

POSSIBILITY OF USING KNOWLEDGE FROM THE ANIMAL WORLD IN SOLVING BUSINESS PROBLEMS

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Abstract: *The patterns of functioning of ecosystems is widely used as a type of learning and simulation to solve problems of organization and management of human groups and joint work. It turns out that certain animal groups are very social, that individuals learn from one another, and group is learning too, which is the forerunner of a learning organization in the modern age. Thanks to sociability they have been able to adapt to the external environment and many species survived that way; those who were not able to adapt simply disappeared from the ecosystem. Intelligence of ant colony, of swarm of bees, intelligence of flocks of birds, animals pack, etc. enables successful creation, maintenance, and management of organizational systems. By studying them and applying particular knowledge in business systems it is possible to establish a new quality in achieving business success of enterprises, institutions and other systems. This paper aims to show the possibilities of applying certain knowledge of the animal world in the management and organization of organizational systems.*

Keywords: *wildlife, intelligent animals, a swarm of ants.*

1. INTRODUCTION

Scientists and scholars of individual or collective intelligence of animals investigate the operation and behavior of animal groups, or pack animals, insects, birds, fish and other animal groups in order for this behavior to be transferred into the design and management of organizational systems. Noting that in any pack or animals herd there is a leader who dominates and often becomes the guardian of the territory, made us imitate this type of leadership in organizational systems. Therefore, in modern business leadership it is stated that 'it is better to have a herd of deer led by a lion than a herd of lions led by a deer.' In other

words, it indicates that the leading entity in animal groups as well as leaders in organizational systems have a decisive impact on their functioning.

By studying the way of functioning of ants in an anthill, a swarm of bees in the hive or flocks of birds we can obtain relevant knowledge that can be applied in the organization of business and other systems. Naturally, this statement is true in the modern age too, where there is an explosion of knowledge and of new techniques and concepts. A flock that is flying indicates a high level of togetherness and respect for the rules of flight. A similar situation exists in the swarm of bees, ants, flocks of fish and other intelligent animal groups. Therefore, by observing the functioning of animal groups it is possible to come up with new knowledge. This knowledge can be used to increase business performance, but also to increase the socialization of the organization, either at the macro, meso, or micro level, which imposes the need for a more detailed elaboration of the above options.

2. THE POSSIBILITY OF USING KNOWLEDGE FROM THE ANIMAL WORLD IN SOLVING BUSINESS PROBLEMS

By using intelligence animal groups, or self-organization, it is possible to design, develop and maintain organizational systems as artificial creations. [1]

- *Flexibility.*
- An organization can successfully respond to incremental or radical changes occurring in the environment. In other words, flexibility creates conditions for adaptivity in which the organization changes (adapts) to changing circumstances. This characteristic is particularly important in conditions of dynamic and uncertain environments. That is why organizations that have managed to create adaptive organization are much less subject to crises. Should it occur, they are more likely to emerge from a crisis more quickly and with less disruption and damage.
- *Stability.*
- The use of swarm and animal groups intelligence demonstrates that these organizations do indeed survive even if certain members of the system fail to perform their job, i.e., to carry out their tasks. The stability and strength is provided thanks to the group's ability to change in the same pattern of changes.
- *Decentralization.*

Every individual in an intelligent animal group has relative independence in carrying out its functions. Individuals perform it without asking for permission and without supervision. Zoology found that "in the colony of ants are: ants suppliers, ants protectors that protect the anthill, queen ants tasked with providing offspring, ants who take care and feed the larvae, etc. Ants-suppliers have a duty to supply food for the entire colony. They do not call meetings or develop strategies, neither do they seek guidance from the central leaders how to act in certain situations. They simply find food and bring it to the nest by following a simple procedure that is built into their genetic code.

Analogous to the above, in carrying out joint work, i.e. in organizations there is division of labor too, with individuals carrying out tasks defined by the organizational setting. Thus, a human organization is an imitation of what happens in the animal world; nevertheless, one should always bear in mind that this imitation is performed at a much higher level. [2]

As already noted, living beings or animals including man, function on the principle of self-

organization. In the process of solving the problem of self-organization they work independently and in accordance with the situation. Here there is no central authority to issue orders, but have developed strategies troubleshooting by individuals in the group who are responsible to finish the job. For example, if one ant finds a piece of food that is too large for a single ant, another ant quickly arrives to help him. They run around changing position until they balance that burden so that they can carry it to the final destination. As a consequence, ants in the ecosystem have been present for tens of millions of years, and one of the reasons for this is that ants are rare insects which are in group 2% of the animals that live in colonies, or groups. Here all members of the colony work together and strive to establish and maintain a global system.

Naturally, when all individuals think and act in the interest of the whole, success is guaranteed.

Or, for example, when one of the birds from a flock falls ill, the other two birds with that sick bird leave the flock, staying together in a location and to remain together until the diseased bird is either cures or dead. Should people behave like geese in a flock, they would stick with each other in the good and in the bad, difficult moments. Hence, a flock of birds is a highly socialized organization, a problem that in modern management represents a major problem. [3]

Of course, the previous characteristics are not expressed independently, but are in a dialectical unity. The division of labor in animal or human groups imposes the necessity of association of individuals to one another in order to achieve greater synergy effect by helping each other.

3. THE POSSIBILITY OF APPLYING KNOWLEDGE FROM THE ANIMAL WORLD TO MODERN TECHNOLOGY

It is known from management knowledge that technology is actually applied knowledge. The functioning of animal groups or colonies of ants, swarm of bees, flocks of birds, schools of fish, can also be applied to the design and construction of technical and technological systems, including modern information technology. "Most experts agree that artificial intelligence refers to two basic ideas. First, it involves the study of the thinking process in humans. Second, it deals with the presentation of these processes through mechanisms or technologies, or organizations such artificial creations. The final goal in the study of natural intelligence is to build machines, or organizations that will imitate or emulate human intelligence. [4]

Swarm intelligence of ants, bees and other intelligent group provides an opportunity to examine the collective systems in which a group of individuals having specific goals can solve problems and make appropriate decisions without centralized control or general plan. The problem that ants have actually resolved is one of the oldest problems that known to men, and that problem is the optimization of time. It is also known as the 'shortest path problem' or traveling salesman problem. Anyone who plans distribution roads for delivery trucks in a factory had to find a solution for the same type of problem.

By implementing this model from nature, researchers of information technologies have made a series of small robots and put in them a software that allows robots to follow the rules and react in the same way as ants. They were free of physical form, creating virtual ants in the form of small autonomous blocks of code that we call intelligent programs. Each code is able to follow certain rules, react and adapt to certain situations. These virtual ants were

then organized into multi-program systems which were further processed by programming models.

The example of the world-famous *Southwest Airlines* confirms this in the best possible way. Although loading, unloading and reloading was only a minor part of the work in the *Southwest*, it was still a major headache for its management at busy airports. *Southwest's* management consulted with experts on swarm intelligence who implemented a virtual model of ants-suppliers to simulate the process of transferring cargo. And so, to their surprise, *Southwest* managers discovered that there are better ways to transfer the load than to put on the first plane to the preferred direction. To their surprise, the computer model program of swarm intelligence showed that it might be better to leave the cargo on the plane going in the wrong direction. For example, cargo that goes from Chicago to Boston would be better left on the plane that goes from Chicago to Atlanta, and then switched to a flight to Boston, which requires less unloading and reloading. Following the model of ants, *Southwest* had reduced its costs for transfer of cargo by 80% and reduced the work of loading workers by 20%. Further, they realized that there is more room in the schedule of flights that previously was full, allowing the company to accept more work and thus fully utilize its capacity. *Southwest's* total profit from this was \$ 10 million a year. Comparison of the activities of ants-suppliers and freight activities in the *Southwest Airlines* provides an excellent example of the similarities between ecosystems and human organizations. [5]

Analogies in the functioning and behavior of animals are often used in the design and construction of technical systems. The anatomy of birds has served to construct the plane with a beak to make it easier to compensate for air resistance and thus save power. This analogy is also accepted by cyclists and athletes in order to better use their energy resources. All the above systems are complex and adaptive to the many changes that occur in the natural order.

Thanks to the knowledge based on the animal world, a large number of technical systems, hardware and software has become more efficient and effective in spending matter, energy and information as mandatory elements of each and every (self) organization. However, its implementation is lacking or insufficient in the design and construction of organizational systems, although their application is much more natural in organizational than in technical systems.

This is because the technical systems are composed entirely of artificial subsystems or components and sub-assemblies, while the organizational systems are composed of people as a natural element that functions on the principles of self-organization and resources to work as artificial elements. It is shown that the introduction of the legality of functioning ecosystems which means self-organization in designing organizational systems provides a significant contribution to increasing business success. Therefore, organizational systems become less effective, especially when it comes to the ability to adapt to changes that occur in the natural order.

4. CONCLUSION

From the above text we can conclude that biomimicry, or the study of behavior of animal groups, even those that are considered unintelligent, is indeed a new possibility of organizational learning and improving of organizational systems. This technique, i.e. analogy from the animal system has not been exploited nearly enough, though it has infinite potential. Today, great attention is paid to the formation of scientific, innovation and other centers

of research and innovation without seeking analogies and metaphors in the natural order and the application of their legality in the organization and management.

Another reason is the insufficient knowledge of natural law, given that man has not been able to uncover all the secrets of the functioning of ecosystems. It turns out that for a long time he will not be able to achieve this. To the extent that man is getting to know the legality of functioning of the natural order, especially self-organization, he will be able to, through analogous developments, in the eco system successfully designs, builds and manages organizational systems. This is a real fact, because it shows that each organization is an artificial creation made of natural and artificial elements. Considering that man as self-organization is the only natural element of the organization, by learning about biomimicry man would manage to create a more efficient organization, but also to solve complex business problems.

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- [5] Examples of business models, which are taken from nature, can be seen in the overview of industrial perspective "Automated Truck-Painting Booths Scheduled Themselves.