

## THE GAMIFICATION AS A TOOL TO IMPROVE RISK MANAGEMENT IN THE ENTERPRISE

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*ABSTRACT: The following article presents the application of the mechanism games, "gamification" as a tool to support risk management in the enterprise. After presenting the risk characterization, risk management and the concept of gamification, we present practical steps to be taken in accordance with the concept of gamification, allow for the efficient operation of Risk Management in any enterprise. We have chosen an enterprises, producing the small plastics objectives, as an example how the Risk Management System might be improved by adding the action taken from the gamification mechanisms.*

*Keywords: risk management, gamification, tool, enterprise*

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### **The issue of risk - historical view and definitions**

The first mention of risk has appeared in the first economic treaties, was provided it mainly in the context of its relationship with profit entrepreneur. The famous Arab philosopher Ibn Khaldun wrote about the risk as some kind of legal gambling, *"trade is a natural method of obtaining profits. However, most of its practices and methods is a cunning and calculated to obtain the margin between purchase price and selling price. Thus, the law allows the cunning of trade, because it contains an element of gambling. This does not mean, however, taking the property of others without giving anything in return. So it is legal"*. (Abd Ar Rahman bin Muhammed Ibn Khaldun, 2001)

Term risk is derived from the Italian language, which means primarily the project, whose outcome is unknown or uncertain, or the possibility that something will succeed or fail (Biegański M., Janca A., 2001), or otherwise as a condition in which the outcome achieved in the future is unknown, but it can identify its future alternatives, assuming that the chances of possible alternatives are known (Leksykon finansów, 2003).

The word risk comes from the Arabic or Latin word. Arabic word means "everything that is received from God and has brought benefits." In this definition, risk has a positive connotation. Latin word, originally meant the challenges that were posed in front of sailors who want to defeat the reef, and had the undertone, "to benefit from unforeseen events" (Merna T., Al.-Thani F. F., 2008).

Word of the risk derived from the Greek language has overtones of both negative and positive. Today's word of the risk, usually has a negative character, but there are cases in which it has a positive connotation, such as "to dare nothing, I gain nothing." In turn, the English word risk has only a negative character, the risk is exposure to danger (Starostka-Patyk M., 2007).

During the industrial revolution, the concept of risk was referenced not only to trade but also to entrepreneurs involved in production. In the treatises written by Adam Smith and David Ricardo, the risk is an integral part of business. Adam Smith remarked that *"the ordinary rate of profit always increases more or less at risk"* (Smith A., 2011), along with Ricardo believed that the risk

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borne by the entrepreneur must be paid to him, *"the farmer or manufacturer cannot live without profit more than a worker without pay. Their motivation to accumulate will decrease with each decrease in profit, and disappears entirely when their earnings are so low that it does not compensate for the effort and risks that must suffer"* (Ricardo D., 1821).

Rowe defines risk as *"potential negative consequences of an event or action"*, (Rowe W.A., 2005). Rescher defines risk as the chance of an adverse event (Rescher N, 1983).

Polish Language Dictionary defines risk in three dimensions (Polish Dictionary, 2009):

*"Risk is the possibility of success but also failures or losses. It is also a project whose outcome is uncertain or doubtful. The risk is also the possibility of injury"*

- *the possibility that something goes wrong, a project whose outcome is uncertain,*
- *imposing to a danger,*
- *the likelihood of aggravating the injury the injured person, regardless of fault, if a contract or legal provision does not commit another person to compensate for the damage.*

With all of the above definitions, it follows that the risk is a derivative of uncertainty and is measurable. According to these definitions, there are grounds for not only to identify the same risk but also enable it to empirical verification through appropriate measurement methods. Risk is a phenomenon that can be measured, but only in situations where there is full access to needed information, allowing to estimate the probability of damage or loss relating to the action. The risk includes a combination of the probability of perceived risk or present circumstances and the size of their impact on the established goals. The concepts of risk is used to describe an uncertain event whose result may adversely affect the goals or profits of the enterprise, while the term describes the uncertain circumstances of the event whose effect, in turn, may be a positive influence on the goals and profits of the enterprise. (Office of Government Commerce, Crown 2007)

There are five major issues underlying risk (Barkley B.T., 2004):

1. Risk is the uncertainty that occurs in the project company that could potentially be monitored or tracked. This means that each project carries out some risk. The most important is the identification of risk carrying the greatest threat to the project, and then controlling it. Overcoming the risks that the company will be able to complete the project. The other side of risk is opportunity - where the company is better, faster and cheaper to manufacture their products, identifying the needs of customers and reducing risk in their processes, and all this takes place at the same time, then it becomes an opportunity to increase the possibility that their market shares and development of the whole enterprise,

2. Risk is an integral part of the business and its processes, so the risk cannot be treated as something else, as a separate part. This risk is causing businesses and creating new projects. If there is no risk – there will be no new enterprises created together with new projects. Addressing the risk means that the enterprise is always looking around and identify situations in which something can go wrong, which may adversely affect the entire business enterprise,

3. The enterprise should focus primarily on the risk with very high probability, since it is able to focus on all types of risks involved in its activities.

4. Risk monitoring is to identify points in the business or enterprise in which the project may be at risk, and therefore, decisions about risk should be taken. These points may relate to equipment companies, available resources or raw materials or technologies for the manufacture of products,

5. Planning response to the risk requires a full understanding of a business or its projects, under which scenarios are created events. Realistic scenario assumes the most probable situations, pessimistic scenario assumes the worst situation in which a company can be found, while the optimistic scenario assumes the best way out of the situation,

The main groups of risk in the enterprise are (Lam J., 2003):

- Risk of technology - in this group there is a risk that the products produced or offered will not have the highest quality, is inextricably linked to this risk, the risk of manufacturability and

technical measures. The use of obsolete machinery and equipment may be associated with decreased quality of its products, and outdated machinery may affect the risk of accidents at work,

- Risk organization - inadequate organizational structure and lack of suitably qualified staff may result in risk of poor maintenance of machinery and equipment and adversely affect the continuity of processes, which in turn may lead to delays and break the deadlines,

- Risk management - in this group there are many types of risks, risks associated with the logistics can be caused by insufficient harmonizing all the logistics processes, from supply (too high inventories) to the delay in deliveries, the risk of compliance with the law associated with this activity company that goes beyond the specific legal norms,

- Financial Risk - the risk is concerned the enterprise's financial liquidity, credit risk and its proper assessment of the risk of investment by the company.

A separate group is reputation risk, it involves the perception of the company by the external environment. The negative perception usually involve the loss of customers or counterparties and thereby - reducing the risk of financial income and the amount of profit achieved.

Another group of risk is an operational risk - is that kind of risk that is associated with the implementation of its functions by the company. Operational risk is a broad term that includes risk of fraud, the risk of legal or natural and environmental hazards (Crouhy M., et all., 2001). Operational risk is the risk of loss resulting from incorrectly the processes, people or systems (Mema T., Al.-Thani F. F 2008).

Since the risk is present in all aspects of not only human but also organizations and companies. With time, it was necessary to define and systematize risk activities, including the way science department was called "Risk Management", which is described in more detail in the next section of this article.

### **The Risk management in the enterprises**

Risk management has emerged in the same time as the risk, people are practicing risk management for a very long time, even without being aware of it. This is called. informal risk management, such as wearing the belts in the car when traveling or waiting for the green light at a pedestrian crossing. Formal risk management is most common in businesses and takes the form of procedures, rules or principles.

The beginning of modern risk management adopted in years 1955-1964, then a risk management sharply began to develop, both on academic and professional ground (Snider H.W., 1991). Initially there was a risk management in insurance, and many companies now involved in risk management, has roots in the form of insurance companies. Also, research on risk management in terms of research carried out at universities insurance.

Despite the fact that the basis of risk management was the purchase of insurance, there are a number of other equally important factors that influenced the development of the field of risk management. Those responsible for the operational management had a strong influence on the development of risk management strategy which appears as a result of normal business, while sections: marketing, planning or public safety also have an impact on risk management, depending on the risks of what they have to contact (Williams C.A., et all. 2002)

By tracking the evolution of risk management over the years, Dr. Vernon Grosse notes that security procedures have created and promoted several concepts that have subsequently been adapted by the insurance part of risk management, otherwise known as the financial aspect of risk management (Grosse V.L., 2002). Among the few ideas he lists: *a fully integrated risk classification systems, management shift to lower levels, extensive involvement of the organization's risk management process and the concept of adverse effects arising as a result of risk management methods used*" (Grosse V.L., 2002).

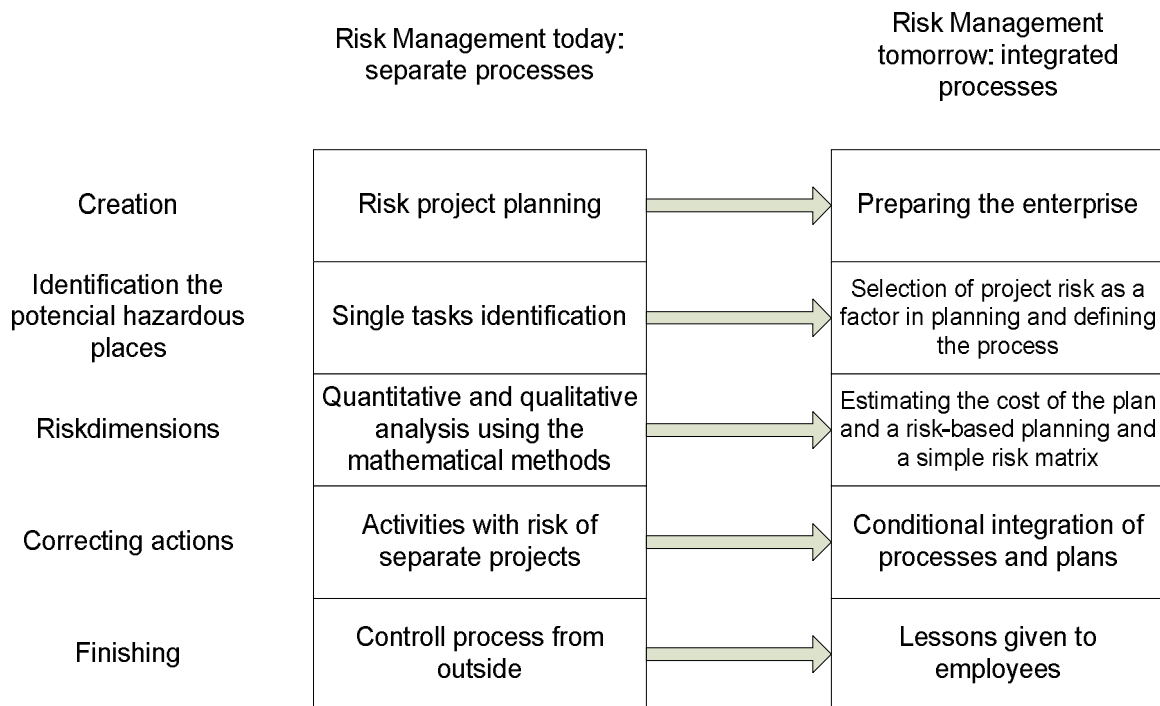
On the other hand, only recently in the process of risk management processes included in occupational health and safety. The reason for this was that the cooperation between specialists of

risk management and safety specialists occurred very rarely. This was caused, among others. organizational structure of enterprises as well as acquiescence to an independent, usually parallel development of both these areas, the top management companies. Another stumbling block was also different perceptions - perceived health and safety specialists the technical side of risk management, which in turn was a difficult for people coming from insurance - risk management managers.

Currently, tasks and operations managers, risk managers, are determined by the type of risk inherent in the enterprise. Today, risk management goes hand in hand with the health and safety risks of law enforcement or security systems

Besides the classical approach to risk management approaches, there are a few of its contemporaries which have supporters and opponents. Proponents proclaim the classical view that the "risk management has an interdisciplinary character and is used to manage pure risks in the organization" (Williams C.A, et all, 2002). This concept is based on the assumption that risk management is a continuous evolution and the factors do not affect the growth of the company may have an impact on decision-making regarding risk management.

The Software Engineering Institute defines risk management as "a proper risk management is a process in which risks are continuously identified and analyzed. The risks are tracked, mitigated and controlled. Efforts are underway to prevent potential problems, and employees focus on the risks affecting the quality of the product or products" (Barkley B.T., 2004).



**Fig. no 1. - Risk Management – today and tomorrow**

Source: Author's elaboration based on Barkley B.T., „Project Risk Management”, The McGraw Hill, NY 2004.

The term risk management may also refer to the creation of certain assumptions, establish objectives and processes for identifying and measuring risk and then plan and implement activities designed to prevent risks. Risk management creates environment characterized by a pro-active<sup>3</sup> behaviors in the area of risk (Office of Government Commerce, Crown 2007). The proactive

<sup>3</sup> Pro-activ – these are measures aimed at prevention of threats, rather than taking action after the occurrence of the risk.

environment, risks and hazards covered by the risk management process should be clearly defined, before they become a serious problem (Lam J., 2003).

Risk management is a cyclical process, which should be repeated at regular intervals, this applies to all activities of the project and its individual projects (Well-Stam D., et al., 2004).

Fundamentals of risk management have been developed by many researchers, theorists, stating that risk management can affect the tax cuts, reductions in transaction costs or to streamline decision making in the enterprise. However, beyond the theoretical approach, there are four, from a practical point of view, reasons why the risk management should be introduced to the company (Lam J., 2003):

Risk management is a manager's task - enterprise risk management is the direct responsibility of manager who is a specialist in this field. It has a wide range of knowledge concerning:

- of historical data on the risk of the enterprise,
- the current level of exposure to the risk of the company and its concentration in its activities,
- about future actions and investment plans of businesses that may alter risk,

Analysis and risk management is a challenge for every manager, despite the fact that it has unlimited access to company information, and it has the tools to support risk management process (Dima I.C., et al. 2010). Main task of the manager responsible for enterprise risk management is to ensure the full capabilities of the company to achieve this and also that the company is not unnecessarily exposed to danger or risk.

Table no. 1.

**The Risk Management's main elements**

<p>Social: - consumer's requirements and expectations - Socjalne: - wymagania konsumentów, - oczekiwania konsumentów - increasing consumer's awareness - using the media - UE partnership</p>	<p>Internal factors: - faith and ethics - enterprise's culture - pressure on the employees, - changes occurring in the processes and tasks, - personal changes, - better raw materials utilization - illness and absence costs -</p>	<p>Political: - UE law - audit priorities - change of the employer's profile - mobile community - differences between the governments - partie's priorities</p>
<p>Technology: - technical equipment modernisation - better security - using the substitutes - better data storage - more effective data collection</p>		<p>Economical: - rate interest change - infation level - the cost of waste management - reduction on numer of waste - insurance premiums - tax stimultation - grants and subsidies - investors and shareholders expectations</p>
<p>Competitive: - contract's requirements - bigger pressure on the entrepreneurships - obtating licenses - using ISO/BSI standards - benchmarking</p>		

Source: Author's own elaboration based on Jeynes J., „Risk Management: 10 Principles”, Butterworth&Heinemann, Oxford 2002.

These elements were divided into four separate groups:

- Physical characteristics - location, product, purchasing, raw materials,
- The human element - staff, procedures, protection of employee
- Processes - processes, performance
- Elements of governance - rules, strategy, planning and organizing

All of these elements have some extent interact with each other, and cannot be too much separated from each other. These elements form the structure through which risk in the enterprise is identified and then managed, result in the initiation and use of appropriate controls in order to reduce the risks involved.

### **The issue of Gamification**

The term "gamification" usually is defined "*as the use of gameplay mechanics for non-game applications*" (Grove J., 2011). According to this definition, gamification is a process in which AI thinking is applied to solve the problem or a commitment to workers.

According to Milosz Brzezinski the "gamification" is used to motivate people and it is an essence of the mechanisms derived directly from the computer game. In the games, because winning was the one who performs the task, comply with the rules and is the fastest (Brzeziński M., 2011). An example of motivation in mind, "gamification" is a system of rewards drivers with hybrid cars. Personal trainer explains that the driver fuel economy is likely to be awarded the Christmas tree. It has symbolic importance but it really proves that the driver consumes less fuel, which now translates to as much as possible on the environment and the wallet. And in Sweden, "gamification" is used in traffic. There, for now only in some areas, radar puts the images of the drivers whose drive in accordance with the regulations. Later, the driver honored participate in sweepstakes, where they can win money derived from fines. - Being able to cash in on those who ride fast, it pays to go slowly - Brzezinski observes (Brzeziński M., 2011).

Despite the fact that the term "gamification" relatively recently, is used in conjunction with terms such as "motivation" and "management" is the idea gamification is not a new idea. Gamification mechanisms for many years are used by companies or sectors of the economy. An example here might be the hotel industry and aviation. Hotels for many years use loyalty card systems, which are collected points earned by customers through the use of hotel services for the network. In turn, the aviation sector, has called the collection. miles, for example, after collecting a certain amount of customer's flight miles, it gains the right to one free flight (Hunter J., 2011).

To change the current perception of "gamification" is influenced by several factors. One important factor is the success of newly established companies such as Foursquare, who mastered to perfection the four main mechanisms "gamification" - points, levels, badges and leaders. Another, probably even more important, factor is that currently used methods and techniques of marketing are proving to be increasingly less effective. This is because that, currently, people are eager for more experience and experimentation. This concerns mainly the younger generation - and younger generations Millennium - represented by people who are more familiar with the mechanics of games than the previous generation. Therefore, "gamification" serves to provide both one (experience) and second (experimental), in order to gain the attention of people and gain their commitment for a longer period of time. Therefore, today the term "gamification" is "hot" because, following this logic, is used mainly to create applications and services designed especially for the younger generation and the Millennium. With this assumption agrees SCVNGR<sup>4</sup> founder Seth Priebatsch saying, "*as in the social layer complete, the construction will begin in earnest on the game layer*" (Priebatsch S., 2011).

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<sup>4</sup> A social location-based gaming platform for mobile phones

Zichermann distinguishes five most common mechanisms of gamification (Zichermann G, Linder J., 2011):

Points - points have long been used in non-game applications, and they mean to obtain its objective. Points also measure the performance of a single user in comparison to the points earned by other users. Thus, they cause the user to increase the motivation to achieve their greatest possible number.

Badges - despite the fact that the badges are very popular in the real world, are now also very popular in the digital world.

Levels - are used to motivate users to increase their efforts to achieve a progressively higher level.

Challenges - challenges can be very simple or very complex, very often require the involvement of the entire group of users.

Gamification is also a very useful tool for solving problems such as too many e-mails leading to overload mailboxes and servers, weight gain caused by dislike of society to exercise. To this end, a number of applications, such as The Game Email or Health Month, which aims to reduce the number of emails sent, or to convince people to exercise. Health Month in the application used gamification mechanism causes that make people feel less guilty in the case of failure. In games, as you know, the player has to defeat, which did not prevent him from playing. Games allow users to accept their failures. In this case, when you eat too much, Health Month users will be not discouraged by the whole idea of healthy eating, but still tries to continue the "game".

However, all the advantages of gamification they would not gain so much popularity of this concept if not for acceptance by users. Currently, the concept is so popular in the science of managing and motivating, in addition gamification mechanisms can be effectively used in risk management in the enterprise, which will be presented in another part of the article.

### Risk management supported by gamification

Despite the above, four main gamification's mechanisms, distinguished by many additional mechanisms that are used in the planning, implementation and control Risk management in the enterprise, can greatly contribute to increasing the involvement of employees and thereby increase the effectiveness of Risk Management.

Table no. 2.

**Gamification's mechanisms**

Dice roll	Things people like	Example 1	Example 2	Example 3
1.	Pattern recognition	Memory game interaction: items are discovered, then hide, and then combined	'Itme's combination like in the „match the element" games	Earn and burn: lesson of operating in the field of virtual economy
2.	Collecting	Stamps and badges collecting	Scarcity and return: time and quantity limited items	The exchange mechanisms
3.	Surprise and unexpected delight	Variable reinforcement, slot machines,	Easter eggs, hidden objects, geocaching	Unexpected dynamics, unique badges
4.	Organizing and creating order	Time and work challenges	Connecting similar items, creating similarity	Creating the teams
5.	Gifting	Easy, virtually, transferred items	Reminder gifts and recommendations	Karma points: target is a present
6.	Flirtation and Romance	Smile, flirting, ease-to-break relations	Choose the best/worst dressed people	Virtual items, light propositions, stout-outs
7.	Recognition for achievement	Badges and trophies	Contests, shows, game-shows	Nike Plus system

8.	Leading others	Teamgroup challenges	Levels requiring the leadership	Long-time targets requiring teamwork
9.	Fame, getting attention	Leaderboards based on players' opinions, points and promotion	Shows, exhibitions, contests	Opportunity to present at a big scale
10.	Being the Hero	Challenges like rescue the maiden"	Ask for help and reaction	Everything blows up in a 10...9...sec
12.	Nurturing, growing	Work systematization	Points, losing importance in during the perios of inaction	Score pyramid, points cumulucaction for the people and leaders

Source: Author's elaboration based on Zichermann G., Cunningham Ch., "Gamification by Design: Implementing game mechanics in Web and Mobile App", O'Reilly, CA 2011.

Based on the above table, will present examples showing how to use gamification elements can affect the overall Risk Management in the enterprise.

The presented enterprises products small plastics objectives, such as plastics covers and belongs to Small and Medium Enterprise sector. The enterprise has implemented a Risk Management System, which we can used as an example to use the gamification mechanisms. After the analysis of all Risk Management System procedures and its effectiveness, both for the enterprise and its employees, we have proposed additional gamification mechanisms to be implemented, which are presented below. Its implementation and realization should increase the effectiveness of the Risk Management System in some degree:

Pattern recognition - this element can be used to search for the optimal behavior of employees in the course of their work. Asking them to examine all the movements and behaviors that accompany them and then coming and finishing exercises and tasks, the person responsible for the Risk Management has the ability to obtain the templates of behavior that are the most optimal from the perspective of employees and then putting them into practice the company. Usually, these behaviors are intuitively secure because the man, even unconsciously, by doing certain things, trying to protect yourself and not lead to a situation threatening the life or health.

Collecting - collectible option is an incentive for everyone, now almost every person in some way, collecting points, be it at petrol stations or shopping in the store. In the implementation of risk management, employees of a company may be further motivated to comply with newly implemented safety procedures, by awarding them points as accurately as possible the use of these procedures.

Surprise and unexpected delight - referring to the above point regarding collecting points, the person who won the most points, it may be, for example, once a month, awarded the title of the employee who most closely observe safety rules in the company.

Organizing and Creating order - the introduction of this element can rely on showing that the worker is the most effective solutions for safety, allows the creation of the whole procedure of the proceedings, and in addition you can enable it to create a group of people that will be working on the issue. This action not only motivate employees but also lead to this that they feel that they are an important element in the implementation of Risk Management which will automatically translate into their total commitment.

Gifting - everyone likes to receive gifts and presents. In the case of risk management, this small gift can be sent virtually cake for an employee who faithfully fulfills all the procedures. A gift can also take the form of a reminder, the style - like make a cake for a security report at the time.

Flirtation and romance - not about no sexual overtones, is a piece based on the presentation of sympathy and kindness. For an employee who has some difficulty in adhering to safety procedures. Manager responsible for Risk Management, may be in the form of casual conversation or a simple presentation of sympathy, cause that person will be trying more to perform their work according to the rules of safety. It has long been known that the carrot and stick method does not work in every situation.



Recognition for achievement - this mechanism introduces an element of rivalry between employees of the enterprise. Their commitment and accuracy in carrying out activities which are converted into points placed eg on the scoreboard. The recipient gets the most points awarded in the form of gifts or title.

Leading others - this element is to play. After presenting the problem of safety rules in the enterprise, employees derive a working group to resolve the issue. This results in introducing an element of rivalry between groups, as each of them strives to provide the best possible solution to the problem, as soon as possible.

Fame, getting attention - in relation to the previous item, a group of employees who will develop the best solution to the problem is somehow a reward for its winning message reaches all employees of the company.

Being the hero - people like to turn to their managers to inquire about a specific problem. In the case of risk management questions may concern the application of procedures relating to occupational safety. It can happen here, both to propose new solutions for improving the safety at work or modify existing solutions.

Nurturing, growing - this element can be very useful for controlling and monitoring risk management in the enterprise. This element leads to the fact that control is carried out regularly, and even the slightest derogation from the rule are immediately reported to the person responsible for risk management.

As is clear from the above proposals, gamification can be very useful element in designing, implementing and monitoring the risk management in any enterprise.

Currently, the company is testing and monitoring the process of implementing the proposed gamification mechanisms and their influence on the behavior of company employees as well as the effectiveness of the Risk Management System. After a period of 6 months, another tests will be carried out, to check how the gamification mechanisms work in a practice, together with its impact of the attitudes of employees and whether, in their opinion, these are mechanisms that work in Risk Management System. Properly functioning gamification mechanisms will be permanently implemented into the Risk Management System, in case, of their negative effects, further mechanisms derived from the concept of gamification will be proposed. All the results will be developed in a subsequent article.

### **Conclusion**

Risk Management today is a very popular concept and virtually every company employing a number of people trying to create a suitable security system for its employees and the nature of its activities. Designing, implementing and monitoring the Risk Management often faces resistance which is employees' barrier against any changes. The solution to this problem may be application of the concept gamification, whose elements and mechanisms, respectively made, can lead to the fact that, first, convince workers to make the necessary changes and procedures on safety at work, and secondly, they engage in the process creating risk management in the enterprise. As everyone knows, we all like to play, earn points and levels, and especially likes the element of competition. All these elements can cause that the introduction of risk management in the enterprise can become a challenge not only for business executives, but also its employees, who will make every effort to put risk management system was characterized by effectiveness and efficiency.

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