# A MODERN MANAGEMENT APPROACH IN INTERNET ERA

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**ABSTRACT**
*Decentralized autonomous organizations (DAOs) are the result of the high-speed development of international economy and internet technology, this new management approach is also the need of management in different complicated industries as well. The objective of this paper is to present the basic concepts related to DAOs, blockchain technology and to reveal their advantages and disadvantages. A management perspective to the DAOs and related concepts is presented, also. Besides, in this paper the application of DAOs also will be discussed, from a general perspective but from our own, also.*

**KEYWORDS**: *bitcoin, blockchain technology, decentralized autonomous organizations (DAOs), smart contracts.*

**JEL CLASSIFICATION:** *O32*

## 1. LITERATURE REVIEW

The new era of the 21st century is dominated by technology transfer, openness and a very flexible organizational environment. The traditional concepts related to organization and management has been evolved to new dimensions and approaches in which computer science plays an important role. Debates regarding centralization vs. decentralization are still in place but more and more examples lead us to a decentralized approach in which all resources are directed to the lower levels in organization to be as close as possible to the space where they are used and where creativity is one of the most important factor to sustain organization progress and performance. Thus, one of the basic concepts of this article- Decentralized Autonomous Organizations (DAOs) is described using a combination of several basic management concepts- decentralization, individual responsibility and creativity, autonomy of actions and decision-making process. Also, DAOs could be approached like an actual organization frame to take advantage of some important dimensions of virtual organization which enables its competitiveness and sustainability.
In this part, the explanations of DAOs from different researchers and economists will be presented, as well as the working theory, and the related concepts, like smart contracts, blockchain, Ethereum and bitcoin. The connections between each other also will be explained.

### 1.1 Decentralized Autonomous Organizations (DAOs)

Decentralized Autonomous Organizations (DAOs) is a virtual organization working through rules encoded as computer programs, which are also called smart contracts. The concept of DAOs is an idealistic outcome of the crypto-tech revolution (Mougayar, 2015). The **autonomous organizations can run entirely on the blockchain and follow a set of rules and parameters implemented**

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**through smart contracts** (Lielacher 2017)**.** What is more, it is a kind of computer program, running on a peer-to-peer network, incorporating governance and decision-making rules. DAOs can be programmed to operate autonomously, without human involvement, or the code can provide for direct, real-time controlling of the DAO and funds controlled by it (Harrison 2016). With the features of high levels of transparency in this new management approach with blockchain, there is little possibility of corruption. Every action is recorded on the blockchain and is visible to all token holders. This form of management also features lower administration costs in comparison to traditional organizations as many functions are handled by the blockcain itself (Lielacher 2017).

The blockchain, and cryptocurrency-based protocols and platforms are foundations for the consensus mechanism. Typically, these are open source decentralized consensus and decentralized trust protocols which guarantee the irrefutability, verifiability and veracity of all transactions and smart programs. These protocols can be general-purpose (e.g. Ethereum, Bitcoin) (Mougayar, 2015). They are the fundamental support for the establishment and development of DAOs.

According to Mougayar (2015), DAO has an evolutionary development including 6 main stages from the beginning when people have the early idea to have DAOs to its final mature stage.

**Table 1. Six main stages for DAOs evolutionary development**

| | | |
|---|---|---|
| **1** | **Participative stage** | users can search and decide voluntarily and independently in any projects |
| **2** | **Collaborative stage** | users collaborate for common goals or objectives |
| **3** | **Co-operative stage** | users prepare and expect some shared gains |
| **4** | **Distributed stage** | Users start the propagation with a wider net |
| **5** | **Decentralized stage** | further scalability is reached by instilling more powers for users to the edges |
| **6** | **Autonomous stage** | Autonomous agents, smart programs, and increased levels of artificial intelligence and AI algorithms will provide self-sustainability in operations and value creation at the centers, edges and arteries of an organization. |

*Source:* Mougayar (2015)

And someone may ask how we can join in the process of DAOs. Mougayar (2015) gives 3 ways to be involved in a DAO: you can buy shares, cryptocurrency or tokens (1), or they can be granted to you (2), or you can earn them (3).

In our opinion, DAO is a large concept for a virtual organization working in a virtual network. It could be identified as a decentralized traditional organization with little or even no formal hierarchy and top management. There are no centralized data and thus, the benefit of increased security occurs because of data distribution to all parts inside the virtual environment. All data and information are coded, no traditional documents or papers being used. Also, there is no third part involved in the process, except the two direct ones. Thus, the relationship developed inside the network are direct with no intermediary which determine cost reduction when refer to taxes or commissions.

For an effectively functioning of DAOs there is the need of a virtual network/ Ethereum. The basic activity of DAOs is to receive ether-send tokens, to develop smart contracts, to integrate in blockchain, and to use universal tokens, like bitcoin, for all transactions. The following figure can give a more clear explanation of the relationship between these factors.

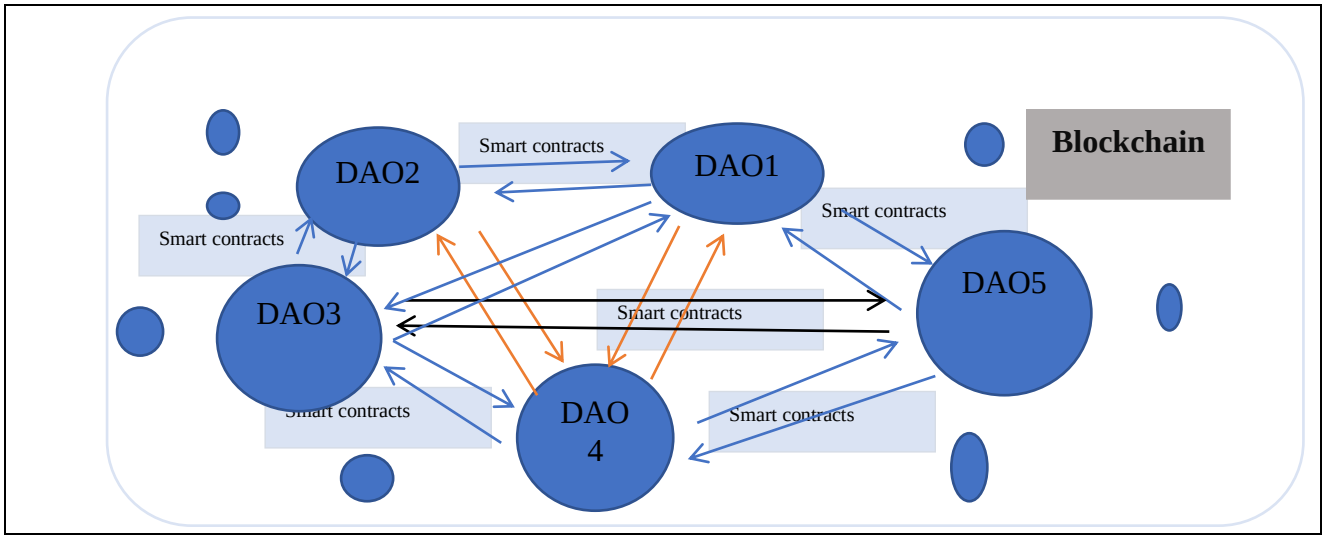


**Figure 1. Relationship between DAOS, Blockchains, Smart contracts.**
*Source: from authors*

### 1.2. Smart contracts

Smart contracts are important construction factor of DAOs. According to Burterin (2014), a smart contract is a mechanism which involves digital assets and two or more parties, in which some or all the parties put assets in and assets are automatically redistributed among those parties according to a formula based on certain data which is not known at the time when the contract is initiated. Hedging contracts and escrow contracts are includes in smart contracts too. Smart contracts are coded and available to anyone involved in the contract. According to Jentzsch (2017) smart contract helps DAOs to develop new projects inside the virtual chain e.g. building new products, developing hardware or writing code.

The opinion held by us is that within the Ethereum virtual environment, smart contracts are developed by DAOs when they want to do more than store Ethers or tokens inside the network. Thus, one or more contractors should exist when a smart contract is launched by a DAO. All members of the smart contract vote for decision-making problems in the contract based on their token number. In terms of governance management, there are specific instruments for minority to participate to the decision-making process even though one member has more than 50% of tokens.

### 1.3 Blockchain

The blockchain is another important factor to process DAOs.

According to Amstrong (2016), a blockchain is a "decentralized and distributed digital ledger that is used to record transactions across many computers so that the record cannot be altered retroactively without the alteration of all subsequent blocks and the collusion of the network". And Norta, (2015) describes blockchain like "a distributed database for independently verifying the chain of ownership of artifacts in hash values that result from cryptographic digests". The above approaches reveal that there are both centralized and decentralized views when a blockchain technology is used. The centralized information is available for all DAOs because offers general perspective of instruments and information. The decentralized approach offers individual data security but also certain transparency levels. Because all process is digitalized, there is no other part to change or modify data content. There are specific design procedures e.g. coding for building the blocks and, more important the iterative process to allow the initial data not being damaged. The blocks up-to-date come from both the iterative process but also from keeping the historical perspective of data. Meanwhile, some non-value data could be eliminated when they are tested like considering different criteria.

Bitcoin's blockchain, for instance, is a list of transactions that shows which users hold how much of the currency. It has the big advantage that no one entity controls the list. Once the record is made on the blockchain, it is impossible to manipulate. Rather than being kept on a single, central server, the blockchain is stored and checked across the whole network of users. Sophisticated mathematics — the "crypto" part — keeps it secure.

Blockchains can also be used to send messages or transfer ownership records and store data. All kinds of contract could reside on a blockchain, written in computer code rather than ordinary legal jargon. These smart contracts could establish projects, marriages, organizations, even national constitutions; they are anything you can code. The contracts would enforce themselves in a pre-determined way, including by automatically removing funds from a party's account (Norta, 2015).

In our opinion, with these characteristics of blockchain, many economists, investors and managers are very interested in the development and application of blockchain. In the near future, many industries will utilize blockchain to improve the efficiency and reduced costs for labors and resources. There is a new approach to information management system where bureaucracy and data redundancy is dramatically reduced. The decentralized aspects of gathering data offer information and data security to anyone involved. Being a user of a specific blockchain we identify multiple opportunities for sharing the specific information and thus, to develop the openness to others.

### 1.4 Ethereum- one virtual environment for DAOs

Ethereum is a community- virtual space built with the foundation of blockchain. Harrison (2016) gives a quit clear explanation of the relationship between Ethereum, Ether, and DAOs. Thus, Ethereum is a distributed network formed by thousands of nodes with computers all around the world. It is a public blockchain which provides a decentralized virtual machine to execute peer-to-peer contracts using its native crypto currency. Ether is used as the currency for transaction fees on its blockchain for the purpose of recompensing the computers of the network for providing computing power to validate actions taken on the Ethereum blockchain. Ether is therefore the underlying fuel for all Ethereum transactions. Then DAOs are made possible by the development of Ethereum.

Anyone can create an Ethereum contract. Once the contract is established and deployed, that script will exist in the Ethereum blockchain permanently and publicly, and the copy will be stored on every node in the Ethereum network. The nature of Ethereum, being distributed with numerous computers and laptops, makes it very difficult to interfere to the people who are involved in the Ethereum contracts or the execution of each Ethereum project. (Harrison 2016).

So in this case, when it comes to the comparison between the traditional business environment and that in Ethereum, we appreciate the latter one being more dynamic, flexible with fewer barriers for entry. All rules are coded, and all historical transactions registered. Thus, a higher level for transparency and individual data security is achieved through blockchain technology.

### 1.5 Bitcoin- the universal coin

Bitcoin is a worldwide cryptocurrency and digital payment system called the first decentralized digital currency, since the system works without a central repository or single administrator. So the advantages of it, such as there is no commission in transaction, make it more and more popular in economic and financial area. Bitcoin's blockchain, for instance, is a list of transactions that shows which users hold how much of the currency. No one entity controls the list. Rather than being kept on a single, central server, the blockchain can be used to store and check across the whole network of users.

Now we could find that Bitcoin has the similar features of DAOs which makes decentralization, being autonomous, and improving efficiency as goals. Like Bitcoin, DAOs is also an internet program making use of computers and laptops all around the world to find projects, solve problems, and return profits. However, DAOs have developed a lot, which is an evolved program to solve many more problems in different industries than Bitcoin. Walsh (2014) gives an explanation to the

difference. He believes that in the same way that Bitcoin is decentralizing money; DAOs seem to offer the potential to decentralize the entire world of business, commerce, finance, the economy, and so on. The businesses worked in DAOs can potentially be owned and run by their customers and their "employees", with no single fixed owner or central authority like a board of directors. The development of DAOs is a big step on the road to greater freedom and autonomy in independent working world and an antidote to the corruption and crony capitalism of current corporate world, and some dehumanizing influence in corporate hierarchies and environment can have improvement.
We consider that like the earlier popular Bitcoin, Ether in Ethereum is a unique cryptocurrency used for all transaction within Ethereum network and DAOs. Because its uniqueness there is no additional costs related to traditional commissions. Thus, some traditional financial activities should be adapted to the new approach.
In conclusion to part one- literature review we consider that a new management has lately occurred due to all presented concepts. The table below tries to summarize some of the identified elements of differentiation in comparison with the traditional management of organization.

**Table 2. Various management aspects traditional organization vs. DAOs**

| Traditional organization | DAOs |
|---|---|
| Works in a physical, geographical area | Works in a virtual environment (Ethereum, for example) |
| Intranet, for data bases or network within a supply chain, with ERP implemented and integrated. Any alternative possible, in respect with centralization/decentralization | Internet, within Ethereum space, a decentralized environment |
| A closed approach, inside organization or supply chain area | An open approach, within Ethereum space, any other DAOs members possibly a partner |
| Human resource HR involvement, at all levels | A coding system, with 100% track for all processes, activities, transactions, etc. Possible with zero involvement HR, except the code writers |
| Shares, in accordance with everyone participation to the capital | Virtual shares- tokens possible to be moved from one DAO to others (a virtual stock exchange) |
| A variable centralization vs. decentralization ratio | A decentralized perspective |
| Different currencies for transactions | Eather, like universal coin inside network |
| A majority governance management | Minority included in governance management even there is a 51% of tokens for a single DAO |
| Traditional computerized system- ERP, or centralized systems at local or government level | Blockchain technology, different levels of implementation- business organization, more entities, national or international level |
| Traditional ownership, transferable through classical stock exchange units | More flexible and dynamic ownership |

## 2. THE CONNECTION BETWEEN DAO's AND MAIN INDUSTRIES

Nowadays, many industries have connections with blockchains. There are already companies which utilize blockchain technology while some others are planning to use it through DAOs in the future. Below we present some examples of main industries utilizing blockchain in practice and the advantages of doing that.

As we previously discussed the Ethereum is a public blockchain which provides a decentralized virtual machine to execute peer-to-peer contracts. And DAOs were made possible with the development of Ethereum, which is also depending on the application of blockchain. So blockchain technology is used as foundation for DAOs. In recent years, many new and creative ideas have been put forward to use DAOs in many industries, such as the education, bank, insurance, logistics, and so on.

***In finance***, blockchain and DAOs have caused enough attention from big companies and government, one attractive aspect is how new business ventures access growth capital. Compared to the traditional searching for investment, which include targeting angel investors in the early stages of a new business, looking to venture capitalists, culminating in an initial public offering (IPO) on a stock exchange, the new funding mechanism has already transformed with blockchain. In 2016 blockchain companies raised $400 million from traditional venture investors and nearly $200 million through what we call initial coin offerings (ICO rather than IPO) (Tapscott&Tapscott, 2017). The investment has been increasing all these years with a high speed. And with the application of blockchain and DAOs in finance, many problems, such as the financial crimes rate can be decreased as the information is more public and clear.

***In banking***, with the utilization of blockchain and DAOs, the centralized electrical book can be replaced by a decentralized public ledger, where the information is all open and transparent. It can not only save papers and reduce the waste and pollution, but also reduce the mistakes caused by staffs. Data maintaining can be saved. Besides, the decentralized public ledger can avoid the intermediary agents. And once the blockchains are completely established, all the records cannot be manipulated. All the clients' information and transaction records which are confirmed cannot be interfered by anyone or anything during the execution. It is helpful to avoid the abnormal transaction and cheating. Nowadays, many banks have established laboratories to research the application of blockchain and get closer to DAOs.

***In education*** blockchain technology is suitable and appropriate for individual entities, a group of individual institutions but also for national or international level. The blockchain can help to promise the authenticity of the education certificates, or make sure the storage and utilization of the research achievement (Clark, 2016). The outcome is the need to maintain reputation, trust in certification, and proof of learning while the educational environment is more dynamic, diversified but less secure. Thus, building and sharing data related to credentials, long life learning information, certificates/people or certificates/ institutes or certificates/domain could be serious reasons for investing in blockchain technology. And one day the blockchain can help education and research organizations to build a knowledge system like Wikipedia or Khan Academy.

***Telegraphic transfer*** is the most popular way to have cross-border payments. However, it costs a big money including commission and telecommunication charge. With the utilization of blockchain and DAOs, the payments between the remitter and remitted can be direct without the extra cost as the time and cost in the head computer can be saved. The advantages also include that all the payments can happen in 24 hours and transfer in time.

According to Banker, (2017) ***in logistics***, blockchain is the new technology which can put all documents related to a shipment in one single electronic place, or can prevent thefts like fabricated documents, or can track a shipment using RFIDs, or is very effective in food and drug traceability. Even more, there is a great potential for cost savings when some commissions inside the supply chain are eliminated. Thus, blockchains, could greatly reduce the financial costs associated with strategic procurement.

According to IBM.com, "Traceability and transparency are some of the most important foundations of logistics. IBM Blockchain optimizes business transactions and trading relationships with robustly secure business networks on blockchain—both at scale and globally".

Blockchain offers a tool which is updated and validated in real time with each network participant with equal visibility of activities.

**In an Ethereum London Meetup in June 2017,** Christoph Jentzsch and Marvin Maistry discussed the potential that decentralized autonomous organizations (DAOs) hold when it comes to ***the charitable giving sector***. They believe that in the near future, DAOs can overcome the difficulties and be utilized in the management. Public faith in the efficiency of charities is at an all-time low. People are donating less money, and those that do donate are unsure of the results and impact their contribution will have. This is due to corruption, mismanagement, and misappropriation of funds through centralization, which can foster corruption and fraud. And this is the big reason why blockchain and DAOs can overcome or at least make those situations better.

## 3. PERSONAL UNDERSTANDING

This part presents the advantages and disadvantages of DAOs. As a quite new management approach appropriate and suitable for more and more areas, it is very normal that it has its advantages as well as weaknesses. At present, its role in different industries has showed the importance and won increasing confidence from some big companies and organizations. Although investors and economists are considering the challenges and problems of DAOs, the trend of being popular of DAOs is becoming stronger.

### 3.1 Advantages of DAOs

The most obvious characteristics of DAOs are being decentralized and autonomous. Compared with the traditional companies and organizations, these two features are the significance of the existence and development of the concept of DAOs and attract more companies and organizations.

First, decentralizing takes some of the burden of daily business operations off the business owner. As Joseph (2016) demonstrated, when the owner allows others to perform such tasks as hiring new employees or ordering supplies, DAOs can free the owner from the trivial work to spend more time on more important items, such as planning for expansion of company or meeting with important clients. Employees can be empowered with having more autonomy to make their own decisions and have more space to develop, giving them a sense of importance and making them feel as if they have more involved in the direction of the organization. It also allows them to make better use of the knowledge, and expertise they have gained to implement some of their own ideas.

For a growing business, decentralization can facilitate the process of expansion more effectively. For example, a company decides the expansion in opening new business units in different geographic areas, decentralization allow the new units to operate as independent entities to react more easily and effectively to the specific and different needs of areas, such as deciding on the products that appeal to the local markets.

As Walsh (2014) mentioned, a regular corporation or a company has its ownership, whether it is private or in the form of shares, there is headquarter where a central board of directors gets together in a fixed physical location to run the company. The organization of the business is hierarchical, and ultimately there is the CEO, who has authority over all decision making. Compared with these features in traditional companies, the companies or organizations managing with concept of DAO can make the decision more efficient and effective, as they have saved the time, labor cost in meeting and decision making. The time for preparation of a project can be reduced to a shorter period.

Second, about the feature of being autonomous, Walsh (2014) points out that in its core, Ethereum is a kind of system full of smart contract, and any DAO created on this protocol is likely to be composed of an interlocking web of contracts automatically executing to perform specific functions and projects. In this case, an Ethereum DAO would be autonomous in which it could run independently of human intervention. It could start payments to pay for its own hosting, run code to provide a service, and perform any other required functions completely on its own. It would be impervious to any kinds of bad side of human being, such as corruption, greed, and frailty. And all the information is open and transparent. An investor, partner, or customer would know exactly what

they are going to get and not need to worry about human error messing things up. A DAO would also be able to operate effectively in every second whilst making little or no profit, which makes people have no worries about management.

### 3.2 Challenges for DAOs

As DAO is a quite new management approach mainly in finance and information management areas with the association with blockchain technology, it is normal to have some problems related to confidentiality and security. Besides, the problems include game theoretic resilience, structural biases and concentration of token ownership.

The most famous example of a DAO is *The DAO*, which is a project and has gained many attentions from the economical and investment field. It gained great media attention after it raised the equivalent of 168 million US dollars from individual investors in its initial stage, becoming the world's biggest crowd funding project. However, on 17th June, 2016, a hacker exploited an unintended operation of *The DAO*'s computer code and its underlying programming language to take funds from *The DAO*. This accident makes the security and the future development of DAOs meet many suspicions from investors. Because of this accident, the following problems appear, such as whether and how to attempt to return the stolen Ether to investors, and if these funds alone are successfully returned, it would represent a loss of around 30% for investors (Harrison, 2016). This attack reveals the weakness of the DAOs management at that moment and the possibility of a further attack. In total, between 3% and 15% of all Ether is estimated to be at risk (Harrison, 2016).

Another challenge is how to determine jurisdiction in this field. As *The DAO* had no legal personality or existence, it was just a collection of computer scripts on the Ethereum with blockchain. So DAOs are not recognized nor cannot be included as usual legal entities, but creating uncertainty to the legal rights of a DAO and who should bear the legal responsibilities. When there is a problem coming, who can be the person or unity in charge of the problem becomes a hot topic. A DAO could be created by many contributors, some known, and some unknown, who are based on multiple jurisdictions. And although a DAO might have extensive rules governing its conduct from internal members, those rules may be of little use in cooperation with an external legal system.

One more legal risk for DAOs is the status of their participatory tokens (Harrison, 2016). The tokens-Ether are the basic of normal working of DAOs, they are like shares and equity in a traditional company. On the one hand, DAO tokens represent means of access and voting to a technological experiment, and improve and progress nascent projects on the new Ethereum ecosystem. On the other hand, DAO tokens have the role of an investment of potentially significant monetary value. *The DAO* is conceived as an organization that helps Ethereum products by providing Ether, which may result in returns on Ether, or free services or products. However, there is a strong countervailing argument that the structure, value and marketing of *The DAO* can be characterized as an illegal sale of securities.

## 4. FUTURE RESEARCH

### 4.1 General view

The future research will focus on the development of DAOs and blockchains in different industries, as they exist and develop closely. Because this is about a new way of managing organizations, the actual problems will be solved while others will occur. And the suggestions for the application of DAOs management and blockchains also will be more detailed. For example, what we can do to improve management and performance in banking industry, logistics, education and so on.

How to make DAOs as a legalized organizations as normal companies? How to make investors believe that a person or entity that can be in charge, and be responsible for solutions and possible improvements. There are several suggestions have been put forward. Bordet, (2015) holds the view that one-way DAOs could settle disputes with appointing a legal representative who would act as the only real-world link to the company. Harrison, (2016) says that its legal status of DAOs would

be determined by a court building on existing legal principles, and it would be willing to accept based on a litigant's argument. Walsh (2014) has the view that in the future the seemingly stark line between a DAO and a traditional business is a whole lot fuzzier than what we see now, and that a wide range of businesses may be amenable to some form of 'DAOification'. The reality is that more and more conferences are held to discuss the future of DAOs. **The Ethereum London Meetup in June 2017 was held to discuss the big future of utilization of DAOs in management, which is a good example.**

So, in a conclusion, most researchers and economists have a quite positive attitude towards the management method of DAOs and the extensive use of blockchains, and more contributions will be made by them to many industries and projects.

### 4.2 Authors' perspective

Considering the various possible directions within DAOs future our focus is on management issues. We will try to develop future researches in the next couple of years related to:

- How to increase DAOs performance within the virtual open source platform;
- How to develop and adapt traditional strategy to the new challenges;
- How DAOs fit with management structures of the 21st century, from the perspective of innovative companies in organizational areas;
- How to increase the process quality and to promote the ongoing improvements;
- How to better adapt and utilize the actual databases of companies, already available, to the new requirements of the open source network.

We consider that the future is very generous and thus, any of the above-mentioned subjects could bring contributions to management in 21st century.

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