Progress in Science is Driven by Ethics, Creativity and Trust

Wilfried Wunderlich
Tokai University, Department of Material Science, Kitakaname 4-1-1, Hiratsuka-shi, 259-1292, Japan
Email: wi-wunder@rocketmail.com

Abstract
Keeping the balance between two extremes in social dilemmas is essential for maintaining the progress of any society. While severe quality management and mistrust have destroyed grown overcapacities but also necessary resources in many research institutions in the last two decades, now the call for humanity and ethical principles are gaining popularity, such as work-life-balance, clear long-term perspectives for researchers, and society-driven ethical research and development. In this study the factors for creativity in science are discussed by studying the biography of physic Nobel laureates. The conclusion is that the income plays a minor role for engaged scientist, which main driving force is social acceptance.

Introduction
The past century experienced a large increase in the number of natural scientist, such as physicist, chemists, and life scientists and it is well accepted that the most creative ones were honored by the Nobel prize [1-3]. The progress in science has accelerated in the 1980-ies and many new research institutes were established. After this period of scientific freedom, critics arose [4], because many professors overused the freedom and power they had. The balance changed towards the other social extreme, and the focus on the needs of the society became stronger. Noticing that, politicians cut public spending for research in Europe and USA in the late 1990-ies to a minimum. Scientists, who were at that time at the beginning of their career, had to suffer many restrictions or had to choose other careers. Another financial source was the third-party founding. It worked well as long as the companies had enough resources. From around 1985 politicians realized that they are the main contributor and demanded that scientists should communicate their research in society. Besides open-days and other public events, the politicians as managers demanded for recruitment of new scientists the importance of communication skills, because then the sense of new research can be better explained. By overdoing the communication-in-science paradigm some scientists were excluded from getting a proper position, especially in Germany.

Max Weber's *homo economicus*, is known as an agent who attempts to maximize utility as a consumer and profit as a producer [5]. For justification of the drastic financial cuts, research managers changed the interpretation in such a way, that young talented academics should give up their scientific career and better turn towards the sources of money. The monetary flow should control the direction, in which young citizens should focus their visons; this was the strategy of the managers. In this paper we consider another agent, the *homo scientificus*, a researcher who has the passion to work in science. "His highest task is to recognize and transmit wisdom" for the "well-being of "society" [6] is the definition in sense of positivism. Such an agent overlaps very much with the *homo sociologicus* see also [7], which desire is, "not to pursue selfish interests but to fulfill social roles of the world." We define *homo scientificus* as an actor with excellent skills in creativity and strong interest providing this output for the benefit of the society. He has less interest in income and has communication skills below average, which is the reason why he has chosen the complex subject of physics.

In this paper we first describe a study on the biography of physic Nobel laureates as examples of *homo scientificus* and check whether they prefer to work alone or in a group. Then we describe the history of cycles concerning the dilemma of construction and destruction in science with special focus on trust and risk. Then, the next chapter describes the factors which stimulates or destruct creativity. Finally, the paper is concluded.

Study on social behavior of Nobel Laureates
In recognition of the importance of progress in applied science Alfred Nobel has established in 1901 the Nobel prize [1-3] in honoring remarkable findings. In this paper we report in the next section on a study on the social behavior of Nobel laureates, as they are well established as most creative scientists. In the discussion section these results are compared with trust-and-risk-experiences in the QM dominated age of university life in Germany and Japan. Especially we evaluate which are the new issues in social development of the post-QM age at universities.

Nobel laureates are usual considered as smartest people in society with large amount of creativity. Their biography is easily accessible [1-3] and chosen for this study in their social behavior. In this study the factors for supporting creativity and scientific output are simplified on two axis, their positive (+) or negative (-) experience in society and their working style, whether they prefer to work solitary (S) work or in a group (G). In the case of a scientist who prefers to work alone, it is hard to distinguish whether he has chosen this workstyle by himself or was not integrated into a group; anyway for this state analysis it does not matter. The transitions S to G (SG) and G to S (GS) are also recorded. For each of the 200 Nobel laureates three data points were recorded, one in the early stage of the career but after receiving Ph.D., then at the time of receiving the Nobel prize and finally in an later stage of the career.

There is a remarkable tendency in the post-QM-age from mid-1980-ies that the Nobel committee tends to laureate scientists in a rather late stage of their career. In this case the discovery and another turning point in the early career were used for data collection. There seem to be several reasons for awarding at a later stage of career. Science becomes more complicated and the importance of a new discovery is hard to be foreseen. Also, there were examples of some scientists with bad attitude who use the Nobel Prize as a kind of capital to get more attraction or even personal profit. The older a recipients is the probability decreases that he gets involved in bad ethics. Hence, we also analyzed the age when a scientist received his award. In the period from 1902 to 2015 there are 201 honors, when we count John Bardeen's double honor in 1956 and 1972 separately. The 3x201 = 603 data points were drawn in intervals of seven years starting from 1901. By chance remarkable historical dates follow these 7-year cycles: the year 1915 is shortly after start of first world war, 1929 marks the great depression, 1936 refers to the up-rise of Nazi regime, in 1943 world war II (WWII) starts, 1957 was Yuri Gagarin's space flight as the start of the cold war, in 1992 the German re-unification occurred, 2006 marks the start of the Lehmann crisis, and so on.

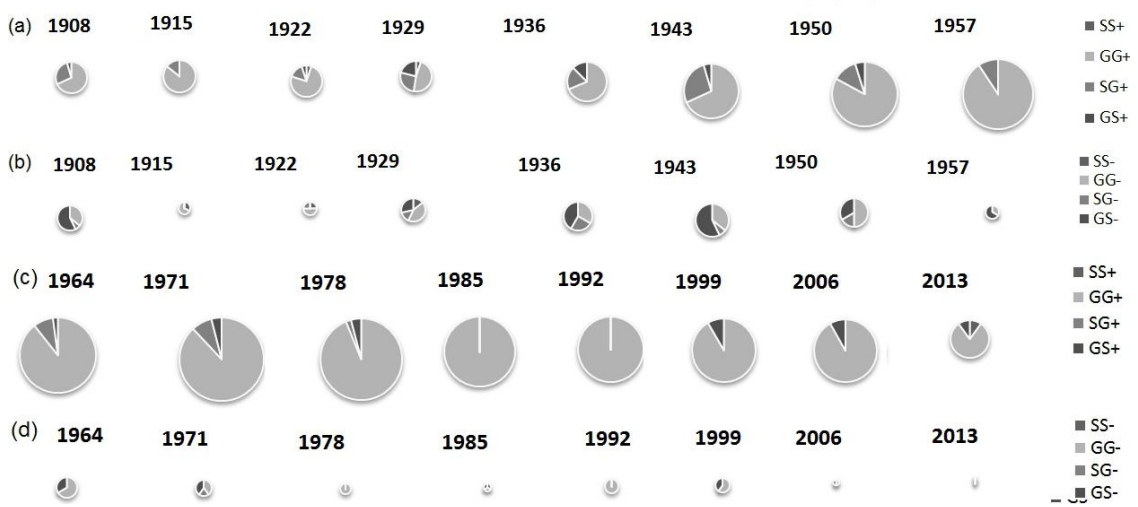

Figure 1. Evaluation of social behavior of physic Nobel laureates, where the size of the circles correspond to the number pf data points in each of the 7-years' time periods. The rows represent (a) the positive evaluation for the periods starting from 1908 to 1957, (b) negative evaluation 1908-1957, and (c) positive and (d) negative evaluation 1964-2013. Light, grey color marks group affinity (GG), dark colors mark the choice of self-centered work or their transitions (SS, SG, GS).

The results of the data are displayed in fig. 1. The upper row (a) represents positive evaluation for the periods starting from 1908 to 1957, next in (b) the negative evaluation. The size of the pie refers to the number of researchers and is much smaller in (b) than in (a). The dark color represents the cases for researcher, who preferred to work alone, either on purpose (SS) or as transition into a group (SG) or as disappointment from a group (GS). The data for the period 1964 to 2013 (c,d) are in the same order and meaning as those in (a,b).

Let us briefly explain the large amount of negative evaluation in the period 1943-1950. Otto Hahn received 1944 the Nobel prize for the discovery of nuclear fisson. His female coworker, Lise Meitner, pointed out the large amount of released energy, but was not honored, which is considered in retrospective as a remarkable case of unfairness [2]. On the other hand, the first application of this discovery was the release of two nuclear bombs on Nagasaki and Hiroshima at the end of WWII. The civil use of nuclear fission in nuclear power station is still considered by many physicists as the most powerful and efficient method for energy supply, it would significantly help to reduce the environmentally dangerous emission of carbon dioxide.

From the viewpoint of social science, however, there is no trust even in the civil use of nuclear power, because the remaining risks of natural disasters, technical failure, or human errors are too high for whole human mankind. Arguing in this way, it was probably advantageous that the ethical high valued country of Austria was not involved in the honoring of a not sustainable technology. It is the nature that humans make errors. Many

researchers, including Nobel recipients, worked in the Manhattan project, which had the purpose to produce destroying weapons. Some of the reasons for joining were: strong propaganda of elitism in order to destroy ethical doubts, interests of nationalism, herd effect, temptation of material benefit and the lack of ability to foresee the burdens for future generations. The same reasons may apply for the subject of this paper, the overstraining of the quality argument in university management. Social science has the obligation to point out the risk of these factors of inhumanity.

As a first conclusion we can state that the personal traits creativity and originality of research are not related to communication skills. There are about 10% of Nobel laureates who would prefer to work single. Observation of nature in experiments is important in physics and that can be done best when not disturbed by others. Also, creativity is related to a single person, working together can stimulate idea, but the actual work has to be done by each one itself.

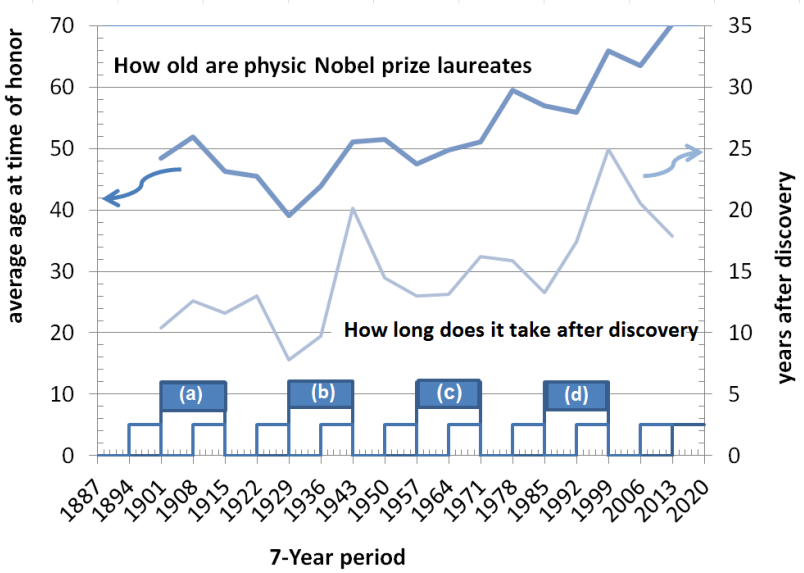

Fig. 2 Average age of physic Nobel laureates at the time of honor (left y-axis) and years after discovery received the honor (right y-axis) in a 7-year interval with starting year marked. The important periods in history are, (a) preparation of first world war, (b) great depression and second world war, (c) cold war, (d) reunification of Germany. **Period from discovery to award**

There are more facts which we can extract from this study as shown in fig. 2. The age of the physic Nobel laureate is shown as average in the same periods as before. An increasing age means that in this period the number of new discoveries decreased, because achievements from periods before were honored, and the age of the recipients increases. In the dark periods of history as marked with (a-d) in fig. 2, when the conditions for research were not good, the age of recipients increased in these periods while in the prospering periods in between it decreased. This trend is even more pronounced, if we draw the years how long it took after the discovery was honored, as seen in the light blue curve with y-axis on the right. In the periods, where the condition for research was bad, the increase is even steeper than the age of the recipients. Hence, both measurements, the age of Noble laureates and the time from discovery to honor, can be considered in reciprocal form as indicators for creativity

The general trend of increase in the average age of recipients has its natural, physical limit and will saturate in near future. Ernst Ruska was 78 when he received the award and died two years later. Until now, the oldest recipient is Yōichirō Nambu. He was 87 in 2008 and died seven years later. While before 1971 there were only two cases of researchers who received the highest honor in physics in retirement age or thereafter, in the period until 1978 there were four and until 1985 two, from 1985 it increased to the number of 29. One of the reasons might be, that science becomes more complicated, so obviously the committee wants to avoid risk. Also, there are a few cases where the Nobel Prize was used to gain money for won profit. In the next section we will discuss further physical limits.

As a conclusion of this study, the majority of physic Nobel Prize laureates are strongly embedded in their communities, and were encouraged during their career by collaborators, their supervisors and in some case through family connections. Only in average about 10% of the Nobel Prize recipients prefer to work single in the sense of the above mentioned *homo scientificus*. Another 10% have been affected by negative influence and do not care about ethics. In times of bad ethics in society both numbers increased to about 20%. In the flowing chapter we will discuss the reasons for that by focusing on the criteria for being creative.

Discussion

Nobel laureates in **physics, chemistry and medicine** are considered as the idol of creativity, as they are honored for new discoveries which are the motor for progress in science and technology. In many biographies the recipients confess that the foundation for their strong interest in physics has been created by key experiences in their early childhood. Good elementary school teachers or encouraging high school classmates were also reported. Education is the necessary foundation becoming excellent, but the real driving force is the passion, the curiosity and the interest in new challenges, which can only come from the researcher himself. The mixture between traits such as creativity and skills of concentration and own interest have been described as necessary conditions [8], while luck is also beneficial.

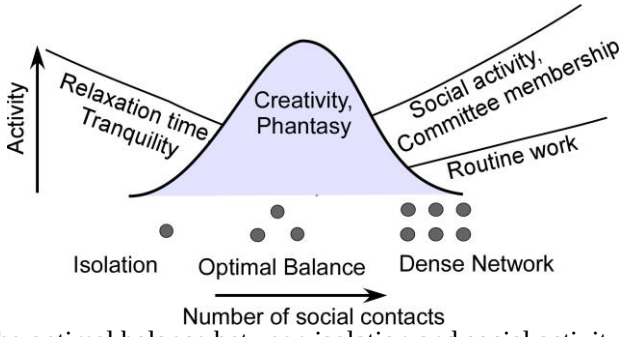

Figure 3 Creativity requires the optimal balance between isolation and social activity, committee or routine work.

The scheme in Fig. 3 summarizes the social conditions for being creative as researcher. The x-axis shows the number of social contacts. If they are too few, researchers are isolated and have too few information concerning the progress in science, but on the other hand they have much time for independent thinking. The best conditions are in the middle, expressed a peak of creativity. On the right side, when the researcher is embedded in a dense social network, there are several destructions, which prevent the researcher from being creative, such as commitments for meetings, social activity, and also the amount of routine work. There is an example in history: When the famous solid-state physicist Paul Drude, who is known for finding equation of electric conductivity, got promoted as director of an institute, he could not work creative any more. The burden of administrative work was too much frustration for him, and he finally committed suicide.

Other necessary conditions for creativity are tranquility, job security, motivation, and at least some friends in community. After successful graduation of master or doctor course a young scientist feels having a lot of time and freedom to choose the desired subject. These kind of paradise-like conditions existed in western societies until around 1971, before criticism about technology dominance in the society arose [9]. After that the society started to distrust the scientists. In accordance with the above found seven-year cycles, we will explain in the following twelve reasons why creativity has diminished.

1964 -1971 (1) misuse of power

Power harassment was one of the issues in the students' revolution 1968, while from then on in Germany almost all important decisions at universities are made in a faculty committee, while in Japan still until a decade later some researchers complained that a powerful "king" in the laboratory destructs creativity.

1978 - 1985 (2) communication skills overestimated, (3) research position occupied by less talented persons

While before 1971 people trusted each other naturally, the invention and spread of television had the effect that everyday announcer or actresses with their perfect communication skills came on the screen in the living room. Suddenly the mutual judgment of humans also emphasized the importance of this issue. There is nothing wrong with that as long it is focused on social issues. But a little while later, around 1985, scientists were judged in this way too. Even TV managers were astonished about this effect and gave the warning "Fast speaking does not necessarily means fast thinking [10]." As we have seen in the study on Nobel Prize laureates, good social contacts help for the career, but there is only a very weak correlation between communication skills and creativity.

The science actor as mentioned in the introduction can either spent time in his laboratory to do his experiments and find new data or can present his results at a conference, but not both at the same time. We can call it the dilemma of collecting or presenting data. As in any dilemma there need to be a balance between the two extremes. When scientists with good communication skills are preferentially selected, then it is likely that they tend to choice the presenting option instead of the data collection option. Furthermore, communicative people can easily find a position anywhere else in society, while the agent *homo scientificus* is attracted by his passion for science or physics. If the communicative people occupy the positions in science, the scientist with passion has no other choice where to go. It is considered as unfair that a job which is especially created for him is taken by others which are less-talented in data collection but mainly focus on communication. Hence, we can conclude that the television effect had decreased the number of jobs suitable for the scientist with passion.

1985 -1992 (4) period of selection (5) financial restrictions for research

Around 1985 the situation in Germany became more severe, because at this time a remarkable high peak of the so-called baby-boom generation, which are born after the aftermath of WWII ~~were settled~~, entered universities. At that time the subject physics had a high reputation in society; lower than medicine but higher than economics or law. In each academic subject there are about 10% of students who realized that the chosen subject does not fit to their expectations, and quit after enrollment. Another 10% graduated but changed subject thereafter. Still the number of applications for science career was higher than the number of for academic positions.

Another difficulty arose, because the professors who got their positions shortly after WWII were retired. For the new unexperienced professors there was a lot of burden to organize their lab and lectures, and hence they could not focus on the judgement of young scientists. It is human nature not to take the risk, if you are not sure about a new candidate. Due to the introduction of computers, speed in research was increasing. Also the progress in technology was accelerating. It became harder to judge the outcome of research and arguing with the candidate became also difficult.

Formal rules were created to organize the judgement of young scientists, such as the 6-years period for achieving tenure track. The age of 35, which is well-accepted as the limit age to find a partner for live, was also used in research institutes as age limitation for the judgment whether suitable for a permanent position or not. Beyond that age the point-of-no-return has passed, the *homo scientificus* is usually allowed to proceed with his scientific career. If other conditions are fulfilled, the community usual finds for native Japanese at the age of 45 a position as associate professor and at 55 a full professorship. Beyond the 56, the age when biology changes the hormone balance of the body, usual working speed and creativity are likely to decrease, but trained researchers can still contribute to science with new ideas. The ERC has acknowledged this by setting no age restrictions on research proposals. Cognitive inertia is the key component of trust and friendship. A 56-year old scientist at the end of his creative life, but not his physical life, has the obligation of human rights to be employed in a proper position, preferentially in his subject research. Nobel Laureate Erwin Schrödinger finally got at the age 56 a professor position in his home country Austria.

After the period of selection, when the fear of losing the job for a *homo scientificus* vanished, the mistrust still might have remained. Movies around that age [11-14] emphasize that the candidate faces harsh judgement in the case, when some of his personal traits are below average. Albert Einstein is now known as the ikon of a *homo scientificus*, but even for him many points of his career were very uncertain. He first worked in a patent office, changed his citizenship four times and even **at** the nomination of the Nobel Prize he faced a strong opposition from one of the committee members, Allvar Gullstrand, a Nobel Laurate himself.

1992-1999 (6) hidden managers, (7) bended reality

The endless discussions about the secure career or promotion to the next positions cost a lot of time. As a consequence the research managers changed their method. Instead of open discussion with the candidate they decided to have secret committee meetings with hidden judgement. Usually a group of professors as a part of a community form these secret circles, for which different names exists and “strong network” is the most neutral expression. Before 1999 the internet was not so dominant, so they could even control the publishing process of a scientific paper and the German research foundation (DFG) saw it necessary to publish ethical guidelines [15]. In the meantime most of the publishers accepted these guidelines, while some criticism about the peer review process still remains and even Nobel Laureates faced rejection of their papers. Young scientists often experience the fact that a research proposal is rejected but the new ideas appear in presentations, papers or proposals of some of the community members. The applicant loses the trust in the practice how the community operates.

A young scientist or the engaged science agent, who thought only with his abilities he could get the honor for his creative work, notice the remarkable resistance as difficulties in the acceptance of his work. A large amount of distrust turns an easy career path into a large hurdle consuming time and effort as sketched in fig. 4 a. Experience of such bended reality was first described in the novel “Sophies world” [16]. Some managers judge the creative work even without ever having talked to the candidate in person. The hidden managers justify this behavior as an effective method that prevents lengthy and useless discussions. Up to this point it is neutral from the viewpoint of ethics, but it becomes questionable, when it is used as a power instrument. This one-way method of top-down directive becomes unfair, when the victim does not know, what kind of data are collected, when he is examined, which are fake situations just to test his behavior, which are the criteria of judgement, and in which direction he should proceed. Observation without giving any vision or guiding directive causes remarkable and permanent distress for the candidate, he gets frustrated and finally burned-out. The secret method was optimized in Japan and the ten-thousands of suicides every year are obviously a cause of this inhuman method. If the agent has strong personal traits and proceeds in spite the resistance and according to his own vision, he even becomes the object of research [17].

From the viewpoint of the victim it is nearly impossible to fight against such a group with distrust, as the

allegations and the reasons are not explained. In some cases the managers had no other choice; it was their task or higher order to destruct overgrown capacities. This conflict of interest (COI) in science, the willing full candidate against the destructive manager was commented in a blog [18] as "never ending motivation, but contract limitation for ever". Nevertheless, the method of making secret decisions had many bad consequences. Spreading of bad rumors becomes easy. A small fault or disabilities could be exaggerated, resulting in academic bullying [19] with the purpose of humiliation. In Japanese society the soft form of teasing starts already in kindergarten [20], and almost nobody would have the courage to stop it. Physics Nobel Prize laureate 2002 Masatoshi Koshiba faced a lot of mental pain due to mobbing from some of his colleagues during his stay at Tokai University from 1987 to 1997. The famous physicist Ludwig Boltzmann, who was suggested for Nobel Prize, could not withstand severe bullying within the community and finally committed suicide in 1906.

In such an atmosphere of distrust only the members of the committee feel strong. They even "forget" to verify and check the origin of the rumors or look for evidence of the allegations, as the group conformity is stronger. Hidden dark power prevents from any rational discussion. Secret circles have been reported in history and are mostly formed as bottom-up resistance of an unfair totalitarian system, but this time it is in opposite direction from top-to-bottom in order to maintain power for destruction. The *homo scientificus* in our report feels in such a situation that he cannot work effectively. Cut into isolation means to cut his creativity and motivation. Another strategy was to cut the financial resources, assuming that most agents will follow the *homo economicus* stereotype. From ethic viewpoint the hunger-out strategy is unfair and inhuman, and can only be explained by the assumption that the group does not wants to integrate, but instead kill any critical scientist. Secret circles of top-down management should use their power properly, avoiding unfairness in peer review, citations, positions, follow the golden rule of practical ethics, including the duty to fairly honor scientific achievements.

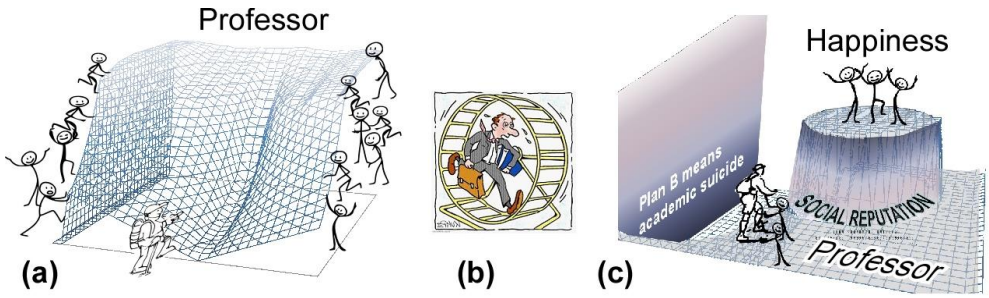

Fig. 4 Illustrations explaining the creative scientist and his experience with the conditions for research, (a) bended reality due to hidden managers, (b) overloaded work pattern in a cage, (c) lack of social reputation, indifference or ignorance.

1999-2006 (8) pressure and (9) Hyper-activity

In 1999, ministers from about 30 European countries signed the Bologna Declaration [21]. ''Greater compatibility and comparability of the systems of higher education'' should increase quality management [22] and the scientists' exchange. In the age of globalization excellent researchers have many opportunities to go, and, when Japan experienced its bubble age, working in Japan was an attractive opportunity, because at the end of the bubble age companies were still seeking for interesting projects. In some areas of science technological races between competing rivals occurred. Both indicators for creativity (Fig. 2) went up, as the age of Noble laureates and the time from discovery to honor, dropped down. It was a matter of speed which competitor could first accomplish writing a patent, claiming his area of interest. Leaders, who knew what was going on, forced their scientists or in other creative professions [23] to work harder. While some humans indeed work harder under pressure, the work-live balance concept [24, 25] found in contrary that for the majority of people the probability becoming physical or mental ill is increasing. There are some physical limits for the human body. It needs eight hours of sleep and workers cannot commute more than 1.5 h each direction to work, and need a free day at the weekend, and around three weeks rest each year.

Similarly, the data collection for an original scientific paper needs about two weeks' time and at least three succeeding days for writing the text. At that time the defending needed about one year and recognition in the community another year, while now these periods are accelerated a little due to internet blogs like researchgate or academics.edu. The pressure, which came from the companies, was directed by the professor towards his post-docs, and while rushing from one conference to the other, he put a double pressure on the post-doc to produce new results. If the results are taken away and made public, before they are totally confirmed, the *homo scientificus* loses confidence in his own work and he slows does his working speed. Creativity needs an open space of activity, a too small cage yields to frustration.

In the peak time of power harassment less than one or two decades ago, typically a 56-year old scientist became mighty enough to acquire enough research money to hire some post-docs. He used their creativity and

originality to gain more scientific papers. Experiencing also pressure from above, he did not had enough time to inspire, discuss or sometime even read the papers of his employees. On the other hand he claimed co-authorship as he had supported facility equipment and financial support. At the end of the contract he felt the obligation and used his connections to provide the victim a lower-paid job, but in retrospective the post-doc had indeed felt the choice of this laboratory had been a killer of his career. In any service business there is an oath to provide the best for customers. The hypocratical oath in medicine demands best treatment for the patient. Similarly, educational ethics demand to do the best for the student career. Scientists should use their special expertise and way of thinking to guard against bad effects on society. When the professor put his aims first, he is violating this principle.

The cartoon in fig. 4 (b) refers to hyperactivity which fits well to Japanese mentality. One scientific conference followed the other, and one paper after the other was written to pile-up records for evaluation. The quantity in papers increased remarkably. The pressure was so high that many professors neglected human ethics, and pressed everything out of the young researcher, just for the sake of their own honor. At that time, the leader of the German science foundation (DFG) still hold on the principle, which worked for the past years, namely to trust the established professors and had to face some criticism [26]. Holding too long on the extreme of trust instead of allowing risky new innovation as the young professors, will not lead to remarkable progress and hence he soon was replaced.

2006-2013 (10) overload with administrative work and (11) indifference

The period of hyperactivity ended, when more and more scientists decided to keep the work-life-balance, and the term "slow science" was created. The 2014 Nobel laureates in chemistry, Stefan W. Hell confessed [2,3] that he was lucky to find a continuing position after his second post-doc period expired; otherwise he could not have started the honorable work. Concerning this a tip of an iceberg, there might be thousands of researchers who did not had the luck of continuing their research. There are only a few possibilities for experienced scientists. As demand for consulting is also limited, there are jobs in science organizations with large amount of administrative or representative work. However, that is not what a scientist is trained for and instead of the desired honor by working in a team, he again gets isolated just by being placed on top of the hierarchy higher than the others.

When a young scientist receives the call for a professor position, he faces a lot of additional work load, preparing lectures and organizing his laboratory. In private universities this pressure is much higher, as the administration requires profit-oriented efficiency, the students demand attention, and the faculty members want transfer some work load to the newcomer, and in rare cases the work load is used as instrument of bullying. When the famous solid-state physicist, Paul Drude, was offered the leadership of the physical institute at the Humboldt University in Berlin, he committed suicide in 1905, because he could not manage the burden of work overload and different work-pattern.

While professors in the age before 1985 were trusted as what they are, the motor for progress in science and education, and any support from the university facilities were provided, the situation changed since 2006. The personnel were cut and the burden of most of the administration work was loaded on the new professor. Lecture duties increases remarkable, when the Japanese government suddenly decided in 2006 to increase the lecture time from 12 to 16 weeks each semester, which means the reduction of time for research by two months each year. The principle of own responsibility instead of getting support by others, means the *homo scientificus* is doing again work which is contrary to his self-concept. As the left side of fig. 4 (c) illustrates, the intention was even to push him away from social reputation, isolate him and force him to change to another subject and frankly means academic suicide.

The hidden managers on the other hand, always demand the importance of their quality management, because there is the fear of losing their job. The worst case is indifference, which means no trust, no risk, no willingness of the group to integrate new members. The criteria for entering are too high, the pride of the group, their wealth is too high, than their ivory tower cannot be penetrated, as the right side of fig. 4 (c) illustrates. This was the feeling of foreign researchers in Japan who came after 1995 experience a lack of integration into their communities. While the researcher have the positive experience and integration of foreigners coming to USA in mind, Japanese communities were not used and are not willing to integrate, which has been named as Galapagos effect [27] or researcher's village. The Nobel prize in physics 2014 honors the Japanese researcher Shuji Nakamura who emigrated to USA for the same reason. Other examples in history are Lise Meitner and the author's PhD supervisor Hellmut Fischmeister, who both could not get permanent positions in Sweden, finally moved to a third country.

2013 until now (12) resistance against disruptive technology

When the above mentioned extreme of a social dilemma would continue for too long, experience shows that either overdoing or resistance from grassroots will lead to the burst of a bubble or a revolution. Such an unresolved dilemma is called in social science conflict of interest (COI) and the destructive power for both partner

has been mentioned many times [2,3]. Unresolved conflicts polarize opponents until a small spark initiate an explosion which destroys instead of solving anything.

The motivation for this unresolved dispute is a remarkable resistance against too fast progress in original research, as expressed in the wikipedia pages on disruptive technology [2,3,28]. Obviously big companies insist of maintaining their plan for future technology strategies, their tools and projects should not to be disturbed by too fast innovations of individuals. New products created by clever researchers or start-up companies would make it hard for them to react as manufacturing a new product needs some time. Another such method is to apply for a patent with broad range, On the other hand as outlined above, a passion-driven researcher actor has no other choice as to follow his vision and desires to develop new technologies.

In spite of excellent effort, some foreign researchers in Japan experience remarkable resistance, indifference, disinterest or no willingness. The hidden power of destruction is remarkable but hard to verify, and includes sending of computer virus, hacker attacks, sabotage, stolen equipment, and students in the laboratory who work as spies or are manipulated. Sometimes classified as organized crime [29], this scientific practice had some to the notice of research organization in which the victims are embedded in, such as Euroaxxes, JSPS Alumni Club, German Science Foundation (DAAD) and even the embassies are aware and passively watching these problems, but obviously don't want to get involved. The German justification seems to strictly follow a certain decision, even if the outside situation has changed, while the Japanese ethic obviously approves destruction, if it is based on a decision of a powerful group.

In Future

The conflict-of-interests' situation can only be solved by diplomatic talks [30] and by turning the destructing conflict in a harmonic win-win situation. The negotiations should be held between equal partners and it not good ethical practice that a powerful organization hears an individual. The individual first should be backed up with an organization of people who have the same interests. Employees at private universities, especially those with part-time contract, in Japan have formed a kind of labor union. However, due to many trials in court, the entrance fee is a very high hurdle and there is the suspicion that this institution is driven its own dynamic. On the other hand a consensus decision-making is required.

One of the human rights states that every civilian has the right to find a proper work place. It has been a long tradition that a talented person with the trait of creativity sees no other alternative for his self-concept than working in science. Quality management should not destroy such established tradition, even if the candidate has some lack in other skills, especially communication.

Conclusion

In this paper we have evaluated the best conditions for obtaining creativity and studied the behavior of and engaged scientist *homo scientificus*. In a study we have analyzed the biography of physics Nobel Prize recipients as they are considered as most creative scientists in society. The results are:

1) In average about 10% of laureates prefer to work alone instead in a group, showing that there is only a weak correlation between creativity and communication skills.

2) Averaging over periods of seven years, the age of the Nobel Prize recipients increase in times, when conditions for research are bad. The same is valid for the time between discovery and honor.

3) Twelve conditions for diminishing creativity are outlined in the discussion, where the worst case is no trust, no risk, no willingness for integration the engaged scientist into the community.

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