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People's self-fulfilment in modern digital society

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Abstract

In modern society, there is an acute problem of self-realisation of people who possess remarkable intellectual potential, since their creative abilities generally remain unsatisfied. The issue can be solved based on the Internet of Things concept, by making different tools for indoor creativity (such as 3Dprinters which provide building useful products, knitting machines with embedded artificial intelligence, etc.).It is proved that solving the problem of self-fulfilment has crucial meaning for development of both science and art, as right in this case social sustainable demand for development of science and art arises. In the absence of a distinct social demand, the development of science and art, these areas of human activity, can develop only with the help of the state's support, which significantly degrades their efficiency (also in purely economic terms).

Keywords: The fourth technological revolution, digital society, citizen's self-fulfilment, artificial intelligence, creativity, neural networks, bureaucracy.

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1. Introduction

As the modern theory of innovations which was founded by Joseph Schumpeter (2020) and King and Levine (1993) shows, any innovation possesses final potential for its development.

The following thesis was formulated by proceeding with this idea. Western European type science (more precisely, science which originated in Western Europe in a new time period) also should be considered as an innovation. Reasoning consists of following: Western European type science (i.e., science currently dominating on our planet) was created with distinct purpose and it has authors including Lord Francis Bacon (Suleimenov, Gabrielyan, Sedlakova & Mun, 2018).

Being innovative (even having global character), therefore, has the final potential for development, which finally will be concluded. Evidences for that, we witness now. It is expressed, particularly, in the way the effectiveness of capitals funding in scientific research development kept decreasing during the 20thcentury and is still decreasing nowadays (Suleimenov et al., 2018).

More evidence in favour of the above-mentioned thesis is the dramatic fall of the authority of scientists and also a drop in their social status and consequently the loss of interaction between science (as social institution) and political elites.

Namely, in modern conditions, political elites of most countries prefer science, especially in pragmatic point (in terms of direct financial benefit). This situation completely differs from what occurred in the frontier of the 19th and 20th centuries, when interaction between science and elites was strong. As an illustration, it is sufficient to point the fact that in political struggle in Russia at the beginning of the 20th century, philosophy was actively applied, which can be easily identified in writings of V.I. Lenin (Ulyanov). As it is highlighted in works of Bauman (2013a, 2013b), during the transition from society of modern age (industrial society) to society of postmodern age (post-industrial society), the community of intellectuals lost their role as 'legislators' and are now executing function of observers or 'interpreters'.

Most obviously it is identified in the example of authority loss and meaning of philosophical knowledge. At the end of the 19th century, philosophy was considered as some kind of tool for the transformation of society, as a means to overcome its inherent demerits. (Most apparently, it can be seen in the example of the creation of the USSR as an experiment on practical embodiment of quiet definite philosophical doctrines.) Nowadays, most of the scientists working on natural and technical disciplines consider philosophy as an abstract insight, as a game for refined intellectuals. It is evident that political elites will take into account the legislator's opinion rather than the interpreter's opinion.

Similar conclusions could be made related to research studies, in general: governments of all countries considered forced development of science as a political tool too (not only in military aspects). Considerately analysed political elites existed the moment research studies and developments gave corresponding recommendations and set the development direction de-facto.

In contemporary conditions, pointing to it again, the situation was contrary. Controlling science actually reduced the use of financial tools only (Suleimenov et al., 2018). Political elites now barely rule the direction of the development vector. Only analysing commercial return (through appropriate institutes) of scientific directions and prioritise them according to it. The exception is separate directions, which serve for existing, particularly research studies in the area of hypothetical changes of climate and research studies in the green area.

One more proof in favour of the thesis above is the significant weakening of the link between science and society. While in the frontier of the 19thand 20thcenturies society had more interest to problems of science development, leading universities used to organise lectures for the general public, which were attended with great interest; however, in the present, the interest gradually weakened. Moreover, a certain part of modern society, for psychological reasons, considers the large amount of researchers as people who receive money in vain. The society does not see the appropriate return of

scientific research studies, in the sense that it has already ceased to have a fundamental impact on changes in the quality of life (excepting informational technologies). And again we can use as an example the situation in the frontier of the 19thand 20thcenturies, when achievements in different areas of science and techniques were swiftly changing the life quality of citizens of any big European (Suleimenov et al., 2018), namely electricity became a commercial item, literally in one decade.

Hence, to bring back that status of science, it is necessary to revive the interest of the general public to problems of science development. This task has humanitarian character, at that, psychological factors play significant role. Indeed, ordinary citizens of any post-soviet countries had limited opportunities to judge the real achievements of modern science. The way what takes place in science is covered now has, firstly, fragmentary characteristics, and secondly, media stuff fulfilling requests, cover only those which could arouse the reader's interest; therefore, formed insight is far from the objective one. There is no opportunity for ordinary citizens to estimate the real situation in science. That kind of factors also have a direct economical meaning: loss of connection between science and society leads to that, private businesses invest less in scientific research studies and developments, example of Kazakhstan shows it distinctly. Attempts of RK's Government on stimulation of state–private partnership in this area still do not bring expected results.

In conclusion, it can be argued that for science to develop successfully there must be some translator or terms between science and society. The creation or occurrence of the translator, as shown in given work, is closely connected with the problem of people's self-fulfilment.

1.1. Purpose of study

The question of the vector of development of science is far from trivial. The history of science definitely suggests that a certain mainstream (more precisely, a certain paradigm) has always been formed in it, (Kuhn, 1962). as a result of which certain scientific areas have been predominantly developed, while the rest have turned out to be on the side lines of history. This conclusion is clearly confirmed by the analysis of the current situation, when information technologies receive predominant development (if we talk about technology), while, for example, the aircraft industry can demonstrate only relatively modest successes. In particular, the aircraft fleet of the vast majority of the world's airlines consists of aircraft, the design of which was developed in the middle of the twentieth century. It was important to emphasise the existence of the mainstream in relation to the statement of the problem of this work for the following reason. In modern conditions, the vector of further development of science has not been yet determined (the previous paradigm has largely exhausted its capabilities, and the new one is still in its infancy). Even if we restrict ourselves to the problems of artificial intelligence, we have to admit that the situation remains multivariate due to the fact that the geopolitical interests of different countries of the world do not coincide. In particular, different directions of development of artificial intelligence systems correspond to different interests (Kalimoldayev, Pak, Baipakbayeva, Mun, Shaltykova & Suleimenov, 2018a).

Therefore, it is appropriate to raise the question of exactly which vector of the development of science and technology will maximally meet the needs of the development of science as a social institution, on the basis of which, ultimately, modern civilisation is built.

The objectives of this work are as follows:

– Show that a systematic solution to the problem of self-realisation of people who have increased intellectual potential, but are not professional scientists or educators, fully meets the interests of the further development of science as a social institution;

– Show that this problem can be solved by using the concept of Internet of Things (IoT) and artificial intelligence systems.

2. Methods

The task is solved in the work from the point of view of the principle of convergence of humanitarian, natural science and technical knowledge. The validity of the application of this particular principle for the purposes of this work follows from the following considerations. In modern society there is a pronounced deficit of all that is expressed by the term 'self-realisation'. So, any of those who are called 'office plankton', deliberately does the work, which, to put it mildly, very rarely becomes a favourite thing. Moreover, the vast majority of activities performed by educated people create very few opportunities for self-improvement and personal growth.

The existence of almost all formats of activity of office workers, as a rule, is associated only with the imperfection of information logistics, and this (at least at a subconscious level) is perceived by them. It is no coincidence that the rough but extremely clear term 'bullshit jobs' has recently appeared in the literature (Graeber & Cerutti, 2018). This term reflects a very specific view of the problems associated with the emergence of 'office' jobs, in accordance with which they perform, primarily social functions. Namely, they create the appearance of labour employment (and formally close to intellectual) for a significant number of people who have graduated. Simplifying 'office' workplaces created only because in the vast majority of organisations there are bureaucratic structures, whose functions de facto include only interaction with other bureaucratic structures (Kalimoldayev, Pak, Mun, Bakirov & Baipakbayeva, 2018b) they simply 'burn' labour resources that have become de facto redundant. The reasons why a significant part of the workforce was doomed to 'burning' (more precisely, to inefficient disposal) are mainly associated with a significant inertia of social systems. Since the 1930s, higher education has become widespread (Kalimoldayev et al., 2018b). There were quite objective reasons for this, which Marxist literature expressed with the thesis 'science is the productive power of society.' Accordingly, society began to perceive higher education, primarily as a social elevator, accessible to a wide range of people. The manifestations of this are obvious for any Kazakhstani – the vast majority of our compatriots seek to give their children and grandchildren a higher education regardless of the real practical usefulness of such a step. Any teacher faced and is faced with the expressed desire of students to get not so much knowledge as a diploma. However, in connection with the crisis in science mentioned above, higher education has ceased to fulfil the functions of a social elevator since the 1970s. The economic efficiency of scientific research has fallen to unacceptably low levels, and science has ceased to systematically generate meaningful meanings (in the philosophical meaning of this term) (Suleimenov et al., 2018). As a result, the development of technology (with the exception of a small number of areas related mainly to info-communication technologies and medicine) has also slowed down significantly, as emphasised earlier.

Nevertheless, the inertia of mass consciousness continued (and continues) to drive significant masses of applicants to universities. But, the society of the second half of the 20thcentury was unable to meet the expectations of all those who aspired for universities. For them, there were no adequate formats of activity and, in order to avoid a social explosion, the corresponding labour resources had to be 'burned in a bureaucratic furnace', creating fake jobs around the world. The indisputable theoretical position 'the middle class is the guarantor of social stability' contributed in every way to processes of this kind. However, this provision, in many ways, really was and remains operational. Namely, 'office' surrogates of socially useful activities could easily form (and are) substitutes for life success: in bureaucratic structures, arbitrarily complex hierarchies can be created that create surrogates for personal growth. Of course, career growth associated with financial success in bureaucratic structures takes place in reality, but career and personal growth is far from the same thing.

The idea of surrogate jobs for the middle class is not yet universally accepted. However, there is no doubt that the vast majority of office workers and the like are aware of the disadvantage of their position, at least at a subconscious level. The proof of this statement is the unusually high popularity of social online networks: having no chance of self-fulfilment at work, educated people, by the will of fate turned into office plankton, are looking for other ways – in virtual worlds.

The political elites of the core countries of the world economic system, in essence, have found a rather effective (from the point of view of maintaining social stability) method of utilising the labour resources generated due to the massive nature of higher education. Instead of adequate creative activity, its surrogate in the form of office formats, instead of adequate self-realisation, its surrogate in the form of online social networks and other 'ways to virtual worlds'. There is every reason to believe that the system of surrogate 'office' jobs was created artificially through a complex system of legislatively fixed administrative procedures.

It is on this basis that it can be argued that the modern world, which is actively developing artificial intelligence systems, has come to the next 'branch point' when there is a choice of the path for the further development of civilisation, but the result is far from predetermined. (Moreover, in modern conditions, the mechanisms underlying this choice are far from obvious.)

In one extreme case, artificial intelligence systems will continue to destroy a person in a person, making him an appendage of various techno-information networks (from the existing Internet, to the industrial Internet, the appearance of which is provided for by the concept of Industrialisation 4.0).

In another extreme case, artificial intelligence systems will become a new highly effective tool for creativity. Moreover, it is they who are able to become the means to overcome the deficit of self-realisation that really exists in modern society, as was shown above. In essence, this deficit is due to the fact that the modern consumer society de facto alienates large masses of people who are potentially capable of creativity from creativity and the associated self-realisation. In return, various surrogates are provided; social online networks, which were mentioned earlier in this context, are only one of them. In the same row is the pursuit of branded products, fashion, etc. – All this is nothing more than surrogates of means of expression, which does not require extensive evidence.

We emphasise that the above-mentioned options for the interaction of society with artificial intelligence are precisely the limiting cases; the real development of events will, of course, correspond to one of the many intermediate options. In essence, these options form a continuous (or close to solid) spectrum, but in any of them there will be features of both limiting cases. However, there is no doubt that the problem under consideration has both a pronounced technical and a pronounced humanitarian aspects, which makes it reasonable to use the principle of convergence of humanitarian and technical knowledge.

3. Results and discussion

The inefficient use of intellectual resources, of course, is absurd. But, politics is most often formed on the basis of precipitately made decisions; therefore, many forced and seemingly temporary measures in fact generate something lasting – the inertia of large social systems works.

Thus, there are no and cannot exist ready-made (and even more so-tested) solutions to solve the problem. But, there is a huge resource that can be used without the slightest risk. We are talking about the desire of the vast majority of more or less developed (intellectually) people to self-realisation.

As noted earlier, in modern conditions, one of the main platforms for the self-realisation of citizens is online social networks. There is no need to prove that economic efficiency (if we talk about the interests of society as a whole) of more than a significant investment of time in generating a huge array of files filling out the indicated networks is close to zero. Of course, these networks can be used for various pragmatic purposes (promotion of goods, monitoring the reaction of society to certain political decisions, etc.), but this does not negate the thesis that the effectiveness of tools based on people's desire for self-realisation can be multiplied. Moreover, the example of online social networks clearly demonstrates that people are often ready to carry out very, very active activities for free.

Thus, we can come to the question of using this resource (people's desire for self-realisation) to ensure an innovative breakthrough. We show that such a formulation of the question seems paradoxical only at first glance.

As the latest history of science clearly shows, the vast majority of full-time employees of any university are de facto, metaphorically speaking, nothing more than a kind of 'cultural humus' (Kalimoldayev et al., 2018b). Developing this metaphor further, we can say that their role is to form a kind of 'soil layer' on which 'useful plants' actually grow, i.e., the activities of those who really make scientific discoveries are carried out, they provide real training for those few students who really become specialists, etc. (Similar considerations are true for any organisation whose official purpose is to conduct scientific research.) We emphasise that such a situation can be considered precisely as a hallmark of the history of science in the second half of the 20th century – in other historical periods, such a state of affairs would be impossible (Suleimenov et al., 2018).

The role of this layer, metaphorically called 'cultural humus', also cannot be underestimated – it ensures that the translation of new ideas and views into society serves as a kind of intermediary between those who create innovations and political elites. The disadvantage of such an 'intermediary' is obvious: its existence requires financial (and not only) costs at about the same level as real scientific work. The question arises whether it is possible to exchange an existing 'intermediary' for one whose services will be free. The answer is yes, yes, it can – through the mobilisation of exactly the resource mentioned earlier, i.e., people's aspirations for self-realisation.

In modern conditions, this formulation of the question looks more than realistic, since the role of a conductor of advanced scientific ideas in society can be taken by artificial intelligence systems integrated into society, if, of course, their development goes along the path that satisfies the social request craving for creativity. Professional science and professional art are not able to satisfy this request de facto: in their development, they have gone too far from the capabilities of the vast majority of people who have even received modern higher education (especially if we take into account that in many cases it is only by title) (Obukhova, Guichard, Baikenov & Suleimenov, 2015), hence the problem of ensuring creative amateur fulfilment of an amateur.

Fortunately, it is artificial intelligence systems that can satisfy 'creative hunger' and solve a problem that is already acquiring all existential traits. Consider a good example. The literature on artificial neural networks (which are the basis for a significant part of artificial intelligence systems) describes numerous attempts to teach neural networks to write pictures, poems and articles (Elgammal, 2017; Tatalovic, 2018). Such attempts can be attributed to the paradigm of 'replacing the creator with artificial intelligence.' You can set the task and otherwise – configure the neural network so that it can, starting from a careless pencil sketch, synthesise, for example, a decorative pattern for fabric or wallpaper.

Obviously, such a network greatly enhances the capabilities of a person who is not too skilled (in this case, as an artist), but able to think creatively. However, this example is more illustrative, although it is a completely conceivable situation.

Based on that, we can come to the concept of IT art, which implies the creation of software and hardware for the creative (and pragmatically useful!) self-fulfilment of all who have the corresponding aspirations. We emphasise that this work does not consider certain technical solutions at all; the current state of the means providing the creation of software products (as well as the means providing the production of specific devices) clearly indicates that the statement of the problem is more important than its solution. It is well known that the more a technical system is irreproachable, the easier it is to manage it; programming languages are no exception. Nowadays, a person who is very mediocre in mathematics (and not even versed at all) can create adequate software products; development of technical tasks has come to the fore.

In accordance with these theses, it can be argued that the concept of the IoT, at least in a country like Kazakhstan, should be aimed at creating automated indoor tools (as a means of managing them, it is obviously advisable to use cellular phones).

For example, to develop and implement an unmanned system that provides for painting and plastering is not difficult. Such systems, in particular, can initially be aimed at providing a wide variety of the final result (from Venetian plaster to the manufacture of complex stucco decoration elements).

Even more, it is possible and necessary to raise the question of creating various varieties of 3D printers designed for indoor use. In particular, this implies the creation of more advanced (and, therefore, simple) software products that provide control of such devices.

As an analogue of a 3D printer, obviously of interest to households, a computer-controlled knitting machine can be considered. Its advantage (from the point of view of the question of the self-realisation of citizens) is its orientation to the most accessible varieties of the source material, as well as the ability to manufacture items arbitrarily complex in geometry (up to covers for sofas and laundry baskets). In addition, the use of an automatic device allows us to realise knitted products from very small loops, which makes them in the future comparable with the best products of this kind known in history (materials for gold-woven medieval costumes of the highest nobility).

Obviously, the field for activity here is very wide; moreover, the potential for the development of such funds is associated with meeting current needs.

Safe-to-operate systems associated with the production of a product will automatically involve adolescents in this activity. Therefore, such an activity will inevitably tap into the potential of the Game, but only (unlike existing social networks) this Game will flow far from only in virtual space.

The material for the functioning of 'home' 3D printers (as such devices become more common as personal computers are now common) can and should be recycled materials. Back in 2001, the waste volumes of polyethylene terephthalate (the material from which disposable packaging for drinks is mainly made) in Russia alone amounted to 10.2 million tonnes, while 60 two-litre bottles are enough for 1 m^2 of carpet.

Polyethylene terephthalate is a very convenient material for recycling; it can be used, including for educational purposes, focusing on the collection of secondary raw materials by schoolchildren. The experience of collecting waste paper in the USSR can be very useful, with the difference that the proposed approach assumes that students will collect recycled materials at home, and in their own interests, essentially for gaming purposes. This thought can be developed further; with the improvement of 'home' systems for manufacturing products for various purposes, an ever wider range of secondary raw materials can be included in circulation. This path is the most promising from the point of view of garbage processing, where the problem of its primary sorting is of primary importance.

It is appropriate to emphasise that this particular problem is not only technical, but also social in nature, which once again brings to mind the principle of convergence of natural science and humanitarian knowledge. The problem of recycling is not solved by the fact that mankind will learn how to efficiently process complex raw materials of variable composition, but by the fact that valuable (ideally, any) components will not get into garbage cans at all.

The thought expressed can be continued in the key (Kalimoldayev et al., 2018a): a 'smart home' can be exploited only by a 'smart owner', and this is primary. It is ridiculous (at least for countries like Kazakhstan) to raise the question of creating a smart home, without first preparing the social conditions. But, if they are created, it is better to equip the 'smart owner' with the means by which he can improve the 'smart home' himself. From the point of view of a 'clean' economy, such an approach is nothing more than another absurdity. But, it can become a reality, if you use the potential of the Game. The venerable father of the family will not install an energy-saving device on the roof of the

house, since the economic effect of this will be insignificant, but a child can do this – simply because he will be interested.

4. Conclusion and recommendations

In other words, it is the Game that can do what the economy cannot do, for example, bring to a logical conclusion the concept of a smart home, which should become a system that is close to self-sufficient in both matter and energy. The game has crucial meaning in modern world, where almost only teenagers have saved the interest for the surrounding world. Unfortunately, pedagogical experience shows that students are already charged with bureaucracy in the third year of study, which is quiet common for post-soviet universities. Generally, only game, namely the orientation on creativity, is capable of overcoming this negative tendency.

So, in order to develop fundamental science and art in society, the society itself must be oriented towards creativity and prosperity. If science and art are separate from society, they are doomed to stagnation.

The society, ultimately, will refuse to finance pure science and art. The state will be charged with responsibility on that issue, and this is what we actually see now. It is regarded as ineffective approach according to practice.

Therefore, providing the society the direction of creativity is the way for development of science. The solution is common with one of people's self-fulfilment problem of those who are inclined to creativity. For that, systems of artificial intelligence and IoT concepts provide a wide range of opportunities.

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