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Determinants of effective creation of ideas within an enterprise on an example of a start-up organisations

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ABSTRACT

Technology environment is known for dynamic changes and a general lack of stability, which causes difficulties in researching it and determination of any common substantive values. This paper addresses these challenges and its whole argument is based not only on the known literature, but also on clear examples from history which are chosen to support some of the arguments. A key aspect of this study is comprehensive empirical research that combines indirect observation of the start-up community and environment with in-depth interviews with various participants in the process of innovation within technology companies. Interviewing and gathering information from people working and setting up innovative projects at different stages of development allowed for identifying some universal values shared by all participants of the process. The research has been summarized and the results presented in four models explaining the general method for creating effective ideas within start-up type organisations. Study presents a new approach to thinking about sparking, creating and managing process of innovation. It helps to understand determinants of effective creation of ideas within a company.

Keywords**:** start-up, innovation, promotion, technology, leader, creativity, ingenuity, idea, implementation

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1. INTRODUCTION

A formalised structure of the company often prevented organisations and corporations generating innovative ideas. Over time, temporary projects began to emerge which aimed to launch something new, innovative, something that will change the reality, into the market. Such temporary businesses and organisations searching for their own business model and for a model for rapidly scaling their operations which would guaranteeing a dynamic development of the company began to be known as start-ups.

Start-ups are most of all characterised by high innovation indices. The vast majority aim to create something new or improve a product or service and subsequently commercialise them. Examples of well-known start-ups include garage companies such as Hewlett Packard, Microsoft and Ikea, but also Google, Facebook and the Polish social networking portal Nasza Klasa. Additionally, start-ups are associated with a high risk and (at the same time) with a possibility of a very high capital return. Peter Thiel invested 500,000 US dollars in Facebook in exchange for 10.2% of the shares, which placed him on the Forbes list of billionaires only a few years later (source: http://www.forbes.com). This, however, is an exception - the vast majority of start-ups fail and don't deliver the profits their owners expected...

The question remains why start-ups are so effective in promoting and creating new ideas. One needs to consider structures and methods used in such organisations and what makes them so special. But first it is worth defining innovation and invention itself.

What is innovation and invention?

Considerations around start-ups should begin with defining the terminology, including the concept of innovation. The classic and most famous definition of innovation was formulated by Schumpeter (1934, Rogers 1998). According to him, innovation consisted in an introduction of a completely new product, or improving the quality of an existing product, industrial process, or opening of a new market, new use of materials, or changes in the organisation.

Whitfield's (1975) thought offers a slightly different, more systemic approach to innovation. In his book Creativity in Industry Whitfield described innovation as a process of many often complex events leading to the creation of a new good which solves a specific problem. This theory can be easily compared to current standards, because the widely recognised Business Model Canvas, the most common model for developing and documenting ideas (Osterwalder et al, 2010), was created on the basis of this very assumption.

The key is realising that innovation is much more than just invention. External factors, including economic, environmental, business factors, and countless unidentified events, situations and circumstances that affect the final success consisting in the implementation of the innovation (its commercialisation is another, difficult to achieve, stage) play the most important role in the process of innovation. Therefore, the crucial terminology issue consists in highlighting and explaining the distinction between innovation and invention. The most important difference, which is worth emphasising, is that innovation, unlike invention, has been implemented and has a market value, which means it is invention that has undergone the process of commercialisation. Nordfors et al (2003) describe, for example, the case of Thomas Edison's inventions.

This extremely creative man had more than 1,000 patents to his name, but only a few of them, such as the lightbulb, microphone or alkaline battery, have been put into practice and saw the light of day.

Moving further along the road of distinguishing invention from innovation, it is worth considering the model published by Jolly (1997). It refers to the process of creation of innovation and its commercialisation. The author distinguishes nine individual stages in this process. In the quoted publication the author's attention is focused on the first stage of the process, on its course and preceding factors, i.e. on the creation and fostering invention, or simply on the creation of ideas.

To facilitate interpretation and methodology, in this paper invention will be treated as the first step needed to create innovation - it will therefore be understood as a spark or catalyst for innovation, similar to Jolly's (1997) understanding. Invention will be thus synonymous with an idea, and treated as such from now on, because an idea, the first step in generating innovation is particularly important in start-ups. However, it is important to determine how the process of generating inventions, proceeds according to the literature.

2. INVENTION AS AN INDIVIDUAL, GROUP AND MIXED ACTIVITY

Cain (2012) suggested that the creative process and generally understood invention is usually an task undertaken individually, by introverts. She noted that it was people of this temperament that were the most effective, created the ideas in the largest quantity and of the best quality. Moreover Cain noted in her book, that, contrary to the popular opinion, individualists-introverts were not completely withdrawn, but rather sociable and friendly - but still preferred to work alone (Schat 2012); (Thomas, 2012). Thomas listed commitment and no fear of hard work (Thomas, 2012) among the most important advantages of introverts working alone. Schumpeter (1939) decidedly agreed with the opinion expressed by Cain. He argued that inventions were created by individualists who then worked on creating and implementing innovation or sold the rights to their idea to someone else.

However Montuori and Purser (1995) did not fully support Cain's ideas. They claimed that in addition to individual invention there was something else - invention that came about as a result of creative inventiveness of a group. According to them, this process was as effective as the one attributed to the individual members of the group. According to the concept presented in their paper invention often manifested thanks to a "spark" occurring between members of a group, for example in an organisation. This view seems entirely reasonable and also has foundation in the everyday observation of the birth of inventions. The widely praised idea of group work, including brainstorming methods, is based precisely on this assumption. However, there are also different views, which dispute this point to a certain extent, noting that "brainstorming" is not always the most effective way of creating ideas and emphasising the importance of individual work (Kavadias and Sommer, 2009). Purser and Montuori also reject such one-sided beliefs and do not diminish the role of individuals in the process of invention. This suggests that each invention requires both group work (the "spark") and individual work done by individual members of the group. Lundvall (2016), who focused on technological industries, has simply suggested that innovation meets between user needs and technological possibilities, so it requires both individual and group work.

It can be concluded that what's required is a certain mix of individual and group work, which is consistent with experience and common sense.

Importance of knowledge management

Pełka (2013) and Lee et al. (2013) have shown that knowledge management is both vital and necessary in the process of innovation, furthermore, management of determinants of effective invention is important as well. The latter has also demonstrated the key importance of knowledge management by providing empirical evidence in technological innovation. Le Bas et al. (2015) took a step further by testing various determinants and their impact on innovation persistence in technological companies. Whereas they focused on innovation persistence, which is a key value for technological ventures, they looked at product and process separately. Interestingly, their research has shown that different determinants influence product innovation persistence and process innovation persistence.

Khurum et al. (2015) agree with the statements provided above but suggest that within technological companies, the process of innovation cannot be standardised as it is contextual in nature. However, they have also indicated that such frameworks could be created for various cases if further research was to be conducted.

Start-up company

It is extremely difficult to define the moment when the first venture of a start-up type was created. Both Thomas Edison, who invented, patented and commercialised the light bulb, and Alexander Graham Bell, who commercialised the phone, could be called start-up men. Interestingly, Edison's company gave rise to General Electric and Bell's business was transformed into AT&T, both large corporations operating now (source: http://www.ge.com/ and http:/www.thocp.net/). But what is a start-up? The concept of a start-up is often misused and wrongly associated with any small company. For example, Ries defines a start-up as any activity or project set up to create a new or modified product or service, but acting in conditions of extreme uncertainty (2011). Damodaran defines a start-up differently, as a company whose future depends only on its future growth and provides several characteristics: low rate of success in the market, dependence on investors, or lack of financial history (2012). Blank and Dorf's definition, well received by the community and very accurate, defines start-ups as companies in various stages of development, seeking their business model, which will be easily scalable and repeatable (2012).

3. METHODOLOGY AND RESEARCH QUESTIONS

Choosing appropriate methodology was of great importance for this paper. It is not an easy task to describe the start-up environment, as it is highly variable, changing, and often unstable, while trends and standards change much faster here than elsewhere. In addition, various start-ups generally deal with completely different things, and comparing them is extremely difficult. Thus selecting appropriate research methods that would uncover the truth and the real state of affairs, while allowing for comparisons between different companies, was a difficult task. This study was primarily inspired by ideas of Burrell and Morgan, who first proposed the interpretative paradigm of understanding the empirical world as it is, allowing

the researcher to understand the world from the subjective perspective of each subject (1979). The study was therefore carried out using interviews and observation of operations of the businesses from the outside and from the inside - thanks to the deep immersion in their structures and observing them from a neutral point of view. Professor Jemielniak applied similar methods in his book describing mechanisms of action, relations and relationships between people contributing to Wikipedia (2014).

The surveyed companies were divided into three groups:

Called in the text	**Dynamic**	**Maturing**	**Mature**
Number of employees	1 - 5	5-15	15+
Time on the market	Less than 12 months	More than 12 months Less than 3 years	More than 3 years
Investments	No investment or investment of a business angel	Funding completed, searching for a second round of funding ("between-rounds")	Not needing investment or looking for the next round of funding
Team	Mainly shareholders	Shareholders and employees	Mainly employees

Two companies from each group were carefully chosen. A total of 18 respondents, three from each of the six companies participating in the study, were interviewed for the project. At least one participant from each company was a leader of the project, a member of the board holding shares in the business. There was also at least one ordinary (no shares) employee and one person that could be a shareholder or not depending on the company. Qualitative research and the specific research questions were designed based on the Creswell's book and aimed to investigate phenomena impossible to examine in quantitative research (2013). Each study consisted of two stages. The first stage involved the respondent completing a general info-sheet (size of the company, duration of employment, media and business coverage, etc.), while the second stage consisted of an interview with the main and supplementary questions:

1. Main Question - How do ideas arise in a start-up type of business?

    1.1. In what situations do most ideas emerge?
    1.2. How to structure the methodology of creating ideas?
    1.3. What ideas, among those appearing within the company, get implemented?
    1.4. How does the physical environment influence invention and work?
    1.5. How to motivate and what impact does it have on invention?

2. Main Question - What are the conditions for generating ideas in technology companies?

2.1. What is the role of the working atmosphere and relationships?
2.2. What is the role of security and openness in creating ideas?
2.3. How does a project leader influence the creativity of team members?
2.4. How to prevent the phenomenon of increasing the number of ideas while decreasing their effectiveness/value?

The respondents did not know the interview guide and no standardised structure was imposed on the conversation. The questions were only used as required to prompt and facilitated the process of obtaining the desired information. The respondents were encouraged to make longer statements, give examples, digress and share their opinions and feelings about the discussed subjects. The interviews lasted from about twenty minutes to over an hour and were often unstructured. Interviews took place in different environments, some were held in the respondent's office, during an busy work day and others at home, while at leisure. In all circumstances the interviewer tried to create an atmosphere of security and to encourage the respondent to share as much information as possible. To ensure such comfort, each respondent was first assured that the research was anonymous, and that the recordings would not be shared with third parties. Another factor important for the format of the study was the fact that the researcher did not come from the outside, but from a familiar business environment so the participants were more willing to share their experiences and extremely valuable views on various topics, similar to the methodology of Professor Jemielniak (2014). The study had also a third stage, of which the participants were not aware. The companies were observed both from an external perspective (all available data, websites, social media, news, articles, etc.) and internally (observation of the work, interactions between people working in the company, behaviour, culture, and atmosphere in each company).

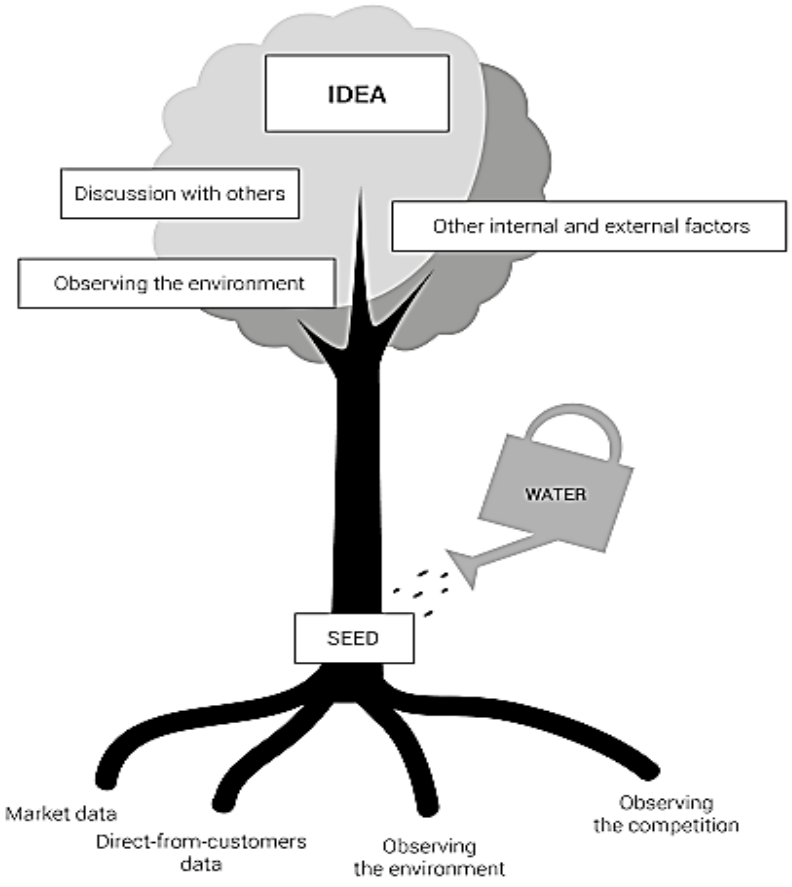
Conclusions arising from the study

The process of generating ideas within companies depends on many external and internal factors. However, the public opinion generally considers technology companies to be the most innovative and creative. The question remains how such companies generate ideas, which ideas are implemented and how should such processes be structured and stimulated. It is also important to distinguish between two types of creativity described in the study. The first is targeted creativity, aiming to solve a specific problem. The second is dispersed creativity, which aims to meet a need or to create or uncover a need the customers are not yet aware of.

Main Question - How do ideas arise in start-up type companies?

It is extremely difficult to precisely define the way in which ideas are created in start-up companies. They are often very different, operate in diverse business areas, are surrounded by different people, they have their own histories and experience, and operate in specific circumstances. However, it is interesting that despite the considerable differences resulting from the way they do business, as well as their very structure and conditions, there is a certain base of shared similarities, which could be observed in all studied companies. This allows for interesting conclusions. They are focused around the issues that emerged in interviews and during observation, regardless of company size and its stage of development.

Idea as a tree

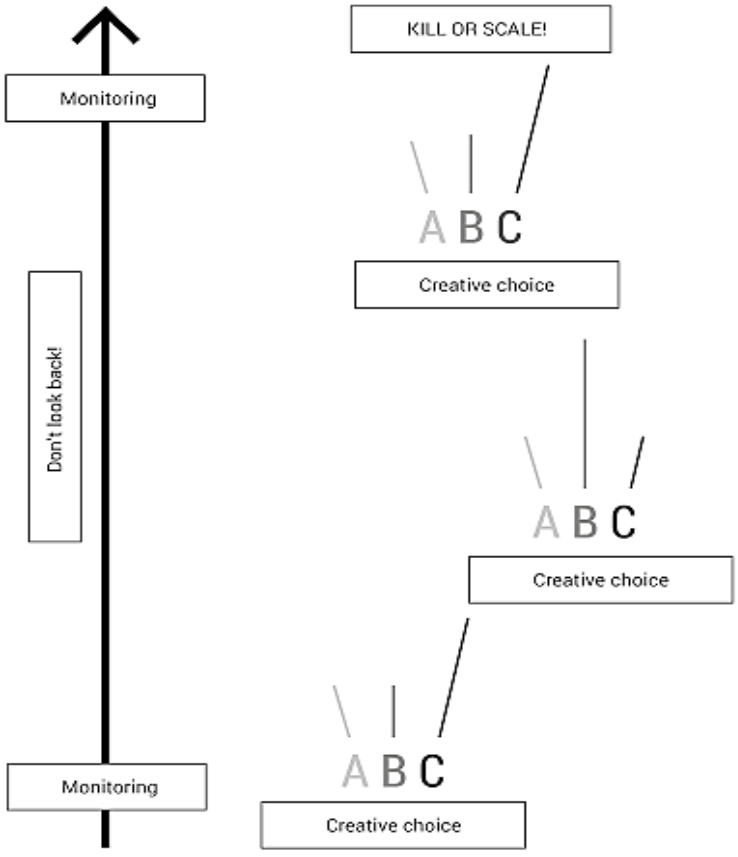


IDEA AS A TREE

Regardless of the type of idea, all businesses showed one basic trait. An external factor was always present at the base of an idea, originating either in the external or internal environment. As the leader of one of the mature start-ups said "I think it is a result of a long process, even if it is unconscious" [015]. Sometimes a little thing that defined the idea provided the seed of change. Often the idea resulted from collaboration, emerging as a result of brainstorming or creative meetings. Typically, however, these were only the motivators of the idea, the catalysts, or the "Eureka" moments described in the literature. Such moments provided the germ of the idea but not yet the idea itself, only its prototype. Interestingly, such events usually occurred outside the workplace, away from everyday obligations. Later, through various factors, observation, and motivation to promote the idea, the idea matured and became more and more real, until the a symbolic tree grew from it. It is also important to note that the more such tree was nurtured (more work of the person responsible for the idea), and the better ground it had to grow in (good observation of the environment, obtaining information from the market), the stronger the tree - the idea - was at all the stages of its development.

These results are rather inconsistent with Cain, who suggested that creativity is a process undertaken individually (2004). They are also inconsistent with Schumpeter's ideas, clearly stating that inventions come mainly from individualists who worked by themselves on their creation and its improvement (1939). However, it is a partial confirmation of what Hughes proposed (2004). Just as in his book, the respondents claimed they experienced the "Eureka" moments, but also admitted that it was the interaction with the external environment and other people that had a positive effect on the stimulation and change of this moment and the subsequent development of the invention, which isn't consistent with Hughes' views. Fortunately, help is at hand from Rhodes and Usher who consistently described invention as a result of a combination of individual and group work (Rhodes, 1961); (Ruttan, 1959). Usher's concept of the path of cumulative synthesis corresponds to the results and particularly well describes the reality of the start-ups. According to his description the origins of the idea include both the individual "Eureka moment" described by Hughes, and the influence of the work of others, the environment and the subsequent changes in the concept (today we would call it a pivot point), which in turn brings the desired final effect (ibid).

Start-up operation as a path



START-UP OPERATION AS A PATH

In order to succeed, every start-up needs to move along a certain path. The same applies to ideas. The respondents said they often faced a creative choice. Their ideas may involve small changes in the internal process or a strategic reorganisation, which can completely change the direction of development of the company (the "pivot " so common in start-ups). As one of the respondents described it "the impulse [pivots], [...] it is not that you come up with something and it just stays " [013]. Each start-up provides time to make a decision and to implement the idea into practice. Decisions may be taken at creative meetings, in quick discussions or via other methods for implementation of ideas. Then the time for validating the idea comes. Depending on the nature of the start-up, as well as the type and determinants of the idea, its validation takes a certain time and is associated with an in-depth analysis and processing of the idea. The next stage involves another creative choice: the path of development is chosen for the idea - an important aspect here is the lack of reverse gear - the decision made at this point is therefore final, otherwise the whole process loses its effectiveness. It is also extremely important to note that the better designed the validation process is and the more work is put in it, the more likely it is to recognise genuine business potential in an idea. The decision to "kill" the idea, i.e. to simply reject it, or to scale it, i.e. to allocate more resources to its more thorough implementation. An important issue is also the fact that regardless of whether the idea is still in its initial stage, or has transformed into a viable solution, one thing that distinguishes start-ups is constant and continuous monitoring of all solutions - conditions may change and the idea will have to be "pivoted" or " killed".

The second main question - What are the conditions for the formation of ideas in technology companies?

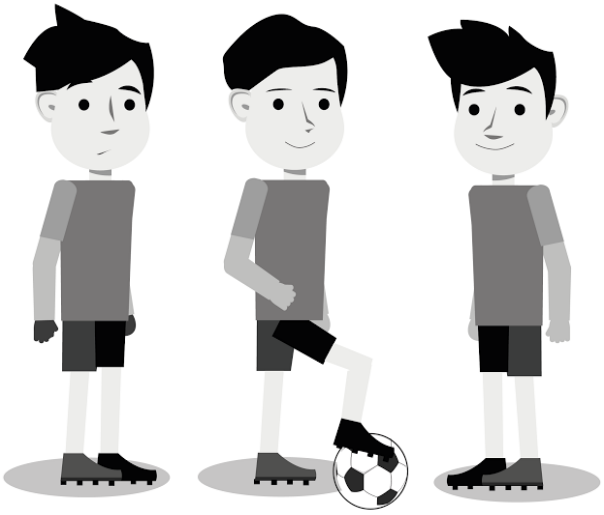
There are many factors that distinguish start-ups from other types of companies. Corporations often try to copy the start-up operation model, introducing various solutions, such as a flat management structure, improving the atmosphere, or even creating small ecosystems within their structures. However, most of these models simply don't work in corporations. The question is, what factors define technology start-ups and what their leaders are doing to maintain the right balance for stimulating creativity.

Conditions in which ideas appear in technology start-ups are usually different than in large companies and corporations. By definition, start-ups operate in an environment of continuous change, must be ready for sudden transformations, and quickly adapt to the environment, because it defines their survival. An additional difficulty is that technology start-ups include people from vastly different backgrounds and with different competencies, which creates a very difficult challenge for the leaders and the management. However, regardless of the type of start-up, the environment or the structure of the business, there are certain similarities and interesting relationships which determine and stimulate creation of new ideas.

Start-up as a football team

Many of the respondents said that start-up is like a family or a household where everyone has their tasks and responsibilities. However, the most interesting metaphor was invoked by one of the respondents from among mature start-ups [018]. He presented a start-up as a football team in which everyone has a function. The project leader and senior management are not only coaches and the training team, but also play as forwards and

strikers: they are responsible for scoring goals and enforcing the strategy. The leader is the captain, because they are responsible for the atmosphere and what happens in the locker room, but also for motivating the other players (employees) - they are a person who usually lead the team to victory, and can turn the tide of a game. However, it must be kept in mind that the forwards by themselves will achieve nothing and fast midfielders, strong defence and a good goalkeeper are also necessary - and this is why it is so important to wisely divide the tasks and responsibilities in a company. If one person can not play, there must be someone who can replace them, because after all the season is all-year-long. Creativity provides a significant advantage over other teams, which is why it is so highly valued on the pitch and while deciding on a match strategy.



START-UP AS A FOOTBALL TEAM

This view is also confirmed by the literature. Usher's approach related to the path of cumulative synthesis fits extremely well with this analogy (Ruttan, 1959). This view is indeed contrary to Schumpeter's and Cain's ideas, but is consistent with the opinion presented by Solo, who suggested that invention was a process that occurred through interactions between people, similar to the interactions of players on the pitch (Schumpeter, 1939); (Cain, 2012); (Solo, 1951). Solo also drew attention to the fact that a suitable division of responsibilities and tasks is extremely important (ibid). It is important here too, to note that both Usher and Hughes were right in terms of the "Eureka" moments because a victory in the match is often decided by the "genius" of an individual player, one pass, one move, or one shot on the goal, which take only a few seconds but can define an entire attack sequence or decide the outcome of the match (Hughes, 2004); (Ibid). Montuori and Purser (1995) also wrote about the spark created between the members of a group. In addition, it is worth recalling the views of Schomokler, who notes that often the competitive advantage of teams is a result of hard work - just as in football, where the winning team has not just the talent and the plan, but is also well trained technically and physically (Schomokler, 1962) . The football metaphor significantly develops and perfectly illustrates the views presented here, and further deepens the understanding of the interdependence between the team members as well as explaining the role of a coach and a "playing coach" [018].

The leader as the leader / guardian of the company's operation and creativity

THE LEADER AS THE LEADER / GUARDIAN
OF THE COMPANY'S OPERATION AND CREATIVITY

The project head is not only the team captain, but also its leader and its guardian. The leader, because they are responsible for setting new development paths, looking forward and planning. They are also responsible for encouraging people around them to help with the project, and to share thoughts and ideas. As a person at the helm of the company, they are often treated as an authority by others and their approach determines the approach of team members. The stronger and more efficient the leader, the more the team members trust them, see more sense in what they do themselves, the more creative and willing to share their creativity with others they are, often working first on their idea.

The leader also acts as a guardian At any time, the culture and atmosphere of the organisation can be disrupted by a countless number of external factors, which will lower the sense of security, motivation and creativity. The role of a leader is to avoid such situations through clear and honest communication of principles and plans. This is to make the co-workers feel a strong bond and trust, which will allow them to cope in even the most challenging "business breathing difficulties".

4. CONCLUSIONS

Many of the cited authors drew attention to the "Eureka" moment or "a spark" that came from contact with the external environment responsible for the stimulus. Some pointed out that a person with experience and competence in a given subject area was much more likely to experience (and recognise) such a moment. Exactly the same situation occurs in start-ups,

where, thanks to the catalysts from the outside world, observation, and feedback from customers, a germ - a prototype of an idea - emerges. Then the willingness of a person caring for the germinating seed ensures that it grows into a beautiful and strong tree - an idea that can completely change the organisation.

Ideas in start-ups come mainly from the so-called targeted and reactive creativity, one that aims to solve the problem raised by the customers, users or other project stakeholders. Such ideas usually come from people who are closest to the processes, responsible for the contact with the customers, which allows them to continuously collect feedback, opinions and information from the market. The second group consists of so-called proactive ideas, which are typically (but not always) a result of dispersed/distributed creativity. It consist in the creation of solutions and ideas for the needs customers and stakeholders of the project are not aware of.

What is interesting, it was noticeable in the study that the competences in the start-ups were well divided and that most of the ideas in a given field were generated by people operationally involved in it. In each of the surveyed companies, employees were encouraged to share their creativity with teams from other departments, so sometimes the idea came from a person who was only partially operationally associated with a particular department or completely unrelated to it. An important aspect of the issue is also motivating the employees who, appreciated, will be able to generate many more good ideas.

In terms of structuring creativity every start-up has its own principles and structures. Some organise regular meetings, others brainstorming, still others discuss ideas on a regular basis or enter them into a software tool and wait for the opinions of others. However, there is a certain set of similarities: all surveyed companies declared that they effectively separated the time for creativity and time for validating ideas. In practice, this means that an idea always moves along a similar path: it is discussed, an appropriate development path is selected for it, it is validated, then discussed again and again validated until scaling or killing the idea. This whole process is characterised by well-thought-out analytics and accurate monitoring of each implemented idea.

The research presented here has practical applications. It would be interesting to compare the results with data on other groups of start-ups (e.g. foreign ones) or corporations, which by definition employ a completely different style of management. Introducing the methodology of start-up type of business to corporations and vice versa would also be interesting, and allow for comparing the results to determine which methods of promoting ideas are the best and most effective.

References

[1] Blank, S. G., & Dorf, B. (2012). The startup owner's manual: The step-by-step guide for building a great company. K&S Ranch, Incorporated.

[2] Burrell, G., & Morgan, G. (1979). Sociological paradigms and organisational analysis (Vol. 248). London: Heinemann.

[3] Cain, S. (2012). The rise of the new groupthink. The New York Times, 15.

[4] Creswell, J. W. (2013). Research design: Qualitative, quantitative, and mixed methods approaches. Sage publications.

[5] Damodaran, A. (2012). Investment valuation: Tools and techniques for determining the value of any asset. John Wiley & Sons.

[6] Hughes, T. P. (2004). American genesis: a century of invention and technological enthusiasm, 1870-1970. University of Chicago Press.

[7] Khurum, M., Fricker, S., & Gorschek, T. (2015). The contextual nature of innovation–An empirical investigation of three software intensive products. *Information and Software Technology*, 57, 595-613.

[8] Jemielniak, D. (2014). Common knowledge?: An ethnography of Wikipedia. Stanford University Press.

[9] Jolly, V. K. (1997). Commercializing new technologies: getting from mind to market. Harvard Business Press.

[10] Kavadias, S., & Sommer, S. C. (2009). The effects of problem structure and team diversity on brainstorming effectiveness. *Management Science*, 55(12), 1899-1913.

[11] Le Bas, C., Mothe, C., & Nguyen-Thi, T. U. (2015). The differentiated impacts of organizational innovation practices on technological innovation persistence. *European Journal of Innovation Management*, 18(1), 110-127.

[12] Lee, V. H., Leong, L. Y., Hew, T. S., & Ooi, K. B. (2013). Knowledge management: a key determinant in advancing technological innovation? *Journal of Knowledge Management*, 17(6), 848-872.

[13] Lundvall, B. Å. (2009). Innovation as an interactive process: from user-producer interaction to the national system of innovation. *African journal of science, technology, innovation and development*, Volume 1, Issue 2 & 3, Pages 10-34

[14] Montuori, A., & Purser, R. E. (1995). Deconstructing the lone genius myth: Toward a contextual view of creativity. *Journal of Humanistic Psychology*, 35 (3), 69-112.

[15] Nordfors, D., Sandred, J. and Wessner, C. (2003). Commercialization of Academic Research Results, VFI 2003:1, Vinnova, Stockholm.

[16] Osterwalder, A., & Pigneur, Y. (2010). Business Model Generation: A Handbook For Visionaries, Game Changers, And Challengers Author: Alexander Osterwalder, Yves. (p. 288). Wiley.

[17] Pełka, W. (2013). Living Labs as a Form of Innovation Development. *Management and Business Administration. Central Europe* Vol. 21, No. 4(123), 139-152.

[18] Rhodes, M. (1961). An analysis of creativity. *The Phi Delta Kappan*, 42 (7), 305-310.

[19] Ries, E. (2011). The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses. Random House LLC.

[20] Rogers, M. (1998). The definition and measurement of innovation (pp. 1-27). Parkville, VIC: Melbourne Institute of Applied Economic and Social Research.

[21] Ruttan, V. W. (1959). Usher and Schumpeter on invention, innovation, and technological change. *The Quarterly Journal of Economics*, 596-606.

[22] Schat, S. (2012). Quiet: The Power of Introvert in a World That Can't Stop Talking. *Brock Education Journal*, 22 (1).

[23] Schmookler, J. (1962). Economic sources of inventive activity. *Journal of Economic History*, 1-20.

[24] Schumpeter, J. A. (1934). The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle (Vol. 55). Transaction Publishers.

[25] Schumpeter, J. A. (1939). Business cycles (Vol.1, pp.161-74). New York: McGraw-Hill.

[26] Solo, C. S. (1951). Innovation in the capitalist process: A critique of the Schumpeterian theory. *The Quarterly Journal of Economics*, 417-428.

[27] Thomas, S. P. (2012). In Praise of Introversion. *Issues in mental health nursing*, 33(11), 717-717.

[28] Whitfield, P. R. (1975). Creativity in industry. Penguin Books.

Additional details of interviews

[001] Interview 1, Maturing Start-up, Male, 22 years old, Polish, Place of work (city): Krakow, Seniority: above 12 months.

[002] Interview 2, Maturing Start-up, Male, 32 years old, Polish, Place of work (city): Krakow, Seniority: above 2 years.

[003] Interview 3, Maturing Start-up, project's leader, Female, 27 years old, Polish, Place of work (city): Krakow, Seniority: above 2 years.

[004] Interview 4, Mature Start-up, Female, 34 years old, Polish, Place of work (city): Krakow, Seniority: above 3 years.

[005] Interview 5, Maturing Start-up, Male, 29 years old, Polish, Place of work (city): Krakow, Seniority: above 12 months.

[006] Interview 6, Dynamic Start-up, project's leader, Male, 29 years old, Polish, Place of work (city): Krakow, Seniority: below 12 months.

[007] Interview 7, Maturing Start-up, project's leader, Female, 29 years old, Polish, Place of work (city): Krakow, Seniority: above 12 months.

[008] Interview 8, Dynamic Start-up, Female, 39 years old, Polish, Place of work (city): Krakow, Seniority: below 12 months.

[009] Interview 9, Dynamic Start-up , Male, 26 years old, Polish, Place of work (city): Krakow, Seniority: below 12 months.

[010] Interview 10, Dynamic Start-up, project's leader, Female, 26 years old, Polish, Place of work (city): Krakow, Seniority: below 12 months.

[011] Interview 11, Dynamic Start-up, Male, 22 years old, Polish, Place of work (city): Krakow, Seniority: below 12 months.

[012] Interview 12, Dynamic Start-up, Male, 22 years old, Polish, Place of work (city): Krakow, Seniority: below 12 months.

[013] Interview 13, Maturing Start-up, Female, 27 years old, Polish, Place of work (city): Krakow, Seniority: above 12 months.

[014] Interview 14, Mature Start-up, Female , 28 years old, Polish, Place of work (city): Krakow, Seniority: above 12 months.

[015] Interview 15, Mature Start-up, project's leader, Male, 29 years old, Polish, Place of work (city): Wroclaw, Seniority: above 5 years.

[016] Interview 16, Mature Start-up, Male, 32 years old, Polish, Place of work (city): Wroclaw, Seniority: above 12 months.

[017] Interview 17, Mature Start-up, Female, 22 years old, Polish, Place of work (city): Wroclaw, Seniority: below 6 months.

[018] Interview 18, Mature Start-up, project's leader, Male, 29 years old, Polish, Place of work (city): Krakow, Seniority: above 5 years.