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Socio-Managerial Risk Evaluation In Technologically-Dominated Human Societies

Ioan I. Gâf-Deac[1], Maria Gâf-Deac[2], Oana Elena Brânda[3]
[1]*PhD Senior Lecturer, SH University of Bucharest, Romania.*
[2]*PhD Management/PhD Engineering, Senior Lecturer, Bioterra University of Bucharest, Romania.*
[3]*Assistant Professor, University of Bucharest, Romania.*

ABSTRACT: *The article presents the results of a theoretical analysis and its reflection in human societies, concerning the domination of ultra-complex technologies. References shall be made to the situation of ultra-complex technologies between "risk incubators" and "development incubators", in addition to a presentation of the conceptual basis of the risks implied by technological functionalism, the manifest tendency to revive "eco-technology" and the risks entailed by the diffusionism between technologies and various technological cultures. An essential conclusion of the present study is the fact that the operational linear economy still does not offer the proper position and importance to the technical risks entailed within the functioning of the technological production ensemble. Moreover, the authors suggest a reconceptualization of the risk of technological functionalism, which should also be accompanied by a revival of "eco-technology"*

Keywords: *ultra-complex technologies, risk incubators, risk difussionism, technological warnings, the New Economy*

I. INTRODUCTION

Evaluating risks within those groups of individuals engaged in economic activities based on tangible assets imposes a parametric and factorial determination of errors and conventional deviations, which affect the trivial material evolution, decisionally programmed and assumed by the respective entities.

Risk becomes tangible as a result of the difference between "positive expectation" and "the negative event", due to its probability of occurring. (Bogdan-Tucicov A., Chelcea S., Golu M., Golu P., Mamali C., Pânzaru P., 1981) Moreover, on a global level, it is generally acknowledged that "Processes to develop and facilitate the availability of appropriate knowledge and technologies globally, as well as capacity-building, are also critical". (Declaration, al. 63, UN, 2016). Bostrom N., (2002) and Hanson R., (1995) highlight the fact that "for present purposes we can use three dimensions to describe the magnitude of a risk: scope, intensity, and probability".

Current literature in the field, as well as official state documents emphasize the need to increase attention and efforts in order to be able to better identify risks, be they of any nature; this is a primary step, essential in ensuring a framework of society sustainability.

Within such a context, it is a fact that "Identifying risks and emerging issues, and adapting to them, will be a critical part of achieving *The 2030 Agenda for Sustainable Development*." (2016) The above mentioned ascertainment, acquiesced on a global level, is complemented by the fact that «The World Economic Forum in its *Global Risk Report* has been "highlighting the most significant long-term risks worldwide, drawing on the perspectives of experts and global decision-makers" and in the context of economic, environmental, societal, geopolitical and technological issues.

The 2015 report warns that the world is "insufficiently prepared for an increasingly complex risk environment".» (*WEF Global Risk Report 2015, The 2030 Agenda for Sustainable Development,* 7 October 2015)

II. ULTRA-COMPLEX TECHNOLOGIES BETWEEN "RISK INCUBATORS" AND "DEVELOPMENT INCUBATORS"

The economic growth of any enterprise is confronted with certainty or uncertainty, which is often expressed through risks. The perception of risk and its size/measure in technology concerns management decisions/ operations. (Gâf-Deac I.I., 2007). Occasional risks formalize probability laws through the intended technological objectives.

However, risk and uncertainty are to be found also articulated and combined in technologies. In *micro-economics*, an enterprise would be usually confronted with several types of risks such as: 1) exploitation risks (an economic risk, expressing the volatility of an economic result); 2) financing risks (financial risk) and 3) bankruptcy risks (insolvency risk).

Preventing, limiting or counteracting the effects of risks, including technological ones, is achieved through monitoring. At present, it is a general idea that technologies tend to become ultra-complex and dominate/ can

dominate social life in general, all between knowledge, working with tangible assets and risks. The "*complex*" term associated with contemporary technologies shows that its traditional meaning has not been lost ("consisting of two or more related parts/ not simple; involved or complicated;/ consisting of interconnected or interwoven parts; composite;/ comparative more complex, superlative most complex.").

In fact, it is a constant idea that the origin of the term "complex" derives "from Classical Latin *complexus*, past participle of *complecti*, to encircle, embrace". (*The American Heritage Dictionary of the English Language*, 2013) The "*ultra*" particle confirms the composed form, with the sense of "very", "extremely", "overly", "beyond", serving thus in the formation of adjectives such as "*ultracomplex*". It is thus, a main element of a scholarly composition, meaning "very", "extremely", "beyond", "over". (DEX'09, 2009)

For instance, «"*Ultra-large-scale system* (ULSS) is a term used in fields including Computer Science, Software Engineering and Systems Engineering to refer to software intensive systems with unprecedented amounts of hardware, lines of source code, numbers of users, and volumes of data. (…) The term 'ultra-large-scale system' was introduced by Northrop and others to describe challenges facing the US Department of Defense.» (Northrop L et al, 2006)

The term has subsequently been used to discuss challenges in many areas, including the computerization of financial markets. (Cliff D., Northrop L.**,** 2011) Also, "the term 'ultra-large-scale system' (ULSS) is sometimes used interchangeably with the term 'large-scale complex IT system' (LSCITS). These two terms were introduced at similar times to describe similar problems, the former being coined in the USA and the latter in the UK". (wikipedia.org/wiki/Ultra-large-scale systems, 2016).

The analysis of economic risk is made reasonably through indicators of the profitability/ return threshold. Moreover, financial risk characterizes the variability of result indicators under the incidence of the company financial structure. Bankruptcy risk (the enterprise's capacity to regulate in time its commitments) is accompanied by contractual risk, as well as marketing risk. However, the authors believe that operational linear economy does not yet provide the attention and necessary consideration to *the technical risks entailed in the functioning of the technological production ensemble*.

It is a fact that for the past decades, reliability has been ensuring a qualitative increase in the number of production instruments used. However, the authors consider that the new global dimension of information has been intangibly/ non-tangibly affecting the conventional good operation of ultra-complex technological structures. Moreover, the "widening" of the multidimensional space occupied by technology within society is a good opportunity for these to be installed *positively* (for development) or *threateningly* (entailing risks of stagnation or society regression). Based on this, a multitude of ultra-complex technologies have been produced.

On the other hand, "risks to the macroeconomic and inflation outlook appear broadly balanced". (*European Economic Forecast,* 2015)

The authors believe that certain productive-economic behavioral deviations caused by contemporary society ultra-complex technologies as assimilated with "negative errors", which, by assembly, tend to become real "*risk incubators*", others are "positive errors", assimilated with "*development incubators*". (Gâf-Deac I.I, 2010) *(Figure 1.)*

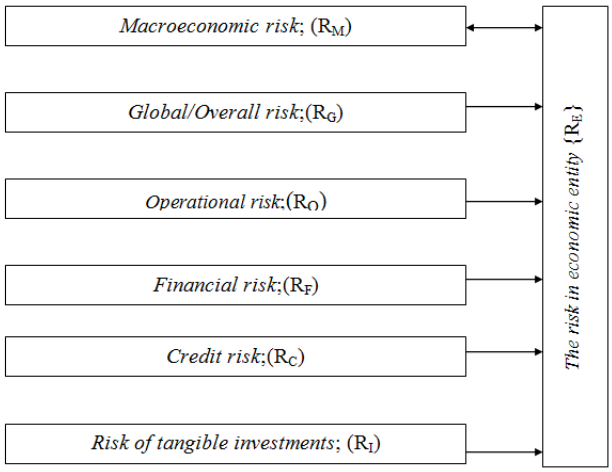

Figure 1: Risk assessment in the groups of people who engage in economic activities based on tangible assets

Within this framework, for an economic entity (company, enterprise, multinational company, etc.), where a group of individuals used tangible assets in production/reproduction, respectively ultra-complex technologies, the socio-managerial evaluation means *composing risks* (Gâf-Deac I.I., 2010) on lines of activity and on sub-levels:

$$\{(R_M) * (R_G) * (R_O) * (R_F) * (R_C) * (R_I)\} \longrightarrow \{R_E\} \quad min \qquad (1)$$

The process of risk quantitative transformation within linear economy is oriented towards minimizing "negative errors", and can take place in a situation in which their dimension/ amplitude is measured, resulting thus in indeterminations being set aside.

Additionally, the content of risk on lines of activities and sub-fields is subjected to rationalization, following a tendency to annihilate "risk incubators". Despite this, one has never encountered the ideal situation in practice:

$$\{R_E\}=0 \qquad (2)$$

However, $\{R_E\}$ can reach values close to zero, a case in which certainty regarding the appearance of "development incubators" increases. (Gâf-Deac I.I., 2007)

The authors consider that, in the above-mentioned case, within those groups of individuals performing economic activities based on tangible assets (company, enterprise, multinational company, etc.), one needs to prioritize the analysis of strategically endogenous and exogenous signals. Operational statistical realities have shown that mainly the external environment of the entity in which the respective groups of individuals performing economic activities based on tangible assets are to be found, is the keeper and generator of significant risks from the domination/ dominance of ultra-complex technologies specific to contemporary days. Based on this featuring, it is useful to *1)* identify the strategic exogenous signals concerning risks and *2)* to interpret the respective strategic signals from their evolutionary perspective, as risk keepers.

An *announcement* or a *statement* on the changes of the external environment of the enterprise is considered to be a strategic signal, as it leads to the manifestation of new, unmeasured fears, even if the new ultra- complex technologies could offer new opportunities of profitable evolution for the respective economic entity.

The direction in which change is to be performed within the company's endogenous environment, under the dominant influence of the new ultra-complex technologies, as well as the nature of the change, are to be found in *technological warnings*.

In the modern economic-productive practice, the seizing and receiving of technological warnings is to be followed by analyses, through which the warning signals are characterized or labeled as being conventionally *positive* or *negative*. In general, within those collectivities performing economic activities based on tangible assets, one needs to take into consideration gatherings of sub-fields for the study of strategic signals, intended to identify general risks as well as technological ones, in particular.

Such a case is the result of a decisional process, adjoining specifically to the new knowledge-based economy; however, the authors consider that linear economy remains the main keeper of negative errors. Indeed, measuring the entailed risk for the activities specific to the functioning of ultra-complex technologies, is often accompanied by action impressed upon them, with the aim of minimizing their negative practical and operational manifestation.

A reconceptualization of the risk of technological functionalism needs to be accompanied by a revival of "eco-technology". (*Figure 2.*)

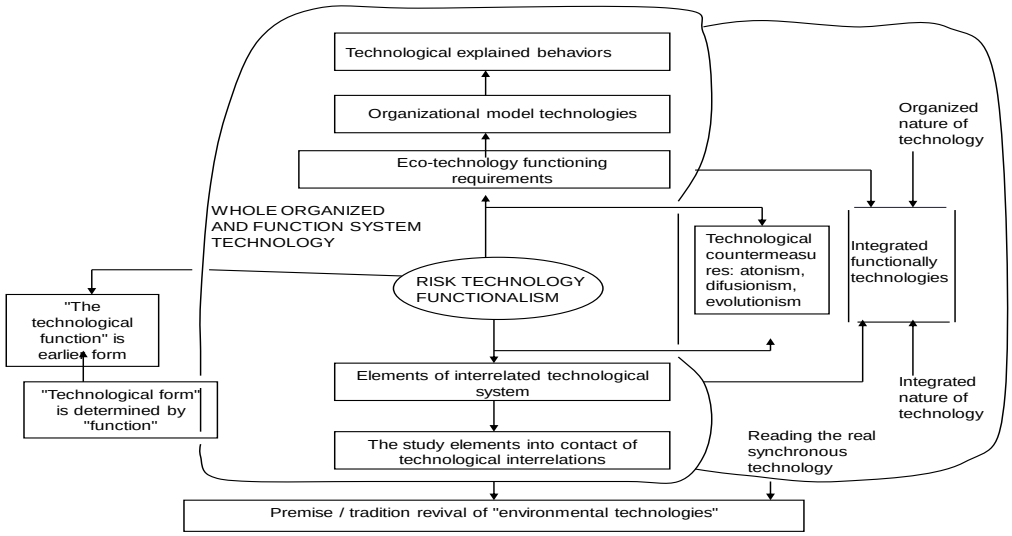

Figure 2: Conceptual basis of technological functionalism risk and Revival trend of "eco-technology"

In fact, the authors have noticed that eco-technologization plays an intrinsic role of moderating and flattening technological domination/dominance, which, even if the respective technologies are "ultra-complex" ones, they would get back to an ordinary, common level, becoming only "complex" ones. In fact, it all refers to the installing of the *circular economy*. Contemporary literature in the field highlights the fact that "the development of nuclear weapons was, at the time, an *unprecedented technological risk*. In the near future, dual-use technological development will give rise to new unprecedented risks. In particular, like nuclear technology, developments in synthetic biology, geoengineering, distributed manufacturing and artificial intelligence create risks of catastrophe on a global scale." (University of Oxford, 2013)

Of great importance is currently the category of risks resulting from the *technological diffusionism and various technological cultures*. At present, there are frequent references to the "domination/ dominance of *emerging technologies*". In context, it is of real interest and following the conceptual remark:

"Governance of emerging technologies: The pace of technological change is faster than ever. Disciplines such as synthetic biology and artificial intelligence are creating new fundamental capabilities, which offer tremendous potential for solving the world's most pressing problems. At the same time, they present hard-to-foresee risks. Oversight mechanisms need to more effectively balance likely benefits and commercial demands with a deeper consideration of ethical questions." (Marsh & McLennan Companies, 2016 p. 9)

The same Report shows that "Emerging technologies hold great and unprecedented opportunities. Synthetic biology could create bacteria that turn biomass into diesel. Gene drives could assist in the eradication of insect-borne diseases such as malaria. Artificial intelligence is behind advances from self-driving cars to personal care robots etc.

The establishment of new fundamental capabilities, as is happening for example with synthetic biology and artificial intelligence, is especially associated with risks that cannot be fully assessed in the laboratory.

Once the genie is out of the bottle, the possibility exists of undesirable applications or effects that could not be anticipated at the time of invention. Some of these risks could be existential – that is, endangering the future of human life." (Marsh & McLennan Companies, 2016 p. 36)

The diffusionism between technologies and different technological cultures needs to be mastered. Diffusionism organization and leadership presents itself as a new branch of management (*Figure 3*)

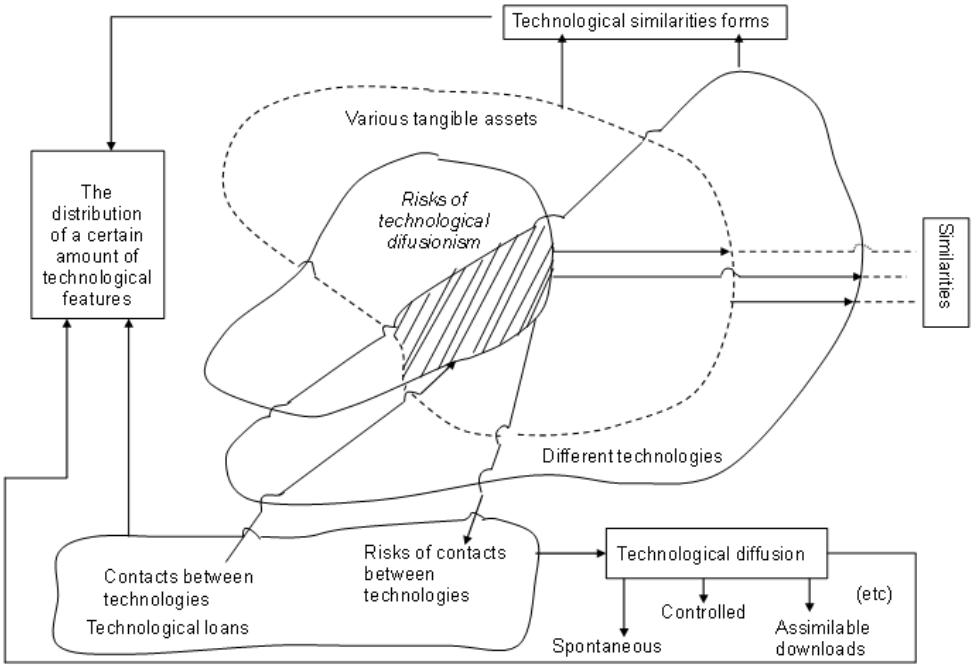

Figure 3: Risks of diffusionism between different technologies and technological culture

Although, in general, one tends to pay attention to individual risks, it is not always necessary to process all risks. However, diffusionism provides a clear road for the circulation of all risks. For instance, for 2019, global predictions point out towards more than 219 million unemployed, according to the report published by the International Labour Organization in Geneva. (AFP, 20 janvier 2015)

Naturally, those technologies which tend to occupy by replacement the labour market, contributed to the above-mentioned situation. The best recommendation in this case is to focus *a)* on major risks and *b)* on those factors which can alleviate or eliminate them in order to achieve a reduction/ eradication of unemployment.

III. CONCLUSIONS

Taking everything into consideration, the socio-managerial analysis of risk within human societies dominated by technology reflects the feasibility of micro- and macro-economics in the general framework of economic theory. Its aim can be explanatory, theoretical or applicative. When attempting to explain *why* technological actions and deeds occur under the incidence of a certain level of risk, this analysis has a positive character.

When the intended goal is an applicative one (*how*, in what manner should the technological reality be changed without risks), the analysis entails a normative character. The two aspects of the analysis are interdependent and reciprocally assumed, given the inter-relation between theory, reality and economic policy.

The discoveries achieved through the socio-managerial risk analysis within human societies dominated by technologies, serve towards a better understanding of the economic and productive reality, verifying in time the precision of previous conclusions and theories. They also allow for a better substantiation of decision-making in the act of leadership and in the elaboration of prognoses or alternatives to be taken into account, which are relevant to the economic and productive theory and practice.

The structural socio-managerial risk analysis within human societies dominated by technology consists of an ensemble of procedures focused on recognizing and comparing risk differences among the structural/structured technological networks. Thus, the authors behold the fact that there is no consolidated culture of indicators, as even when operating with ultra-complex technologies, one cannot articulate them with the complexity and dynamism of the external environment adjoining structures affected by uncertainty.

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