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The Most Important Risks Resulting From The Computerization of Smart Decisions

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ABSTRACT

The risks of automation in making "smart" decisions are among the most critical problems facing the modern world, as the issue of digitizing all areas of society is an integral part of it. Today, anyone tries to make their life simple in everything from robots used in production to remote control of home appliances. The decision-making process also tends to be simplified, but this simplification creates some risks that must be addressed, minimized, or prevented at best. This research aims to understand the principles and methods of developing, making, implementing, automating decisions and risks. In this study, the phenomenon of automating administrative decision-making was studied, the risks of this trend were considered, and the extent of effective implementation of this trend in Jordan was understood. This work can be used as a theoretical basis for automating business processes and as practical recommendations for monitoring and researching vulnerabilities in automated systems.

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1. Introduction

Decision making is an integral part of everyday life. The effectiveness of management depends on the correctness and timeliness of the decisions taken. The decision-making process can be turned into a science using mathematical research methods, and recently such a transformation is necessary (Pink, 2019).

To make competent decisions, it is necessary to create decision-making systems (DSS). Among the DSS, expert systems (ES) and decision support systems (DSS) are distinguished. The former serves to solve poorly defined and semi-structured problems, the latter - to assist specialists in solving emerging problems on their own based on their knowledge, experience, and intuition.

Integrated intelligent decision-making systems (IISPR), combining ES and DSS, can work in incomplete information conditions and develop judgments, demonstrating intellectual traits. Possessing several indisputable advantages, IISPR has found wide application in various fields. However, the mathematical models used in IISPR are rather crude and, in some cases, give qualitatively incorrect predictions (Bandy, 2011). A promising direction in the creation of IISPR is the use of fuzzy logic.

1.1 The problem

At the present day, some people try to simplify their lives in all aspects of life and economy, including using robots in the production process to remote control home appliances. The decision-making process also tends to be simplified, but this simplification creates new risks that must be addressed or minimized.

1.2 Research objectives

The goal is to study the risks associated with automated decision-making and suggest developing, making, and implementing automating decisions and risks.

1.3 Scientific suitability

The topic of automation risks in making "smart" decisions is especially relevant in the modern world, an integral part of the digitalization of all spheres of society, from industry to the social sphere.

1.4 Scientific novelty

In this study, the phenomenon of automating administrative decision-making was studied, the risks of this trend were considered, and the extent of effective implementation of this trend in Jordan was understood. This work can be used as a theoretical basis for automating business processes and as practical recommendations for monitoring and researching vulnerabilities in automated systems.

2. Basic concepts

A solution is a specific set of operations on goals, and they are executed for a specific reason. Most of the time, it is taken to solve a problem that has arisen or develop a one activity or another, such as expanding the production line.

An essential concept in this business is the concept of risk. Understood as the risk of a wrong decision, the losses may be caused by deviation from the target. Risk is a potential existing possibility of a loss of resources, non-receipt or loss of income, the occurrence of another unfavorable situation or an unsuccessful outcome of production, economic activities, or other activities, which results from the implementation of the corresponding decision (Yao, Zhang, & Zhou, 2006).

Most decisions are multi-alternative and probabilistic. There is a constant need to choose the only way out of the situation, but you can never know what consequences this or that decision will have. When speaking of decision-making in conditions of risk, we mean a situation in which each of the options for the situation's outcome is somewhat predictable and has a certain proportion of risk, while some position decisions are more favorable to the agent than others. One of the main tasks in decision making is to consider all potential risks and to think of ways to reduce or avoid them altogether (Guernsey, 2003).

If, when making a decision, many different scenarios, including unfavorable, are considered to develop the situation in detail, if all potential risks are evaluated, every step of the proposed actions is thought out, and backup steps are calculated in case of failure. We can say it is a "smart" decision.

We will introduce the term "smart solution," which we will use in the future: Smart Solution - a set of procedures that ensure the goal is achieved faster, safer, and more cost-effective (Taubes, 2008). Today, it is ubiquitous to develop and make decisions using information technology to increase these processes' efficiency. Of course, it is impossible to automate the entire decision-making process since personal human qualities, experience, qualifications, and even the decision-makers intuition are often required. However, automation dramatically speeds

and simplifies this process by performing routine operations, reducing errors, making information more comfortable, and Providing the best solution to the situation.

In general, automation is a powerful tool for forecasting, choosing options, and analyzing the organization's state, which contributes to the adoption of appropriate and timely decisions (Ferreira & Acuña, 2017).

3. Methodologies for automating decision-making

There are many automated decision-making options, but two methods can be called necessary: analytical (rational) and statistical (natural). The analytical approach relies on formal and generalized patterns of behavior. The system contains a predefined decision-making model that can be implemented in a mathematical model and the form of business rules or proprietary algorithms.

An advantage of an analytical decision support system is its ability to start its work from the very beginning of the system, with the entire procedure pre-programmed. They are also predictable and able to explain why individual decisions have been taken, which helps avoid surprises in the equipment's operation. Another feature that arises from the system's simplicity is the high performance when implemented on computers (Bidgoli, 1997).

On the other hand, these systems are narrowly focused and can only be used for specific tasks. Also, analytical systems are often static and cannot automatically improve their work quality over time. In this case, it is necessary to either manually correct the built-in algorithm or completely rewrite it. Another risk of the analytical approach is its instability in the face of errors: if the data input for decision-making is of low quality, the decision is likely to be of the same low quality (Daganzo, 2010). The statistical approach, in turn, differs in that it does not require an embedded template model. The system is trained directly in its implementation process, and a model is created automatically to predict future management decisions in similar situations, based on previous management decisions, goals, and case information.

The main advantage of the statistical decision support system is its versatility. These systems can independently create different types of solutions, automatically create and recalculate the model when external conditions change or improve their work quality. Statistical systems are error resistant, able to independently emerge from difficult situations, and find acceptable solutions even with low-quality or seemingly unpromising initial options (Bhat, 2002).

The main drawback of statistical systems is that they are fatigued and slow. They do not get going with full force from the start. They need preliminary information to analyze the situation, the history of management decisions, and a set of officially set goals. These systems often do not explain the decision-making path adopted, but there are exceptions to this issue, for example, the decision tree model.

In modern practice, preference is given to the statistical approach because it can really find a way out of a non-standard situation despite its complexity and high resource density. It is worth noting that there is still no way to fully automate the adoption of unique and innovative decisions at the current technology level, and you can still do without the human mind (Rigatos, 2010).

3.1 Risk rating

In the decision-making process, you can face a range of different types of risks. In the educational literature, there are several classifications of risks when making decisions caused by the ambiguity of the concept of risk itself. Therefore, to identify specific groups of risks, classifications are made according to their various criteria: by type of object, because of damage, by the nature of negative consequences, by the characteristics of exposure to risks, the specificity of the results, where the risks occurred, etc.

Let us consider several classifications in more detail. For example, when taking the type of object as a criterion, it is possible to distinguish between risks associated with the property

(usually expressed in a monetary form that reflects the actual value of the property), with income (which arises in the context of income generation or distribution and is evaluated based on mutually exclusive alternatives to options. Possible to obtain income in the future), with employees (usually an estimate of the magnitude of the adverse financial consequences), or liability (determined by the responsibility arising concerning the unforeseen development of events) (Pink, 2019).

According to its predictability, risks can be divided into two groups: expected and unexpected. The first group may include risks associated with the economy's cyclical nature and the expected development of the area in which the decision is made. Predictability is relative because if the outcome is known at 100%, it cannot be considered a risk. The second group includes completely unexpected options for the development of events, for example, cases of force majeure (Niedermeier & Ariely, 2009). There is a variety of risk classification according to their financial consequences. In such a group, there are risks of exclusive economic losses (negative consequences, such as loss of cash and capital), risks of losing profits, as well as risks that could result in both economic losses and additional income ("financial speculation is a risk"). The risks are divided into two groups: net and speculative. Pure risk, otherwise called statistical or straightforward, always incurs losses for activities. They can be caused by natural disasters, accidents, criminal acts, breakdowns, etc. Speculative risk, or dynamic risk, is usually associated with the decision-making process's financial side and thus can incur additional losses and benefits to the organization or agent that takes on it. Examples of such risks are currency fluctuations or legislative amendments (Al Salaimeh, 2017; Muradov, Hajiyev, Al Salaimeh, & Istyaq, 2018).

3.2. The advantages and risks of automation

Automation can significantly improve, speed up and simplify the quality of work. In manufacturing and business, control operations involve many time-consuming calculations and may contain manual calculation errors. Automation avoids these problems, speeds up lead times, and improves these processes' accuracy (Safwan & Jaber, 2005).

In manual work, not enough time is given to carefully consider and find the optimal solution to the problem, while automation can develop more ways to solve the problem, analyze each of them and choose the best solution for each specific case. Among other things, automation helps assess debt conditions and develop preventive measures to improve it and prompt planning and managing organization payments, liquidity analysis, and improvement daily (Al Salaimeh, 2011).

The risks of automated decision-making are not well understood, but the following factors can be unambiguously identified, which can cause additional severe difficulties in solving the problem. Like any complex system, "smart" is prone to malfunctions. At the same time, because the idea of automating the decision-making process is only still developing, today there are not many companies that can accurately assemble the system while adhering to the deadline and the declared value.

Besides, there is the problem of equipment incompatibility, which can only be avoided by a specialist who understands both the features of modern automation and the programs that require it. If in the West they often sell a ready-made system, then in Jordan, it is assembled into separate components, where there is an additional risk of errors in the assembly and assembly of equipment (Al Salaimeh & Pushkarev, 2011)

There is also the problem of the "domino effect." It is very likely that if only one device fails, the smart system's overall chain and operation will be disrupted. One of the essential and inevitable aspects of the digital age is information security. With each passing year, the technology is becoming more sophisticated, and the hackers are becoming more sophisticated and skilled. Many "smart decisions" are at risk - they can be compromised and intercepted, leading to unpredictable consequences.

The listed risks require special attention in automating the adoption of "smart" decisions. It is imperative to improve countering cyberattacks, frequently update the system, and implement failure and failure prevention (Al Salaimeh, 2017). If "smart" decision-making automation is being introduced within the company, it is necessary to verify its readiness for this process, to track its compliance with the following necessary criteria:

First, the corporate project goals must be clearly defined and measurable and prioritized for achieving them. Second, the project requires separate budgetary funds and an understanding of where they should turn: to buy licensed software and equipment, pay for consulting services, specialized training for employees, etc. Third, to successfully initiate automation of "smart" solutions, a project team must fully understand and share project goals and priorities. It should consist of specialists whose professional level corresponds to the objectives of the project being implemented. Fourth, to avoid the risk of sabotage by company leaders, its key employees must be motivated to achieve results (Muradov et al., 2018).

The risk of inconsistency between the corporate strategy and the automation strategy being implemented in it is the most obvious in principle. In this case, the company will quickly face the complexities of its insufficiency, the limitations of existing equipment, and the need for significant investments.

In general, we can say that the set of mistakes made when introducing the automation of the decision-making process in an organization is relatively standard: these are the problems of setting goals, implementation stages, and project management. Such "typical" risks such as deadlines due to perfection and the desire to make the project "perfect," dismissal due to innovations, risks of personnel unwillingness to change, lack of responsibility and professionalism for project teams do not disappear anywhere (Istyaq, Al Salaimeh, & Miqdadi).

This could also include a superficial attitude toward entering raw data into a "smart" automated system, saving the number of workstations and equipment, reducing the timing and cost of implementing technology, and other obstacles that need to be thought of in advance of solutions. The better the automation implementation process errors are corrected and accounted for, the greater the likelihood of its success and the expected path of development (Al Salaimeh, Al Saraireh, & Al Rawashdeh, 2015).

3.3. M2M technologies in the world

Technologies that allow controlling cars or robots directly from a smartphone are increasingly appearing in our lives, as they have earned the name M2M - "machines that machines own." It is based on the principles of interaction between devices connected by wired or wireless links. The objects exchange data in one or two directions, while every device in the system can be tracked at any time.

The development of the M2M field - machine-to-machine communication or the Internet of Things - has opened the door to business management changes, opening up new horizons of opportunities (Al Salaimeh, 2017). Mobile operators and system integrators were the first to develop them. It became apparent that users were no longer interested in additional options in ringtones or weather forecasts. It became a thinner additional income source, so it became imperative to find a new type of income. Then an idea emerged of how to use the existing network.

Initially, the machine-to-machine communication idea was only tested on gadgets and household appliances. So, for example, smart home systems appeared. Then the companies moved into the B2B and business sector in general, providing communication between devices and other services - for example, analytics. Another flagship company is Qualcomm, which has implemented OmniTRACS, a commercial vehicle tracking system (Istyaq et al.). M2M platforms make it possible to solve business process improvement problems and provide complex solutions. In factories and factories, SIM cards were integrated into the equipment, making it possible to automate the entire production process. The number of production workers decreased dramatically, and the store buildings of many companies became almost deserted: it became

possible to manage the entire production by a single operator who monitors the state of the system and gives the main orders for the entire system (Al Halaybeh, Besoul, & Al Salaimeh).

The wave of machine-to-machine communications struck Germany in the early 2000s when payment terminals equipped with industrial modems began to be used everywhere. Today it occupies a leading position in terms of the number of installed payment terminals. The active development of these technologies is particularly noticeable in the transportation sector. For example, taxi companies integrate systems that help build and analyze roads, monitor drivers, and collect information and display it on dashboards (AL SALAIMEH, 2018).

The application scope of M2M technologies is broad: these are security systems, industrial automation, logistics, trade, healthcare, etc. Machine-to-machine communication is actively entering agriculture today, paving the way for high-development, employee-reduced, and profit maximization. This could also include equipping naval ships with systems that create a continuous communication channel with the land virtually without human intervention.

The main goals pursued when applying these technologies are:

- Maximizing the use of existing technologies and increasing their efficiency;
- Gain new competitive advantages in already manufactured products;
- Increase the efficiency of data collection and analysis;
- They are improving the environmental situation in the regions.
- Turnkey business improvement solutions for large industries,

Many companies, especially mobile operators, actively serve factories and taxi companies. The company offers many ready-made "smart" solutions used by the Ministry of Emergency Situations employees, the General Inspectorate of Traffic Safety, banks, advertisements, commercial fields, and their clients.

MTS could become an example of the successful implementation of M2M solutions. In mid-2014, INTACH INSURANCE reached out to her in search of innovations to attract new clients. Together with MTS, two new insurance products from CASCO were launched, which used MTS's innovative services, "Smart Insurance."

An IT unit was built into the vehicle, which made it possible to evaluate driving quality, safety, speed limits, night driving, etc., making it possible to assess risks more accurately and rely on insurance coefficient. The idea attracted eager drivers who could lower their premiums by proving they were safe to drive. Today, about a third of the company's new customers enter into contracts with smart insurance services (Bandy, 2011).

The development of M2M technologies is still relevant today and is unlikely to lose relevance tomorrow. There are developments underway to make devices more efficient, reduce system size, improve reliability, and simplify management. Also, a way to harmonize communication standards is expected to appear soon. The fact that the "Internet of Things" has room for further development is evident. We have already seen the emergence of systems for connecting home devices via Bluetooth and Wi-Fi, and everyone has heard about smart home projects, baby monitors, and more. There are more than 2 billion connections between 200 million devices globally, and these numbers are snowballing.

Unfortunately, there is also a severe problem with the trend towards the introduction of these technologies. Data flows increase so rapidly that there is a risk of a power shortage. If you ignore this issue now, all future power plants will only process and transmit data. There are some promising development paths in telemedicine, automated vehicle control systems, and 'smart cities,' where M2M equipment enables improved quality of life and residents' safety. Of course, the prospects for machine-to-machine development in the business sphere of our time have practically no limits.

4. The results

In this research, the goal set for it was achieved, suggesting some methods of developing, making, implementing, and automating decisions and risks. At the same time, some of the principles used in this area were clarified.

5. Recommendation Conclusion

It turns out that automating "smart" decision-making can speed up routine and time-consuming processes, making life much easier for the agent who uses them. The introduction of such systems allows you to focus on work outcomes, research tasks, and special operations involving experience, knowledge, and intuition, and not on formal mechanical processes. With the help of "smart" systems, costs are reduced, the risks of disorganization and calculation errors are eliminated, the impact of the human factor is reduced, and the entire organization's efficiency is increased.

On the other hand, the introduction of "smart" automated solutions creates new risks that must be avoided. This requires continuously improving and updating a complex technological system, increasing its security against cyber-attacks, motivating management to achieve results, training employees to work with technologies being introduced, etc.

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