Stimulating the creativity of the team and encouraging entrepreneurial attitudes in academic environment

How to deal with the innovation?

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Abstract: In this paper we try to investigate the most essential conditions set of the innovation-friendly environment. Our aim is to find the culture of work, in which participants are well motivated to experiment, and not afraid of being entrepreneurial. After new experiences gained in the leading in the innovations environment of Silicon Valley, we suggest new approaches towards innovation with the use of 'adopt and adapt' rule.

We consider perception of failure from the cultural point of view and diversity of people engaged in the projects – interdisciplinary teams as the innovations nests. We try to work out the methods of handling new technologies (e.g. disruptive innovations) and introduce open innovation model for empowering collaboration with industry or with other universities. In order to support the presented ideas we attach several case studies of success stories.

The outcome of this paper is newly developed set of recommendations and approaches, which could be helpful in stimulating the creativity spirit and entrepreneurial attitudes among the universities' crews.

The proposals have been worked out during the intensive program 'Top 500 Innovators' which focused on the science management and commercialization. These are the results of many discussions and meetings with CEOs of leading companies from Silicon Valley, professors of UC Berkeley, directors of Technology Transfer Offices (UC Berkeley, LBNL, LLNL and Stanford OTL) as well as personal experiences of managing the start-ups.

Keywords: creativity, team building, innovation, failure, entrepreneurship, start-up, working environment, culture of work, Silicon Valley

INTRODUCTION

Introducing new approach of management in any area of activity is a complex issue and demands following a set of baby-steps until succeed. There is always a bundle of mutual connections among many different elements of a strategy. Because of that we have to consider not only single change, but also parallel improvements in different domains, which are correlated. In this paper we propose analyzing physical and organizational conditions of work, we look at the environment of Silicon Valley and try to identify advantages of it and adopt some of them to our conditions (second section). Ability of group work and desired features of the team members, as well as definition of *T-shaped* people are discussed in third section. Complementary to issues mentioned above we describe new approach - appropriate perception of failure and incentives for experiments described in fourth section. It is essential to define scope of term innovation and broaden view of that subject (fifth section). In order to provide easy flow and exchange of ideas, methodologies or technologies, the classical way of thinking has to be changed. Because of that we introduce new model - open innovation (sixth section). In the last section we point out the main risks connected with disruptive innovation, and present methods for managing them. We conclude paper with important remark - business and market are very dynamic and one must be flexible and ready to pivot all the time.

MICROCLIMATE OF SILICON VALLEY

Specific atmosphere of the Silicon Valley is conductive to dynamic development of new technologies. It happens due to a few main factors, which, thanks to geographical closeness to each other, create synergy effect enhanced their influence. First of all - Silicon Valley is a cultural, industrial, ethnical, religious and social diversity. Such conditions allow breaking schemes, stereotypes and national or opinion barriers. Monocultural team will never be as much creative and efficient as multicultural one.

Another very important element of this environment is so called '*supply chain'*. There is very small physical distance between the suppliers, developers, and producers- almost all of the stakeholders. Moreover, we have access to specialists and technologies from different areas as well as financial and consulting institutions. This is what makes this region so special. Similar clusters are known in other parts of the world e.g. film industry in Hollywood or manufacturing in China.

We cannot recreate all of the features of Silicon Valley in our work environment, but we can introduce good patterns and practices. For sure we have to be more open for internationalization and diversification of project teams what will increase creativity and efficiency of our actions.

Henry Chesbrough said to me during one of our meetings: *To move wisdom you have to move people*.

WHAT MEANS TO BE T-SHAPED?

Conception of splitting people in two general categories – *I-shaped* and *T-shaped* is based on their skills and abilities gained in importance during last years. It has appeared already in 1991 and was some kind of variation on the *man of the renaissance* as described in Guest (1991). It happened due to changes in perception of work (see Fig.1) and those who carry out the work as stated in Career Life Connection (2012). People representing the *I-shape* type have thorough knowledge and experience in individual field. They are experts in what they do, however they lack soft skills or understanding in other fields.

Character *T* became the symbol illustrating two main sets of man qualifications. Following the ERE.Net (2010), Tim Brown (CEO of IDEO) defined such people in that way: *the vertical shaft of the T represents the depth of expertise/skill that a person exhibits, while the crossbar of the T represents the amount they are willing and able to collaborate*. He believed, that while building team consisted of *T-shaped* people one could achieve interdisciplinary crew, which will be extraordinary creative and able to cooperate efficiently. Other approach clarifies that horizontal shaft in *T* represents ability to understand many fields and the vertical one corresponds with deep and through wisdom in very narrow area (Fig.2).

How Jobs are Changing

	Traditionally	Today
What work is:	A Job	A Role
What work covers:	A Function (IT, sales, marketing, finance)	A Set of Tasks and Specialties (software development, writing, statistics, communications…)
What you do:	"Own" a function and manage it	"Contribute" in teams and get work done
How work is scoped:	Responsibility (Functional areas, span of control)	Project and Jobs to do (Ownership of tasks and projects as part of a team)
How work progresses:	Career Path (Increased upward mobility in a function, with greater span of control)	Career Progression (Increased responsibility and project experience, often horizontal)
How you develop:	Upward Mobility (to manager, director, VP)	Increased Specialization and Experience (to senior, expert, consultant)
How you are recognized:	By your level, title, span of control, size of office – by your boss	By results delivered, expertise, and demand for your skills – by your peers
Role of leadership:	To direct and manage, hold people accountable	To build teams, lead teams, contribute, inspire, empower and coach others
How you succeed:	Widen your skills and build more power in the organization	Deepen your skills, drive results, and get more done
Tools of the trade:	Job models, competency models, descriptions, organization charts, top down directives	Capability models, knowledge sharing tools, expertise directories, shared values and mission

Fig. 1: *Change in a perception of job, ERE .Net (2010)*

All above do not indicate that one ought to build teams by selecting only *T-shaped* people. Bill Buxter (Microsoft Principal Investigator) once said the best team is *I-shaped* people completed with three *T-shaped.* Such a compilation provides appropriate level of expert's wisdom, enhanced by communication skills and tools for group work (identification and distribution of roles, motivation, using the potential of every team member), and by a variety of fields of interest, which increases the creativity of the crew.

PERCEPTION OF FAILURE

Perception of technology pioneers, whose companies went bankrupt, is in California significantly different from the well-known one in Europe. In the Silicon Valley they are treated as valuable source of the wisdom and

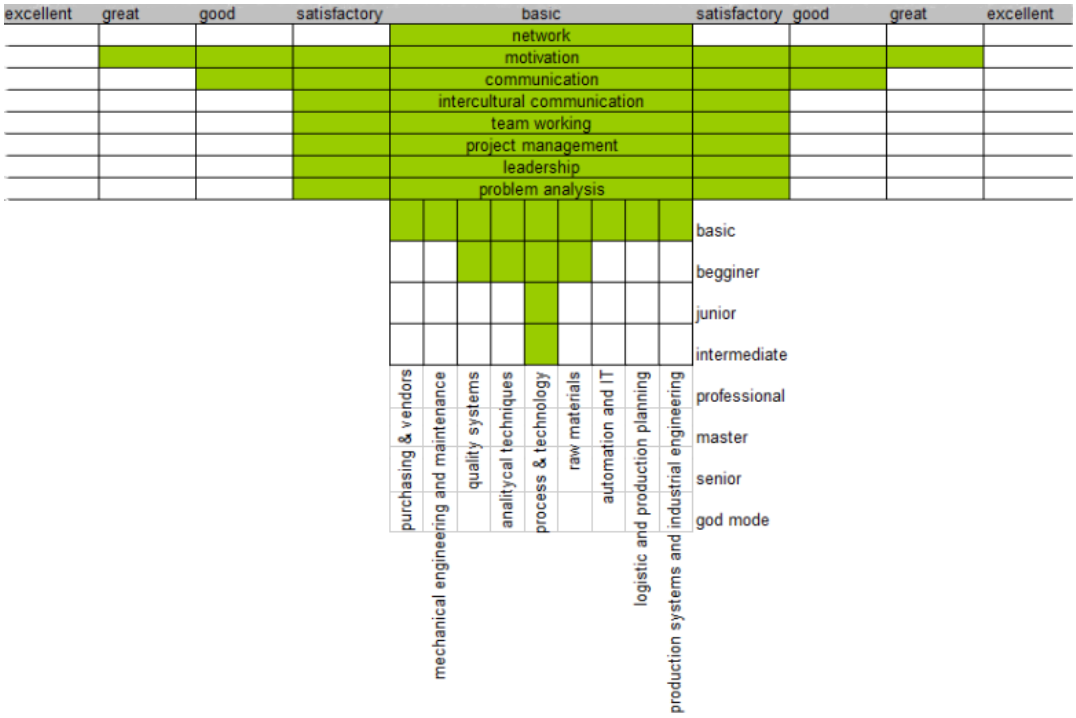

Fig.2: *Building the shape on site, T-shaped professionals (2012)*

considered experts. For those reasons they are desired workers in the labor market of companies, which would like to run their business in similar or directly the same area. In European culture such people are labeled as "untrustworthy" and considered losers. The conclusion is simple - if they failed, they are not good enough. Nobody wants to collaborate with defeated. Are we encouraging to experiment, to look for new solutions and develop innovation by such perception? We should consider and introduce new approach: *sometimes it is OK to fail!* There is no progress without failure.

Culture of work in particular organization may stimulate creativity of its workers. It is crucial in dynamic, growth-oriented areas and in companies, which want to use innovative and unconventional approaches. In order to introduce innovatory way of thinking, one have to create appropriate conditions and organization of work, in which such undertakings will be rewarded and supported, not rebuked and perceived as jump the gun.

There is no technological progress without failure and dead ends. Everyone, who looks at the history of technology a bit closer will easily notice that, if every scientists had stepped back and dropped their work after their fail trials we would still lived in the stone age. Ups and downs are hallmark of progress – learning by our experience and, what is more important – learning by experience of others and be courageous in recovering from them and taking the next step.

Necessary element of building the friendly environment for experimenting and using new tools and conceptions is depersonalization of fault and failure. One must not mentally burden the individual for their unsuccessful trails or incorrect approach. Such wrong assumptions should become source of new data and conclusions, which could be helpful by filling the arisen gap.

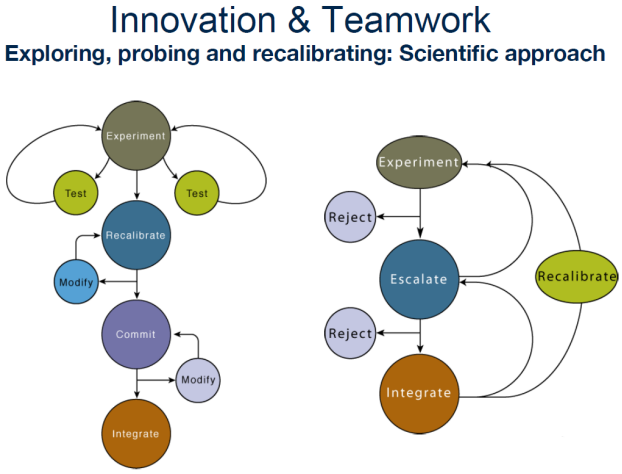

Fig.3: *Cycle of developing the solution, Bahrami (2012)*

I have not failed. I've just found 10.000 ways that won't work.

–Thomas A. Eddison

If you fell down yesterday, stand up today.

--H.G. Wells

If you've never failed – you haven't tried hard enough to succeed.

--Steve Jobs

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WHAT IS THE INNOVATION?

We speak a lot about innovation these days. This catchall appears almost everywhere and in every context. It suits perfectly in many initiatives of European Union, particularly funding of various kind. But the troubles start when we ask someone what the *innovation* is. First thing coming to head- it is something new or based on new technology. This kind of conceptual wandering indicates that we are familiar with it, but not in details.

Lets outline two essential issues. First of all- innovation does not have to involve new things (especially in technology). Secondly- innovation is not only about the creating something that has not yet been seen. Note the difference between words *inventor* and *innovator*. First of them discovers or invents new thing, technology, way of thinking, etc. The second one introduce new value (renew), its effect may apply to both old and new.

As it often happens new product brings new values and meets needs in a previously unknown way. Innovation occurs in many contexts and many various areas. It is not only valuable because of its tangible physical form, but also because of its sociological and business value. In simpler words - innovation could be a combination the existing elements, made to create a new value, or creation of ideas, so far absent, carrying some ideals.

IDEA OF THE OPEN INNOVATION

Internal R&D departments of companies, encryption and hiding the data and source codes of software, hiding any results of scientific researches and emerging technical solutions have influenced development of innovation. Legal and communicational restrictions caused that people often *reinvent the wheel*, spend lot money for researches already done by someone else, or work in the wrong direction. Classical model of innovation (internal innovation) is no longer sufficient these days.

Today it is very hard to develop new solutions or technology yourself. From the economic point of view it is not efficient, because each depends on the time and financial effect. In this impasse comes to our rescue a new model of creating innovation - one based on free exchange of concepts and solutions among entrepreneurs, research institutions and authors. This approach helps to maximize efficiency of work, reduces cost and allows collective work on interesting topics (refers to idea of *open source* and *crowdsourcing*).

According to Chesbrough (2006), innovations developed in one company can be released into the market and be adapted by other entrepreneurs helping in creating new markets. They may also contribute to the company's current market. Flow of innovations is regulated by internal policy of the companies, wherein in every moment particular solution can be enclosed and independently develops (Fig.4). At this point it may be a conflict in the understanding of *open innovation*. One concept, derived from the MIT, represented by Eric von Hippel assumes the model should be completely open and be for public good, like an *open source*. The second one, derived from UC Berkeley and taught by Henry Chesbrough, assumes combination of idea of openness with business model. In this way new financial flows could be created, as we can read in Chesbrough (2006).

SUSTAINING VS DISRUPTIVE INNOVATION

Have you ever wondered, how it happens that in our market, there are new devices that use previously unknown technologies? In fact the path from the invention (created in the laboratory) to the commercial product in the market is very long. How hard and time-consuming way must innovation pass, before it will be available for

ordinary customer? Who decides at what stage, and if at all, is it worthy to invest in it? Will there be a breakthrough? Companies which build their strategy of growth, want to be innovative and remain competitive in the very dynamic market, must be answered these and many other questions.

Vast majority companies leading on the market are completely unprepared, when it comes to branding new technologies. Worldwide giants do not know how to cope with disruptive innovations. One of the reasons is using improper methods and conceptions for these specific products. It could be compared to repairing the watch by using hammer and chisel – we are bound to fail in advance. Why does it happen? We will try to explain this in a few sentences, which help to understand the specification of disruptive innovation and indicates differences between it and classical linear innovation (with witch mentioned companies handle very well).

At first existence of disruptive innovation does not seem to be interesting for companies leading in certain fields. This emerging technology has worse attributes in areas, which current market expects and actual solutions work there perfectly. In spite of that, it provides new previously absent attributes. Technically - it creates an opportunity to open new markets, but in evaluation, it is quite shallow and unknown (necessity of company's transformation and taking the risk). Large stabilized companies with wide scope of customers do not see significant source of revenues and sense of investment in new developed innovative products. It happens due to missing current customers' needs as we can read in Christensen (1997).

Disruptive innovation develops and improves itself much more quicker than currently used technology. It rapidly achieves, even exceeds, level of performance expected by the market. At this point, the additional values correlated with new technology, previously perceived as inessential, become significant advantage in competition with old solutions.

Strategy of the big companies should include: identifying new market for disruptive innovation, planning small revenues during developing it, and expositing new values of a product in a market. In order to avoid connecting this uncertain product with stabilized position and trademark of company, it should establish new independent mark under the wings of primary company. Source of feedback for this innovation has nothing to do with current customers, who got used to products that meet their needs perfectly. New set of people and companies, who will lead the evolution of product, must be found (market niche). They will appreciate new values of innovation, which help them to prosper.

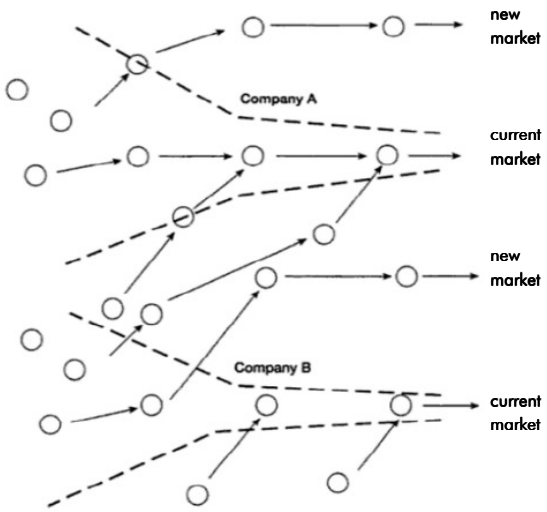

Fig. 4: *Open Innovation: the new imperative for creating and profiting from technology, Chesbrough (2006)*

Some big companies use the strategy called *second to invent*- it based on detailed observation of start-up, while it develops new technology. They do not interfere, but learn on its mistakes. When they gather sufficient amount of data and notice, and when market for that innovation emerges- they take over the pioneer firm or destroy it by entering the market as a competitor with a large capital.

Following Christensen (1997), every technology has got its limitation of development. It is described by so-called *S-curve* – it means there is a moment of twilight for every technology and one has to have prepared a new solution, which state of development will be at dynamic point of another *S-curve*. We could say that every disruptive innovation will with time turn into sustaining innovation, and its development will gain incremental pace.

CONCLUSIONS

If we want to stay up-to-date in science or business, we have to analyze market and trends all the time. We could say that *trend is our friend;* it indicates

we have to be ready for the pivot, prepared for reframing our strategy, or for changing direction of our activity. Only such approach gives us a chance to be a leader in a certain field, as we know noting is constant. Following the example of venture capitalists we should not be afraid of very risky undertakings and projects. There is a great chance of failure, but if we succeed – it is a huge possibility it will be a breakthrough. To facilitate such an approach we should establish some kind of internal fund in our institution – devoted only for venture projects.

In order to stimulate the creativity of a team we have to challenge them from time to time, maintaining their activity on a high level. It could be achieved by mixing the teams and rebuilding them, it also provides the flow of fresh members as well. We have to remember that none of a homogenous crew will be as efficient as a various one. It facilitates exchanging of ideas, knowledge and skills. Do not forget about soft skills, which are crucial during working in a group, where communication is one of the most important issues. Disability of using the strengths of all group members and lack of fluent communication is what makes the real group less efficient than potential group.

During development a new solution or project, we could spare a lot of time and funds by using the methodology of *minimum viable product*. It means, that we need to create a set of minimum-desired features of the product and test it (build the prototype). If it does not work out as we expected, we reframe the assumptions and start the process from the beginning (compare Fig.3). Introducing the change in any further stage of development of a product is much more harder and expensive. That best way is to spot any disadvantages in the first phase of production.

References

Chesbrough, Henry (2006) *Open Innovation: The New Imperative for Creating And Profiting from Technology*. USA : Harvard Business School Publishing Corporation

Christensen, Clayton M. (1997) *Innovator's Dillema. When New Technologies Cause Great Firms to Fail*. USA : Harvard Business School Press

Moore, Geoffrey (2002) *Crossing the Chasm: Marketing and Selling Disruptive Products to Mainstream Customers*. USA : Harper Business

Fiske, Peter (2012) *Best Practices in Funding Research and Commercialization*, Faculty at UC Berkeley School of Business, USA

Fiske, Peter (2012) *The Academic Entrepreneur*, Faculty at UC Berkeley School of Business, USA

Wilton, Peter (2012) *Essential Elements of Technology Strategy*, Faculty at UC Berkeley School of Business, USA

Isaacs, Drew (2012) *The Silicon Valley Model of Innovation*, Faculty at UC Berkeley School of Business, USA

Isaacs, Drew (2012) *Marketing Emerging Technologies*, Faculty at UC Berkeley School of Business, USA

Bahrami, Homa (2012) *Leading High Performance Teams*, Faculty at UC Berkeley School of Business, USA

Guest, David (1991) *The hunt is on for the Renaissance Man of computing*, September 17, The Independent, London

ERE .Net (2010) *T-Shaped People, Jobs, and Recruiting* [online] http://www.ere.net/2010/02/11/t-shaped-people-jobs-and-recruiting [20 January 2013]

Career Life Connection (2012) *Role Changes in the World of Work* [online] http://www.careerlifeconnection.com/blog/2012/02/09/role-changes-in-the-world-of-work/ [20 January 2013]

Laskowska, A., Oettingen, M., Stankiewicz, K., Walter, B., (2012) *T-shaped professionals*, Final Presentation Top 500 Innovators Programe at UC Berkley, USA

Wroclaw Research Center EIT+ (2012) *Amerykanski przepis na transfer technologii* [online] http://www.eitplus.pl/pl/amerykanski_przepis_na_transfer_technolo/2980/ [20 January 2013]