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# Heuristic methods as a powerful managerial tool for enterprise in times of uncertainty

## Metody heurystyczne jako skuteczne narzędzie zarządzania przedsiębiorstwem w czasach niepewności

**Summary:** In managing enterprise, uncertainty belongs to the attributes of the decision making processes. In competitive environments, where success depends on high-quality decisions, taking the wrong steps can lead to loss of market share or even contribute to running out of business. That is why it is important to choose from the many alternatives those methods which will be most effective in solving problems in a simple and quick way, and heuristics offer such a solution, which has proved its usefulness in uncertain business environments. The aim of this study is to present and evaluate heuristic methods and show their specificity and applicability in management science for enterprises in times of uncertainty. In this article, the theoretical aspect of managerial heuristics is presented, and the emphasis is also placed on presenting practical examples of applying heuristics in companies with times of uncertainty, but also in these times of the Covid-19 pandemic. The study also offers conclusions and provides practical recommendations.

**Keywords:** heuristics, managerial decision-making process, uncertainty, Covid-19 pandemic

**Streszczenie:** W zarządzaniu przedsiębiorstwem, niepewność należy do atrybutów podejmowanych decyzji menedżerskich. W konkurencyjnych środowiskach, gdzie sukces zależy od wysokiej jakości decyzji, podejmowanie błędnych kroków może doprowadzić do utraty rynku lub nawet przyczynić się do zakończenia działalności. Dlatego tak ważne jest, aby spośród wielu alternatywnych metod wybrać tę, która będzie skuteczna w rozwiązywaniu problemów w prosty i szybki sposób. Heurystyka

oferuje rozwiązania, które udowadniają swoją przydatność w niepewnym otoczeniu biznesowym. Celem pracy jest przedstawienie i ocena metod heurystycznych oraz wykazanie ich specyfiki i możliwości zastosowania w naukach o zarządzaniu przedsiębiorstwami w warunkach niepewności. W artykule przybliżono aspekt teoretyczny heurystyk menedżerskich, położono również nacisk na przedstawienie praktycznych przykładów zastosowania heurystyk w przedsiębiorstwach w warunkach niepewności, także w czasie pandemii Covid-19, wyciągnięto wnioski i sformułowano praktyczne rekomendacje.

JEL: D79, D81, L20, L25

The essence of management lies in working on effective decision-making processes. That is why it is the responsibility of the managerial staff to choose methods that make a significant contribution to the improvement of their decisions. During times of uncertainty due to the constraints of time, cost, and information, managers very often connect their decisions to a heuristic-based approach. The following study is focused on an analysis of the existing literature. This paper addresses the research question: do heuristics turn out to be an effective managerial tool for enterprises to apply in times of uncertainty?

The study supports the hypothesis that there is a positive correlation between managerial decisions and their application of heuristics in times of uncertainty. The article contributes to the scientific literature by providing a discussion on perceiving heuristic methods as a powerful managerial tool for enterprises in times of uncertainty. The first chapter of the article briefly outlines the theoretical aspects of heuristics, the second reflects upon presenting heuristics within the decision-making process, and the third chapter discusses the importance of applying heuristic methods in enterprises during times of uncertainty. The study concludes with a short discussion.

## Heuristics well defined

The term heuristics comes from the Greek word meaning: *serving to find out or discover*. It generates certain *golden rules* or *rules of thumb* (Cossette, 2014). Heuristics are regarded by many as a significant method in management that improves the decision-making process (Lawrence, 2002; Heizer, 2004). Thanks to their strategies, heuristics enable solving problems that logic and probability theory cannot. Heuristics refer to a unique creation of strategies that is only partially based on the information accessible in the problem space. It is quick because the adaptation preferences are chosen with minimal time, knowledge, and computation (Artinger et al., 2014).

Four strategies that can be involved in creating heuristics are as follows (Ridha, 2015):

- the construction strategy,
- the improvement strategy,
- the component strategy,
- the learning strategy.

The features of these heuristic strategies are *simple requirements in terms of design and computation, reasonable computational time of execution, providing solutions which are close to optimality; assuring that there is a small probability of any particular solution being far below optimality* (Nelson, Winter, 1982).

Apart from being quick and reasonable, the other very important reasons for using heuristics are:

- saving time and costs (it is better than in exact optimization models),
- the simplicity of heuristic methods that can be implemented without undue difficulty. For example, it makes it possible for managers to communicate well with other managers, and managers are more prone to delegate authority,
- heuristic methods are more adaptable to change within the dynamic environment of production managers (Alsameraai, 2003; Becerra-Fernandez, 2004).

Heuristics possess many advantages: *this method is accessible, it is not difficult to get to know it, it is also easy to implement it, it helps to save formulation time, it offers variable solutions*. What is more, when it comes to the usage of heuristics by managers, it helps them to develop creativity and to find better support in managerial problems (Ridha, 2015).

## Heuristics in the decision-making process

Managerial practitioners pay special attention to various decision strategies that are treated as successful tools in their business Environments. There are many decisions that impose the use of heuristics among management. The features of managerial heuristics are presented in Appendix. From the perspective of the organizational level, knowledge of individual-level heuristics can contribute to the improvement of decision-making processes. In management, the process of learning for which states a particular decision strategy is to be chosen is referred to as *the adaptation process*. Adaptive strategies occur as a kind of response to looking for the best action, where *ex-ante no optimal solution can be inferred* (Manimala, 1992).

These are the verbal approaches that offer important insights and illustrate how important heuristics is in managerial decision making. Coleman et al. (2010) indicate some verbal heuristics, for example, *focus on keeping it simple and understand what are the fundamental things you have got to get right*. It is, however, good to realize that

such approaches may present the problem, but they do not mention when and why they perform well. In the literature on heuristics, different attempts to systematize this knowledge have been presented. The distinction between heuristics needed to explore business opportunities and heuristics that have the essential role in linking different business opportunities was made by Bingham and Eisenhardt (2011). In management, the study of the defining application of heuristics gains huge benefit by defining testable descriptions of decision-making processes. Gigerenzer and Gaissmaier (2011) presented three building blocks: *search rules* that state where to search for information, *stopping rules* that define when to stop searching, and finally, *decision rules* that decide how to share information. The number of managerial applications of heuristics involve (Artinger et al., 2014):

## Satisficing

An important strategy for decision making, the term satisficing makes reference to the realistic goal that is finding a solution that is good enough. The term also has another usage – it refers to a given strategy in which decisions involve establishing an aspirational level. This level is either fixed or adjusted and the formula for the fixed aspiration level strategy is as follows (Selten, 1998):

- 1) Search rule: set an aspiration level and search through objects.
- 2) Stopping rule: stop search when the first object meets the set aspiration level.
- 3) Decision rule: choose this object.

## Tallying and 1/N

Following this strategy, the number of cues that favour one alternative over another are counted. It is represented as follows:

1. Search rule: search through cues in any order, add positive cues to the tally, and deduct negative cues from it.
2. Stopping rule: stop after  $n$  cues (where  $n$  can be any number up to the complete set of cues).
3. Decision rule: decide for the alternative with the higher tally. If after searching through all cues there is a draw, guess.
4. Tallying can present a remarkable performance (Dawes, Corrigan, 1974; Einhorn, Hogerth, 1997).

## Lexicographic strategies

A form of implementation of sequential decision making, achieved by elimination of aspects. Focusing on taking the best, cues are ordered by decreasing validity. *Take the best* is formulated in the following way (Gigerenzer, Goldstein, 1996):

1. Search rule: Order cues by their validity.
2. Stopping rule: Stop on finding the first cue that discriminates between the alternatives.
3. Decision rule: Choose the alternative with the higher cue value.

## Recognition

Decisions based on recognition refer to those situations where *the mere recognition of an object is a predictor of the target variable*. The strategy can apply to various decision-making situations. The strategy can be formalized as follows (Gigerenzer, Goldstein, 1996):

1. Search rule: Search for an object that you recognize.
2. Stopping rule: Stop as soon as one object is recognized.
3. Decision rule: Infer that the recognized object has the higher value with respect to the criterion.

Recognition heuristics can turn out to be a very effective decision-making strategy. It demonstrates that under some conditions ignorance can be bliss (Gigerenzer, Goldstein, 2011). From the managerial aspect, recognition is a significant characteristic of venture creation, playing an essential role when identifying business opportunities. (Bhave, 1994).

## Similarity

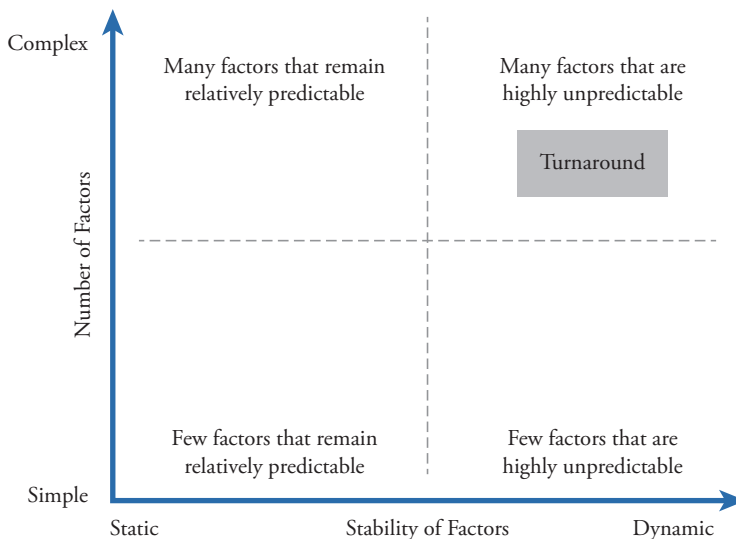
The decisions made by companies are very often made in new environments. Similarity enables them to identify the source that combines central characteristics with a target. It can be formalized as follows (Read, Grushka-Cockayne, 2011):

1. Search rule: Search for an object that is more similar to the target than objects drawn from a reference class.
2. Stopping rule: Stop as soon as a more similar object is found.
3. Decision rule: Infer that the identified object has a higher criterion value than those from a reference class.

## Heuristics in enterprises during times of uncertainty

Taking into consideration the nature of decisions made in a business enterprise, Frank Knight, about a century ago, presented an important connection between achieving economic profit and making entrepreneurial decisions when facing some uncertainties. Managing uncertainty requires knowledge, however, massive use of information is irrelevant. Figure 1 presents a two-dimensional matrix of uncertainty in stability and turnaround. Uncertainty can be observed in decisions that include various factors which can be unpredictable and constantly changing. (Artinger et al., 2014).

**Figure 1** Two-dimensional matrix of uncertainty



Source: elaboration based on Artinger et al., (2014), *Heuristics as adaptive decision strategies in management*, Journal of Organisational Behavior, 36(1), p. 38.

In the majority of business scenarios, decisions made on the basis of effective heuristics skip information according to the following rule: when it comes to uncertainty, less can often turn out to be more. Gigerenzer, Gaissmaier (2010) comment on this as follows: *Heuristics need to be simple (...), particularly in a world that is so fundamentally uncertain.*

The original concept that the mind is adaptable to an uncertain environment can be found in the research program on fast and frugal heuristics, the aim of which is to define heuristics in terms of ecological rationality, to determine “proper” environments for heuristics (Gigerenzer et al., 1999). The difference between the heuristics and biases tradition and the approach that deals with fast and frugal heuristics is such

that the latter concentrates on making decisions regarding ill-structured problems which cause uncertainty.

When talking about the difference between the fast and frugal research program and the heuristics and biases tradition, we can distinguish three points (Artinger et al., 2014):

### 1. Computational models of heuristic

By using these models, researchers are able to make exact predictions and also test which strategies are used by people. The heuristics and biases program deals with “availability and affect heuristics” and does not offer details about the cognitive processes.

### 2. Ecological rationality

The research on ecological rationality answers the question *In what environment is a given heuristic more successful than other strategies that are better adopted?* The heuristic and biases approach treats logic and statistics as the normative benchmark, and heuristics alone is second best.

### 3. “Less can be more”

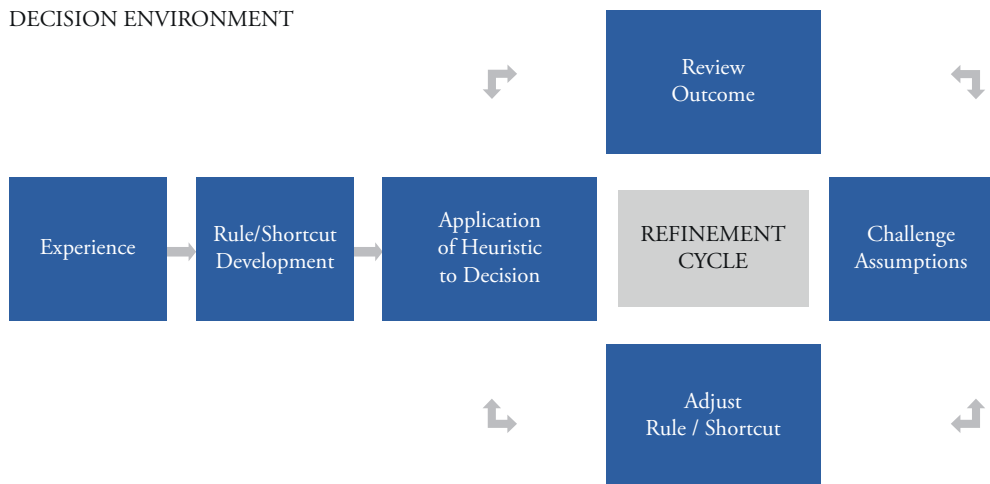
The heuristics and biases program does not find the difference between risk and uncertainty. Heuristics are never more than “rational choice” and the only advantage is that it needs less effort.

Figure 2 presents an illustrative model of a heuristic refinement cycle. The aim of this improvement cycle is to ensure heuristic methods are well developed and avoid the repetition of negative outcomes (Govender, 2016).

The findings of the research project “Heuristics in managerial decision making during company turnaround and uncertainty” emphasize the importance of managers using three heuristics in conditions of turnarounds, being “take-the-best, satisficing, and the recognition heuristic” (Albar, Jetter, 2009). The other heuristics, for example, “F&F decision trees, Tallying, similarity, Imitate the successful, and Imitate the majority”, despite being effective during times of uncertainty (as the literature states), turned out not to be particularly useful (Artinger et al., 2014), (Gigerenzer, Gaissmaier, 2011), (Mousavi, Gigerenzer, 2014). The study indicates that turnaround environments were more prone to short, quick decisions which involved limited information and provided ideal conditions for heuristic use. The research proves that for a company in a turnaround, it is suitable to make use of cognitive heuristics, and it presents the factors which contribute to the use of heuristics in turnarounds, which

are “*risk, comfort level, decision impact, urgency, decision horizon, experience, familiarity, information availability, pressure, strategic importance, time, and uncertainty*” (Albar, Jetter, 2009), (Gigerenzer, Gaissmaier, 2011), (Gigerenzer, Goldstein, 1996), (Maitland, Sammartino, 2015), (Mousavi, Gigerenzer, 2014), (Shah, Oppenheimer, 2008). The study indicates the heuristic methods which address company uncertainty such as “learning through mistakes, learning from others, continual refining of one’s heuristic toolbox, and self-awareness of personal heuristic styles”. In the research, criteria for using heuristics were taken into account such as “questioning whether the heuristics provide a good model for the decision being made, questioning whether the heuristics perform well for a given task” (Mousavi, Gigerenzer, 2014). The results and findings show that the company context and its decision environment are strongly connected with the use of heuristics. The study also explains the reasons which contribute to the negative perception of heuristics, being “unsuccessful outcomes of the present use of heuristics, forced use of heuristics, irresponsible use of heuristics, and a false sense of heuristic ability” (Govender, 2016).

**Figure 2** Illustrative model of a heuristic refinement cycle



Source: own elaboration based on L. Govender (2016), *Heuristics in managerial decision making during company turnaround and uncertainty*, Gordon Institute of Business Science, University of Pretoria p. 108.

The research presents several important implications for managers; emerging circumstances of uncertainty require from them the adaptation of an attitude of acceptance and tolerance. This attitude, combined with the use of heuristic methods, allows for better use of time and a faster decision-making process. Managers need to be more aware of the impact that changing circumstances have on decision resources (time and



availability of information). This allows for better adaptation of decisions to existing conditions. In addition, these activities develop agility in decision making and affect the taking of accurate steps. It is a frequent phenomenon that companies focus on systems and analytical models to improve their decision-making process. Heuristics prove to be very helpful in company counselling on issues related to thinking, analysing information and making decisions (Dietrich, 2010). Thus, managers are encouraged to take actions based on “building, reviewing, adjusting, and refining heuristics”, which has a significant impact on decision outcomes (Gigerenzer, Gaissmaier, 2011). The study realizes the need to develop greater awareness of the importance of the impact of decisions on performance and the impact of the environment of uncertainty on decision making in companies.

Heuristics also turned out to play an important role in making decisions in the Covid-19 scenarios. The pandemic and its devastating impact on human lives emphasized the necessity for tools to forecast its development (Ehrig, Foss, 2020). In many countries, it was conducted by means of the Statistical Heuristic Regression Model (de Andres P.L. et al., 2022). Furthermore, availability heuristics turned out to be one of the cognitive strategies that can explain the reaction of people towards COVID-19. It enables assessing how people judge risks under uncertainty. This heuristic is based on a mental shortcut that makes people misjudge the likelihood of an event on the basis of the level of ease of recalling the event from their memory. It defines very well any overestimation of the frequency of memorable events. Thanks to heuristics and biases, it was possible to provide an explanation why, e.g., during the outbreak of Covid-19, many Italians acted irrationally and behaved in the opposite manner to what was in their own interest and in the interest of the Italian community as a whole. Italians, when the risk of the pandemic was being announced, behaved in a way that erroneously underestimated the danger. Because, being used to the fact that media sensationalize events, they under-evaluated and ignored the recommendations and policies of politicians (Miscuraca R. et al., 2022).

## Conclusion

Heuristics deals with situations in which all possible options, with their consequences and probabilities, are not known by the decision-maker. It plays a powerful role as a decision-making tool. Research indicates how successful heuristics is in complex, uncertain, environments. The article, therefore, becomes an opportunity for managers to evaluate if, in times of uncertainty in their enterprises, the use of heuristics methods becomes the best choice. The study presents a highly practical approach towards applying heuristics methods, rooted in the theoretical background. It shows the criteria for

using heuristics in uncertain conditions, briefly presents some of the heuristic managerial decision-making strategies, and provides practical solutions, thereby becoming an excellent introductory step towards further exploration of the applicability of heuristics in times of uncertainty and in times of crises such as the Covid-19 pandemic.

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## Appendix 1

**Table 1** Management heuristics

<b>Direct</b>
<ul style="list-style-type: none"> <li>▪ Manage the things that are in your control – take note of things starting to deviate from the plan.</li> <li>▪ Swift and decisive decision making.</li> <li>▪ Respond swiftly to problems.</li> <li>▪ Don't shift blame. Deal with and focus on resolving the situation</li> </ul>
<b>Prioritize</b>
<ul style="list-style-type: none"> <li>▪ Use proper, accurate KPIs.</li> <li>▪ Plan/ consider capacity. Don't over-commit. Leave cushion for agility.</li> <li>▪ Manage time; don't over-commit.</li> <li>▪ Manage your capacity (time) to think.</li> <li>▪ Make sure that you work on the most important thing at all times, don't simply be busy.</li> <li>▪ Allow priorities to arise naturally, incorporate them into plans and schedules.</li> <li>▪ Deal with work as it arrives, don't postpone anything.</li> <li>▪ Priority categories: urgency, relevance, flexibility, potential. Priority according to task nature or type, e.g., operational tasks vs development tasks.</li> </ul>
<b>Plan</b>
<ul style="list-style-type: none"> <li>▪ Understand seasonality and trends.</li> </ul>

### Schedule

- Proper project management and planning.
- Break down activities, assign tasks/ sub-tasks.
- Break down long or complex tasks, allocate resources accordingly.
- Proper, clear task allocation; check on progress and quality.
- Monitor tasks: The team leader should monitor tasks.
- Plan and spread resources according to priority and need.
- Deal with work as it arrives. Don't postpone anything – any work. Sort out work as it arrives.
- Keep a loose schedule: Don't predetermine most of the tasks in terms of timelines.
- Allocate and reallocate tasks and resources as new tasks and problems arise.
- Optimize the processes of task allocation and task prioritization.
- Quickly and frequently re-evaluate and reassign task schedules.

### Capacity

- Examine capacity, and the capacity required, and decide on the best approach.
- Empower your staff – upskill when necessary.
- Acquire the necessary expertise.

### Communicate

- Open and regular communication ensures everyone is on same page, and prevents complacency and familiarity.

### Delegate

- Capacity and capacity planning enable the entrepreneur to delegate.
- The entrepreneur must delegate, to improve/ increase capacity.
- The entrepreneur who doesn't distribute leadership and management prevents employees from giving their best.
- Assign tasks based on where the organization is heading.
- Evaluate whether your position warrants the work you are doing, or whether you should not rather delegate it.
- Delegate, communicate, get feedback and evaluate.

### Risk

- Know your risk profile and propensity.
- Risk is specific to the task or project.
- Analyse the market and the risk.
- Take risks/ chances.
- You can't avoid risk; take on a healthy portion of risk.
- Take risks but make smart bets.
- Establish the risk you are able to take on. Only make mistakes you can afford to lose and recover from. Build and improve as you go.
- Manage your risk. Ensure the business can handle the risk. Have a tabled risk plan.
- Diversify so that income doesn't come from one source.

### Culture and morale

- Build good culture, morale, and ethics.
- Create a culture of responsibility and accountability.
- Avoid complacency, by creating urgency and challenges.
- Create challenges through goals, assign accountability and responsibility to each department.

**Comprehension**

- Be informed. Know your business. Work on gut feel, and then get data to support it.
- Have support when making key decisions.
- Think holistically.
- Leverage off collected data.

**Profitability**

- Ensure each unit contributes positively (to profit) and is profitable.
- Keep an eye on expenses.
- Minimize operational costs, e.g., buy stock strategically.

**Perspective**

- Maintain perspective. Don't get stuck in detail. See the big (ger) picture.

**Structure, organize, systematize**

- Formalize thinking.
- Streamline the processes, output, and governance of the business.
- Use systems to ease resource requirements and increase efficiency.
- Run the business on reliable systems, and train employees on these systems.
- Put down some kind of system (create a play book). Don't run things from memory or off the top of your head.
- Have pre-packaged ways to deliver services, solutions, and solve problems.
- If unstructured, put systems in place to help bring/ restore order.
- Evaluate, assess, and refine processes – each process must positively contribute to value.
- Work processes should have a quick return.
- Delineate a broad framework, but don't get bogged down.
- In areas or cases without systems, or new development, form an understanding of what needs to be done.
- Keep it simple. Encourage ownership of the process. Get buy-in.
- Look at the constraints and optimize. Find the best trade-off/ solution.
- Combine the best way vs the most practical – the way the employee is most likely and capable of using it.
- Use process maps. Map complicated processes.
- Inputs and processes determine the outcomes.

**Leadership, direction, mastery**

- Self-management.
- Become an efficient leader.
- The entrepreneur must be good at delegating, leading, coordinating and task allocation.
- Transparent, honest, flexible, diverse, foresight, communicator.
- Don't micro-manage, view time as a scarce resource.
- The entrepreneur should be an autocrat, more than a democrat.
- Leadership: open and approachable.
- Open door policy – available and approachable for advice.
- Don't spoon feed, and don't give blank cheques either. Put up boundaries and perimeters.
- Don't become complacent with time. Guard against stop listening, paying attention, improving, changing, etc., as you become more successful.
- Have a support network or structure to help during difficult times.
- Have a mechanism to deal with stress.
- Important the entrepreneur looks after his or her health, well-being (emotional and mental), deals with emotions.

Source: A. Makings, B. Barnard (2019). *The Heuristics of Entrepreneurs*. Expert Journal of Business and Management, 7(2), p. 185–187.