
**AN ASSESSMENT OF OPERATIONS RESEARCH: A PANACEA
FOR PROBLEM-SOLVING INTELLIGENT BUSINESS DECISION-
MAKING**

**AKPAN, E. Ebenezer, Ph.D, FCICN, AP, PPGDCA,
PHDCDPM
Corporate Institute of Research and Computer Science
140 Ikot Ekpene Road
Uyo, Akwa Ibom State**

And

**GODDYMKPA, Commy Precious Ph.D
Faculty of Education
University of Uyo**

ABSTRACT

The study was sort to investigate the assessment of operations research as a panacea for problem-solving intelligent business decision-making. Operations Research is the application of scientific methods to improve the effectiveness of operations, decisions, and management. By means such as analyzing data, creating mathematical models and proposing innovative approaches, Operations Research professionals develop scientifically based information that gives insight and guides decision-making. They also develop related software, systems, services and products. Operations research attempts to provide those who manage organized systems with an objective and quantitative basis for decision; it is normally carried out by teams of scientists and engineers drawn from a variety of disciplines. The study reviewed the concept of operations research, it history, characteristics, applications and it importance. The study also reviewed the concept of decision-making, Concept of Business Decision-Making, Concept of intelligent Business Decision-Making, and Concept of Data Scientist. It was on this basis that the paper concluded that the main aim of Operations Research is to find the best solution for any problem. It goal is to help managers obtain a quantitative basis for decision-making. This results in increased efficiency, more control and better coordination in the organization when fulfilling the required objectives. Operation research approach helps in operation management. One of the characteristics of operations research is it quantitative solution, The scope of operations research encompasses any effort to methodically apply modern mathematics, statistics, and computer science techniques to governmental, business, and industrial problems in managing materials, money, machines, and human beings. Operational research can be applied in a wide range of industries to help with complex problems in planning, policy-making, scheduling, forecasting, resource allocation, process analysis, operations research is important because it increases productivity and lower failure risk. One of the recommendations made was that operations researchers should ensure that they introduce operations research to various organizations and let them have adequate knowledge of the roles it performs and the benefit of applying the techniques in solving the materials, human and financial related problems.

INTRODUCTION

Managers nowadays, particularly in developing nations, make decisions based only on experience, hunches, and rules of thumb. These decisions impact an organization's survival, growth, or even death. Because most decisions are made to ensure the stability, continuity, and expansion of strong prospects and operating performance, the decision-making process is not always initiated when a management senses a problem. OR has evolved as a tool that enables decision-making in the lowest amount of time while minimizing risk concerns. Operations research aims to provide individuals in charge of organized systems with an objective and quantitative basis for decision-making; it is typically carried out by multidisciplinary teams of scientists and engineers (Sarah, 2023). Hence, operations research is not a science in and of itself, but rather the application of science to the solution of managerial and administrative problems, and it focuses on the performance of structured systems as a whole rather than on the performance of their elements individually. Operations research differs from systems engineering in that it is usually concerned with systems in which human behavior plays an essential role, whereas systems engineering, employing a similar approach, is usually concerned with systems in which human behavior is not relevant. Operations research was initially concerned with enhancing the operation of existing systems rather than inventing new ones; systems engineering was the opposite. This distinction, however, has been fading as both professions have grown (Ammeh, 2013).

In recent years, business intelligence has risen to the top of the international agenda. Companies' importance in this aspect has grown dramatically. Companies can use BI solutions to help them make their business-critical data and processes more transparent and intelligent. Employees will also be able to make better judgments, attain the desired goals faster, and continue to grow. Another advantage of BI systems is that they enable businesses to improve the profitability of their customer and supplier relationships by lowering costs, reducing risks, and increasing added value. Massive amounts of data are available without the usage of BI tools, but they spread confusion and eventually complicate operations.

Concept of Operations Research

Operations research is a sophisticated analytical tool that enables firms to solve problems and make better decisions. The Operational Research Society of the United Kingdom defines operational research as the application of current scientific methods to complex problems occurring in the direction and administration of huge systems of persons, equipment, materials, and money in industry, business, government, and defense. Its particular approach is to create a scientific model of the system that includes measurements of characteristics such as change and risk in order to anticipate and compare the outcomes of various decisions, tactics, or controls. The goal is to help management make scientific decisions about policies and actions.

Hemant (2019) defines "operations research" as the use of scientific methods to improve the effectiveness of operations, decisions, and management. Professionals in operations research create scientifically based information that provides insight and guides decision-making by analyzing data, developing mathematical models, and proposing novel approaches. In addition, they create related software, systems, services, and products.

Morses sees operations research as a quantitative approach and describes it as "a scientific method of providing executive departments with a quantitative basis for decisions regarding the operations under their control." The main objective of operations research is to find the best or optimal solution to the problem under consideration. AKPAN, E. Ebenezer Ph.D And GODDYMKPA, Commy Precious Ph.D is the scientific study of big systems with the goal of identifying the best solution for managers with a quantitative basis for making decisions that will improve their effectiveness in attaining the set goals (Obi, 2014). Hence, operations research aids in recognizing, comprehending, and analyzing a current situation in order to make an informed conclusion. This strategy improves organizational control and coordination.

Concept of Business Intelligence (BI)

Business intelligence (BI) is defined as "a set of theories, processes, frameworks, and technologies that transform raw data into meaningful and usable business information" (Mohammad 2019). The primary goal of business intelligence is to aid in improved business decision-making. Business owners and managers will have access to the correct information at the right time and in the right format if a proper BI system is in place. Business intelligence can give a company with a wealth of data resources that can aid in the achievement of its business goals and objectives by directing timely strategic decisions.

Business intelligence systems have evolved into one of the most important technological and organizational innovations in modern organizations, promoting knowledge diffusion and serving as the foundation of business decision-making processes. Through the use of business intelligence justification, organizations create their own business decisions and operations. As a result, organizations can do this through knowledge and the dissemination of accurate information. As a result, business intelligence has become the primary criterion for achieving dominant character in modern organizations. For many organizations, BI conjures up images of simple arithmetic summaries in drab, out-of-date reports. Nonetheless, keen insights are expected beneath the Business Intelligence grey surface, particularly for those willing to revamp their business intelligence strategy to address the types of problems that forward-thinking organizations are already addressing with modern business intelligence (Abhishek, 2019).

The purpose of business intelligence towards a business is to assist business executives, business managers, and other active workers to make improved and well-versed business conclusions. Companies conjointly use business intelligence to reduce outlays, recognize new business opportunities, and spot inefficient business processes.

Concept of Decision-Making

The process of choosing choices by identifying a decision, acquiring information, and evaluating possible alternatives is known as decision-making. By collecting important information and outlining options, a systematic decision-making process can assist you in making more deliberate, considered decisions. Decision-making is defined as the cognitive process that results in the selection of a belief or course of action from a set of different possibilities. It might be rational or irrational. The decision-making process is a reasoning process based on assumptions about the decision-values, maker's preferences, and beliefs (Geektonight 2022). Every decision-making process results in a final decision, which may or may not result in action.

Decision-making can be viewed as a problem-solving activity that results in an ideal or at least acceptable solution. As a result, it is a process that can be more or less rational or

irrational, and it can be founded on explicit or implicit knowledge and beliefs. Decision-making is the process through which a person, group, or organization decides what future activities to take given a set of objectives and available resources. This process will frequently be iterative, comprising problem conceptualization, intelligence collecting, reaching conclusions, and learning from experience.

Decision-making is a frequent cognitive process in the demanding environment in which he or she works, even in the most routine tasks. It makes hundreds of judgments. It is a critical procedure because he or she must prioritize organizational and managerial actions depending on time, resources, and other significant elements. Management decisions are significant because they frequently affect corporate activity, organizational functioning, and business goals. There have been numerous scientific and practical research on the process from the standpoint of learning.

Without good decision-making, no one can survive. Some decisions may be mundane and repetitive in nature, while others may be strategic in nature and necessitate extensive systematic and scientific analysis. A teacher is always a decision-maker in the educational sector. Teachers are expected to make decisions that impact the growth and development of the pupils under their supervision (Allison, 2018). Individuals operating alone or in groups can carry out the decision-making process.

Concept of Business Decision-Making

A business decision, often known as a "operational decision," is any choice made by a business professional that influences the short-term or long-term operations of the organization. Professionals make business judgments in response to a range of conditions, such as deciding which job candidate to recruit, how to distribute department budgets, when to enter a new product market, whether to merge branches, and other situations that necessitate well-thought-out actions.

A decision-making process is a set of processes that an individual goes through to identify the best alternative or course of action to satisfy their needs. It is a collection of procedures done by enterprise managers to define the intended course for company initiatives and to set particular measures in motion (Kate, 2022). Business choices should ideally be based on a study of objective facts, which is facilitated by the use of business intelligence (BI) and analytics technologies. In any business setting, there are numerous paths that a plan or initiative can take. The number of options to consider and the volume of decisions that must be taken on a regular basis, particularly in large organizations, make the implementation of an effective decision-making process a critical component of managing successful business operations.

It is critical to think through a business decision because it might have a long-term impact on a company's efficiency and performance. These are some specific reasons why it is critical to think through a business choice.:

- Influences the longevity of the company: ultimately, your ability to think through a business decision can influence the productivity of your company, the way it changes or adapts and the level of success your company achieves in the long-term

- Enhances profitability: Thinking through business decisions can also help you make smart decisions that enhance the profitability of your company through new sales initiatives, product offerings, marketing initiatives and revenue structures
- Affects successful hiring activities: A good business decision relating to hiring and training activities can positively impact the success of hiring initiatives, including hiring candidates with the right qualities for the job and making changes to training activities that influence the employee satisfaction and retention rates
- Conveys your professionalism: Overall, your ability to think through and make the right decisions for your business can help convey your professionalism to your customers, higher ups and external stakeholders

AKPAN, E. Ebenezer Ph.D And
GODDYMKPA, Commy Precious Ph.D

Concept of Intelligent Business Decision-Making

Intelligent decision-making is an iterative and integrated decision-making and learning (reflection) process. The ability of managers to make decisions is the most important and significant component of practical knowledge in a management situation.

According to Intezari (2016), wisdom is the ability to evaluate options and consider both the short- and long-term effects of any action. The convergence of wisdom and decision-making expresses dealing with ethically complex circumstances, differentiating the good from the bad, examining and analyzing alternatives, making solid judgements about significant subjects, and selecting appropriate means to achieve good aims. Nonetheless, despite the importance of decision-making in wisdom, this study demonstrates that practical wisdom is more than just decision-making ability. Wisdom necessitates thinking beyond the sequence of actions of detecting issues, developing, comparing, and selecting among several possibilities. Rather, it entails self-analysis and continuous learning (reflection).

To learn to make sound decisions it is critical to understand the environmental backdrop as well as what is considered wise and valued by the community, society, and stakeholders. If a person demonstrates the traits that are attributed as intelligent and appreciated in any specific environment, the individual is thought to be wise. If these attributes are undervalued or ignored, the person may not be considered wise. Hence, via reflection, the wise person is continually re-evaluating his or her position in a setting (McKenna 2013). The ability to make sound decisions develops throughout time as a result of frequent decision-making practice and practically integrating personal features (internal attributes) with practical traits (environmental context, the attributes that are valued and described as wise). The introspective process of smart decision-making becomes a path to practical wisdom in and of itself.

History of Operations Research

OR as a formal discipline dates back to 1937, when A.P. Rowe, Superintendent of the British Royal Air Force's Bawdsey Research Station, requested British scientists to aid military officials in the use of the newly invented radar equipment to detect hostile aircraft. A few years later, the British Army and Royal Navy both integrated OR to help with the radar system. By 1942, all three British armed services had established formal OR teams. Other countries had similar changes (of which the most significant are those of the United States in terms of the further development of the discipline).

With the conclusion of WWII, some British operations researchers moved to government and industry. By the 1950s, the US government and industry had also implemented OR projects. OR

was born in India in 1949, when an operations research unit was established at the Regional Research Laboratory in Hyderabad. The Military Science Laboratory also developed an OR team to address inventory, buying, and planning challenges. In India, the application of OR methodologies to non-defense operations grew steadily throughout the 1950s. The Indian Statistical Institute, Calcutta, developed an OR unit in 1953 to address national planning and survey challenges. OR was also used by the Indian Railways to resolve ticketing glitches, train scheduling issues, and other concerns. Since then, organizational research has grown steadily as a formal field during the last 70 years, and it is widely recognized as a crucial approach to decision-making in the management of various areas of

**AKPAN, E. Ebenezer Ph.D And
GODDYMKPA, Commy Precious Ph.D**

The tools of operations research were more frequently applied to challenges in business, industry, and society in the decades following the two world wars. Since then, operational research has evolved into a field that is widely used in industries ranging from petrochemicals to airlines, finance, logistics, and government, with a focus on the development of mathematical models that can be used to analyze and optimize sometimes complex systems, and it has become an active area of academic and industrial research.

Operations Research Methodology

Until the twentieth century, laboratory experiments were the primary and nearly exclusive technique of performing scientific research. Large systems, such as those investigated in operations research, cannot, however, be brought into laboratories. Furthermore, even if systems could be brought into the laboratory, what was learnt would not necessarily apply to their behavior in their natural environment, as demonstrated by early radar experience. Experimentation on systems and subsystems in their actual environment ("operational experiments") are now possible thanks to the experimental methods pioneered by R.A. Fisher, a British statistician, in 1923-24. However, for logistical or even ethical reasons, it is rarely practicable to conduct experiments on big, organized systems in their natural habitats. This poses an apparent conundrum: it appears that testing is essential to gain understanding of complicated systems, but it is rarely done out. The employment of models, or representations of the system under investigation, solves this problem. If the model is sound, experiments (known as "simulations") or other methods can be employed to obtain relevant results.

Concept of Data Scientist

Data scientists are a new breed of analytical data experts who have the technical skills to solve complicated problems as well as the curiosity to discover what problems exist. Data science is defined as a "concept that unifies statistics, data analysis, informatics, and their related approaches" in order to "understand and analyze actual phenomena" using data. A data scientist employs techniques and theories from a variety of disciplines, including mathematics, statistics, computer science, information science, and domain expertise (Cao, 2017). Data science, on the other hand, is distinct from computer science and information science.

A data scientist is a professional who writes programming code and applies statistical skills to extract insights from data. A data scientist also incorporates domain knowledge from the application domain (for example, natural sciences, information technology, and medicine) (Donoho, 2017). Data science is a science, a research paradigm, a research approach, a field, a

workflow, and a profession, among other things. Data is today's world's oil. With the correct tools, technologies, and algorithms, we can exploit data to gain a distinct competitive advantage. Using modern machine learning techniques, data science can assist you in detecting fraud. It assists you in avoiding huge monetary losses. allows for the construction of intelligence capacities in machines. You can use sentiment analysis to determine customer brand loyalty. It enables you to make more informed and timely judgments. It enables you to recommend the correct product to the right buyer in order to grow your business.

Caroline (2022) defines data science as the use of tools from several disciplines to collect a data set, process it, generate insights from it, extract useful information from it for decision-making reasons. Mining, statistics, machine learning are some of the disciplinary topics that comprise the data science field. The data scientist's role is frequently that of a storyteller, providing data insights to decision-makers in an intelligible and problem-solving manner. Businesses are incorporating big data and data science into everyday processes in order to provide value to customers. Financial institutions are leveraging big data to improve the success rate of fraud detection (Johnson, 2023). Big data is being used by asset management organizations to forecast the chance of a security's price moving up or down at a given period. Organizations like Netflix analyse huge data to determine which things to offer its customers. Netflix also use algorithms to generate customised recommendations based on a user's viewing history. Data science is rapidly evolving, and its uses will continue to transform people's lives in the future.

Operations Research Characteristics

The goal of operations research is to identify the optimum solution to any problem. Its primary purpose is to assist managers in obtaining a quantitative foundation for decision-making. When meeting the required objectives, this leads in higher efficiency, more control, and better coordination within the organization. OR is a multidisciplinary field that combines mathematics and science. Statistics, algorithms, and mathematical modeling are used in operations research to find the best feasible answers to complicated issues. OR essentially entails optimizing the maxima and minima functions. A business problem, for example, could be tied to maximizing profit, performance, or yield, or it could be related to limiting risk and loss. OR has distinct properties according on the goals for which it is utilized (George, 2020).

The significant characteristics of operational research include the following

1. Decision making: every industrial organization faces multi facet problems to identify best possible solution to their problems. OR aims to help the executives to obtain optimal solution with the use of OR techniques. It also helps the decision maker to improve his creative and judicious capabilities, analyze and understand the problem situation leading to better control, better co-ordination, better systems and finally better decisions.
2. Use of Information Technology (IT): O.R. often requires a computer to solve the complex mathematical model or to perform a large number of computations that are involved. Use of digital computer has become an integral part of the operations research approach to decision making.
3. Quantitative solution: Operations research provides the managers with a quantitative basis for decision making. OR attempts to provide a systematic and rational approach for quantitative solution to the various managerial problems.
4. Human factors: In deriving

quantitative solution we do not consider human factors, which doubtlessly play a great role in the problems.

4. Human factors: In deriving quantitative solution we do not consider human factors, which doubtlessly play a great role in the problems. So study of the OR is incomplete without a study of human.
5. Inter-disciplinary team approach: OR is performed by a team of scientists whose individual members have been drawn from different scientific and engineering disciplines. For example, one may find be mathematician, statistician, physicist, psychologist, economist and an engineer working together on an OR problem.
6. Uncovering new problems: solution of an OR problem may uncover a number of new problems. In order to derive the maximum benefit each one of them must be solved. OR is not effectively used if it is restricted to one sl **AKPAN, E. Ebenezer Ph.D And** ve full benefits, continuity of research must be maintain **GODDYMKPA, Commy Precious Ph.D**

Scope of Operations Research

The scope of OR is extensive. It includes any endeavor to apply current mathematics, statistics, and computer science skills methodically to governmental, business, and industrial problems involving the management of materials, money, machines, and people. We must emphasize that OR will never take the role of a manager as a decision-maker. The model and its conclusions are merely a tool for making decisions, not a set of rules.

Operations research generates a model that approximates the process or system under investigation. Analysts and managers are responsible for improving the model, adjusting it to reality, and producing increasingly exact data or answers. The director, operations manager, or area where operations research is applied will bear the ultimate and entire responsibility for considering all elements and making judgments. Operations research, in its broadest meaning, is concerned with general elements of production, such as supply chain management, inventory control, sales, production scheduling, and the overall movement of goods and services from factories to customers (Raja, 2020).

Operation research aids in the management of operations. The management of systems for supplying goods or services is known as operation management, and it is concerned with the design and operation of systems for manufacturing, transportation, supply, or service. The operating systems convert the inputs to meet the needs of the customers.

Hence, operation management is concerned with resource optimum use, i.e., effective resource utilization with minimal loss, underutilization, or waste. In other words, it is concerned with providing excellent customer service while maximizing resource utilization. An operating system's inputs can be material, machine, or human resources. Only when we evaluate human factors in respect to the various choices will the O.R. analysis be complete. A team of scientists or professionals from various related fields conducts Operation Research.

Operations Research Applications

Operational research can be used in a variety of industries to assist with complicated problems such as planning, policy formulation, scheduling, forecasting, resource allocation, process analysis, and so on. It may be used by almost any industry to find the best answer to any challenge. OR can be used in a variety of human tasks that require resource efficiency.

The following are some areas where OR may be applied:

1. Resource distribution in projects: Various OR tools are used to determine which resources are to be allocated to which activities. For instance, OR can help in determining the allocation of 'n' number of jobs among two machines. Similarly, OR can also be applied to determine and allocate materials, workforce, time and budget to projects.
2. Project scheduling, monitoring and control: OR is applied to activities involving scheduling, inventory control, improvement of workflow, and elimination of bottlenecks, business process re-engineering, capacity planning and general operational planning. OR tools such as the Critical Path Method (CPM) and Project Evaluation and Review Technique (PERT) are used for scheduling the different activities involved in a project. In addition, these tools are also used for continuous monitoring and control of the project.
3. Production and facilities planning: OR can be applied for activities involving site selection, factory size, facility planning, inventory control, economic order quantities, computing reorder levels, maintenance policies, manpower planning, and assembly line scheduling, etc. All the important decisions and planning work related to facilities, manufacturing and maintenance can be completed using OR tools.
4. Marketing: Application of OR can be done in budget allocation for advertising, choice of advertising media and product launch timing. For instance, how should a company allocate its budget for advertising a newly launched product on two TV channels, TV1 and TV2 within a given budget. A company may also use OR techniques to find out how many units of each product in a product mix should be produced to maximise demand.
5. Personnel management: OR also finds application in manpower planning, scheduling of training programs, wage administration, etc. Finance and accounting: The application of OR in finance is concerned with effective capital planning, cash flow analysis, capital budgeting, credit policies, investment analysis and decisions, establishing costs for by-products and developing standard costs, portfolio management, risk management, etc.
6. Supply chain management: The application of OR in Supply Chain Management involves decision-making regarding the transportation of goods for the purpose of manufacturing and distribution. This further involves the selection of the shortest optimal routes so that the goods can be transported to maximum locations at minimum costs.
7. Importance of operations research: The field of OR contains robust tools that can be applied in a variety of fields such as transportation, warehouse, production management, assignment of jobs, etc. Operations research creates feasible solutions to complex business challenges and uses data to create information, which organizational leaders can use as insights to improve results and make more informed decisions about the future of the company (Tutors globe, 2020).

There are many importance of OR, as mentioned below;

1. Increased productivity: Operations Research helps in increasing the productivity of organizations to a huge extent. The use of OR for effective control of operations allows the managers to take informed decisions. Effective and precise decision-making leads to improvement in the productivity of an organization. OR tools also help increase the efficiency of various routine tasks in an organization such as inventory control, workforce-related, business expansion, technology upgrades, installation etc. All these ultimately contribute towards productivity improvement.

2. **Optimized outcomes:** Management is responsible for making various important decisions about the organization. OR tools can be used by the management to find out various alternative solutions to a problem and selecting the best solution. Selection is based on the profits accrued and costs incurred.
3. **Better coordination:** OR can be used to synchronise the objectives of different departments which results in achieving the goals of all departments. Managers belonging to different departments become aware of the common objectives of the organization, which ensures that different departments coordinate towards achievement of the said goals. For example, OR helps in coordinating the goals of the marketing department with the production department. **AKPAN, E. Ebenezer Ph.D And GODDYMKPA, Commy Precious Ph.D**
4. **Lower failure risk:** Using OR tools and techniques helps in identifying all the alternative solutions and risks associated with a given problem. Prior information with respect to all the possible risks helps in reducing the risks of failure.
5. **Improved control on the system:** Managers can apply OR to take better control of the work since it provides comprehensive information about any given course of action. Since OR informs managers about the expected outcome, they can determine what standards of performance need to be expected from employees.
6. **Provides a more detailed analysis:** Operations research relies on analytics, which uses mathematical and scientific methods in the analysis and various problems. By using these methods, operations research can provide a more detailed and insightful analysis to decision-makers. This allows them to implement more comprehensive and thorough solutions to problems. It can also help them understand how to analyze similar problems in the future.
7. **Helps reduce uncertainties:** By using proven methods and modeling techniques, operations research can also help companies eliminate uncertainties that might arise. Inputting realistic data into a model that's already been effective at solving problems can help reduce or even eliminate uncertainties for companies. Having reliable data to resolve challenges can instill confidence in company leaders and make it easier for them to manage complex business processes.
8. **Supports increased productivity:** By helping to reduce business uncertainties and improve the coordination between different departments and teams, operations research can also support increased productivity in the workplace. The advanced models that it uses can provide managers with the information necessary to make more thoughtful decisions, whether those decisions involve upgrading new technology or expanding into a new market. It's also useful for routine business tasks such as workforce planning.

Components of Operations Research

The field of operations research often includes three key characteristics or components:

1. **Optimization:** Optimization is the process of determining the ideal solution to a problem based on potential constraints. Constraints are the limitations that might occur in an everyday situation, and these limitations may occur when you're calculating how to best optimize a situation. For example, the constraint for a business experiencing staffing issues would be the number of shifts each employee is able to work due to labor laws (Randhiri, 2019). When using operations research to solve business issues, you might

compare different options to assess the benefits and costs of each in greater detail after considering the constraints.

2. **Statistics and Algorithms:** Operations research relies on statistics and algorithms, which comprise the wider field of mathematics. Optimization algorithms can be especially important for operations research, and the purpose of these algorithms is to locate a minimum or maximum value based on a certain group of possibilities. For example, a company that wants to determine the lowest possible cost necessary for fully staffing a manufacturing facility might use an algorithm that includes the number of people required to operate a facility, the hourly wage of each employee and how long each employee can work.
3. **Simulation:** Simulation also uses algorithms **AKPAN, E. Ebenezer Ph.D And** of a situation, and it involves the creation of a **GODDYMKPA, Commy Precious Ph.D** before implementing them. When using optimization algorithms, a company might adjust some of the constraints or factors in the equation to try to produce a different outcome. By simulating an event, operations research can describe a situation or a potential outcome of a situation more easily.
4. **Forecasting:** This component is related to using the organization's historical data, facts, and figures, collected statistics, and details when making production decisions (EconPost 2023). These decisions are made for future productions based on the past data available. Accurate forecasting should be able to decide the production volume that is necessary for a specific time period. This will help the business to avoid maintaining excess inventory with the company or face shortages in the inventory in the production process.

Conclusion

According to the study, the primary goal of operations research is to discover the optimum solution to any problem. Its purpose is to assist managers in obtaining a quantitative foundation for decision-making. When meeting the required objectives, this leads in higher efficiency, more control, and better coordination within the organization. Operation research aids in the management of operations. The quantitative nature of operations research is one of its distinguishing features. Operations research involves any attempt to methodically apply current mathematics, statistics, and computer science approaches to governmental, business, and industrial challenges involving the management of materials, money, machines, and humans. Operations research is significant because it boosts productivity and lowers failure risk in a wide range of businesses.

Recommendation

1. Operations researchers should ensure that they introduce operations research to various organizations and let them have adequate knowledge of the roles it performs and the benefit of applying the techniques in solving the materials, human and financial related problems.

2. Business Intelligence Systems should be utilized in companies as it can make the customer and supplier relationships profitable, reduce costs, minimize risks and increase added value.
3. There should be a public awareness about operations research and how it can be effective in different organizations.

REFERENCES

- Sarah L. (2023). *Operations Research (OR)*. Available at: <https://www.techtarget.com/whatis/definition/operations-research>
- Hemant, M. (2019). *Introduction to Operations Research*. Available at: https://thefactfactor.com/facts/management/operation_research/operations-research
- Geektonight (2022). *What is Operations Research (OR)? Definition, Concept, Characteristics, Tools, Advantages, Limitations, Applications and Uses*. Available at: <https://www.geektonight.com/operations-research/>
- George D. (2020). *Operations research*. Available at: https://en.wikipedia.org/wiki/Operations_research
- Raja A. (2020). *Basic Concepts of Operations Research*. Available at: <https://www.slideshare.net/rajajntu/operations-research-unit1-notes>
- Randhiri, (2019). *Explain the characteristics of Operations Research*. Available at: Sarthaks.com - <https://www.sarthaks.com/1039547/>
- Tutors globe (2020). *Characteristics of Operation Research*. Available at: <https://www.tutorsglobe.com/homework-help/operation-research/characteristics-of-operation-research-7164.aspx>
- Allison, G. T. (2018). *Essence of Decisions: Explaining the Cuban Missile Crisis*. Boston, MA: Little, Brown
- Ammeh, S. (2013). *World Greatest Speeches in History (Benin City) Self-Improvement Publishing*.
- Obi, J. N. (2014). "Decision-making Strategy". In C.P. Maduabum (Ed.) *Contemporary Issues on Management in Organizations of Readings* (Chapter 6, p.63). Ibadan: Spectrum Books Limited.
- EconPost (2023). *12 Main Components of Operations Management*. Available at: <https://www.econposts.com/business-management/12-main-components-of-operations-management/>
- Kate B. (2022). *Decision-making process*. Available at: <https://www.techtarget.com/searchbusinessanalytics/definition/decision-making-process>
- Abhishek S. (2019). *Business Intelligence to Decision Making: A Conceptual Review*. Retrieved from: <https://www.linkedin.com/pulse/business-intelligence-decision-making-conceptual-review-shukla>
- Mohammed A. (2019). *Business Intelligence For Business Decision Making*. Available at: <https://www.linkedin.com/pulse/business-intelligence-decision-making-mohammad-qudah>
- Cao, Longbing (29 June 2017). "Data Science: A Comprehensive Overview". *ACM Computing Surveys*. 50 (3): 43:1–43:42.

Donoho, David (2017). "50 Years of Data Science". *Journal of Computational and Graphical Statistics*. 26 (4): 745–766.

Caroline B. (2022). *Data Science: Overview, History and FAQs*. Available at: <https://www.investopedia.com/terms/d/data-science.asp>

Johnson D. (2023). *What is Data Science? Introduction, Basic Concepts & Process*. Available at: <https://www.guru99.com/data-science-tutorial.html>

Intezari, A. (2016). *Practical wisdom through sustainability: A Meta-approach*. In A. Habisch & R. Schmidpeter (Eds.), *Cultural roots of sustainable management: Practical wisdom and corporate social responsibility* (pp. 23-37). Switzerland: Springer

McKenna, B., Rooney, D., & Kenworthy, A. L. (2013). Introduction: Wisdom and Management - A guest-edited special collection of resource reviews for management education. *Academy of Management Learning & Education*, 12(2), 306-311.