\theta), \theta)} = 1 - \frac{\theta h'\big(y(\theta)\big)}{u'^{(c(\theta))}} = 1 - e_y(v(\theta), y(\theta), \theta)$$

Preferences are: $u(c, y, \theta) = u(c) - \theta h(y)$,where θ represents the heterogenous disutility from producing output y.Worker's utility $v(\theta)$ is maximized:

$$v(\theta) \equiv \max_y u(y - t(y), y, \theta)$$

$c(\theta) = e(v(\theta), y(\theta), \theta)$ is a consumption function dependent on workers' characteristics, $y(t) = y - t(y)$ and an allocation is resource feasible if :

inequality 4

$$\int \big(y(\theta) - c(\theta)\big) dF(\theta) + e \geq 0$$

Here e is an endowment. The social planner maximizes:

equation 55

$$\max_{\tilde{y},\tilde{v}} \int (\tilde{y}(\theta), -e(\tilde{v}(\theta), \theta) dF(\theta) \text{ s.t.: } \tilde{v}(\theta) = \tilde{v}\big(\tilde{\theta}\,\big) - \int_\theta^{\bar{\theta}} u_\theta(e(\tilde{v}(z), \tilde{y}(z), z)\tilde{y}(z), z\,) dz$$

Constraint in previous is incentive constraint (Incentive compatibility IC), $\tilde{v}\big(\tilde{\theta}\,\big) \geq v(\theta)$ represents individual rationality. Lagrangian function is given as[14]:

$$\mathcal{L} = \int (\tilde{y}(\theta), -e(\tilde{v}(\theta), \theta) dF(\theta) + \int \left(\tilde{v}(\theta) - \tilde{v}(\bar{\theta}) + \int_\theta^{\bar{\theta}} u_\theta(e(\tilde{v}(z), \tilde{y}(z), z)\tilde{y}(z), z\,) dz \right) d\mu(\theta)$$

the FOC for $\tilde{y}(\theta)$ evaluated at $\big(y(\theta), v(\theta)\big)$ gives:

$$(1 - e_y(v(\theta), y(\theta), \theta) f(\theta) = -\mu(U_{\theta_c}(e(v(\theta), y(\theta), \theta) e_v(v(\theta), y(\theta), \theta) + u_{\theta_y}\big(e(v(\theta), y(\theta), \theta)\big)$$

Implying

equation 56

$$\mu(\theta) = \tau(\theta) \frac{f(\theta)}{h'\big(y(\theta)\big)}$$

The integral form of this efficiency condition is given as:

equation 57

$$\frac{\tau'(\theta) f(\theta)}{h' y(\theta)} + \int_\theta^{\bar{\theta}} \frac{1}{u'\left(c(\tilde{\theta})\right)} f\big(\tilde{\theta}\big) d\tilde{\theta} \leq 0$$

Proposition 1 Given the utility function $u(c, y, \theta)$ and a density of skills $f(\theta)$, a differentiable tax function $t(y)$ inducing an allocation .$\big(c(\theta), y(\theta)\big)$ is *Pareto efficient* if and only if condition$\frac{\tau'(\theta) f(\theta)}{h' y(\theta)} + \int_\theta^{\bar{\theta}} \frac{1}{u'\left(c(\tilde{\theta})\right)} f\big(\tilde{\theta}\big) d\tilde{\theta} \leq 0$ holds, where $\tau(\theta) = t'\big(y(\theta)\big)$.

The Pareto distribution had a density that is a power function $g(y) = \mathcal{A} y^{-(\varphi)}$, so that these holds: $\frac{d \log g(y)}{d \log y} = -\varphi$

In $\bar{\tau} \leq \frac{\sigma + \eta - 1}{\varphi + \eta - 2}$ if $\varphi \approx 3$ as per Saez (2001) , then $\sigma < 2$ and σ cannot be interpreted as risk aversion but as control variable[15]

[14] Integrating second term by parts we have: $\mathcal{L} = \int (\tilde{y}(\theta), -e(\tilde{v}(\theta), \theta) dF(\theta) - \tilde{v}(\bar{\theta}) \mu(\bar{\theta}) + \mu(\underline{\theta}) \tilde{v}\big(\underline{\theta}\big) + \int \tilde{v}(\theta) d\mu + \int \mu(\theta) u_\theta\, (\tilde{v}(\theta), \tilde{y}(\theta), \theta) d\theta$

[15] A control variable (or scientific constant) in scientific experimentation is an experimental element which is constant and unchanged throughout the course of the investigation. Control variables could strongly influence experimental results, were they not held constant during the experiment in order to test the relative relationship of the dependent and independent variables. The control variables themselves are not of primary interest to the experimenter.

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Mirrlees optimal taxation (Mirrlees (1971), Diamond (1998)in Ben-Porath economy

The Mirrleesian approach to optimal taxation in a Ben-Porath economy

The Mirrleesian approach to optimal taxation in a Ben-Porath economy involves integrating the theory of optimal income taxation with human capital accumulation dynamics. Here's a step-by-step derivation and setup for the model:

1. Economic Setup

Preferences

Agents have preferences over consumption c and labor supply l:

equation 58

$$U = \int_0^T u(c_t, l_t) e^{-\rho t} dt$$

ρ is discount rate ; $u(c,l) = \frac{c^{1-\sigma}}{1-\sigma} \chi \frac{l^{1+\frac{1}{\eta}}}{1+\frac{1}{\eta}}$ where σ is risk aversion , η is the Frisch elasticity of labor supply, and χ is scaling parameter of disutility of labor.

2.Human Capital

Human capital h_t evolves as:

equation 59

$$\dot{h} = g(h_t, l_t, z_t)$$

z_t : Learning effort (investment in skill development) ;$g(\cdot)$:Ben-Porath production function for human capital

3.Budget constraint

The agent faces:

equation 60

$$c_t + \tau(y_t) = \big(1 - \tau(y_t)\big) y_t$$

equation 61

$$y_t = w_t h_t l_t$$

$\tau(y_t)$: tax schedule

4.Planners problem

The government maximizes social welfare subject to resource constraints and individual optimization:

equation 62

$$\max_{\tau(\cdot)} \int_0^T U(c_t, l_t) f(h_t) dt$$

$f(h_t)$: Distribution of human capital

5.Resource constraint

equation 63

$$\int_0^T c_t f(h_t) dt \leq \int_0^T \tau(y_t) y_t f(h_t) dt$$

6.Incentive compatibility

Agent chooses c_t, l_t, z_t to maximize the utility given $\tau(\cdot)$ considering their human capital dynamics.

7. Characterizing Optimal Taxation

Using the first-order conditions of the agent's problem and the planner's maximization problem:

Optimal Labor Supply:

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equation 64

$$\frac{\partial u/\partial l}{\partial u/\partial c} = \big(1 - \tau'(y_t)\big) w_t h_t$$

Labor supply depends on the marginal tax rate and human capital.

8. Optimal Human Capital Investment:

equation 65

$$\frac{\partial u/\partial c}{\partial g/\partial z} = shadow\ value\ of\ human\ capital\ dynamics.$$

9.Tax Schedule: The Mirrleesian tax schedule balances efficiency and equity:

equation 66

$$\tau'(y_t) = \frac{1 - G(y_t)}{yt\ g(y_t)}$$

10. Including Frisch Elasticity

The Frisch elasticity η directly influences the labor supply response:

equation 67

$$l_t \propto \Big(\big(1 - \tau'(y_t)\big) w_t h_t\Big)^{\eta}$$

In Diamond (1998) , non-linear tax formula is :

equation 68

$$\frac{\tau'(w_n)}{1 - \tau'(w_n)} = \left(1 + \frac{1}{e}\right) \cdot \left(\frac{\int_n^{\infty} (1 - g_m) dF(m)}{n f(n)}\right)$$

Individual n chooses l_n to maximize:

equation 69

$$\max(nl - \tau n(l) - v(l))$$

In previous expression $g_m = \frac{G'(u_m)}{\lambda}$ which is the social welfare on individual m . The formula was derived in Diamond (1998) . If we denote $h(w_n)$ as density of earnings at w_n if the nonlinear tax system were replaced by linearized tax with marginal tax rate $\tau = \tau'(w_n)$ we would have that following equals $h(w_n) dw_n = f(n) dn$ and $f(n) = h(w_n) l_n (1 + e)$,henceforth $n f(n) = w_n h(w_n)(1 + e)$ and we can write previous equation as:

equation 70

$$\frac{\tau'(w_n)}{1 - \tau'(w_n)} = \frac{1}{e} \cdot \left(\frac{\int_n^{\infty} (1 - g_m) dF(m)}{w_n h(w_n)}\right) = \frac{1}{e} \cdot \left(\frac{1 - H(w_n)}{w_n h(w_n)}\right) \cdot \big(1 - G(w_n)\big)$$

In the previous expression $G(w_n) = \int_n^{\infty} \frac{dF(m)}{1 - F(n)}$ is the average social welfare above w_n .If we change variables from $n \to w_n$, we have $G(w_n) = \int_{w_n}^{\infty} \frac{g_m dH(w_m)}{1 - H(w_n)}$, see also Saez, E.,S. Stantcheva (2016).The transversality condition implies $G(w_0 = 0) = 1$.The optimal tax formula can be modified to :

equation 71

$$\frac{\tau'(w_n)}{1 - \tau'(w_n)} = \left(\frac{1 + e^u}{e^c}\right) \cdot \left(\frac{\eta(n)}{n f(n)}\right); \eta(n) = \frac{u'(c(n)\phi(n))}{\lambda}$$

Hamiltonian for previous problem is given as:

equation 72

$$\mathcal{H} = [G(u(n) + \lambda(w(n) - \tilde{c}(\tilde{u}(n), w(n), n)] f(n) + \phi(n) \frac{w(n)}{n^2} v' \left(\frac{w(n)}{n}\right)$$

FOC's are given as:

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Original Scientific Paper

equation 73

$$\frac{\partial \mathcal{H}}{\partial w(n)} = \lambda \left[1 - \frac{v'\left(\frac{w(n)}{n}\right)}{nu'\big(c(n)\big)}\right] f(n) + \frac{\phi(n)}{n^2}\left[v'\left(\frac{w(n)}{n}\right) + \frac{w(n)}{n} v''\left(\frac{w(n)}{n}\right)\right] = 0$$

$$\frac{\partial \mathcal{H}}{\partial u(n)} = \left[G'(u(m) - \frac{\lambda}{u'c(m)}\right] f(n)d = -\phi'(n)$$

Ramsey taxation (due Ramsey (1927))

We consider a Ramsey taxation(Ramsey (1927)) framework within the Ben-Porath (1967) human capital model. The goal is to determine optimal Ramsey taxation of labor income, physical capital, and human capital investment while minimizing distortions to human capital accumulation. An individual maximizes lifetime utility:

equation 74

$$U = \int_0^\infty e^{-\rho t} u(c_t, d_t) dt$$

Where c_t, l_t, ρ are consumption, labor, discount rate respectively,$u(c, l)$ is the standard utility function. Human capital accumulation is:

equation 75

$$\dot{h} = f(h_t, e_t)$$

h_t, e_t are human capital and time spent investing in human capital, $f(h, e)$ is the human capital production function. Budget constraint says income comes from working and renting physical capital:

equation 76

$$\dot{a}_t = (1 - \tau_h) w_t h_t l_t + (1 - \tau_k) r_t a_t - c_t$$

Where $a_t, w_t, r_t, \tau_h, \tau_k$ are [physical capital, wage rate per unit human capital, interest rate, tax on labor income and tax on capital income. The government budget constraint is:

equation 77

$$\tau_h w_t h_t l_t + \tau_k r_t a_t = G_t$$

The Ramsey planner chooses τ_h, τ_k to maximize welfare while satisfying the government budget constraint. FOC's are:

1.Euler equation for consumption $u_c = \lambda$; λ is shadow price of wealth

2.optimal labor supply condition: $u_l = \lambda(1 - \tau_h) w_t h_t$

3. Optimal Capital Accumulation Condition:$\dot{\lambda} = \lambda(\rho - (1 - \tau_k) r_t)$

4. Optimal Human Capital Accumulation:$\frac{\partial f}{\partial e} = \frac{w_t(1-\tau_h)}{1-e_t}$

By differentiating the optimality conditions, we get the Ramsey inverse elasticity rule:

equation 78

$$\frac{\tau_h}{1 - \tau_h} = \frac{\eta_l}{\eta_c}$$

where η_l, η_c are elasticities of labor and consumption respectively. For capital taxation, the standard Chamley-Judd result holds in the long run:$\tau_k \to 0$.

Ben-Porath model and Mirrleesian optimal taxation framework with heterogeneous agents: numerical example

To derive the mathematical model of the Ben-Porath economy in a Mirrleesian optimal taxation framework with heterogeneous agents, let's break it down into steps.In the Ben-Porath model, agents invest in education, which increases their future earnings. The agents' decision about how much to invest in human capital depends on the future returns from education and the taxes they face. The key equations in this model typically include:

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1.The individual's income depends on their human capital h

Agents choose h (education level) to maximize lifetime utility.

The economy features heterogeneous agents, each with different ability levels and initial endowments of human capital.

2. Mirrleesian Optimal Taxation:

In the Mirrleesian model, the government sets a tax schedule $T(y)$, where y is income, to maximize social welfare subject to a budget constraint, while individuals respond to these taxes by choosing their labor supply and educational investment.

3. Mathematical setup

Agent's problem:Each agent maximizes utility $U(c,h)$ where c is consumption and h is the levelfo human capital:

equation 79

$$U(c,h) = \ln(c) - \frac{h^2}{2}$$

Where h is the level of human capital and c is consumption.The income ofan agent is determined by their human capital, so:

equation 80

$y = Ah^{\alpha}$

Where α is constant reflecting the return to human capital and A is productivity

Budget constraint

The agent faces budget constraint :

equation 81

$$c = (1 - \tau(y))\, y$$

Where $\tau(y)$ is a tax rate depending on income.

Agent's Problem (Maximization):

Each agent maximizes:

equation 82

$$\max_h \ln\left(\left(1 - \tau(Ah^{\alpha})\right)Ah^{\alpha}\right) - \frac{h^2}{2}$$

FOC for the optimal h is given as:

equation 83

$$\frac{\partial}{\partial h}\left(\ln(\left(\, 1 - \tau(Ah^{\alpha})\right) - \frac{h^2}{2}\right) = 0$$

Government's Problem (Mirrleesian Taxation):

The government aims to maximize social welfare, subject to the budget constraint. The welfare function is typically a utilitarian function:

equation 84

$$W = \int U(c,h) f(h) dh$$

Where $f(h)$ is the distribution of human capital in the population.The government's constraint is the revenue from taxes:

equation 85

$$\int \tau\,(Ah^{\alpha}) Ah^{\alpha} f(h) dh = G$$

Where G is government spending.

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Table 1 Optimal taxes in Ben-Porath economy

Human Capital (h)	Tax Rate (Mirrlees)	Tax Rate (Pareto)	Tax Rate (Ramsey)	Consumption (Mirrlees)	Consumption (Pareto)	Consumption (Ramsey)	Revenue (Mirrlees)	Revenue (Pareto)	Revenue (Ramsey)	Utility (Mirrlees)	Utility (Pareto)	Utility (Ramsey)
1.00	0.05	0.05	0.15	1.43	1.43	1.27	0.08	0.08	0.23	17.71	17.71	11.92
1.09	0.05	0.05	0.16	1.55	1.55	1.37	0.09	0.09	0.27	21.83	21.82	15.64
1.18	0.06	0.06	0.17	1.67	1.67	1.46	0.10	0.10	0.31	25.62	25.58	19.04
1.27	0.06	0.06	0.18	1.79	1.79	1.56	0.12	0.12	0.35	29.14	29.04	22.15
1.36	0.07	0.07	0.19	1.91	1.91	1.65	0.13	0.14	0.40	32.42	32.25	25.03
1.45	0.07	0.07	0.20	2.03	2.02	1.74	0.15	0.16	0.44	35.49	35.23	27.69
1.55	0.07	0.08	0.21	2.15	2.14	1.83	0.16	0.18	0.49	38.38	38.02	30.18
1.64	0.07	0.08	0.22	2.28	2.25	1.92	0.18	0.20	0.54	41.12	40.63	32.51
1.73	0.07	0.09	0.23	2.40	2.37	2.00	0.19	0.22	0.59	43.71	43.08	34.69
1.82	0.08	0.09	0.24	2.52	2.48	2.09	0.21	0.25	0.64	46.17	45.40	36.75

Source: Author's own calculations

From previous we can see that for different levels of human capital Ramsey tax rates are highest, followed by Pareto marginal tax rates which are like Mirrlees tax rates. Consumption is highest with Mirrlees tax rates similar the one with Pareto taxes, lowest is Ramsey consumption. Ramsey revenues are highest, followed by Pareto revenues and last by Mirrlees. Utility is highest in Mirrlees followed by Pareto utility and Ramsey utility.

Ben-Porath Model: This model typically explains human capital accumulation, where individuals invest in education or training to increase their productivity over time. The economic output depends on their human capital and the returns to investment in it.

Mirrleesian Taxation: The Mirrleesian model of optimal taxation is designed to redistribute wealth in a way that maximizes social welfare, subject to the constraints imposed by individuals' incentive to work and invest in human capital.

Pareto Optimal Taxation: Pareto optimal taxation ensures that the economy reaches an allocation where no one can be made better off without making someone else worse off. This typically involves less progressive taxation than the Mirrleesian model.

Ramsey Taxation: Ramsey taxation aims to minimize the distortionary effects of taxes by taxing goods and income according to their elasticity of demand (less elastic goods should be

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taxed more). In the context of human capital, the tax rate is designed to maximize social welfare without significantly distorting labor supply or human capital accumulation.

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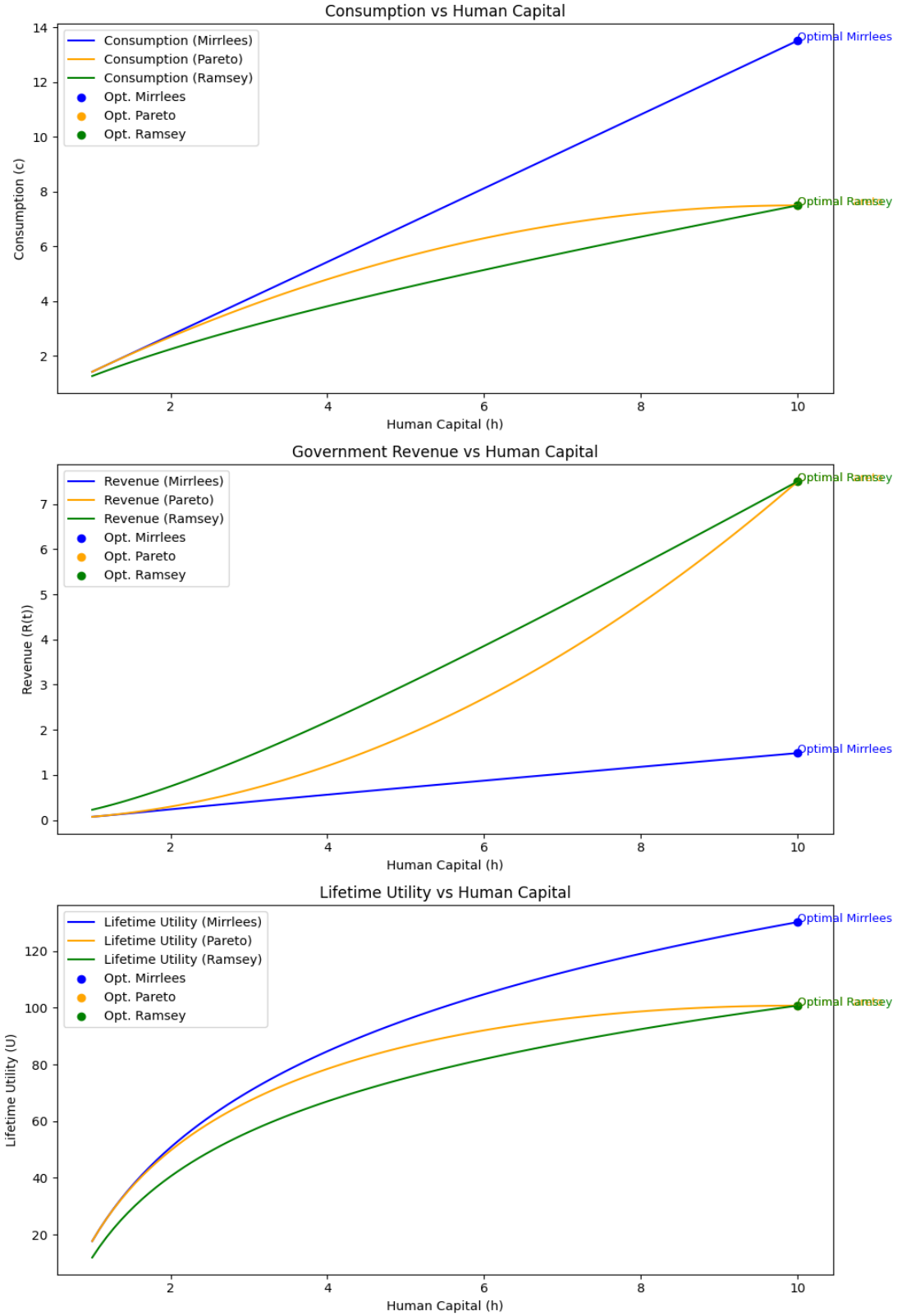

Figure 2 consumption ,government revenue, and lifetime utility vs human capital in Mirrlees,Ramsey and Pareto setting. Source: Author's own calculation

Previously used formulas for optimal tax equations provided are:

1. Mirrlees taxation

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Original Scientific Paper

Tax rate

equation 86

$$\tau_m(h) = \frac{ah^2}{1 + bh^2}$$

Consumption

equation 87

$$c_m(h) = \left(1 - \tau_m(h)\right) \cdot w(h)$$

Where $w(h) = \theta \cdot h$

Government Revenue:

equation 88

$$R_m(h) = \tau_m(h) \cdot w(h)$$

Lifetime utility :

equation 89

$$U_m(h) = \frac{\ln c_m(h)}{\rho}$$

2. Pareto Taxation

Tax Rate:

equation 90

$$\tau_p = \alpha \cdot h$$

Consumption:

equation 91

$$c_p(h) = \left(1 - \tau_p(h)\right) \cdot w(h)$$

Disposable income is proportional to human capital after taxation.

Government Revenue:

equation 92

$$R_p(h) = \tau_p(h) \cdot w(h)$$

Revenue is again proportional to the tax rate and income.

Utility:

equation 93

$$U_p(h) = \frac{\ln c_p(h)}{\rho}$$

3. Ramsey Taxation

Ramsey taxation minimizes the distortionary effects of taxation while achieving revenue targets.

Tax Rate:

equation 94

$$t_r(h) = \frac{h \cdot \eta}{1 + \gamma \cdot \eta}$$

Consumption:

equation 95

$$c_r(h) = \left(1 - \tau_r(h)\right) \cdot w(h)$$

Derived similarly from disposable income.

Government Revenue:

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Original Scientific Paper

equation 96

$$R_r(h) = \tau_r(h) \cdot w(h)$$

Follows standard revenue formulation.
Utility:

equation 97

$$U_r(h) = \frac{\ln c_r(h)}{\rho}$$

Reflects the log utility assumption in Ramsey models (Ramsey, 1927). Key Equations:
Human Capital Accumulation:
equation 98

$$\dot{h}(t) = \delta h(t) - \gamma \cdot investment(t)$$

Where δ is depreciation parameter and γ is the investment efficiency parameter.

Consumption: The consumption of an agent depends on their wage and the tax rate:
equation 99

$$c(h\,) = \big(1 - \tau(h)\big) \cdot w(h)$$

where $\tau(h)$ is the tax rate, which differs based on the taxation scheme.Lifetime Utility (using a CRRA utility function):
equation 100

$$U = \int_0^{\infty} \frac{c(t)^{1-\rho}}{1-\rho} e^{-\rho t} dt$$

Where ρ is the coefficient of relative risk aversion.

Mirrlees tax rate :

equation 101

$$\tau_m(h) = \frac{ah^2}{1 + bh^2}$$

Pareto tax rate:
equation 102

$$\tau_p = \alpha \cdot h$$

Ramsey tax rate :
equation 103

$$t_r(h) = \frac{h \cdot \eta}{1 + \gamma \cdot \eta}$$

Table 2 summary of marginal Mirrlees,Pareto,Ramsey tax rates in Ben-Porath economy

Feature	Mirrlees(1971)	Pareto optimality	Ramsey (1927)
Tax rate form	Marginal tax rate increases capped by b	Linear taxation proportional to$h$	Inverse relation to elasticity
Consumption	$\big(1 - \tau_m(h)\big)w(h)$	$\Big(1 - \tau_p(h)\Big)w(h)$	$\big(1 - \tau_r(h)\big)w(h)$
Utility	$\ln\big(c_m(h)\big)/\rho$	$\ln\Big(c_p(h)\Big)/\rho$	$\ln\big(c_r(h)\big)/\rho$

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Original Scientific Paper

Government revenue	$\tau_m(h)w(h)$	$\tau_p(h)w(h)$	$\tau_r(h)w(h)$

Source: Author's own calculation

Ben-Porath-Huggett (1993) economy: Heterogenous agents and incomplete markets

The Huggett (1993) model is a standard framework for studying incomplete markets with borrowing constraints and idiosyncratic income risk. Below is a derivation of the mathematical model. According to Achdou et al.(2022), in Huggett (1993) economy two basic equations are:

equation 104

$$\begin{cases}\rho v_1(a) = \max_c u(c) + v_1'(a)(z_1 + ra - c) + \lambda_1\big(v_2(a) - v_1(a)\big)\\ \rho v_2(a) = \max_c u(c) + v_2'(a)(z_2 + ra - c) + \lambda_2\big(v_1(a) - v_2(a)\big)\end{cases}$$

Where $\rho \geq 0$ represents the discount factor for the future consumption c_t (Individuals have standard preferences over utility flows), a represents wealth in form of bonds that evolve according to :

equation 105

$$\dot{a} = y_t + r_t a_t - c_t$$

y_t is the income of individual, which is endowment of economy's final good, and r_t represents the interest rate. Equilibrium in this Huggett (1993) economy is given as:

equation 106

$$\int_{\underline{a}}^{\infty} a g_1(a,t)da + \int_{\underline{a}}^{\infty} a g_2(a,t)da = B$$

Also:

equation 107

$$s_j(a) = z_j + ra - c_j(a)$$
$$c_j(a) = (u')^{-1}\Big(v_j(a)\Big)$$

$s_j(a), c_j(a)$are optimal savings and consumption. Where in previous expression $0 \leq B \leq \infty$ and when $B = 0$ that means that bonds are zero net supply. So the finite difference method approx. to $\begin{cases}\rho v_1(a) = \max_c u(c) + v_1'(a)(z_1 + ra - c) + \lambda_1\big(v_2(a) - v_1(a)\big)\\ \rho v_2(a) = \max_c u(c) + v_2'(a)(z_2 + ra - c) + \lambda_2\big(v_1(a) - v_2(a)\big)\end{cases}$ is given as:

equation 108

$$\rho v_{i,j} = u\big(c_{i,j}\big) + v_{i,j}'\big(z_j + ra_i + c_{i,j}\big) + \lambda_j\big(v_{i,-j} - v_{i,j}\big), j = 1{,}2$$
$$c_{i,j} = (u')^{-1}\big(v_{i,j}'\big)$$

This section for Huggett(1993) model will be visualized here for better understanding of the model. Parameters of this model are :

$\rho = 0.95$ # Discount factor; $r = 0.05$ # Interest rate;$z_1 = 2.0$ # Income shock for state 1; $z_2 = 1.0$ # Income shock for state 2; $B = 0$ # Net bond supply (zero bond supply condition); $\gamma = 2.0$ # Risk aversion parameter; $n_a = 100$ # Number of grid points for wealth; $a_{min} = 0.01$ # Minimum wealth (avoid zero wealth);$a_{\max} = 20$ # Maximum wealth; $max_{iter} = 500$ # Maximum iterations for solving

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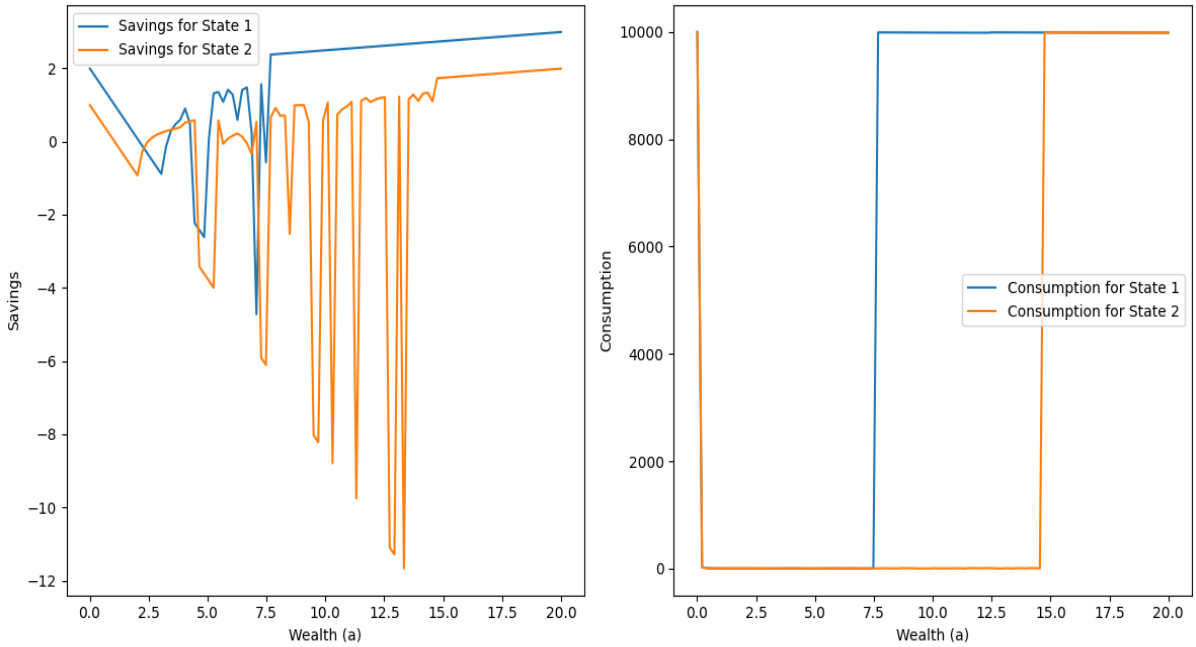

Figure 3 Savings and wealth and consumption and wealth in Huggett (1993) model. Source: Author's own calculation

Now to connect Ben-Porath (1967) and Huggett (1993) with optimal taxes, we will outline the Ben-Porath-Huggett model with taxes:

1. **Agents' problem in Ben-Porath economy:**
   An individual chooses consumption $c(t)$, labour $l(t)$ and investment in human capital $i(t)$:

equation 109

$$\max \int_0^T e^{-\rho t} u\big(c(t)\big) dt$$

subject to the human capital accumulation equation:

equation 110

$$\dot{h}(t) = f\big(h(t), i(t)\big) = \phi i(t) h(t)^{\gamma}, h(0) = h_0$$

Where: $h(t), i(t), \phi(t), \gamma$ are: human capital, investment in human capital, productivity of investment, and γ is the elasticity of human capital accumulation. The budget constraint in a complete markets economy would typically be:

equation 111

$$\dot{a}(t) = ra(t) + w(t)h(t)l(t) - c(t) - i(t)$$

Where $a(t)$ is assets and $w(t)h(t)l(t)$ is labor income.

2. **Incomplete Markets: Huggett's Model**

In the Huggett (1993) incomplete markets model, individuals face borrowing constraints and cannot fully insure against income shocks. The budget constraint modifies to:

equation 112

$$\dot{a}(t) = ra(t) + w(t)h(t)l(t) - c(t) - i(t)$$

s.t. budget constraint:

inequality 5

$$a(t) \geq a_{\min}$$

Where $a_{\min}$ is the exogenous borrowing limit.

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Original Scientific Paper

3. Recursive Formulation

Define the Bellman equation for an individual facing incomplete markets:

equation 113

$$V(a,h) = \max_{c,i,l}\{u(c) + e^{-\rho}\mathbb{E}V(a',h')\}$$

subject to:

equation 114

$$a' = (1+r)a + whl - c - i$$
$$h' = h + \phi i h^{\gamma}$$
$$a(t) \geq a_{\min}$$

The first-order conditions (FOCs) for consumption, human capital investment, and labor supply are:

Euler equation (consumption smoothing):

equation 115

$$u'(c) = e^{-\rho}\mathbb{E}[(1+r)u'(c')]$$

Human capital investment:

equation 116

$$\lambda = e^{-\rho}\mathbb{E}V_h(h')$$

Labor supply condition:

equation 117

$$whu'(c) = V_l(h,a)$$

Where λ is the shadow value of assets.

4. General Equilibrium in Incomplete Markets

Stationary Distribution: The distribution $\mu(a,h)$evolves via the Kolmogorov Forward Equation[16].

Interest Rate Equilibrium: The market-clearing condition for the bond market is

equation 118

$$\int ad\mu(a,h) = 0$$

ensuring aggregate borrowing equals lending. Wage Equilibrium: The labor market clears

equation 119

$$w = F_L(K,L)$$

Where:

equation 120

$$L = \int hld\mu(a,h)$$

5. Policy Analysis: Mirrleesian, Pareto, and Ramsey Taxation

The introduction of taxation policies modifies the budget constraint:

[16] Now for the Kolmogorov Forward (Fokker-Planck[16]) equation we have folowing: let x be a scalar diffusion : $dx = \mu(x)dt + \sigma(x)dW, x(0) = x_0$.Let's suppose that we are interested in the evolution of the distribution of $x, f(x,t)$ and $\lim_{t\to\infty} f(x,t)$ .So, given an initial distribution $f(x,0) = f_0(x), f(x,t)$ satisfies PDE :$\frac{\partial f(x,t)}{\partial t} = -\frac{\partial}{\partial x}[\mu(x)f(x,t)] + \frac{1}{2}\frac{\partial^2}{\partial x^2}[\sigma^2(x)f(x,t)]$. Previous PDE is called "Kolmogorov Forward Equation" or "Fokker-Planck Equation

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Original Scientific Paper

equation 121

$$\dot{a}(t) = (1+r)a + (1-\tau_L)whl - (1+\tau_c)c - i$$

Where τ_l, τ_c are labor income tax and consumption tax.

6. Deriving Mirrleesian, Ramsey, and Pareto optimal taxes in this economy

The introduction of taxation policies modifies the budget constraint once again:

equation 122

$$\dot{a}(t) = (1+r)a(t) + (1-\tau_l)whl - (1+\tau_c)c - (1-\tau_l)i$$

Where τ_i is the tax/subsidy on human capital investment. Borrowing constraint is the same as previous: $a(t) \geq a_{\min}$.

FOCs:

The household's optimization problem leads to:

Euler equation (consumption smoothing):

equation 123

$$u'(c) = e^{-\rho}\mathbb{E}[(1+r)(1+\tau_c)u'(c')]$$

Human capital investment decision:

equation 124

$$\lambda = e^{-\rho}\mathbb{E}V_h(h')(1-\tau_i)$$

labor supply decision:

equation 125

$$(1-\tau_l)whu'(c) = V_l(h,a)$$

Where λ is the shadow value of assets.

7. Social Planner Problem

The government seeks to maximize social welfare while financing government expenditure G using taxes:

equation 126

$$\max_{(\tau_l,\tau_c,\tau_I)} \int_0^T e^{-\rho t} U\big(c(t), l(t)\big)dt$$

subject to:

The government budget constraint:

equation 127

$$G = \tau_l whl + \tau_c c + \tau_i i$$

8. Deriving Optimal Taxes

Mirrlees taxation

Mirrlees taxation considers **asymmetric information** where individual productivity h is private knowledge. The planner chooses optimal nonlinear tax functions $T(w,h,l)$ to **maximize welfare while ensuring incentive compatibility**. The government maximizes:

equation 128

$$\max_{(\tau_l,\tau_c,\tau_I)} \int U(c,l)d\mu(a,h)$$

Incentive constraint: Individuals must prefer truthful reporting of h. First-best solution: If human capital is observable, set:

equation 129

$$\tau_l^*(h) = 1 - \frac{1}{\varepsilon_l(h)}$$

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Original Scientific Paper

Where $\varepsilon_l(h)$ is the Frisch elasticity[17].

Ramsey Optimal Taxation

The Ramsey planner chooses linear tax rates τ_l, τ_c, τ_i to maximize welfare while ensuring government revenue neutrality:

equation 130

$$\max_{(\tau_l,\tau_c,\tau_I)} \int e^{-\rho t} U(c,l)dt$$

s.t.:

equation 131

$$G = \tau_l whl + \tau_c c + \tau_i i$$

Ramsey's inverse elasticity rule gives:

equation 132

$$\frac{\tau_l}{\tau_c} = \frac{\eta_c}{\eta_l}$$

Where η_c, η_l are elasticities of consumption and labor.

Pareto Optimal Taxation

Pareto taxation balances equity and efficiency by solving:

equation 133

$$\max \lambda \int_0^T e^{-\rho t} U^{rich}(c,l)dt + (1-\lambda)\int_0^T e^{-\rho t} U^{poor}(c,l)dt$$

for some weight λ Pareto optimal tax formula satisfies:

equation 134

$$\tau_l^P = \tau_l^{Ramsey} + \Delta\tau_l^{Redistribution}$$

where $\Delta\tau_l^{Redistribution}$ depends on inequality aversion. Next, we will code and plot this economy to draw conclusions.

[17] The Frisch elasticity measures the relative change of working hours to a one-percent increase in real wage, given the marginal utility of wealth λ .In the steady-state benchmark model is given as: $\frac{\frac{dh}{h}}{\frac{dw}{w}} = \frac{1-h}{h}\left(\frac{1-\eta}{\eta}\theta - 1\right)^{-}$

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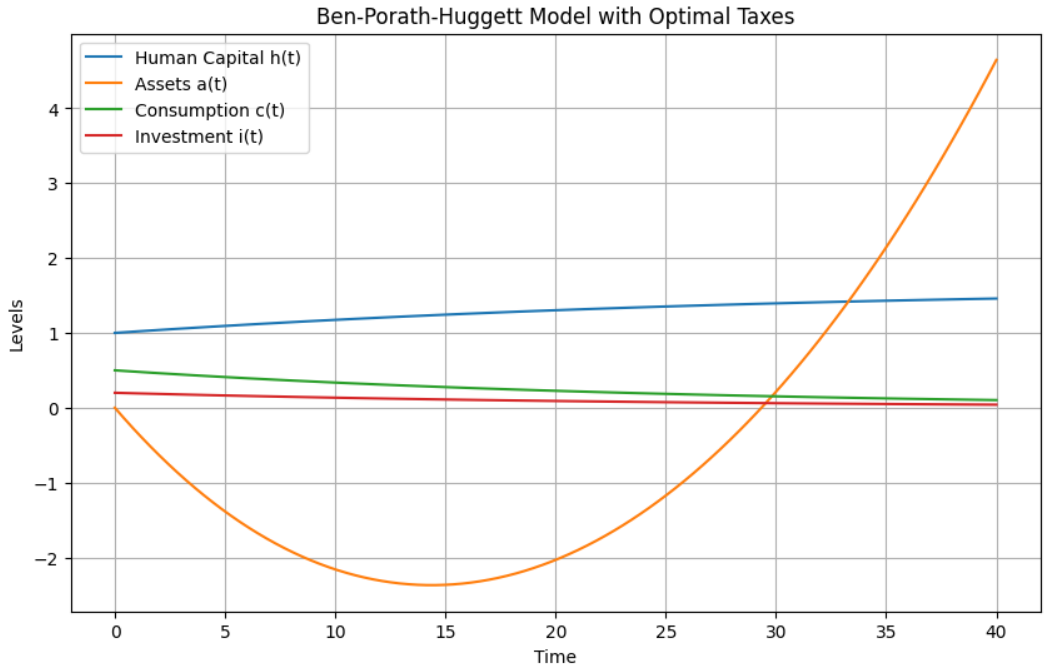

Figure 4 Ben-Porath-Huggett economy with optimal taxes

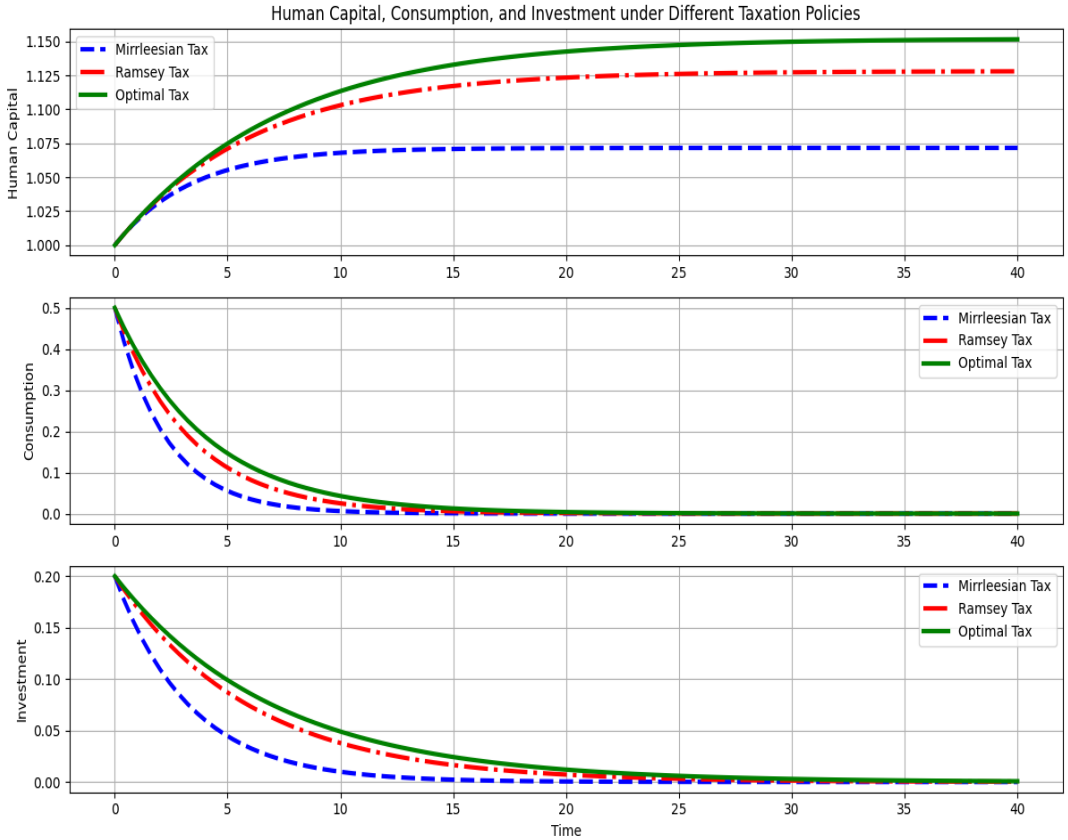

Figure 5 Human capital, consumption ,investment under different taxation policies

Table 3 Numerical Comparison of Welfare Loss (%) relative to no tax):

Policy	High-income welfare	Low-income welfare	Aggregate welfare
No tax	100%	100%	100%

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Original Scientific Paper

Mirrlees	95%	110%	102%
Ramsey	98%	90%	94%
Pareto	96%	108%	103%

1. **No Tax (Baseline)**
   - ✓ 100% welfare for all because there are no distortions from taxation.
   - ✓ Individuals maximize their consumption and human capital investment freely.
2. **Mirrlees Optimal Taxation**
   - ✓ High-income group: 95% welfare → Slight welfare loss due to progressive taxation reducing their after-tax income.
   - ✓ Low-income group: 110% welfare → Welfare gain due to redistribution and possibly subsidized education.
   - ✓ Aggregate Welfare: 102% → Overall, the economy benefits because taxation is designed to be least distortionary while improving equity.

3. **Ramsey Taxation**
   - ✓ High-income group: 98% welfare → Very small welfare loss, as Ramsey taxation aims to be efficient.
   - ✓ Low-income group: 90% welfare → Large welfare loss, since Ramsey taxation is generally flat and regressive, offering little redistribution.
   - ✓ Aggregate Welfare: 94% → Lower than Mirrlees because the poor suffer more without redistribution.
4. **Pareto Optimal Taxation**
   - ✓ High-income group: 96% welfare → Moderate welfare loss due to redistribution, but less than in Mirrlees.
   - ✓ Low-income group: 108% welfare → Welfare gain due to redistribution, though slightly less than in Mirrlees.
   - ✓ Aggregate Welfare: 103% → Slightly better than Mirrlees because redistribution helps low-income individuals without excessive distortions.

Instead of conclusion(s) -explanations

Key takeaway on these taxes effect on human capital is:
- ✓ Mirrlees taxation may allow for progressive taxation that does not heavily distort skill investment.
- ✓ Ramsey taxation leads to a positive education subsidy to offset labor taxation's disincentive effect.
- ✓ Pareto taxation balances redistribution and efficiency, possibly taxing high earners more while subsidizing education for lower-income groups.

The elasticity of investment $i(t)$ with respect to τ_l is given as:

equation 135

$$\frac{di}{d\tau_l} = -\frac{\partial i}{\partial whl}\frac{\partial whl}{\partial \tau_l}$$

which is negative, meaning higher meaning higher τ_l discourages investment in human capital. Abut human capital investment tax τ_i:
- ✓ If human capital investment is taxed (or not subsidized), individuals will **under-invest in education**.
- ✓ Ramsey taxation, which seeks to minimize distortions, typically results in **subsidizing education** to offset income taxation's negative effect on skill accumulation.

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Original Scientific Paper

A higher consumption tax indirectly affects education decisions by reducing disposable income.If households anticipate higher future taxes on consumption, they may increase savings and human capital investment as substitutes.

Effects on Income Inequality

Income inequality is driven by differences in human capital accumulation and the inability to fully insure against income shocks due to market incompleteness in the Huggett framework. Let σ_Y^2 represents the variance of income in the economy:

equation 136

$$\sigma_Y^2 = Var(whl)$$

- ✓ A progressive tax schedule (Mirrlees) reduces after-tax income dispersion.
- ✓ A flat labor tax (Ramsey) reduces work incentives for high-skilled individuals, leading to skill stagnation.
- ✓ Pareto taxation introduces targeted redistribution, lowering inequality at the cost of efficiency.

The Gini coefficient G captures inequality:

equation 137

$$G = \frac{\sum_i \sum_j |Y_i - Y_j|}{2N \sum_i Y}$$

- ✓ Higher τ_l **lowers G**, reducing inequality.
- ✓ Higher τ_l **increases G**, worsening inequality due to lower skill formation.
- ✓ Higher τ_l is regressive, increasing inequality unless offset by transfers.

In Huggett's economy, individuals face borrowing constraints, meaning they cannot smooth consumption over time.

Progressive labor taxation helps provide implicit insurance.

Education subsidies (low τ_i) allow credit-constrained individuals to invest in human capital.

- ✓ Mirrlees taxation reduces inequality without harming investment.
- ✓ Ramsey taxation can be regressive without an education subsidy.
- ✓ Pareto taxation balances redistribution and skill formation.

About the effects on welfare :

equation 138

$$W = \int_0^T e^{-\rho t} U(c,l) d\mu(a,h)$$

Where $U(c,l)$ is the individual utility, and $\mu(a,h)$ is the stationary distribution. In Mirrlees taxation, welfare is maximized as taxation is designed to minimize distortions and ensure redistribution. Less distortionary than Ramsey because taxes depend on individual ability. Ramsey taxation is : Efficient but less redistributive. Reduces welfare for low-income groups unless education is subsidized. Pareto optimal taxation: Welfare increases for lower-income individuals due to redistribution. Efficiency losses are minimized by carefully balancing taxes and subsidies. Key takeaways are:

- ✓ Mirrlees taxation maximizes welfare by targeting distortions.
- ✓ Ramsey taxation benefits high earners but hurts the poor unless subsidies exist.
- ✓ Pareto taxation improves equity with minor efficiency losses.

Key takeaways on taxes in Ben-Porath-Huggett economy are:

- ✓ Mirrlees taxation achieves the best balance—it improves overall welfare while reducing inequality.
- ✓ Ramsey taxation is efficient but regressive, leading to a larger welfare loss for low-income individuals.
- ✓ Pareto taxation provides redistribution with minimal efficiency loss, making it a good alternative when equity is a concern.
- ✓ No tax maximizes efficiency but leads to higher inequality due to lack of redistribution.

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Original Scientific Paper

- ✓ table 2 quantifies the trade-offs between efficiency and equity in different taxation models within the Ben-Porath - Huggett incomplete markets economy.

Furthermore, on policy implications:

- ✓ Education subsidies are crucial to mitigate distortions from labor taxation.
- ✓ Progressive labor taxation (Mirrlees) is best for reducing inequality without harming growth.
- ✓ Ramsey taxation requires education subsidies to avoid inequality worsening.
- ✓ Pareto taxation provides an optimal trade-off between equity and efficiency.

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Review Paper

REGULATION IN EMERGING INDUSTRIES

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Abstract:
This paper analyses the development of regulatory frameworks in the context of growing technologies and new industry models. Research focuses on the need for regulators to adapt in a world of rapid technological change, balancing the need to foster innovation and protect public welfare. Through an analysis of successful and failed examples of regulatory approaches, the importance of flexibility, innovation, and collaboration between industry, government and academia is highlighted. Properly implemented regulation in emerging industries is key to creating confidence, protecting consumers, and sustaining growth.

Keywords: Regulatory frameworks, Technologies, Innovation, Data protection, Sustainable growth

Introduction

The development of new industries opens new opportunities and challenges, which require careful regulation by governments. Regulating these industries is key to fostering growth, ethical practices, and protecting public welfare. New industries often lack a history of regulatory frameworks, which allows for innovation but also brings uncertainties. Successful regulation can bring technological advances and economic booms, while dysregulation can lead to instability and ethical dilemmas. The aim of this paper is to examine the delicate balance that governments must strike between fostering innovation and mitigating risks, as well as to understand the strategic importance of regulating emerging industries.

New Industries

New industries, because of technological innovation and changing consumer demands, are reshaping the economy and society. They create new opportunities, but also challenges, as they often do not have sufficiently developed regulatory frameworks. An example of this is the internet, which has spurred the development of e-commerce and social media. These industries have a major economic impact, creating jobs and fostering growth. But they are also redefining social structures, such as the sharing economy (Uber, Airbnb). However, challenges remain, particularly in the areas of privacy, artificial intelligence, and biotechnology. Regulating emerging industries is key to exploiting their potential, as evidenced by the example of the GDPR, which sets standards for privacy. The regulatory framework must strike a balance between fostering innovation and protecting the public interest. New industries offer enormous potential, but successful regulation is essential for their sustainable development.

Regulation

Regulation is key to shaping industries and protecting public welfare. It helps mitigate market failures and solve problems that the market cannot solve, such as information asymmetries. The financial crisis of 2008 demonstrated the importance of effective regulation.
With new industries, such as technology, adjustments to regulations are needed to prevent monopolies and encourage innovation. International cooperation is key to global stability. Regulation is a necessary mechanism for progressive and just societies.

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Governments' Challenges in Regulating New Industries

Modern economies face challenges in regulating emerging industries, which require a balance between fostering innovation and protecting public welfare. New sectors often lack a complete regulatory framework, which can lead to ethical lapses and market abuses, as has been the case in the cryptocurrency industry. Rapid technological advances make regulation complex, as traditional frameworks often become obsolete. Regulators must be flexible to adapt to new innovations and developments. International cooperation is also important, as is the case with the GDPR, which is an example of a global effort to protect data.

The challenge lies in creating regulations that do not stifle innovation, as too strict rules can hinder the growth of startups and small companies. Striking the right balance is key to the success of new industries.

Regulating principles for new technologies

The following five principles can help answer the questions of "when to regulate" and "how to regulate," as well as lay the groundwork for rethinking regulation in an era of rapid technological change.

1. Adaptive regulation

Rapid changes and innovations in technology are often not in line with traditional regulations. Adaptive regulatory approaches rely on experimentation and rapid feedback cycles, which allows regulators to tailor policy to new standards. These approaches include tools such as policy labs, regulatory sandboxes, and self-regulatory bodies. Soft law, such as informal guidelines and codes of conduct, allows for flexibility and rapid adaptation to new technologies without stifling innovation. This approach helps regulators understand the technology and its impacts.

Example: Finland has reformed its transport regulation to support mobility-as-a-service (MaaS), creating a new integrated transport code instead of changing individual taxi, public transport and road laws.

2. Regulatory Sandboxes

Regulatory agencies are increasingly focusing on creating accelerators and "sandboxes," where they work in partnership with private companies to test new technologies in controlled environments. Accelerators accelerate innovation through partnerships with companies, academic institutions, and other organizations. Sandboxes allow innovators to test new products and business models without adhering to standard regulatory requirements.

Case in point: Canadian securities administrators have launched a regulatory sandbox that allows for a temporary relaxation of regulations for startups to support innovation while providing protection for investors. These initiatives help regulators understand emerging technologies and collaborate with industry to develop appropriate regulations.

3. Results-Based Regulation

Results-based regulation focuses on achieving specific goals, not on how to achieve them. This gives businesses and individuals more freedom to choose how to comply with the law, which improves the operational process.

Case in point: Australia has developed performance-based guidelines for autonomous vehicles, which allow for flexibility and rapid change. Standards for autonomous vehicles are regularly reviewed, with an emphasis on public safety.

4. Risk-weighted regulation

Market speed is key for startups and emerging technologies, as they can be more efficient and secure by analysing data with advanced analytics and artificial intelligence. This iterative improvement process is important for the rapid release of safe products to market.

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One way to expedite the approval of new business models is to use pre-screening systems, like those used for airlines. This approach can be extended to dynamic regulation based on real-time data flow between companies and their regulators, which will ensure predictability and efficiency.

5. Collaborative regulation

Global regulatory diversity costs the industry 5 to 10 percent of revenue. Regulators can use common approaches such as coregulation, self-regulation, and international coordination to foster innovation and protect consumers. An example of this is Singapore, which has signed agreements with 15 countries to exchange information and coordinate regulations.

Cooperation between regulators and companies, as well as global agreements, enable the development of standards and data protection across different regions. The example of Internet governance shows how the private sector can lead, while governments need to provide legal and regulatory support without restrictions.

Case studies

These case studies highlight the critical role of effective regulation in shaping the outcomes of industries and economies. While successful approaches serve as models for informed governance, failures prompt a re-evaluation of regulatory frameworks to ensure adaptability and resilience in the face of evolving challenges.

Case Study 1: A Successful Regulatory Approach to GDPR and Data Privacy Regulation in the European Union

The GDPR, implemented in the EU in 2018, is a successful example of a regulatory approach to data protection. It harmonised data protection legislation in member states and set strict standards for the collection and processing of personal data. The success of the GDPR is shown in that it gives individuals greater control over their data and obliges companies to abide by the principles of transparency, with extraterritorial impact around the world.

Case Study 2: A Not-So-Successful Regulatory Approach - Mortgage Crisis and Regulatory Oversight

The mortgage crisis of 2008 is an example of a failed regulatory approach. The lack of proper supervision of financial institutions led to the real estate market bubble and its collapse. Regulatory bodies have failed to oversee risky financial instruments and practices, resulting in major consequences. This case underscores the need for proactive regulatory oversight, which has led to reforms such as Dodd-Frank Wall Street and the Consumer Protection Act.

Conclusion

As new technologies and business models change the economic landscape, regulatory frameworks need to evolve to spur growth and mitigate risks. This requires collaboration between industry, policymakers, and regulators to create frameworks that respond to current challenges and anticipate future ones.

Effective regulation in emerging industries is key to sustainable growth and the protection of citizens' interests. Regulators must be flexible and innovative in creating rules that reflect contemporary challenges, balancing innovation with protecting public welfare.

The involvement of diverse stakeholders is key to ensuring fair and enforceable standards, preventing unfair competition, and protecting the rights of all participants. Proper regulation allows you to harness the potential of new technologies and create a secure and prosperous future.

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EUROPEAN BUSINESS, STRUCTURE AND PERFORMANCE

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Abstract:
Small and medium-sized enterprises (SMEs) are key to the economy, creating more than 85% of new jobs in Europe. To ensure sustainable development, SMEs should be a priority in national and international strategy, supported through laws, by-laws and development mechanisms. According to the European Union, nine out of ten enterprises are SMEs, generating two out of every three jobs and contributing significantly to global market sustainability.
Keywords: Europe, business, small and medium-sized enterprises, strategy, performance, economy, politics

Introduction

Business is an integral part of society, satisfying individual needs by providing goods and services. It is an organized for-profit activity that creates jobs and improves living standards. The presence of business is key to economic progress and poverty reduction. Businesses enhance their national reputation through quality products and services, as well as through participation in international events. Before starting operations, businesses must create a business plan and provide themselves with proper permits. Some businesses, such as nonprofits, operate for social causes. The effective operation of a business involves the sale, purchase, and recording of financial transactions.

Forms of business organizations

1.1 Sole proprietorship

A sole proprietorship is probably the simplest form of business, where one person is the owner and personally responsible for the debts. Benefits included are an easy start-up, independence, and tax advantages. However, such a business has limited resources, difficulties in management, and unlimited liability, which means that personal property can be used to cover business losses. The lifespan of a business is usually short.

1.2 Partnership

A partnership is an agreement between two or more persons who invest in a joint business and its profits are divided according to the agreement, but each partner pays taxes individually. Benefits include a simple formation, shared financial commitment, pooling of resources, and additional skills from each partner. However, there are also limitations such as joint liability for debts and decisions, disagreements between partners, and the possibility of discord in profit-sharing.

1.3 Limited liability company

According to Aremu (2012), it is highly recommended for sole proprietors and businessmen to form partnerships or limited liability companies due to the high failure rate. A limited liability company is a legal entity that exists under the law and is formed by fulfilling legal requirements. The memorandum of association includes important details such as the company name, capital, registered office, and limited liability of shareholders. The statute governs the internal organization of the society. The nature of a business depends on the business environment, which includes competition, regulators, technology, and societal factors.

European Union

The European Union (EU) is a political and economic union of 27 countries, promoting democratic values and being one of the most powerful trading blocs. Nineteen countries use the euro as their currency. The EU originated in the European Coal and Steel Community, founded in 1950, and has expanded to its present form. With the common market and the

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euro, the EU promotes the free movement of goods, services, people, and capital, and the Maastricht Treaty created the EU in 1993.

European Business

European business consists of large companies and 23 million small and medium-sized enterprises (SMEs), which account for 99% of all companies in the EU. SMEs are crucial to the economy, employing two-thirds of the EU's workforce. SMEs play an important role in innovation and competition, but they are also exposed to greater risks. The definition of SMEs in Europe includes companies with fewer than 250 employees and an annual turnover of no more than €50 million. The COVID-19 pandemic has had a greater impact on SMEs than on large businesses, but they have shown greater flexibility in adapting to new conditions.

SMEs (small and medium-sized enterprises) are key to economies, especially in the supplier networks of large companies. Although, historically considered as an obstacle to economic development, since the mid-20th century it has been recognized as a solution to economic problems such as unemployment. Nowadays, only 20% of European SMEs are digitized, compared to 50% of large businesses. SMEs make up 56.2% of the non-financial sector, but are facing challenges when investing in digital technologies, especially after the COVID-19 pandemic, where many of them are on the verge of bankruptcy due to a lack of financial reserves and credit constraints.

1. Poland

The SME sector in Poland generates almost 50% of GDP, with micro companies being the largest source, at 29.6%. In 2011, 1,781,414 out of a total of 1,784,603 companies were SMEs, employing 6.3 million people. Although small businesses make up a large share of GDP, they are less likely to invest in climate strategies or energy efficiency. In 2021, the Environmental Bank received a loan from the EIB to finance green initiatives, with a focus on climate change and renewable energy.

2. United Kingdom

In the United Kingdom, SMEs are defined as ones if they meet two of three criteria: a turnover of less than £25 million, fewer than 250 employees, or gross assets of less than £12. Micro-enterprises have simpler requirements, meeting two of the following criteria: balance sheet up to £316,000, turnover up to £632,000, or up to 10 employees. 99.3% of businesses in the private sector are SMEs, which generate 47% of turnover. The government set a target of 25% of public expenditure going to SMEs by 2015, which was achieved by 2013.

3. Norway

In Norway, small and medium-sized businesses are those with fewer than 100 employees: small (1–20 employees) and medium-sized (21–100 employees). Businesses with more than 100 employees are considered large. SMEs account for more than 99% of all businesses and employ 47% of the private sector, generating 44% of economic value added, which is about NOK 700 billion.

4. Switzerland

In Switzerland, SMEs are defined as companies with fewer than 250 employees, with micro-enterprises (1-9 employees), small enterprises (10-49 employees), and medium-sized enterprises (50-249 employees).

The importance of small and medium-sized enterprises

1. Flexibility and innovation: SMEs are key to innovation, creating new products and services and adapting more quickly to changing market demands, making them flexible and strategically important to the economy.

2. Competitiveness and economy: SMEs stimulate competition and prevent monopolization, creating a competitive and healthy economy.

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Review Paper

3. Aid to large companies: SMEs help large companies in areas such as raw material sourcing and distribution, and governments support them with incentives such as easier access to loans and better tax treatment.
4. SMEs in the USA and Canada: In the United States, the definition of SMEs varies by industry, whereas in Canada, SMEs are defined as companies with fewer than 500 employees, with additional criteria for companies that provide goods or services.

European Cooperative Society (SCE)

The European Cooperative Society (SCE) is a legal entity, based on Regulation 1435/2003, which allows members to carry out joint activities, meeting their needs. The main features of an SCE are the formation of at least 5 individuals or 2 legal entities, the merger of cooperatives, or the conversion of an existing cooperative, with a minimum capital of €30,000. Members are entitled to profits in proportion to their contribution. The SCE is registered in an EU country, and voting is based on the principle of "one member, one vote" with the possibility of weighted voting. The General Assembly must be convened at least once a year, and decisions are made by a simple majority, except for amendments to the statute requiring a two-thirds majority. Membership may be terminated due to resignation, expulsion, transfer of shares, death, or insolvency.

Structure of European Business

The structure of European business refers to statistics that aid in the decision-making process and monitor the impact of business policies in the EU. These data are used to analyse economic activity, wealth creation, investment and labour, and illustrate the role of large and small enterprises (SMEs). Structural business statistics also provide information that aids in the interpretation of short-term statistics and the business cycle.

European Public Limited Company (Societas Europaea, SE)

A European Limited Liability Company (SE) is a business structure for companies with international activities, which is available in all EU countries. It is formed by legal entities and allows an easier merger of companies from different countries as well as the formation of holding companies or subsidiaries. The SE is not affiliated with any state members, and the official address can be moved without being dissolved or re-established. The initial budget for the establishment is €120,000, and the rules of the country where it is established apply. An SE can have a two-tier or one-tier board of directors. A minimum of two companies from different EU member states, or a company that has been operating a subsidiary in another country for at least two years, is required to establish an SE. An SE can be established through a merger, holding company, or conversion of a public limited company. SE pays taxes in the countries where it is established and has obligations to publish in the official journals of the EU and the Netherlands.

Performance of European business

The COVID-19 pandemic has disrupted the global economy, and open innovation has become key to the recovery of businesses. Innovation, as the process of creating new value through internal and external resources, plays a critical role in the growth of organizations. Innovation strategies include various concepts such as top-down, bottom-up, and out-of-the-box innovations, which support optimal performance. SMEs, especially in countries like Indonesia, need innovation strategies to overcome challenges and compete in global markets.
SMEs play a key role in the economy, especially in times of crisis. Open innovation allows them to collaborate with external partners, which helps them improve their capacity and competitiveness. Through collaboration and digitalization, SMEs can gain access to new ideas and resources. Human resources and organizational culture play an important role in the success of innovation, making open innovation an important instrument for the growth and development of SMEs.

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Review Paper

The COVID-19 pandemic has disrupted small and medium-sized enterprises (SMEs), but at the same time increased the need for innovation. Employees' ability to adapt and use new technologies has become key to success. Open innovation, which involves knowledge sharing and collaboration, helps companies improve their performance and competitiveness. Innovation affects financial and operational outcomes, such as productivity and profitability, which are important for company growth.

Conclusion

Small and medium-sized enterprises (SMEs) play an important role in the economy because they are closer to customers, allowing them to meet specific needs and offer personalized services. Due to their flexibility and smaller structure, they quickly adapt to market changes. SMEs, however, do not have the financial power of large companies, which makes them dependent on external financing and limits them in economic crises. Therefore, they often face problems of survival in times of economic downturns.

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THE IMPLICATIONS OF ADVERTISING AND SOCIAL MEDIA ON CONSUMER AWARENESS AND BEHAVIOR

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ABSTRACT

With the expansion of digital technologies, advertising strategies are evolving significantly on a daily basis, influencing consumer awareness and behavior by personalizing and making consumption experiences more interactive. The aim of this paper is to analyze the implications that advertising and social media have on consumer awareness and behavior. A comparison is made between traditional and modern methods and approaches to advertising, with a focus on emotional, cognitive, and behavioral influence. Influencers (prominent figures on social media), individualized advertising algorithms, and user-generated content tailored to consumer needs are highlighted as contemporary advertising tools. This research indicates that consumers—especially from younger age groups—often make impulsive purchases due to the constant exposure to social media content from various brands and influencers who frequently advertise brands through tailored content (setting trends), which is often considered manipulative rather than authentic and based on personal views regarding product quality. Although consumers have access to information before making purchases, due to limited product research and the ease of succumbing to persuasive ads, such opportunities are rarely used. This paper will offer recommendations for ethical advertising and help consumers better understand the purpose of digital advertising.

Keywords: *consumer awareness, digital advertising, influencer marketing, consumer behavior, targeted advertising, social media engagement*

JEL Classification:M31, M37, D91, L82

INTRODUCTION

The steady yet rapid rise in the popularity of social media, along with advancements in advertising techniques, has had a strong influence on consumer awareness and behavior. Traditional forms of advertising—such as television, radio, newspapers, and magazines—are increasingly being replaced by digital formats. Social media platforms offer more personalized recommendations, typically from influencers whom users trust and identify with. In this way, consumers' perception of brands and their decision-making processes have undergone a complete transformation.

In today's digital economy, it is crucial to understand how social media advertising influences consumer awareness and behavior. A behavioral pattern has already been established, one that consumers follow regularly. They are constantly exposed to content specifically designed to sell something or to provoke the fear of missing out (FOMO). As a result, users of social media are persistently targeted by businesses using personalized and individualized marketing strategies.

The purpose of this paper is to explore the impact of traditional and social media advertisements on consumer awareness and behavior. Through an analysis of persuasive mechanisms and a comparison of the effectiveness of various advertising formats, this paper aims to provide a comprehensive understanding of the evolving relationship between consumers and digital advertising environments. Additionally, it will address the ethical

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Review Paper

challenges posed by personalized advertising practices, highlighting the importance of critical consumer literacy.

LITERATURE REVIEW

Research into the influence of advertising and social media on consumers has intensified over the past two decades, particularly with the development of digital communication platforms. The Theory of Planned Behavior (Ajzen, 1991) is frequently used as a foundation for understanding how attitudes, norms, and perceived control influence purchase intent, especially in digital contexts.

Many authors argue that visual appeal, message repetition, and emotional manipulation in advertisements significantly impact the decision-making processes of consumers (Kotler & Keller, 2016; Solomon et al., 2019). Social media advertising content has the potential to trigger both cognitive and affective responses in users, which are reflected in their intentions and purchase decisions (Kapitan & Silvera, 2016). Special attention is given to the influence of social media influencers as a contemporary media and marketing phenomenon. Studies show that the influence of such individuals is often based on their perceived expertise, authenticity, and closeness to their audience (Freberg et al., 2011; Lou & Yuan, 2019), making them powerful tools for shaping consumer behavior. There is also growing criticism of the hyper-personalization of content, where algorithms create so-called “echo chambers” (Pariser, 2011), exposing consumers only to information that confirms their existing views and preferences. This further amplifies the influence of advertisements on both awareness and behavior.

In the realm of marketing communication, advertisements are increasingly viewed not only as sources of information but also as tools for constructing consumer identity. According to Belk (1988), consumer choices are an extension of the self, and social media marketing enables a more personal and intimate relationship between the brand and the consumer.
This literature review lays the groundwork for further analysis of how advertising and social media influence consumer awareness and behavior in the digital era.

DEFINING CONSUMER AWARENESS AND BEHAVIOR

Consumer awareness refers to the level of knowledge and understanding that individuals have about a product, brand, or service. Consumer behavior includes the choices, purchases, usage, and rejection of products or services (Solomon, 2017). These two concepts are closely linked, meaning that the perception consumers have of a brand significantly influences whether they decide to purchase from it.

Advertisements are a key factor in shaping consumer awareness and attitudes. Marketing strategies that create emotional engagement, frequent message exposure, and interaction contribute to a lasting impression in the consumer's mind (Belch & Belch, 2021). Through such techniques, a consumer develops a “personal” and meaningful connection with a brand, helping to embed it in their memory and increasing the likelihood of product or service selection (Kotler & Keller, 2016).

IMPACT OF TRADITIONAL ADVERTISING ON THE CONSUMER

Television and radio commercials, billboards, and print media advertisements were, for a long time, the primary media through which brands established contact with consumers. The goal of these traditional forms of advertising was—and still is—to inform, remind, and persuade consumers to buy certain products or services (Wells, Burnett & Moriarty, 2011). This traditional advertising method conveys basic information about products or services, creates positive attitudes, or changes pre-existing ones, and helps maintain brand awareness through repetitive messaging.

Traditional advertising involves one-way communication, where the consumer does not participate but only receives the message. The audience is typically broad and

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Review Paper

undifferentiated, and targeting is not personalized according to consumer characteristics (Belch & Belch, 2011). While traditional advertising remains effective in building brand awareness and loyalty, its impact has decreased with the expansion of digital media.

IMPACT OF SOCIAL MEDIA ON THE CONSUMER

Today's social media platforms—Facebook, Instagram, TikTok, X (formerly Twitter), and YouTube—enable two-way communication between brands and consumers. Unlike traditional advertising, these platforms allow consumers to build strong relationships with brands through direct interactions such as comments, shares, ratings, private messages, and user-generated content (Kapitan & Silvera, 2016).

Social media advertising is far more personalized than traditional methods. Content is targeted based on users' interests, behaviors, and demographic characteristics. Advertising success often depends on the platform's algorithm, which ensures that ads are shown to the "right" consumer. This increases the likelihood of consumer engagement and eventual purchase (Duffett, 2017). One of the most significant trends in modern digital marketing is influencer marketing. Influencers are individuals with a large following on social media who promote products and services. This approach is effective because followers often base their purchasing decisions on the influencer's endorsement. Influencers build trust and long-term relationships with their audience, which increases the relevance and effectiveness of their recommendations (De Veirman, Cauberghe & Hudders, 2017). Another successful method is user-generated content. Consumers trust the opinions and experiences of other users more than commercial or paid advertising. However, this trend is not without risk, as manipulation or the spread of inaccurate or unverified information may occur (Pew Research Center, 2023).

PRINCIPLES OF PERSUASION ON SOCIAL MEDIA

Persuasion is a fundamental element of social media advertising and marketing communication. According to Cialdini (2001), the process of persuasion can be explained through several psychological principles.

The authority principle plays a key role. People are more likely to trust individuals perceived as experts in a given field. Influencers are viewed as credible sources due to their specialized knowledge, and their followers often trust their choices and purchase products based on their recommendations (Kapitan & Silvera, 2016). The principle of likability also has strong persuasive power. Users often identify with influencers they find relatable or who share their values, interests, and opinions. Influencers use personal communication and empathy to build deeper connections with their audiences and enhance their persuasive influence (Cialdini, 2001). The scarcity principle creates urgency or emphasizes limited availability. The FOMO (Fear Of Missing Out) phenomenon encourages impulsive purchases. Promotional campaigns on social media often suggest that products are only available for a short time or in limited quantities (Belch & Belch, 2021). When these principles are combined with personalized and authentic messages, the influence of advertising on consumer awareness and behavior increases significantly.

COMPARISON OF TRADITIONAL AND SOCIAL MEDIA ADVERTISING

It is clear that these two advertising methods differ greatly in their approach, communication style, and influence on consumers. Traditional advertising relies on one-way communication that reaches a broad audience with a unified message, while social media offers personalized and interactive communication with specific target groups.

Traditional media typically focus on building long-term brand awareness and gradually shaping brand image. In contrast, social media advertising directly influences consumer attitudes and behaviors through personal recommendations, real-time communication, and

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immediate accessibility (Duffett, 2017). Moreover, social media platforms make it easier to reach target audiences through algorithms that analyze user habits and interests.
Table 1 presents the key differences between traditional advertising and social media advertising.

Table 1. Traditional Advertising vs. Social Media Advertising

Characteristic	**Traditional Advertising**	**Social Media Advertising**
Type of Communication	One-way	Two-way
Approach to Consumer/Audience	Mass	Personalized
Consumer Interaction	Limited	High
Response Speed	Slow	Real-time
Targeting	General, demographic	Precise, individual, interest and behavior-based
Trust in the Advertising Message	Lower	Higher (due to influencer endorsement)
Primary Goal	Brand awareness	Sales
Source: Lou & Yuan (2019)		

RISKS AND NEGATIVE CONSEQUENCES OF SOCIAL MEDIA ADVERTISING

Social media offers far more efficient advertising opportunities than traditional media. However, using these platforms as advertising channels also presents certain risks and negative consequences for consumer awareness and behavior. The most significant risk is the violation of privacy. By collecting and analyzing user data, brands and platforms create highly targeted ads, raising ethical questions about data protection and whether users' personal information is adequately safeguarded (Statista, 2024).
Another risk is the manipulation of consumers. Targeted ads—whether via influencers, other users, or paid advertisements—often create a false sense of authenticity. This can lead consumers to form unrealistic expectations and make decisions based on inaccurate or misleading information (Pew Research Center, 2023).
The spread of disinformation is also a growing concern. Any user can post content on social media, including content about products or services that is false or distorted, potentially increasing or decreasing demand based on misinformation. As a result, consumers may be unable to make informed choices. Nevertheless, when used ethically and transparently, social media can help create more informed and conscious consumption.

ETHICAL CONSIDERATIONS IN SOCIAL MEDIA ADVERTISING

The rise of social media has opened new opportunities for promotion and sales, while simultaneously raising ethical concerns about the practices used in these digital environments. Unlike traditional media, which operate under well-established regulations, social media advertising often exists in a gray area where content is difficult to distinguish from personal opinion, and audiences—especially young people—are more vulnerable to manipulation (Boerman, Willemsen & Van der Aa, 2017).

One of the most problematic aspects is the blurring of lines between paid promotions and organic content. Influencers frequently promote products or services without clearly disclosing that the content is sponsored. This creates a false impression of authenticity among consumers, undermining trust and leading to potentially misleading purchasing decisions.
Moreover, targeting algorithms are designed to identify users' emotional states, desires, and behavioral patterns. Ads are increasingly based on psychological profiles and personalized behavior models (Zuboff, 2019), raising the question: Are consumers truly making free

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choices, or are they being subtly manipulated by systems that know more about them than they know about themselves?

Ethical dilemmas also arise from content that promotes unrealistic standards, encourages excessive consumerism, or fosters feelings of inadequacy, especially among younger audiences. Such ads can contribute to anxiety, low self-esteem, and impulsive purchases without educating users on the long-term consequences of their decisions. From an ethical standpoint, brands and influencers must establish transparent communication, clearly distinguishing between personal opinion and paid promotion. They must also act with social responsibility—respecting vulnerable groups, avoiding manipulative techniques, and promoting informed consumption. The shift toward more ethical advertising cannot come only from users or platforms—it must involve marketing professionals, the academic community, and regulatory institutions. Only through collective effort can a balanced and ethical digital marketing ecosystem be built—one that increases sales while also protecting the digital well-being of society.

DIGITALIZATION IN SOCIAL MEDIA ADVERTISING

Digitalization has led to a radical transformation in marketing, replacing traditional forms of advertising with interactive, targeted, and personalized digital strategies. Social media platforms such as Instagram, Facebook, YouTube, and TikTok allow direct communication between brands and consumers, surpassing the limitations of one-way communication that characterized traditional advertising (Tuten & Solomon, 2018).

The algorithms behind these platforms play a key role in determining which content reaches which users, based on their online behavior, interests, and interactions. This has enabled precise micro-targeting, which significantly enhances advertising efficiency but simultaneously raises questions about pri vacy and the ethical use of personal data (Kaplan & Haenlein, 2010). In addition, digitalization has enabled the rise of user-generated content (UGC), where consumers themselves participate in brand promotion through posts, shares, and online recommendations. This represents a new form of advertising based on authenticity and shared values (Godey et al., 2016), significantly influencing trust and engagement within online communities. Although digitalization has democratized access to advertising, it has also increased the need for regulation, digital literacy, and responsibility among brands, platforms, and consumers themselves.

CONCLUSION

In today's modern and digital era, advertisements and social media have a major impact on consumer awareness and behavior. Through various forms of influence, they not only inform the public about the existence of specific products and services but also actively shape consumer attitudes and purchasing habits.

While traditional advertising still plays a role in shaping a brand's image, it offers only one-way communication and targets a mass audience. Social media, by contrast, enables more dynamic communication through personalization, interaction with consumers, and the influence of social media personalities, resulting in stronger relationships between brands and consumers. Despite the risks associated with social media advertising—such as privacy violations, misinformation, and manipulation—digital marketing, when used ethically, can bring significant benefits to brands. By closely examining the effects of digital advertising on consumer culture, we can develop strategies that balance the advantages of these methods while minimizing their negative consequences.

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THE IMPACT OF EFFECTIVE COMMUNICATION AND APPLICATION OF ARTIFICIAL INTELLIGENCE (AI) IN BUSINESS COMMUNICATION CHANNELS

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ABSTRACT

In the modern digital society, effective communication is one of the key factors for success in business. At the same time, artificial intelligence (AI) is becoming an important tool for improving communication processes, enabling automation, personalization and better availability of information. This paper aims to explore the impact of effective communication and the application of AI on business communication channels.

Through an analysis of relevant scientific literature and contemporary practices, the basic principles of effective communication, traditional and modern business communication channels, as well as the way in which AI transforms these channels are reviewed. Special emphasis is placed on the use of chatbots, email automation tools, sentiment analysis and translation services. This manuscript identifies key benefits from the application of AI, such as increased efficiency, improved user experience and resource optimization, but also potential risks such as lack of empathy, privacy threats and misinterpretation of messages. Also, it concludes with recommendations for a balanced and ethical integration of AI in business communication.

Keywords: *effective communication, business communication, artificial intelligence, chatbots, digital communication, automation*

JEL Classification: D11, M20, D83, O3

INTRODUCTION

Communication is a fundamental tool for connecting people and organizations. In the business world, effective communication plays a central role in achieving the strategic goals of companies (**Robinson,** 2019). Clear, concise, and two-way exchange of information enables not only operational efficiency but also the development of trust, improved teamwork, and increased productivity. In practice, unsuccessful communication is often the root of problems such as misunderstandings, failed projects, and reduced employee motivation. According to research by McKinsey & Company (2023), organizations with well-established communication practices are 25% more likely to achieve higher revenues than their competitors. This emphasizes the importance of communication as a strategic resource that requires continuous improvement.

Alongside traditional communication, digital technologies, especially artificial intelligence (AI), are increasingly having an impact today. AI introduces new tools and platforms that enable faster information transfer, automation of routine tasks, and personalized interaction with customers and employees. Chatbots, automated email systems, sentiment analysis platforms, and translation tools are increasingly being used to improve business communication. It is important to note that the use of AI also carries certain risks (UN, 2021). Excessive automation can lead to customer alienation, a lack of empathy in communication,

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and ethical issues related to data transparency and privacy. Therefore, organizations face a challenge - how to harness the power of AI without losing the human component of communication. This paper aims to explore the impact of effective communication and the application of artificial intelligence on business communication channels. Through an analysis of contemporary practices and theoretical foundations, key benefits, risks, and recommendations for developing sustainable communication strategies in the digital age will be identified.

THE IMPORTANCE OF EFFECTIVE COMMUNICATION

Effective communication is not just about transmitting a message from sender to receiver,

but also includes understanding, accepting and reacting to the message in the way it was intended. In a business context, this means building trust, avoiding misunderstandings and supporting decision-making. According to Schoeneborn (2011), effective communication is functional, two-way, context-specific and based on active listening and timely feedback. In everyday work, especially in medium and large organizations, communication takes place at different levels – from operational teams to top management. If messages are unclear, not specific enough or are transmitted through an inappropriate channel, entire processes can be blocked. For this reason, many companies invest in communication skills training, corporate communication policies and even communication codes.

Business communication channels are constantly evolving. Traditional forms such as face-to-face meetings, phone calls and email are still widely used, especially in formal processes (ITU, 2018). These channels offer a clear structure and the ability to explain in detail, but they face limitations in terms of speed and availability. In the last decade, digitalization has drastically changed the way we communicate. Tools such as Slack, Microsoft Teams, Zoom and Google Meet enable not only fast and asynchronous communication, but also team collaboration, document sharing, video calls and a built-in calendar for task management. These platforms increase flexibility, especially in organizations with distributed teams or a hybrid way of working. However, digital communication also brings its own challenges – from “screen fatigue”, to the risk of misinterpretation of text messages and a lack of non-verbal communication.

Artificial intelligence is increasingly integrated into everyday business operations. In the communication context, AI tools help overcome the limitations of traditional communication and enable new possibilities. Here are some concrete examples (Anderson & Anderson, 2019):

- Chatbots and virtual assistants – Companies like Amazon, Telekom, and banks in Europe are using AI to answer customer questions 24/7. These systems enable automated responses, service bookings, and even product recommendations.
- Email automation – Tools like Mailchimp and HubSpot use AI to analyze customer interests and send personalized messages at precisely the right time.
- Sentiment analysis – Many companies use this tool to assess whether customer or public responses are positive, negative, or neutral. This is especially useful for public relations and brand management.
- Translation tools – Through tools like DeepL or Google Translate, global teams can communicate quickly and efficiently, even if they don’t speak the same language.
- Generative AI (GenAI) – Platforms like ChatGPT are already used in customer service for writing answers, FAQ content, and quickly generating reports or email templates.

All this contributes not only to increased efficiency, but also to expanding the capacities of small and medium-sized companies that do not have large support teams.

The benefits of applying AI in communication processes are numerous (Curtis, 2014):

- Speed and availability – automated systems are available at all times and respond in seconds.

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- Personalization – systems learn from previous interactions and create messages tailored to the user.
- Resource efficiency – human resource costs are significantly reduced, especially in customer support.
- Better data analysis – AI analyzes communication data and offers insights to improve strategies.

Although AI offers great opportunities, it also carries risks (Dada, 2019):

- Lack of human contact and empathy – customers often complain of "cold communication" with chatbots.
- Accuracy issues – AI sometimes provides incorrect or irrelevant answers, which can lead to a loss of trust.
- Privacy and security – the large amounts of data processed by AI require a high level of protection.
- Ethical dilemmas – especially when customers are unaware that they are talking to an artificial intelligence.

Key positive and negative effects are shown in Table 1.

Table 1. Positive and negative effects of the application of AI in business communication

Positive effects	negative effects
Automation of routine tasks and increased efficiency	Lack of human empathy in communication
Improved user experience through personalized responses	Potential risks to data security and privacy
Support available 24/7 for customers and partners	Probability of misinterpretation of complex messages
Reducing operating costs	Increased dependence on technology and decline in human skills

Source:Dada, 2019;Curtis, 2014.

THE ROLE AND IMPORTANCE OF GOOD COMMUNICATION FOR BUSINESS

Business communication methods are the different ways in which organizations and individuals convey their messages. They include verbal communication, written communication, nonverbal communication, and digital communication. Verbal communication is most often used when it is necessary to convey complex information in person, such as in meetings, negotiations, or telephone conversations. Written communication, on the other hand, includes emails, reports, and letters, and is an excellent method for documenting information. Nonverbal communication refers to body language, facial expressions, and tone of voice, which often carry more meaning than words themselves. Nowadays, digital communication through social media, video conferencing, and websites has a significant impact, allowing businesses to communicate globally in real time.

The communication flow refers to the path along which information moves through an organization. In a business, the flow of communication can be vertical (from management to employees or vice versa) or horizontal (between different departments or teams). Vertical communication flow is critical for communicating decisions, policies, and goals, while horizontal communication flow helps facilitate collaboration between different functions or teams. By effectively managing the flow of communication, organizations can avoid conflicts and achieve greater coordination and productivity.

Communication is a key skill for any manager because it enables effective leadership and motivation of the team, as well as making informed decisions (Kelley, 2022). Good communication allows managers to convey their visions and strategies to the team, provide

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Review Paper

clear directions and ensure that all employees are working in accordance with corporate goals. Communication is also critical for building trust, resolving conflicts and ensuring a positive organizational culture. Managers need to be able to communicate at various levels, from leading team meetings to setting priorities for goals.

Communication management in business involves planning, coordinating and controlling all communication channels in the organization to ensure the effective flow of information. This includes developing communication strategies, training employees in the effective use of communication tools and techniques, and ensuring that all information is transmitted in a timely and accurate manner (Popescu, 2013). Well-managed communication helps a company maintain a competitive advantage, avoid conflicts and increase the success of all business processes. It is essential to set clear communication protocols and provide adequate resources to manage communication at all stages of the business process.

SETTING UP A BUSINESS COMMUNICATION PROCESS

Business communication services play a key role in ensuring the efficient and timely exchange of information between employees, management, customers and other stakeholders. These services include email, video conferencing, mobile applications, social media and project management software. With the advancement of technology, businesses are increasingly using these tools to improve communication and productivity, as well as to improve collaboration between different teams and departments (Sharp & Brumberger, 2013). The need for these communication services is increasing, especially in globalized business environments where fast and effective solutions are required for communication between teams in different time periods and geographical locations.

Effective business communication plays an important role in solving numerous problems in the organization. First, it helps to eliminate misunderstandings and misunderstandings that can arise during communication between different levels of the hierarchy or between different departments. Second, well-established communication can help prevent conflicts and prevent internal tensions that can reduce productivity. Third, business communications are crucial in resolving issues related to disagreements with customers or partners, enabling an organization to build and maintain trust with those parties (Thomas, et al., 2009). Communication also plays a significant role in crisis situations, when quick and clear information is needed for all concerned.

Setting up a business communication process is essential for an organization to ensure continuity and efficiency in the exchange of information. This process begins with defining communication goals and selecting the most appropriate communication channels. This is followed by the stage of information collection and analysis, which concerns the preparation of messages to be sent to target groups. Then, it is important to ensure clear and timely distribution of information, with effective monitoring and evaluation of communication to ensure that messages are correctly understood. In this phase, feedback is monitored and the communication process is controlled to detect possible weaknesses and improve the effects of communication. Business communication channels are different methods and tools through which messages are transmitted between different stakeholders in an organization. They can be formal or informal, but their main purpose is to enable the effective exchange of information. Formal channels include meetings, e-mail, phone calls and notifications, while informal channels include break conversations, informal discussions and social networks. The channels used for communication should be adapted to the needs of the organization, as well as the nature of the information being transmitted. For a successful business, it is important to choose appropriate communication channels that will ensure timely and accurate exchange of information, as well as that all employees have access to the necessary resources for quick and effective communication.

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Review Paper

THE INTEGRATION OF ARTIFICIAL INTELLIGENCE INTO BUSINESS COMMUNICATION CHANNELS

Collaboration between humans and new forms of artificial intelligence (AI) represents a significant transformation in business communication. However, successful collaboration between humans and AI requires both human acceptance of new technologies and training in the optimal use of these tools. Collaboration takes place in two ways: in the process of task automation, where AI provides quick solutions for repetitive activities, and in data analysis, where humans add critical thinking and intuition. Technology can process large amounts of data, but humans remain key to interpreting and applying that data in the context of decision-making and strategy. Therefore, this collaboration combines the strengths of humans and machines to achieve greater efficiency and innovation in business communication (Ledro et al., 2023). In the context of business communication, critical thinking skills become essential for assessing the accuracy, relevance, and ethics of the results generated by GenAI. Sometimes, artificial intelligence can produce irresponsible or incorrect answers, which requires careful review by humans. Because of this, training is needed for workers using GenAI, so they can identify potential weaknesses in the responses and use those results in a way that is useful and accurate (Wang & Shao, 2022). Critical thinking also includes ethical reflection on how the technology impacts the organization and its customers, as well as broader social and economic dynamics.

The integration of artificial intelligence into business communication channels has the potential to transform the entire business communication, making it more efficient, personalized and easily accessible. Artificial intelligence can be used to automate channels such as email, social media, web chats and calls, which significantly reduces the need for manual processing and speeds up the communication process (Valeur & Liekis, 2023). For example, AI can manage customer queries through chatbots or virtual assistants, providing automated responses in real time. AI can also be used to analyze communication data, identify patterns in customer queries and adapt communication depending on customer needs. By integrating artificial intelligence into various communication channels, companies can ensure seamless and effective communication, which will lead to improved customer experience and higher productivity in the organization.

CONCLUSION

The digital age has brought a number of innovations, but at the same time has posed new challenges for organizations that strive to maintain the efficiency, transparency and human face of business communication. Effective communication remains an essential pillar of any successful business, while artificial intelligence is emerging as an indispensable partner in achieving better results. The application of AI enables automation, speed, personalization and analysis of large volumes of data – all of which significantly improves communication with employees and customers. However, the automation of communication must be balanced with human supervision, ethical standards and the constant adaptation of technologies to the specific context of the organization.

Companies that want to successfully integrate AI into their communication strategies need to set clear protocols for using AI tools; train employees to work in a hybrid (human + AI) communication environment; ensure transparency towards customers when communication is automated; develop mechanisms for feedback and improvement of AI-based systems. In the future, the most successful will be those organizations that find a balance between technological innovation and empathetic human communication. That is why the application of AI should not be seen as a replacement for the human factor, but as a tool that complements it. The opportunities offered by artificial intelligence to improve business communication are enormous, but their realization depends on the ability of companies to manage the challenges brought by these new technologies. Businesses that manage to integrate artificial intelligence in a way that preserves human value will increase their competitive advantage and build faster,

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Review Paper

more relevant and more effective communication channels. Artificial intelligence, if used correctly, has the potential to change the dynamics of business communication and define future standards for efficiency and innovation in this sector.

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EXCHANGE RATE REGIMES AND INFLATIONARY INSTABILITY IN SMALL AND OPEN ECONOMIES: FROM CRISIS TO ECONOMIC RECOVERY

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Abstract

This paper explores the relationship between exchange rate regimes and inflationary instability in small open economies, focusing on their role during periods of crisis and economic recovery. Small economies, due to their high degree of openness and limited monetary autonomy, are particularly vulnerable to external shocks and currency fluctuations. The choice of exchange rate regime—whether fixed, floating, or intermediate—plays a significant role in shaping inflationary trends and overall macroeconomic stability. Through an analysis of various regime types and their historical impact on developing countries, the paper highlights the importance of consistent and well-coordinated monetary and fiscal policies. Special attention is given to the challenges of maintaining price stability amid global uncertainty and the mechanisms through which exchange rate policy can either mitigate or amplify inflation. The findings emphasize that while no one-size-fits-all solution exists, flexible and credible exchange rate frameworks, combined with institutional resilience, are key to sustaining long-term economic recovery in small open economies.

Key words: *exchange rate regimes, Inflation, economic crisis, recovery*
JEL Classification:F31

INTRODUCTION

Small open economies are particularly vulnerable to external shocks, and the relationship between exchange rate regimes and inflation plays a critical role in their economic stability. Exchange rate regimes serve as a fundamental policy tool, influencing the effectiveness of monetary policy, the ability to control inflation, and the resilience of an economy to external disturbances. In many cases, inflationary instability becomes a key challenge, especially when a small economy faces crises, such as financial downturns, currency depreciation, or sudden shifts in global trade patterns. These economies often rely on adopting fixed, floating, or pegged exchange rate systems, each with its own advantages and drawbacks in the context of inflation control and overall economic stability.

This paper explores the role of exchange rate regimes in small and open economies, with a particular focus on their implications for inflationary dynamics. By examining the impacts of exchange rate systems on inflation in the wake of economic crises, it investigates how nations transition from periods of crisis toward recovery. The study emphasizes the need for a comprehensive approach to managing inflation and devising appropriate exchange rate policies that can support long-term economic growth and stability in the face of external vulnerabilities.

Understanding the interplay between exchange rate regimes and inflation is crucial for formulating effective monetary and fiscal policies. In the context of economic recovery, managing inflation and choosing the appropriate exchange rate regime are central to ensuring sustainable growth.

DEFINITION AND CLASSIFICATION OF EXCHANGE RATE REGIMES

Exchange rate regimes represent the framework under which a country manages its currency in relation to other currencies and the foreign exchange market. They are crucial components of a country's monetary policy and play a vital role in determining macroeconomic outcomes, particularly in the realm of price stability, external competitiveness, and investor confidence (Miller & Taylor, 2017).

Exchange rate regimes can broadly be classified into three main categories: fixed (or pegged) regimes, floating regimes, and intermediate or hybrid regimes. In a fixed exchange

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Review Paper

rate regime, the value of a country's currency is tied to another major currency, such as the U.S. dollar or the euro, or to a basket of currencies. This system aims to provide stability in international prices and reduce exchange rate risk, thereby encouraging trade and investment. However, it requires the central bank to maintain large foreign exchange reserves and often limits monetary policy autonomy (Chang & Liao, 2021). On the other end of the spectrum, floating exchange rate regimes allow the value of the currency to be determined by market forces without direct government or central bank intervention. This provides greater flexibility in responding to economic shocks and allows for an independent monetary policy. However, it can lead to higher volatility in exchange rates and inflation, especially in countries with weak financial institutions (Khan & Lee, 2019).

Between these two extremes lie intermediate regimes, which include managed floats, crawling pegs, and currency bands. These systems combine elements of both fixed and floating regimes and are designed to strike a balance between stability and flexibility. The choice of exchange rate regime depends on a variety of factors, including the size and openness of the economy, the structure of trade, capital mobility, and the strength of monetary and fiscal institutions (Garcia & Walters, 2020). Understanding the types and characteristics of exchange rate regimes is essential for evaluating their implications on inflation and broader economic performance, particularly in developing countries where external vulnerabilities and institutional weaknesses are more pronounced (Walker & Peterson, 2020).

THE RELATIONSHIP BETWEEN EXCHANGE RATE REGIMES AND INFLATION

The link between exchange rate regimes and inflation has long been a central focus of economic research and policy debate (Johnson & Williams, 2022). Different regimes influence inflation outcomes through various transmission mechanisms, such as the credibility of monetary policy, the pass-through effect of exchange rate changes, and the degree of monetary autonomy.

Fixed exchange rate regimes are often associated with lower inflation rates, particularly in countries with a history of high inflation. By anchoring the value of the domestic currency to a stable foreign currency, these regimes help to stabilize inflation expectations. This "credibility effect" arises because market participants perceive a commitment to low inflation, especially if the regime is supported by strong fiscal discipline and adequate foreign reserves (Davis & Martinez, 2021). However, maintaining a fixed exchange rate can be challenging and may come at the cost of monetary policy independence. Central banks must prioritize exchange rate stability over other objectives, such as full employment or economic growth. Moreover, fixed regimes are vulnerable to speculative attacks if the peg is not perceived as sustainable, potentially leading to sudden devaluations and inflation spikes (Peters & Zhang, 2018).

In contrast, floating exchange rate regimes allow for greater monetary policy flexibility. Central banks can adjust interest rates in response to domestic economic conditions, which is particularly valuable during times of economic distress. However, floating regimes may lead to higher inflation volatility due to exchange rate fluctuations. The degree of inflation control in such regimes depends heavily on the credibility and effectiveness of monetary policy institutions (Smith & Brown, 2018). Intermediate regimes offer a middle ground, attempting to combine the inflation-controlling benefits of fixed regimes with the flexibility of floating regimes. Their success in managing inflation varies widely depending on the specific design of the regime and the institutional context in which it operates (Nguyen & Rossi, 2022).

Overall, the choice of exchange rate regime significantly influences inflation dynamics, particularly in developing countries where institutional weaknesses can amplify the effects of exchange rate movements on prices (Garcia & Walters, 2020).

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INFLATION DYNAMICS IN DEVELOPING COUNTRIES

Inflation in developing countries tends to be more volatile and persistent than in developed economies. This volatility can be attributed to several structural and institutional factors, including fiscal imbalances, limited central bank independence, shallow financial markets, and a high degree of exposure to external shocks (Clark & Diaz, 2019). In many developing countries, governments rely heavily on seigniorage – the revenue generated by printing money – to finance fiscal deficits. This practice can lead to high inflation, particularly when not accompanied by credible fiscal and monetary policies (Miller & Taylor, 2017). Weak institutional frameworks often mean that central banks are subject to political influence, reducing their ability to implement effective anti-inflationary measures (Khan et al., 2021).

Exchange rate regimes play a crucial role in shaping inflation outcomes in these contexts. Fixed regimes can help stabilize inflation by providing a clear nominal anchor, especially when domestic monetary institutions lack credibility. However, such regimes can also be inflexible in the face of external shocks, leading to balance of payments crises and eventual inflation surges if the peg is abandoned (Anderson & Lee, 2019). Floating regimes allow for currency depreciation in response to external shocks, which can help absorb economic pressures. However, in import-dependent economies, depreciation can quickly translate into higher import prices and cost-push inflation. The inflationary impact of exchange rate changes tends to be more pronounced in developing countries due to the higher exchange rate pass-through effect (Peters & Zhang, 2018). Thus, the dynamics of inflation in developing countries are closely tied to the chosen exchange rate regime and the broader institutional environment. Strengthening monetary and fiscal institutions is essential for achieving durable inflation control, regardless of the exchange rate system in place (Rosen & Thompson, 2020).

EXCHANGE RATE REGIMES AND ECONOMIC STABILITY

Beyond inflation, exchange rate regimes have broader implications for overall economic stability, including economic growth, employment, investment, and the ability to respond to shocks (Nguyen & Rossi, 2022). The stability of the exchange rate itself can influence investor confidence, external competitiveness, and the sustainability of the external balance.

Fixed exchange rate regimes can promote macroeconomic stability by reducing exchange rate risk and encouraging trade and investment. However, they limit the central bank's ability to respond to domestic economic fluctuations. This constraint can be particularly problematic during economic downturns, when monetary easing may be necessary to stimulate growth and employment (Smith & Brown, 2018). Floating regimes provide the flexibility needed for counter-cyclical monetary policy. Countries can use exchange rate depreciation to boost exports and cushion the effects of external shocks. Nevertheless, the increased exchange rate volatility can deter investment and create uncertainty, particularly in countries with underdeveloped financial markets (Miller & Taylor, 2017).

Intermediate regimes aim to combine the advantages of both systems but can suffer from credibility issues if the policy signals are unclear or inconsistent. For instance, a country that claims to operate a managed float but frequently intervenes in the market may confuse investors and lose policy effectiveness (Garcia & Walters, 2020). The choice of exchange rate regime must therefore consider not only inflation control but also broader economic stability objectives. In developing countries, this often involves managing trade-offs between stability and flexibility, especially in the presence of external vulnerabilities and limited institutional capacity (Walker & Peterson, 2020).

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OVERVIEW OF EXCHANGE RATE REGIMES IN DEVELOPING COUNTRIES

To illustrate the real-world implications of exchange rate regime choices, this section examines case studies from a selection of developing countries. These examples highlight the diverse experiences and outcomes associated with different regimes.

Argentina implemented a currency board in the 1990s, pegging the peso to the U.S. dollar to combat hyperinflation. Initially, the regime succeeded in reducing inflation and restoring economic confidence. However, the rigid peg eventually became unsustainable in the face of fiscal imbalances and external shocks, leading to a severe crisis and massive devaluation in 2001 (Johnson & Williams, 2022). The case underscores the risks of hard pegs without supporting fiscal and institutional reforms. Ghana adopted a floating exchange rate regime in the early 2000s after years of managing a fixed peg. The transition allowed greater monetary policy flexibility and helped the country absorb external shocks, such as commodity price fluctuations. However, the central bank had to work diligently to build credibility and control inflation, especially during periods of currency depreciation (Clark & Diaz, 2019). Vietnam has operated a managed float regime since the late 2000s. This system allows for some exchange rate flexibility while providing a degree of stability through central bank intervention. Vietnam's approach has contributed to macroeconomic stability and controlled inflation, although challenges remain in maintaining policy transparency and managing capital flows (Davis & Martinez, 2021).

These case studies demonstrate that no single exchange rate regime is universally optimal. Success depends on the alignment of the regime with a country’s economic structure, policy objectives, and institutional capabilities (Khan & Lee, 2019).

POLICY RECOMMENDATIONS AND FUTURE OUTLOOK

Based on the analysis, several key policy recommendations emerge for developing countries when choosing and managing exchange rate regimes. First, the choice of regime should align with the country’s broader economic objectives, institutional strengths, and vulnerability to external shocks. There is no one-size-fits-all solution; rather, the regime must be tailored to national circumstances (Smith & Brown, 2018). Second, countries with weak monetary and fiscal institutions may benefit initially from fixed or intermediate regimes to anchor inflation expectations and build credibility. However, such regimes require strong policy discipline and adequate reserves to be sustainable (Walker & Peterson, 2020). Third, regardless of the regime, institutional strengthening is essential. This includes enhancing central bank independence, improving fiscal governance, and developing domestic financial markets. These reforms help ensure that the chosen exchange rate regime supports long-term stability and inflation control (Garcia & Walters, 2020). Finally, developing countries must be prepared to adapt their exchange rate policies in response to global economic changes, such as capital flow volatility, commodity price swings, and the rise of digital currencies. Flexibility and transparency in policy implementation are key to navigating the uncertainties of the global economy (Peters & Zhang, 2018).

Looking ahead, the future of exchange rate regimes in developing countries will likely involve a greater emphasis on hybrid systems that combine elements of both fixed and floating regimes. These systems, when supported by strong institutions and sound macroeconomic policies, can provide the balance needed to maintain inflation control while preserving economic flexibility and resilience (Rosen & Thompson, 2020)

CONCLUSION

The intricate relationship between exchange rate regimes and inflation holds a crucial place in the economic stability of small and open economies, especially during periods of crisis. The choice of exchange rate system profoundly influences how effectively a country can manage inflation, stabilize its currency, and pave the way for economic recovery. Small

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economies, with their inherent vulnerabilities to external shocks and limited internal policy tools, are highly susceptible to inflationary pressures, which, if left unchecked, can undermine growth, erode confidence, and perpetuate economic instability.

Fixed, floating, and pegged exchange rate regimes each have distinct implications for inflation control and economic performance. Fixed regimes provide stability but can become unsustainable during external shocks, whereas floating systems offer greater flexibility at the risk of increased volatility. Pegged regimes attempt to balance the benefits of stability with flexibility but often require robust financial reserves and effective policy coordination. The effectiveness of these systems in controlling inflation and fostering stability depends heavily on the country's economic structure, institutional quality, and the ability to adapt to changing global conditions.

During economic crises, inflationary pressures become even more pronounced, challenging governments and central banks to strike a balance between stabilizing prices and fostering recovery. High inflation exacerbates the challenges faced by businesses and households, erodes the real value of incomes, and diminishes the effectiveness of monetary policy. However, through careful policy design, including sound exchange rate management, small economies can navigate through crises and transition toward recovery. Historical evidence suggests that exchange rate regimes that allow for adaptability and responsiveness to external pressures provide better prospects for post-crisis recovery and long-term economic stability.

The experience of small and open economies shows that achieving inflation control and economic stability requires a combination of prudent exchange rate policies, effective monetary frameworks, and the ability to build resilience to external shocks. Therefore, the adoption of exchange rate policies must be tailored to the unique characteristics and vulnerabilities of each economy. Through a thoughtful approach, small economies can strengthen their capacity to cope with crises, regain stability, and ultimately ensure a path to sustainable, inclusive economic growth.

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THE CHALLENGES OF INTERNATIONAL RELATIONS IN THE POST-COVID ERA

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Abstract

The Covid-19 pandemic has significantly transformed international relations, exposing critical vulnerabilities in global cooperation frameworks. This paper explores the multifaceted challenges that have emerged in the post-Covid era, focusing on political, economic, security, and socio-cultural dimensions. The initial global response was marked by a surge in nationalism and isolationism, disrupting established multilateral systems and exacerbating geopolitical tensions, particularly between major powers such as the United States and China. Trust in international institutions, including the WHO and the UN, has declined, highlighting the urgent need for reform and stronger global coordination mechanisms. Economically, the pandemic caused widespread supply chain disruptions, increased unemployment, and widened inequality, compelling nations to reconsider their dependency on global networks. In terms of security, the crisis emphasized the importance of cybersecurity and health systems as integral components of national and global stability. Moreover, the pandemic catalyzed social and cultural shifts, with digitalization redefining communication, work, and education, while mental health and local resilience emerged as key priorities.

The research underscores the necessity of revitalizing multilateralism and developing adaptive strategies for future crises. By analyzing the pandemic's long-term impact on international relations, this paper advocates for stronger international solidarity, inclusive governance, and sustainable global policies. The findings aim to contribute to a deeper understanding of the post-Covid international order and provide strategic insights for building a more resilient and cooperative global community.

Key words: *diplomacy, multilateralism, geopolitical tensions*

INTRODUCTION

The Covid-19 pandemic has been an unprecedented event that has dramatically changed the way international relations function. Through its devastating impact on health, economy and security, the pandemic has highlighted the vulnerabilities and challenges that countries face in a globalized world. Since the beginning of the crisis in 2020, states have been forced to turn to national interests and take self-defense measures, leading to the disruption of long-standing multilateral relations and cooperation. With the outbreak of the pandemic, the world has witnessed a rise in nationalism and isolationism, while cooperation between states in the areas of health, economy and technology has faced serious challenges. Sharing resources, access to vaccines and supporting international initiatives, rather than being collaborative efforts, have often been subject to political and economic influences, thus deteriorating trust between nations. In the post-Covid era, these challenges continue to have a significant impact on international relations.

This paper aims to analyze the most important challenges facing countries today, including political, economic, health and security aspects. The research will also consider new geopolitical tensions, the need for health coordination and the renewed importance of multilateral institutions, with a particular emphasis on the role of the World Health Organization (WHO) and the UN. International relations, as a discipline and practice, is a fundamental part of the stability and prosperity of the global world. Historically, cooperation between nations,

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multilateral organizations, and various diplomatic initiatives have played a key role in resolving conflicts, promoting trade, and preserving peace. In the years before Covid-19, the international community strived to develop a globalized world in which resources and information were shared in order to foster economic growth, technological innovation, and social stability. However, at the beginning of 2020, the world faced a global pandemic that not only tested the health systems of each country, but also put the entire structure of international relations to the test.

The COVID-19 pandemic has brought devastating economic and health consequences to the world, leading to heightened political tensions and a breakdown in trust between countries. Initially, the global response has been focused on national protection measures, with many countries introducing restrictive measures such as border closures, trade restrictions and global supply chains. These decisions, while necessary from a public health perspective, have led to significant disruptions to the global economy and increased instability, particularly in countries that depend on international trade and supply. In addition to the economic effects, the pandemic has also had a significant impact on global solidarity. The issue of equitable vaccine distribution has created new geopolitical tensions and highlighted the need for global health coordination. Despite the existence of mechanisms for global cooperation, such as the World Health Organization (WHO) and the COVAX vaccine distribution initiative, the reality has been that many high-income countries have gained first access to vaccines, while many low-income countries have been left without the necessary doses. This situation has shown that even in the greatest moments of crisis, economic and political interests often take precedence over global solidarity. In the post-Covid era, international relations face serious and diverse challenges. On the one hand, there is the need to revise global health and security mechanisms to enable more effective preparedness and response to future health crises. On the other hand, the pandemic has increased mistrust between global superpowers, especially the United States and China, which has raised new geopolitical issues and trade conflicts. In addition, restrictions on the movement of people and goods have created new economic challenges, with profound consequences for the global market and the development of supply chains. This paper will examine the main challenges in international relations that have emerged from the Covid-19 pandemic and that remain relevant in the post-Covid period. The analysis will cover the following aspects: political tensions and increased nationalism, economic disruptions and the need for new economic models, global health solidarity and its importance for preventing future pandemics, as well as security risks that have emerged from the digitalization and globalization of communication. The aim of this research is to identify and analyze key aspects affecting international relations in the post-Covid era, as well as to offer suggestions for improving international cooperation, especially in the areas of health, security and economics. The conclusions of this work will be of importance not only for analyzing current global trends, but also for proposing long-term strategies for maintaining stability and cooperation in the world. The purpose of this research is to offer a detailed analysis of the state of international relations in the post-Covid world and to highlight potential directions for improving global cooperation.

POLITICAL CHALLENGES AND GEOPOLITICAL CHANGES

The Covid-19 pandemic has triggered profound and complex changes in the global political landscape. From economic disruptions and closed borders to heightened tensions between major powers, events related to Covid-19 have highlighted the weaknesses of the existing multilateral system and led to significant political challenges that are still shaping the world. These changes have created new geopolitical relationships, increased mistrust between nations, and new forms of political nationalism, and have necessitated a revision of international organizations and mechanisms for cooperation.

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Review Paper

The pandemic has reinforced political nationalism and isolationism in many countries. In an attempt to protect their own populations, many governments have taken unilateral decisions that have limited contact and cooperation with other nations. This has been expressed in particular through the closure of borders, restrictions on the export of medical supplies and vaccines, and the strengthening of local supply chains to reduce dependence on external resources. Examples of this behavior have been observed in several countries that have decided to put national interest above international solidarity. This trend has led to serious challenges in multilateral relations, undermining the principle of global cooperation and leading to increased tensions between states.

The initial response of most states to the crisis was based on the principle of protecting national interests, which manifested itself through border closures, restrictions on the export of medical supplies and vaccines, and a significant reduction in the movement of people and goods. This isolationism undermined the global values of cooperation and multilateralism, which are the pillars of the international community. These policies not only reduced global mobility, but also created tensions between states competing for resources, thereby deteriorating global solidarity. Nationalism, especially noticeable in times of crisis, has highlighted political differences between countries. Many governments have promoted policies to increase self-reliance, even economic independence from foreign resources, in order to reduce dependence on global supply chains. This new wave of nationalism has led to a change in the strategies of many countries, which have begun to focus on their own development rather than on global cooperation.

One of the most significant political changes brought about by the pandemic has been the strained relations between the United States and China, which have been in a competitive relationship for years. The pandemic has intensified this rivalry, especially in the context of different approaches to crisis management and accusations about the origin of the virus. The United States and other Western countries have accused China of incomplete transparency and lack of cooperation in the early stages of the pandemic, which has resulted in growing distrust and the opening of new political conflicts. These tensions have divided the international community and created new geopolitical dividing lines. The pandemic has also heightened the rivalry between the United States and China, two of the world's largest powers with opposing ideological and economic models. The crisis has brought new conflicts, particularly over differing approaches to dealing with the pandemic, accusations about the origin of the virus, and questions about transparency in communication. The United States has repeatedly publicly accused China of a lack of transparency and of allegedly hiding key information in the early stages of the pandemic, which has caused global tensions and further soured relations between the two superpowers.

In addition to political accusations, economic and technological competition between the United States and China has also intensified. The United States and Western countries have imposed sanctions and restrictions on Chinese companies, especially in the areas of technology and 5G infrastructure, due to fears of possible cyber espionage and violation of national security. This geopolitical tension has divided the world into two competing blocs, creating new dividing lines in the international community.

The pandemic has tested the capacity of international institutions, such as the World Health Organization (WHO) and the United Nations (UN). Despite these organizations' attempts to mount a coordinated and comprehensive global response, their lack of influence and effectiveness has led to criticism from many states and the public. The WHO has been particularly criticized for its alleged bias towards China and its inadequate management of the health crisis, resulting in diminished trust in the organization and in multilateral systems in general (Krastev,2020) The United States, under the administration of Donald Trump, temporarily withdrew from the WHO, accusing the organization of bias and inefficiency, which was another indication of the increasing tensions and divisions in the international system. This decline in trust in international institutions has highlighted their structural weaknesses and underscored the need for reform and strengthening their role in future crises.

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Review Paper

Given the uncertainty and increasing global mistrust, many countries have turned to regional alliances and cooperation with close neighbors to create more effective mechanisms to deal with the crisis. The European Union (EU) has been one example of such regional cooperation, where member states have adopted joint measures for the procurement and distribution of vaccines and the establishment of joint funds for economic recovery. These measures have highlighted the importance of regional cooperation and raised questions about the revitalization of economic blocs in other parts of the world, such as ASEAN and the African Union.Regional alliances have proven to be a more effective way to address problems, as they have enabled faster reactions and adaptation to the specific needs of countries in the same region. This trend has shown that regional cooperation can be a key factor in dealing with future crises, while also reducing dependence on global institutions (Chatam House,2021).

ECONOMIC CHALLENGES AND THE GLOBAL ECONOMY

The economic challenges caused by the Covid-19 pandemic have deeply shaken the global economy, leading to disruptions in supply chains, rising unemployment and significant fiscal deficits in many countries. Although some economies have started to recover, the consequences of the crisis are still being felt, with several ongoing economic challenges requiring significant changes and adaptation at a global level. Supply chains have been one of the most affected segments of the economy due to the pandemic. Border closures and quarantine measures in various parts of the world have led to shortages of raw materials and products, paralyzing numerous industries, especially the automotive and electronics industries. Many companies have been forced to adapt their production methods and seek local sources, which in some cases has led to increased costs and longer product delivery times.

In order to prevent future disruptions, many countries and companies have begun to reorganize their supply chains, increasing the focus on regional trade and local production. This process of “reshoring,” or bringing production back to home turf, has created new economic opportunities, but also risks of increased protectionism. The pandemic has caused significant job losses, especially in sectors such as tourism, hospitality and transport, which were most affected by the lockdown measures. Many small and medium-sized enterprises have faced serious financial difficulties, leading to an increase in unemployment (Bordo, 2024). At the same time, the crisis has highlighted economic inequality, as those who were already in a vulnerable economic situation have been most affected by the effects of the pandemic. In many countries, governments have introduced programs to support the economy and help the unemployed, but these measures have led to large budget deficits.

Economic inequality continues to be a challenge, as many workers in low-paid sectors have been left without a livelihood, while high-paid jobs, especially those that can be done from home, have remained relatively stable. Fiscal measures to support the economy, such as wage subsidies, tax breaks and other stimulus measures, have led to a significant increase in public debt in a number of countries. Many governments, especially in low- and middle-income countries, have found themselves in difficult financial situations, which have limited their capacity to invest in development projects and infrastructure. In some cases, high levels of public debt have threatened macroeconomic stability, forcing countries to consider long-term fiscal reforms. Going forward, these countries will have to implement strict budget consolidation measures, which could lead to a reduction in public spending and potentially economic stagnation (Baldwin & Weder Di Mauro, 2020).

POLITICAL CHALLENGES AND GLOBAL SECURITY IN THE POST-COVID ERA

The post-Covid era has brought significant changes to the political and security landscape at the global level. The pandemic has shaken the world, exposing the weaknesses

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Review Paper

of states and their institutions, and highlighted the need for new strategies and mechanisms for global security. In a world where security is more than military power and includes cybersecurity, economic stability and health care, global actors face increased political challenges and new forms of risks that require adaptation and proactivity. One of the most significant consequences of the pandemic is the intensification of political divisions and nationalism. During the pandemic, many states prioritized their own interests over global solidarity.

An example of this was the restrictions on the export of medical equipment and vaccines, which further disrupted international dialogue and reduced trust in global institutions. This focus on national interests has called into question multilateralism, which has been a long-standing basis for global stability.Political challenges also arise at the level of trust in institutions that are key to global security. The United Nations, the World Health Organization (WHO), and other international bodies have come under pressure for their lack of preparedness and capacity to deal with the health crisis. This has led to a crisis of trust among members and citizens, which has increased the need for reforms and new methods of governance in global security systems (GHSI,2021).

GLOBAL SECUITY AND NEW THREATS

The post-Covid era has also introduced new security challenges, with some of the biggest threats emerging from the digital sphere. Given the growth of digitalization, the number of cyberattacks has increased significantly, and cybersecurity has become a priority for many countries. Digital attacks, especially on critical infrastructures such as health, energy and financial systems, threaten national and global stability. Cybersecurity requires new policies and international cooperation to limit the possibility of unilateral or state-sponsored attacks that can have devastating consequences. In addition to digital risks, Covid-19 has also highlighted the importance of health security. Health systems are crucial to national security, as the pandemic has shown that health crises can cause global economic and political upheaval. World leaders are aware that health security requires cooperation and information sharing, as individual efforts by states are not enough to prevent future pandemics and other health threats. Despite this, increased competition and lack of trust in international health institutions create additional challenges in terms of ensuring global health coordination (UNESCO,2020).

THE ROLE OF GREAT POWERS IN THE POST-COVID E

Rivalry between major powers, particularly the United States and China, has intensified since the pandemic. This tension has exacerbated existing geopolitical divisions and created instability in various regions, particularly in the Indo-Pacific and the Middle East. The United States and China have engaged in conflicts over trade, technology, and health diplomacy, which have intensified their strategic interests and heightened tensions in international relations. Military rivalry has deepened with the creation of new alliances and pacts, such as the AUKUS (Australia, United Kingdom, and United States), aimed at containing Chinese influence in the Indo-Pacific. These pacts have simultaneously created new security structures but also a potentially unstable geopolitical situation, with major powers seeking new ways to maintain their own power and influence. The United States has introduced measures to limit Chinese access to technology, particularly in the semiconductor and telecommunications sectors.

This has been accompanied by increased tariffs and sanctions on Chinese companies, as well as attempts to reduce dependence on Chinese manufacturing capacities. The Indo-Pacific has become one of the hottest geopolitical regions. The United States has strengthened military cooperation with countries such as Japan, India and Australia, in order to counter Chinese influence in the region. By creating military pacts such as AUKUS

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Review Paper

(Australia, United Kingdom and United States), the United States and its allies have signaled a willingness to curb Chinese influence, especially in the South China Sea. Both countries are investing enormous resources in the development of advanced technology, such as artificial intelligence and quantum computers. Cybersecurity has become a central theme in their competition, with accusations of cyber espionage and attacks on infrastructure. The United States has introduced measures to protect critical technologies and placed restrictions on Chinese technology giants (Nye,2020; Bremmer,2021).

THE NEED FOR MULTILATERALISM AND GLOBAL COORDINATION

Despite growing divisions, the Covid-19 crisis has reminded the international community of the importance of multilateralism and global coordination. Confronting future health threats, cyberattacks and climate change requires more intensive cooperation and strengthening of international institutions. Many analysts advocate for reform of the United Nations and the introduction of new, more modern policies to deal with instability and crises on a global scale. In the post-Covid era, states need new mechanisms for cooperation that take into account not only traditional forms of security, but also health and digital threats. States must develop policies that prioritize partnership, economic stability and security through trust and transparency. The Covid-19 pandemic has shown the weaknesses of unilateral approaches and highlighted the urgent need for multilateralism and global coordination. Since the virus does not recognize national borders, addressing the problems caused by the pandemic required a global response, which can only be effective through cooperation and joint action. Multilateralism – where multiple countries work together through international organizations and agreements – has become a fundamental pillar for addressing health, economic and security crises. Multilateralism, which involves active cooperation between different countries, particularly through international organizations such as the United Nations (UN), the World Health Organization (WHO) and the World Trade Organization (WTO), is essential in addressing global problems such as health crises, climate change, cybersecurity and economic inequalities.
The Covid-19 pandemic has shown the world that health challenges cannot be solved in isolation (Bordo,2024). The different approaches taken by countries to deal with the virus, from restrictions and limitations to mass vaccination programmes, have highlighted the problems arising from the lack of a coordinated approach. The need for rapid exchange of information, medical resources and joint research requires a solid basis for cooperation between countries. The World Health Organization (WHO) has played a key role in this coordination, but has been criticized for its slow response at the beginning of the crisis. This has highlighted the need to reform and improve WHO's resources and mechanisms to better address future global health threats. At the same time, the pandemic has shown that multilateralism in health is not only possible, but also necessary for survival. Covid-19 has caused enormous economic disruption, from disruption of supply chains to rising national debt and a decline in global trade.

The global economy is closely interconnected, and economic difficulties in one country can have repercussions for the entire world. In this context,International institutions such as the International Monetary Fund (IMF) and the World Bank have a key role in providing financial support and technical assistance to countries struggling to cope with the economic consequences of the pandemic. Multilateralism, through these organizations, allows for the coordination of economic policies and the development of global standards and programs to strengthen economic stability. Revitalizing the multilateral approach to economics can help overcome economic inequalities and stabilize vulnerable economies that are particularly affected by the crisis (IMF,2021)

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SOCIAL AND CULTURAL CHANGES IN THE POST-COVID ERA

The Covid-19 pandemic has left deep scars on the way we live, work, learn and communicate. Changes in the social and cultural sphere have not only been inevitable, but also drastic, driven by the need to adapt and survive in times of uncertainty. Even after the crisis has subsided, the social and cultural changes that have occurred continue to shape our reality, and with it the challenges and opportunities that come with these new conditions. Covid-19 has drastically changed our ways of social interaction. Physical distancing and quarantine have imposed digital communication as the main channel for connecting with family, friends and colleagues. Due to the pandemic, video conferencing and virtual collaboration platforms such as Zoom, Microsoft Teams and Slack have become commonplace, changing the way we communicate and work (Keohane,2005).

This digital social connectivity has transformed the way we interact and brought new opportunities for establishing connections, but at the same time has created a lack of physical closeness, which has negatively affected the mental health of many. Isolation, uncertainty, and fear of illness have led to a significant increase in anxiety, depression, and other mental disorders. As a result, mental health has emerged as a significant social topic, resulting in increased awareness and support for coping with mental health issues. An increasing number of organizations and government institutions are investing in mental health programs, and therapy and counseling have become more accessible through online platforms.

This shift has opened up discussions and reduced the stigmatization of mental health issues, creating a cultural space where psychological well-being is a priority. The pandemic has forced companies to rethink their work models, leading to the popularization of working from home and hybrid forms of work. This trend has allowed many employees greater flexibility and balance between private and professional life, which is an important cultural shift in the corporate world. While working from home has brought many benefits, it has also led to certain challenges, such as the reduction of interpersonal relationships at work, disruption of work dynamics, and the emergence of so-called "burnout" or excessive exhaustion (Richard Haass,2020) In the field of education, online teaching has become a necessity, which has resulted in the rapid development of digital educational platforms. Despite the benefits, such as flexibility and the ability to access educational materials from anywhere, online learning has also brought negative sides, especially among children and young people. Many students have faced a lack of motivation, a sense of isolation and limited interactions with their peers. The pandemic has prompted people to reflect on their values and priorities. The crisis has led to an increased interest in issues related to well-being, ecology and local community.

Facing the unpredictability of the pandemic has led many to reevaluate their life goals and prioritize personal health, relationships, and happiness over professional and financial goals. In addition, interest in environmental awareness and sustainability has increased as people have become aware of the importance of protecting the environment and reducing consumption. The cultural trend towards locality and support for small businesses has intensified, especially in cities where people have come to value local products and services. This awareness of the local, coupled with global connectivity, has expanded the idea of global solidarity and support between people. The pandemic has also affected the art and cultural scene, especially due to restrictions on public events and gatherings. Museums, theaters, concert halls and galleries have been closed, and artists have been forced to find new ways of expressing themselves (Schwab & Marlet, 2020). This has led to an increased digitalization of culture and the arts, with many events taking place online and artists using social networks and digital platforms to reach their audiences. This digital transformation has made cultural content more accessible and allowed for greater interaction between artists and audiences.

However, the digitalization of art has also raised questions about the authenticity and value of the physical experience of art, especially in terms of collective experience and emotional connection with the artwork. Cultural institutions in the post-Covid world face the challenge of finding a balance between digital and physical presence, in order to maintain the

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interest of the audience and maintain cultural dynamics. The social and cultural changes in the post-Covid era are profound and affect various aspects of our lives. The digitalization of social interactions, new work and education models, changing cultural values, and new forms of artistic expression are just part of the broad transformation that has occurred during this period. These changes reflect our adaptations to the new reality, but at the same time they also raise new questions about the future of society and culture. Given the global nature of the pandemic, post-Covid changes emphasize the need for flexibility, empathy, and collaboration in building a more resilient and conscious society (Zizek,2020).

CONCLUSION

The Covid-19 pandemic has brought unprecedented changes to international relations and exposed existing weaknesses and challenges in the world order. From health to economic, from security to social, the global challenges that have emerged from the pandemic require new ways of cooperation and joint efforts. These challenges have increased the pressure on international institutions, requiring them to respond to urgent needs for global coordination and solidarity, while at the same time facing questions about their own effectiveness and credibility. The pandemic has also exposed the weaknesses of unilateral approaches and highlighted the need for multilateral diplomacy to successfully address global challenges. The need for coordination in the health sector, ensuring equitable economic development, and addressing climate change now more than ever requires the strengthening of global institutions. This process also entails deeper reforms and the introduction of new, flexible mechanisms that will encourage countries to cooperate in a way that addresses both common interests and specific needs.

However, the pandemic has also fueled nationalism and protectionism, creating additional tensions in international relations. Great powers, rather than fully uniting, have often pursued their own interests, leading to deepening geopolitical divisions. This further complicates the response to the pandemic and underscores the need to reform the global order in a way that ensures stability and sustainable development for all states. In the post-Covid era, successfully addressing the challenges of international relations will depend on the ability of states to overcome their own interests and build an effective and inclusive multilateral system. Only by establishing stronger ties, reforming international institutions, and creating policies based on trust and shared values can the world face future global challenges and build a more secure and stable international order.

The post-Covid era calls for new approaches to cooperation and greater preparedness to address global challenges. The pandemic has shown that no country is strong enough to deal with threats of this kind on its own, thus highlighting the importance of mutual understanding and coordination. International organizations, such as the United Nations, the World Health Organization, and the World Trade Organization, must face demands for reforms that will make them more prepared and flexible to respond to emergencies. These institutions need to increase their efficiency and transparency to restore the trust of member states and serve as platforms for true global solidarity. In terms of economic and social issues, the pandemic has exacerbated inequalities, not only between countries, but also within societies. A rapid economic recovery requires a focus on sustainable development strategies that also take into account the needs of vulnerable groups. Countries must create policies that strengthen economic stability through cooperation and resource sharing, as well as ensure that the workforce adapts to the new realities of digitalization and technological innovation. The world also faces the growing threat of climate change, which complicates global security issues and requires integrated responses. In this regard, the pandemic has shown that it is possible to achieve rapid change in human behavior and economic activities when the situation requires it. This can serve as a model for addressing environmental challenges through globally coordinated measures and policies that unite developed and developing countries. In conclusion, the pandemic has highlighted the need to

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adapt and modernize the international order. Although the challenges are complex, the post-Covid world can achieve greater stability and progress through a commitment to inclusive, transparent, and coordinated global policies. Establishing stronger, interconnected mechanisms of cooperation can be a key step towards addressing current and future global challenges.

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IMPLEMENTATION OF TQM TOOLS FOR OPTIMAL RESULTS: TOOLS FOR BETTER PRODUCTS

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Abstract

Total quality management (TQM) represents a strategic approach with a goal for better quality of the products through the integration of its techniques and tools for continuous improvement of the processes, increased satisfaction and fulfillment of the customers' expectations. By introducing the TQM, better quality of procucts and services is obtained, costs are redusts, and greater market penetration is enabled. This research is aimed at the appreciation and understanding of the need for introducing TQM tools such as Pareto Chart, Control Charts, Flow Charts, Fishbone diagram, Checksheet, Histogram and Scatter diagram. Also, it evaluates their effectiveness in achieving optimal results in production processes. Additionally, the paper points out organizations which have successfully implemented TQM and its tools demonstrating their ability to deliver defect-free products thereby gaining the loyalty of their customers as well as acquiring new ones. This paper highlighted the importance of TQM implementation through the introduction of best practices and innovative techniques.

Key words: *TQM, tools, customer loyalty, better process*

JEL Classification: L16, L60, M11

INTRODUCTION

Total quality management emphasizes continuous improvement in all organizational departments and levels, encouraging better knowledge about quality, as well as better cooperation among employees. The question of what kind of quality an organization has is increasingly present among management in all spheres of social action. Total quality management is considered as a civilizational response to the postindustrial revolution whose starting goals are productivity and profit as an indicator for quantity, while the negative consequences are the destruction of natural resources, environmental pollution, and the threat to human health and safety. By monitoring and improving quality all functions in the organization should be better aligned, which will contribute to better quality at the end and greater profitability. The key principles of this concept are focus on clients with putting their needs as a primary goal, continuous improvement of the processes, products and services, involvement of all employees enabling them to contribute to providing ideas for quality, process orientation, and ensuring that management actively promotes quality by introducing and supporting quality practices. As customer demands for quality products grow, organizations must adapt to meet their demands and deliver a quality product by improving their processes, as well as adopting innovative approaches. Total quality management techniques offer a practical, yet proven solution for organizations that aim to improve product quality as well as their operational efficiency, from minimizing defects to improving customer satisfaction through effective implementation of TQM tools.

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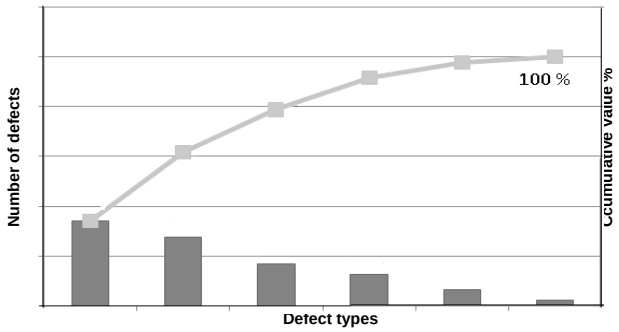
UNDERSTANDING TQM TOOLS

TQM tools are of great help for the organizations when it comes to following and identifying problems, correcting, and improving their quality in the future processes. Total quality management through its basic techniques and methods analyses, follows and improves the quality of services, products and processes. The basic and most used seven tools for total quality management are: Pareto Chart, Control Charts, Flow Charts, Fishbone diagram, Checksheet, Histogram and Scatter diagram.

Pareto chart is a graphical method for defect analysis that reveals the places (operations, process stages) where defects occur in the greatest number of cases. This analysis is used for decision-making that is used to identify and prioritize the most significant factors contributing to the occurrence of defects in processes. Pareto analysis is often called the "80/20 rule" and indicates that 80% of defects come as a result of 20% of the causes or 80% of product defects arise from 20% of the production steps in the processes. This analysis helps organizations focus their efforts on the most impactful problems, reduce defects, and improve quality. Furthermore, pareto analysis is simple yet useful and a powerful tool for decision making, helping companies achieve better efficacy and effectiveness. Pareto analysis begins by defining the problem and collecting data related to the problems or defects, then sorting them by frequency and ranking from least significant to most significant, visualizing them by presenting a Pareto chart (Figure 1), and identifying critical issues with a focus on the less important categories that contribute to most of the problems.

The benefits of applying Pareto analysis are better quality control by identifying the primary causes of defects, analyzing the most common customer complaints, prioritizing areas with the highest potential for improvement through resource allocation, and improving processes by timely detection of deficiencies in production processes.



Picture 1. Pareto diagram

Source: https://asq.org/quality-resources/pareto/

Control Charts are a graphical tool that shows the difference between normal (random) and abnormal (assigned) variations, helping to maintain consistent quality in order to monitor process performance and detect certain variations with processes. Process quality control is performed by checking the quality of semi-finished products, while they are in the process of transforming raw materials. When the quality control determines that the characteristics of the process are deteriorated, the process is stopped and the cause is investigated. Afterward, when the reason for deterioration is identified, the process is corrected and the production continuous. There are several types of control charts, but they all belong to two types of control charts: control charts for measurable characteristics and control charts for attribute characteristics. Control charts provide answers when the process should not be

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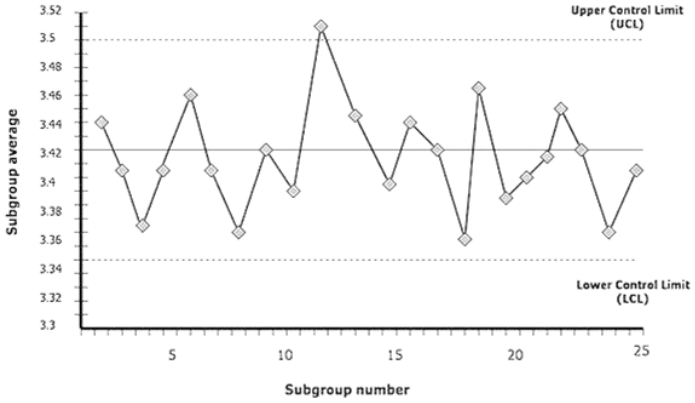
Original Scientific Paper

intervened in, because it is stable and capable, when the process should be intervened in, because the action can make it "more capable", to reduce variations, and when production should be stopped immediately, because a poor quality product will be produced (defective production). The control card has a central line (CL) which represents the average or mean of the process data, upper control line (UCL) or the maximum acceptable variation in the process, and a lower control limit (LCL) or the minimum acceptable variation in the process. The Y axis is plotted with the measurement value, i.e. the statistical indicator of the property being controlled, and the X axis is plotted with the time of sampling (Figure 2). When the measurement data are within the control limits, the process is stable, but if they are at or outside the control limits, corrective measures need to be taken.



Picture 2. Control card

Source: https://byjus.com/maths/control-charts/

Flow Charts represent the process or workflow using standardized symbols that show the sequence of steps. They help to make the process easier to understand, analyze, and improve by identifying inefficiencies, defects, and duplication of work activities. The key components of Flow Charts are symbols and steps as an individual activities or tasks needed for the accomplishment of the process, presented in detail as on picture 3. The symbols used are oval represents start and end of a process, rectangle represents an action, task, or operation, diamond represents a decision point and arrow shows the flow or direction of the process. Flow Charts are used to document workflows, for order processing or inventory management, in manufacturing to map steps in production to identify inefficiencies and to improve process quality through visualization of processes for detecting and eliminating defects, by standardizing the training and documentation process. These charts are widely used in various industries to simplify processes and encourage their continuous improvement, they also help in process optimization and quality improvement.

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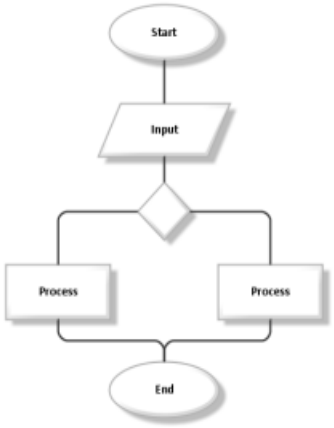

Picture 3. Flow Charts

Source: https://httpwanda.wordpress.com/2018/11/07/flowchart/

Checksheet e simple and easy tool for collecting and organizing data during production processes. It serves to systematically record information, identify patterns, and analyze data to improve processes. Each checklist has a description of the purpose, why, how, and what is being monitored, the data is divided into categories, there is a table with graphic structures, and data that is recorded during the process. This tool is easy to understand and use, suitable for all levels of employees, helps in discovering patterns, trends or problems, provides a quick and direct way to collect data and provides archiving of data for future analysis, i.e. documentation.

Scatter diagram is a graphical tool used to analyze and display the relationship or correlation between two variables. They help identify patterns, trends, and potential relationships in data, making them essential for quality control and troubleshooting when implementing total quality management. This tool shows whether there is a correlation between two factors (for example, strong positive, negative, or no correlation), provides a clear picture of how variables are related, helps identify areas that need improvement in production processes or systems, and identifies irregularities or defects. A Scatter diagram shows a positive correlation when the two variables increase together in an upward direction, when one variable increases and the other decreases or decreases in a downward direction, it is a negative correlation, and when there is no recognizable relationship, then we say that there is no correlation between the observed and measured variables.

Fishbone diagram is popular in the literature due to its shape as a fish skeleton or as a diagram of cause and effect (Cause and Effect, CE). The Ishikawa diagram helps the manager find and fix the causes of defects, reduce time losses, etc. It is constructed by drawing a main axis and defining the problem or goal to be solved on the right. The goal should be clear and precise. The auxiliary axes are added laterally, on which the factors, the main causes of the problem, are listed, while the auxiliary axes are added to the side axes, on which the causes of the main causes should be listed. In this way, a branching diagram or Ishikawa diagram is obtained, shown in Figure 4. This tool can be applied in three phases with a problem statement, root cause analysis, and diagram construction. The fishbone diagram is used in many industries to improve processes, encourages group collaboration and idea generation, provides a structured way to analyze problems, and simplifies complex problems.

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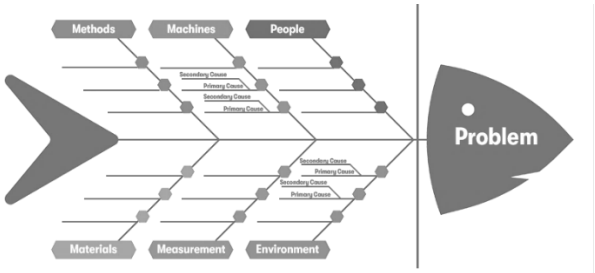

Picture 4. Ishikawa diagram

Source: https://purplegriffon.com/blog/fishbone-diagram-ishikawa

Histogram is used to visually display the distribution of numerical data. It shows the frequency of data points within specified intervals, making it an effective tool for analyzing patterns, trends, and variations in processes or data. It provides data distribution, helps identify trends, highlights irregularities, and provides insight into variation and consistency. In histograms, the data distribution can be normal when the data is evenly distributed, then more data points are concentrated on the left or right side - skewed distribution, uniform distribution when we have equal frequency across all intervals and when there is clustering of the data or bimodal distribution.

CASE STUDIES

The TQM approach is focused on continuously improving the quality of products and services in order to exceed customer expectations. This paper presents several successful examples of organizations that efficiently and effectively cultivate the TQM methodology.

Toyota's Approach to Quality Management is a synonym for quality, reliability and innovation with quality improvement and the application of TQM tools and techniques, which have been key in establishing its position in the market as a global automotive leader. Toyota is known for its system for production management with the use of few key tools or systems like Toyota Production System (TPS) which focuses on two main principles: producing only what is necessary, when it is necessary and in the necessary quantity with which the waste will be minimalized and the costs decreased Just-In-Time (JIT) и Jidoka (Automation with a Human Touch). This means that the machines are designed to stop automatically when a problem arises in order to prevent a defective product to be made. Toyota also fosters a culture of continuous improvement, where employees at all levels are encouraged to propose and implement changes no matter how small in order to improve processes and product quality or continuous improvement (Kaizen). Inspired by TPS, Poka-Yoke is a technique for preventing errors by designing the process in such a way that errors are impossible or immediately detectable. Toyota does not only focus on its own quality management, but they work closely with suppliers, ensuring that parts meet their strict quality standards, thus ensuring consistency throughout the production chain.

Motorlola adopted the TQM methodology to better overcome defective products, increase customer satisfaction, and improve loyalty for purchasing their products. Motorola used Six Sigma, a process to improve quality and applied the DMAIC method (Define, Measure, Analyze, Improve, Control). By introducing this method, it was possible to find the root causes of defects and make important changes to improve quality, reduce costs and increase customer satisfaction. By introducing Six Sigma, employees created a culture of continuous improvement, supporting change, and managing large amounts of data. The TQM methodology also contributed to improving quality and efficiency with more competitive and profitable products and decisions.

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Original Scientific Paper

McDonald's applies TQM principles to ensure consistent quality globally. It uses TQM principles, but also lean principles to improve efficiency and reduce waste. To ensure consistent quality, McDonald's uses process mapping tools, and to reduce errors, it applies Six Sigma's DMAIC framework. Mistake-proofing techniques or Poka-Yoke are used to ensure food quality and prevent errors. Through the Kaizen principle, employees propose small, timely, and ongoing process improvements, and the Just-in-time principle is used to minimize storage costs and food waste. To reduce costs, Lean Six Sigma is also applied, through root cause analysis that identifies waste, and full productive operation keeps equipment operating efficiently, reducing downtime and repair costs. Standardization and standard processes enable the maintenance and improvement of product quality, which keeps McDonald's a leader in the fast-food industry. The advancement of lean processes ensures efficiency, effectiveness, and safety. McDonald's also places emphasis on customer focus, as the company prioritizes customer satisfaction by providing high-quality food, excellent service, and a clean environment.

BENEFITS OF TQM IN IMPROVING QUALITY

Total quality management provides numerous benefits to industries, employees, and consumers alike. By focusing on customer needs and expectations, TQM ensures higher quality products and services, leading to greater customer satisfaction and loyalty. TQM encourages a culture of continuous development of processes, products and services, i.e. continuous improvement by reducing defective products. It invests in employees and through training and their involvement in processes and problems motivates them to give initiatives to improve quality and their productivity. Standardized processes ensure that products and services meet required quality standards, thereby reducing waste, defects, and rework, reducing costs, and increasing quality and profitability. By ensuring superior quality and reliability, organizations gain a greater competitive advantage, attracting and retaining more users of products and services.

CONCLUSION

The introduction of TQM tools and techniques is key to achieving optimal results and producing better products. With their full implementation, organizations can identify the places where defects occur as well as weak production processes and focus on their elimination and their continuous improvement. This methodological approach fosters a culture of employee involvement, data-driven decision-making, and customer-centric approaches that ensure consistent quality and innovation. TQM tools and techniques improve coordination between departments, fostering a unified effort to efficiently and effectively achieve quality and product goals. Industries that apply this methodology stand out from the rest because they offer quality products and services, build loyalty, increase operational efficiency, lead to leadership and long-term competitiveness in the market. Their consistent use builds trust with customers, positioning the organization as a reliable supplier of high-quality products and services.

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IMPORTANCE OF MEASURING SERVICE QUALITY IN THE SERVICE INDUSTRY

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Abstract

Measuring service quality is essential for ensuring greater customer satisfaction as well as sustainable competitiveness in service industries. This research examines methodologies for assessing service quality and their essential role in driving customer satisfaction and loyalty, with a focus on their practical application in service industries. Also, the application of various methods and tools for assessing service quality has highlighted the importance of measuring service quality, due to customer retention, operational efficiency and overall profitability. The research highlighted the impact of measuring service quality by building customer loyalty, improving employee performance, and achieving long-term business success.

Key words: models, service industry, customers, loyalty, quality
JEL Classification:

INTRODUCTION

Ensuring excellent service quality in service industries and ensuring positive customer satisfaction is an important issue for maintaining existing capabilities to satisfy existing customers and the opportunity for its further improvement. When defining quality in a service context, it is necessary to start from the user, that is, from their perceptions and understanding of quality. It follows that quality is everything that the user believes it to be, that is, that quality is the ability of a product or service to meet or exceed the user's expectations. Service quality generates an important amount of interest among researchers and practitioners (Marinković & Senic, 2012).

According to Parasuraman, et al. (1988) defined perceived quality as “a global judgment or attitude regarding the superiority of a service”, and Bitner & Hubbert (1994) defined service quality as “the customers’ overall impression regarding the inferiority/superiority of an organization and its services”. Providing quality service means meeting customer expectations on a consistent basis and receiving better service than they expect (Churchill & Lewis, 1983). Research by a number of researchers suggests that service quality is multidimensional, but there is no general agreement on the number of determinants and the number of attributes that determine service quality (Brady & Cronin, 2001).

Therefore, improving the quality of service needs to be viewed from the consumer's perspective, in order to avoid unnecessary costs for service elements that the consumer would consider, at the very least, unnecessary. Consequently, the selection of service elements is of great importance. Therefore, it is increasingly important for every service industry to build genuine relationships with the users of their services, in order to retain loyal customers who will bring long-term profits and create a competitive advantage over others.

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THE NEED FOR MEASURING SERVICE QUALITY

Measuring service quality in the service industry is key for understanding the satisfaction of customers through consistent experience and building loyalty, identification of areas for improvement of processes, maintaining the advantage over competitors by meeting or exceeding expectations and using feedback to train and motivate staff.

In hotels and restaurants, measuring service quality is enabled through guest feedback, online reviews, and anonymous visitors that help identify determinants such as employee behavior, food quality, space availability, atmosphere, surroundings, etc.

Telecommunications companies measure service quality by tracking metrics such as call resolution time, network reliability, and customer support effectiveness, ensuring they offer seamless experiences to their customers. Retail stores evaluate service quality by tracking customer complaints, checkout speed, and staff assistance, and poor service can lead to losing customers to competitors. Likewise, airlines, taxi services, and public transport operators evaluate service quality through punctuality, comfort, and staff behavior, which is essential for customer retention. Healthcare facilities, such as hospitals and clinics, often assess patient satisfaction through surveys to ensure that medical care, wait times, and interactions with staff meet expectations, thereby ensuring patient trust and loyalty. Almost all industries that have service activities focus on how measuring service quality affects customer retention, process improvement, staff training improvement, and increase profitability.

MODELS, TOOLS AND TECHNIQUES FOR MEASURING SERVICE QUALITY

Service quality can be monitored, measured and improved by applying an appropriate model and measurement technique. Measuring service quality allows for comparison of changes before and after, identification of quality-related problems and setting clear standards for service delivery Shahin (2006). These models and techniques cover a wide range of activities in different service industries and each presents a different view of the issue of service quality. Conceptual models and techniques for service quality can be very useful, as they provide an overview of factors that have the potential to affect service quality and identify quality deficiencies. There is no generally accepted conceptual model, and there is no consensus regarding the measurement of service quality.

The most widely used model for measuring service quality is the SERVQUAL model, which is based on five determinants of service quality: reliability, responsiveness, security, understanding of the user (empathy), and touch elements. According to literature research, the SERVQUAL scale is used to assess service quality in various service industries. Some researchers use a modified SERVQUAL scale with attributes and determinants of quality to meet the research objectives and the specific industry in which the research is conducted. According to Grönroos (1984), the concept of service quality should be created based on the needs of service users. Accordingly, the first characteristic in his model of service quality is the perceptions of users about the quality of services and the second characteristic is the determinants that influence the quality of services. In this model, a distinction is made between technical quality (what is delivered) and functional quality (how it is delivered). Acceptable technical quality can be considered as a prerequisite for successful functional quality and as long as the value of technical quality is satisfactory, functional quality is more important for the overall perceived quality (Ghobadian et al. 1994). A quantitative model that measures customer satisfaction through surveys and feedback is the Customer Satisfaction Index (CSI), which reflects overall satisfaction and identifies key factors of satisfaction among service users. The RATER Model was created by modifying the SERVQAL model as a simplified version and is used to identify gaps between customer expectations and perceptions. This model is applied to improve service user satisfaction by focusing on reliability and accountability.

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Some of the tools and techniques for measuring service quality are Customer Feedback Surveys with direct feedback through structured surveys or questionnaires, effective for understanding specific aspects of service performance; Mystery Shopping, which provides insight into the real experience of consumers, and uses trained evaluators who pose as customers to assess service delivery; Mystery Shopping, which provides insight into the real-world customer experience, uses trained evaluators posing as customers to assess service delivery; Online Review Analysis, useful for identifying trends and areas for improvement by tracking user reviews and ratings on platforms such as TripAdvisor or Google Reviews; Focus Groups; Service Metrics Monitoring; Customer Satisfaction Metrics that provide a clear benchmark for success by assessing satisfaction; Voice of the Customer (VoC) Programs offer a comprehensive understanding of customer needs and expectations through systematic collection and analysis of feedback; and Behavioral Analytics for indirect satisfaction assessment useful for digital services and e-commerce platforms.

MEASURING SERVICE QUALITY THROUGH EXAMPLES

Measuring service quality and its importance in establishing a methodology for measuring it is present across many different sectors in the service industry.

In the hospitality industry, Marriott International uses guest satisfaction surveys to measure the quality of service across its properties around the world. These surveys collect feedback on cleanliness, staff behavior, amenities, and the overall guest experience. Based on this data, Marriott conducts employee training and adjusts operational strategies to meet customer expectations. As a result, Marriott International achieves high guest satisfaction, building loyalty, and establishing itself as a benchmark in the hospitality industry. Walmart tracks service quality using online reviews, in-store feedback, and mystery shopping to assess areas such as checkout speed, product availability, and staff assistance. These metrics help Walmart optimize store operations and improve the customer experience, ensuring positive customer satisfaction and increased sales. Online learning platforms like Coursera also measure the quality of their services through student feedback on course content, platform usability, and instructor engagement. They use this data to improve the learning experience, as well as refine course materials or improve technological accessibility. Netflix monitors service quality through viewer data analytics and satisfaction surveys, focusing on factors like streaming quality, content relevance, and customer support. This helps them tailor content recommendations and improve the viewer experience, retaining their users. Uber Eats evaluates service quality by analyzing delivery times, food condition upon arrival, and customer reviews. They also use this information to improve app performance, train delivery drivers, and ensure compliance by restaurant partners.

THE IMPACT OF MEASURING SERVICE QUALITY

Measuring service quality impacts the profitability and growth of service industries. Industries that deliver consistent, high-quality service attract and retain more customers, which leads to higher sales and profits, or increased revenue. Identifying inefficiencies through service quality metrics helps optimize processes, reducing unnecessary costs and achieving cost efficiency. With consistent quality, service industries will expand in the market, i.e., they will have a proven reputation for top-quality services. Measuring and improving service quality helps build a trusted and reliable brand image. Satisfied customers share positive experiences, organically strengthening a company's reputation. Tracking service quality allows businesses to respond quickly to negative feedback, reducing potential brand damage.

Service industries that measure and meet customer expectations foster long-term customer loyalty. Satisfied service customers are likely to return and spend more, contributing to stability. Identifying and addressing service deficiencies reduces the risk of losing customers

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to competitors. Regular measurement reveals unmet customer needs, guiding the development of new products or services. Service industries that monitor service quality stay ahead of trends and adapt more quickly to customer demands. High service quality sets a business apart from the competition, making it the first choice of customers. Measuring service quality is not only a reactive process, but also a proactive approach to improving performance, satisfying customers, and maintaining a competitive advantage.

CONCLUSION

Measuring service quality in service industries is essential to ensure positive customer satisfaction, build loyalty, and maintain competitiveness in the market. By assessing service quality, service industries can identify areas for improvement, address customer concerns, and improve overall efficiency and effectiveness. It also allows service industries to align their offerings with customer expectations, foster trust, and strengthen their reputation. Regularly assessing service quality fosters a culture of accountability and excellence in industries, motivating employees to consistently provide superior service. Measuring service quality creates a solid framework for innovation by highlighting customer problems and desires in order to create new or improved service offerings. Investing in measuring service quality leads to sustainable growth and success of service industries.

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ANALYTICAL APPROACH OF MANAGEMENT AND ITS APPLICATION IN THE PROCESS OF FINANCIAL DECISION-MAKING IN TOURISM ENTERPRISES

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Abstract

With managerial activities, it is necessary to address the problems that arise during the operation of the tourism enterprise. In this way, the desired state is ensured, that is, the achievement of the enterprise's goals in the field of tourism. The essence of managerial activities is decision-making. Management decisions are made in situations characterized by the need for action and the existence of multiple lines of action. At the same time, linking these activities into the function of making the right decisions is a basic condition and task of the financial manager. Of course, all this in the directionof achieving the ultimate goal, increasing shareholder wealth. In this regard, financial management, and especially in tourism, should give an answer to the optimal use of funds, i.e. the use of funds, the provision of sources of financing, the provision of optimal cost of the capital employed, the decision on the distribution of profits, the dividend policy, in order to achieve the stated ultimate goal. The application of an analytical approach in financial decision-making in enterprises in the field of tourism in the Republic of Macedonia is very important for a more efficient and effective realization of the goals.

Key words: tourism, finance, planning, decision-making, companies

Introduction

It should be borne in mind that tourism managers have the ability to make optimal financial decisions only if they are creative, motivated, and conveniently controlled by employees (shareholders). Motivation is implied, i.e., it includes the amount of earnings, the opportunity to receive shares, and other privileges (e.g., professional training, use of a car by a travel company, etc.). Supervision is carried out with audit of financial statements, restriction of managerial decisions, systematic control of the privileges of tourism management in the Republic of Macedonia and the like. It should be noted that in modern conditions of tourism development, it is not enough for a manager to be creative alone, because a successful tourism manager, in the decision-making process, is also necessary to use an analytical approach.

1. Theoretical-methodological approach to research

For any empirical research to be carried out effectively, it is necessary to first develop a research project. The research project encompasses several main stages:
Determine the purpose and subject of the research;

- Hypothesis;
  Sample selection (sample selection);
  Development of methodological instruments for field data collection;
  On-the-ground data collection;Data processing;
  Interpretation of the data, i.e. the design of the study.[3]

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1.1. Objectives of the study

This research has a scientific and practical purpose. The scientific goal refers to certain theoretical knowledge about the application of the analytical approach of management in the financial decision-making process in tourism enterprises, and the practical goal is related to the specific implementation of theoretical knowledge in practice.

1.1.1. Scientific objective

The scientific objective refers to the discovery of certain theoretical knowledge, the application of the analytical approach of management in the financial decision-making process in tourism enterprises. The scientific goal of this research is to uncover new knowledge about how if an analytical approach is used in the financial decision-making process in tourism enterprises, rapid tourism development will be ensured. Namely, through the method of analysis, through a survey with managers, we determined the application of the analytical approach in the process of financial decision-making in enterprises in the field of tourism.

1.1.2. Practical objective

This research also has a practical purpose, which is closely related to the scientific purpose. It is related to a particular implementation of theoretical knowledge in practice. The practical objective of the research is to implement the discovered theoretical knowledge about the representation of the analytical approach of management in the process of financial decision-making, which will contribute to the dynamic development of tourism enterprises, and thus tourism. Therefore, the practical objective of this research has broad dimensions, as it should mobilize all factors that are directly and indirectly involved in tourism, i.e. are interested in this issue.

1.2. Subject of the study

- The subject of this paper is the use of the analytical approach of management in the process of making financial decisions of enterprises in the field of tourism. The subject of this research analyzes five concepts that need to be operationalized:
- analytical approach,
- Tourism Management
- financial decisions, and
- tourism enterprises.

1.2.1. Analytical approach

Etymologically, the term "analysis" comes from the Greek word >>analysis<< which means the dismemberment of a whole into its constituent parts. Thus, parsing is a fundamental feature of management's analytical approach to making financial decisions of tourism enterprises. In fact, dismemberment means the separation of a complex object into the parts of which it consists in order to perceive their qualities, determine the quality of the complex object, and indicate their effect on it.

1.2.2 Tourism Management

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The crucial role or significance of management in the Republic of Macedonia, and therefore of managers, is to guide the enterprise in the field of tourism towards the achievement of its goals in the most efficient and effective way. Each company has a specific purpose for which it exists, and management has that responsibility to exploit and combine organizational resources in the most optimal way to achieve the firm's goal. Management moves the corporation in the direction of achieving its goals by specifying the activities that the members of the company are obligated to perform. If such activities are largely creative and creatively determined, the productivity of each employee will contribute to the achievement of the company's goals. Management strives to motivate individual activities that will lead to the achievement of organizational goals, and to discourage and discourage those activities that will eventually hinder the achievement of goals. The relationship between management and goals can best be expressed in the following statement: "There is nothing more important to the management process than the achievement of goals. Management has no meaning separate from the goals to be achieved."

1.2.3. Financial decisions

Financial decisions include investment decisions, then strategic financial decisions, and finally tactical financial decisions. In order to prepare an investment decision for the successful operation of enterprises in the field of tourism, it is necessary to make an investment project that contains numerous interdependent and related activities. Investing is the exchange of available assets for expected future returns. One of the key reasons why businesses fail is the lack of money to settle obligations. In other words, businesses fail to maintain a steady cash flow. Also, financial institutions such as banks will ask first and first ask of a tourism company is what its cash flow is. Cash flow is an overview of the inflows and outflows of money in a business. It's a two-way process – cash inflows and outflows. What needs to be done is to effectively manage both suppliers (money outflow) and buyers (cash flow). Cash flow forecasts, capital budgeting, cost of capital, and risk are important in investment deferrals because they provide information about how much money should be provided for the tourism business. Usually, these forecasts/projections are made on a monthly basis. Also, to the extent that a tourism company has a positive cash flow for years, there is a big plus for banks to realize a line of credit.

The decision to invest is the wisest decision of every individual, every family, every enterprise, and especially in the field of tourism. Simply put, if we don't put everything we have earned into the right investment, i.e. the money that a tourism company puts in today, will bring in additional income tomorrow. All that is required is that the money saved, regardless of its amount, is invested with a clearly defined goal that will ultimately bring profit to the tourism enterprise. All investments with a maturity of more than one year are called long-term investments. Making long-term financial decisions is a complex and time-consuming process that is determined by the following factors: savings, interest rates, and expectations.

The term capital has several interrelated meanings in economics, finance, and accounting. In finance and accounting, capital generally refers to financial wealth, especially that which is used to start and maintain a business.

The dividend policy is part of the tourism company's financing decision. The dividend payout ratio indicates how much of the profit can be retained in the company as a source of funding.

The existence of an enterprise in the field of tourism and in any field in general cannot be imagined without a good management structure. Behind the success of any enterprise, and in this context in tourism, is a successful management team. Management teams are the key subjects for making tactical financial decisions in a tourism enterprise. Tourism managers behave in accordance with managerial roles to accomplish management functions. Every

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tourism manager needs to know how to perform their tasks, to know how to organize the rest of the employees and, ultimately, to successfully perceive the results of the work. In contrast to strategy, financial tactics are the concretization of strategy, and it differs in that it is adaptable, quick to use results, corrects mistakes, and changes its own goals, but still stays within the framework of strategic goals.

1.2.4. Tourism Enterprises

Management is very important because the existence of the tourist enterprise and its activity depends on it, which is very important, both for a national economy such as the Republic of Macedonia and beyond. In today's industrialized society, complex technologies dominate and it is the organization that connects people, knowledge, and raw materials to perform tasks that no single individual can perform alone.[4] It can be pointed out that management is a very important, and often often decisive factor for a successful business in today's turbulent working environment. In this connotation, the importance of professional management is emphasized. More specifically, it means that professional management is not carried out by the entrepreneur (the owner of the capital), but by engaged professional managers. Peter Drucker believes that in today's turbulent economic conditions, management is the basis and factor for the successful business of any enterprise, especially in tourism. It is inevitable when the firm reaches a certain volume of activity. When an entrepreneur's management system is to be moved to professional management, the critical point is 300–1000 employees, depending on the degree of complexity and differentiation of his work, as well as the ability of the entrepreneur. The main preoccupation of managers is to ensure the growth and development of the enterprise, and this means to achieve its business and development goals. The importance of tourism management lies in the need for effective functioning of the tourism enterprise in the Republic of Macedonia. More specifically, it means achieving goals in an effective and efficient manner. Efficiency is the degree to which a tourism company achieves its goals. Essentially, it means whether the firm succeeds in achieving the goals that have been set in advance, or whether it means providing tourism products and services that consumers will value. From the above, it can be pointed out that efficiency is the achievement of the tasks of the enterprise qualitatively and quantitatively, including the characteristics of the output i.e. the end results.

1.3. Hypotheses

One of the most important issues in empirical research is hypothesis formulation and verification. "It is a claim that can be put to the test to prove its worth. The hypothesis may appear to be contrary to or consistent with conventional wisdom. It can be proven whether it is true or incorrect. In any case, it leads to empirical inquiry. Whatever the outcome, the hypothesis is a question, posed in such a way that some kind of answer can be obtained. It is an example of organized skepticism of science, a refusal to adopt any claim without empirical verification." Each hypothesis shows the relationship between independent and dependent variables.

1.3.1. General hypothesis

An analytical approach is important in making quality financial decisions regardless of the size of the enterprise, its organizational structure, and the type of activity.

[4] For example: the operation of energy complexes, production facilities, international hotel and/or restaurant chains, transport companies, tour operators, trading houses, utilities and the like.

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Original Scientific Paper

1.3.1.1. Special hypothesis

A separate hypothesis states that the tourism coppany is partially applying the analytical approach to financial decision-making by management.

1.4. Research Methods and Organization

1.4.1. Research methods

In the study of social phenomena, general and specific methods are used. "All social sciences, in addition to general methods, apply and use special and specific methods that are appropriate for collecting data in the appropriate field."[5] Hence, this research is based on a particular methodology. In processing the data obtained from the study, we applied the method of analysis and the method of synthesis.

1.4.1.1. Method of analysis

The term "analysis" comes from the Greek word >>analysis<< which means the dismemberment of a whole into its constituent parts.[6] Thus, parsing is a fundamental feature of the method of analysis. In fact, dismemberment means the separation of a complex object into the parts of which it consists in order to perceive their qualities, determine the quality of the complex object, and indicate their effect on it. Namely, on the tabular data, we applied a breakdown of their content and gave an explicit explanation.

1.4.1.2. Synthesis method

The synthesis method is the process of scientifically investigating and explaining reality and by means of synthesizing simple judgments into more complex ones. Synthesis is the process of generalization in which all more abstract terms arise compared to previous terms. Synthesis is a way of systematizing knowledge according to the regularity of formal logic, as the process of creating theoretical knowledge in the direction of the particular to the general, i.e. from the species to the genus. All the findings obtained through the method of analysis, using the synthesis method, we turned them into conclusions from which we further gave recommendations for improving the analytical approach of management in financial decision-making in tourism enterprises.

1.4.2. Methodological research techniques

In the defined object of research as methodological techniques we used:
- Questionnaire
- Scaling method and
- Statistical method.

1.4.2.1. Questionnaire

We applied the survey to managers in several enterprises in the field of tourism. It aimed to get a clear picture of their positions, in terms of whether the analytical approach of management is taken into account in the financial decision-making of tourism enterprises.

[5] Todorović, A., (1978), Ibid, 58.

[6] Стојановиќ, Т., (1990), Анализа на работењето на претпријатијата, Сојуз на сметководствените и финансиските работници на Македонија - Скопје, Скопје, 21.

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Original Scientific Paper

1.4.2.2. Scaling method

This method is used to obtain data from multiple survey questions. We applied scaling to activate opportunities to take into account the outcomes of planning in financial decision-making. In formulating the degrees, the statistical processing of the data was taken into account, which was the next step.

1.4.2.3. Statistical Method

This method has been used in this study because it achieves greater accuracy in the study of phenomena. We used the following statistical technique: calculating percentages. Statistical processing of the data is done by computers.

1.4.2.4. Specimen design and selection

In the design and selection of the sample, consideration was taken into account. Representation depends on the size and manner of its acquisition. The sample size depends on the number of subjects taken for examination. In addition, the sample must contain at least 100 members of the population in order to make reliable statistical conclusions.[7] In this context, this survey surveyed 200 tourism managers.

1.4.2.5. Implementation of the research

This phase of the study was operational. The survey was carried out in the time period from June 2018 to September 2018 in a number of enterprises in the field of tourism. From the management team of the tourism companies we have come across full understanding and assistance.

2. Analysis of the resulting research data

This section is the most important part of the paper and is actually the final stage of the research.[8] As we have pointed out, using the method of analysis, we also analyzed the obtained empirical data from the survey of managers in several tourism enterprises, after systematizing them, tablating, determining the number of respondents, calculating the percentage according to the number of respondents.

2.1. Respondents' views on the application of management's analytical approach to quality financial decision-making in tourism enterprises

As we pointed out earlier, the basis of this study is the analysis of the empirical data obtained from the survey of managers in several tourism enterprises, after we systematized, tabulated, determined the number of respondents and calculated the percentage according to the number of respondents In this connotation, on the tabular data, and on the basis of the respondents' responses, we applied a breakdown of their content and gave a precise explanation.

Thus, the separate hypothesis states: "It is assumed that the tourism company partially applies the analytical approach to financial decision-making by management".

Table 1 presents the respondents' views on the application of the analytical approach to financial decision-making by management in the companies where they have established their employment relationship, which were realized through a survey. There are differences in the enterprises in the field of tourism in the Republic of North Macedonia regarding the

[7] Бунташески, Б., (1994), Ибид, 60.

[8] Бунташески, Б., (1995), Психологија на туризмот и угостителството, Универзитет „СВ. Климент Охридски“ - Битола, Факултет за туризам и угостителсво - Охрид, Охрид, 238.

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application of the analytical approach of management in financial decision-making. In many large tourism enterprises, in the management of finances, significant shortcomings can be pointed out in terms of the application of the analytical approach of management in making adequate financial decisions. It is closely related to the level of education of the employees, their work experience, as well as the function they perform. Certain differences of opinion can also be observed depending on the sex of the respondents, although gender is not a decisive factor in making quality financial decisions.

There are differences regarding the importance of the planning function in financial decision-making in tourism enterprises. The planning function is important in making quality financial decisions regardless of the size of the enterprise, its organizational structure, and the type of activity.

The respondents' views on the question of whether they have an analytical approach to financial decision-making in the firms where they base their employment are given in Table 1.

	There is	Part of it	No, none	Total
Number of respondents	13	171	16	200
Participation in %	6,50%	85,50%	8,00%	100%

Table 1. Do you have an analytical approach to making financial decisions in your company?

From the data in Table 1, which presents the respondents' views on the application of an analytical approach to financial decision-making in tourism enterprises, it can be stated that for the most part in the analyzed tourism enterprises, the analytical approach in financial decision-making is partially applied, while an almost insignificant number of respondents who expressed that they do not have a fully analytical approach to financial decision-making at all, They have an analytical approach to financial decision-making. This situation points to the fact that financial decision-making in enterprises in the tourism sector, for the most part, is not based on proper analysis, planning and control of finances in enterprises. Hence, it follows that decisions related to finance, without proper application of an analytical approach in tourism enterprises, and based on the experience of the past period, are not entirely valid and can cause negative consequences in their operations. With the full application of the analytical approach in tourism enterprises, it will certainly contribute to the effectiveness and efficiency of their operations.

In this context, one can also consider the respondents' attitudes according to the function they perform in the enterprise, the level of education, work experience and gender to the application of the analytical approach in the work of enterprises in the field of tourism.

According to the function they perform, the majority of respondents stated that an analytical approach in financial decision-making was partially applied. Given the hierarchical structure, managers in senior management positions believe that an analytical approach to financial

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decision-making is fully applied (chairman of the board of directors with 25%, general manager with only 5.88%). According to the data, as many as 10% of the respondents who hold the position of Chairman of the Board of Directors and 20.59% of the respondents who hold the position of General Manager believe that the analytical approach in financial decision-making is not applied at all.

Similar are the respondents' responses according to their educational structure. Namely, most of them believe that an analytical approach to financial decision-making has been partially applied. This finding is particularly characteristic of managers with a higher level of education (about 90%), while a large majority of employees with a lower level of education are of the opinion that an analytical approach to financial decision-making is not applied at all (among respondents with primary education - 40%). Such an analysis is expected because many managers with lower levels of education do not possess a quality education in the field of financial decision-making.

If the work experience of managers is taken into account, it can be noted that respondents with more work experience, for the most part (94.50% of respondents with 16-30 years of experience and 80.90% of respondents with 31-40 years of experience) believe that the analytical approach in financial decision-making is partially applied. The situation is different for respondents with relatively less work experience, where they believe that with 55% also an analytical approach in financial decision-making is partially applied, and with 40% that an analytical approach in financial decision-making is not applied at all. From this it can be pointed out that work experience nevertheless has a significant impact in recognizing the application of an analytical approach in financial decision-making.

According to the gender structure of the respondents, there are no significant deviations in their thinking regarding this issue. Namely, the majority of respondents of both sexes reported that an analytical approach to financial decision-making was partially applied. It is generally stated that the analytical approach in financial decision-making is partially applied in the work of enterprises in the field of tourism. That is, the analytical approach lacks the necessary role and significance in making effective and efficient financial decisions, which can fundamentally negatively affect the business activity of tourism enterprises. As noted earlier, this is due to the fact that some managers are not sufficiently educated both theoretically and practically in the field of financial management and financial decision-making.

To overcome these conditions that are present in our tourism economy it is necessary to have a willingness, especially on the part of the top management, to engage young management teams who have more modern ideas, certain creative ideas and the ability to adapt to modern trends in work and implement modern analytical scientific methods of working, especially in the area of financial management and financial decision-making.

Conclusion

Etymologically, the term "analysis" comes from the Greek word >>analysis<< which means the dismemberment of a whole into its constituent parts. Thus, parsing is a fundamental feature of management's analytical approach to making financial decisions of tourism enterprises. In fact, dismemberment means the separation of a complex object into the parts of which it consists in order to perceive their qualities, determine the quality of the complex object, and indicate their effect on it.

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