Disruptive Technologies - Technological Change Driven Conflicts

M. Molhova[1] and I. Ivanov[1]

Abstract

The article studies the conflicts that arise over the creation, adoption, and deployment of disruptive technologies against the backdrop of technological change. To study the nature of the problem, rooted in the contradictions and conflicts between disruptive technologies' creators and the environment, the following research questions are addressed:

1.   What are the specifics of technological change, which leads to the creation of disruptive technologies?

2.   How to define the concept of technological change through market disruptive technologies? The analysis here is focused on the types of technologies, according to their "disruptiveness", on the different interests of the stakeholders related to the creation, adoption, and deployment of disruptive technologies, on the features of the innovation process in this case and the accompanying problems.

3.   What are the conflicts arising from the creation and introduction of disruptive technologies in the market? Specific attention is paid to the causes of conflicts and the parties involved in them. The analysis here reveals the role of the causes and ways of creating new technologies in the emergence of different types of conflicts and defines the types of conflicts arising when new products, services, business models, technologies, etc. are introduced into the market.

The article analyses and proposes effective approaches and mechanisms (methodologies) for managing and resolving conflicts arising from the creation and introduction of disruptive technologies into the market. Algorithmic solutions are proposed to overcome conflicts arising from technological change and the continuous emergence of disruptive technologies.

---

[1] Industrial Business Department, Faculty of Business, University of National and World Economy-Sofia, Bulgaria.

1. Emergence of new technologies and development of corresponding economic and social patterns of behaviour

Societies' development (both growth and decline) has always been driven by change. Change always leads to a chain of results and many theorists and practitioners have studied how these processes can be managed. In this paper we argue that the change that triggers new economic and social patterns of behaviour is technological change and with the review of techno-economic paradigms we want to show that such change is also always accompanied by conflicts, which arise from intrinsic characteristic of radical technologies, namely their disruptiveness.

1.1   Nature of technology and technological change

Starting from its Greek origin - technology as a term (combination between techne (art, craft) and logos (knowledge)) - meant knowledge on how things are created/made. So, it does not only include the idea and concept about something to be developed, but also the process, which leads to a successful result. We know that historically humans developed tools based on trial and error and there are various definitions of technology that cover different aspects of human behaviour focused on processing raw materials and creating new, more advanced products, improving processes, etc. Definitions, and understanding of technology have varied tremendously. Carroll (2017) makes a thorough analysis of the different perspectives of defining the term through metaphysical, sociological, and scientific lenses to bring us a better understanding about the concept, its applications and typology. Skolnikoff (1993) defines it as the application of knowledge to reach practical goals in a specifiable and reproducible way. Some authors are very open in defining the term as Arthur (2007), who defines technology as "a means to fulfill a human purpose". According to Salomon (1984) Technology may also mean the product of an endeavour to apply knowledge for a practical goal.

Historically development of civilizations is regarded in terms of developed knowledge, skills, and tools as reaction to changes in the environment. As Berger, et al. (2016) discuss in terms of development of societies, the factor with the greatest importance to the creation and expansion of early civilizations was farming and Homo sapiens became more sophisticated foragers as they began to fish with hooks and, more recently, nets, and as they used stone grinding tools to produce flour. "As food gathering techniques evolved for these Palaeolithic foragers, so did their behaviour as organized groups. Modern humans became mobile to prevent resource depletion; they controlled population through dispersion or infanticide, and they began to "live and work cooperatively." As we can see even within primitive societies "hooks, nets, grinding tools" were what made these societies grow and evolve – even at this primitive level we can see that it is all about technology and knowledge. Yet as Mumford (1934) argues back in 1934 "the rise of civilization around 4000 B.C. is not the result of mechanical innovations, but of a radically new type of social organization:…Neither the wheeled wagon, the plow, the potter's wheel, nor the military chariot could of themselves have accomplished the

transformations that took place in the great valleys of Egypt, Mesopotamia, and India, and eventually passed, in ripples and waves, to other parts of the planet". Often the Middle Ages in Europe are described as the "Dark ages" compared to the classical antiquity, but that period was one of the longest of sustained growth of the continent. If we look for the reasons for that we will see that it is technological innovation – finding solutions to feed the constantly increasing population by increasing the cereal production using horsepower and all the technology that was linked to this change – iron, smithing, etc.

Technological change may have many triggers but at its very core it is about looking for a solution of a problem and finding that solution that leads to growth and prosperity – societal change that steps on that new technology. No matter how we define technology there is one thing that is in its roots – it is about problem solving and utilization of the solution for the benefits of specific societal groups. Technology development rarely occurs by chance and even if it does – the chance comes after hours of deliberate intellectual endeavour, trial and error, and background knowledge and experience that find their way in a successfully developed new product, process, method, after many failures. Technology cannot exist without the creative effort of intelligent beings given the inherent knowledge and requisite organization of technology as a system that allows it to produce objects and perform techniques to achieve goals. We can see from the theories regarding the development of civilizations to the theories discussing technological development that such changes and tools as reaction to the environment were made as human brain developed and knowledge-based on experience, built, in the process of problem solving. As a recent study of Adams, et al. shows (2021) it is human nature to solve problems and it is human nature to add complexity to the problems, considering solutions that add features than solutions that remove them, even when removing features is more efficient.

Considering the above said we would like to define technology for the purpose of this paper as technical solution of a problem, expressed in the form of a product or a process, which also includes the knowledge of its utilization. Thus, technology includes:
- the concept of fulfill a purpose,
- the means to fulfill that purpose,
- the knowledge how to utilize the means to fulfill that purpose.

1.2   Inventions and their importance in technological development

The modern theory of the process of technological change can be traced to the ideas of Josef Schumpeter, who sees invention as the first step in the process by which a new, superior technology pervades the market. Invention is the act of creating a new technology. It involves a new scientific or technical idea, and the means of its embodiment or accomplishment. Distinguishing invention and innovation as Schumpeter and numerous researchers have done after him, we need to differentiate between the purely scientific advantage and breakthrough characteristic of a

technology and its characteristics of being economically profitable and socially acceptable. This is important also for the analysis, which follows about the disruptive character of a technology, because such character cannot be studied from a purely scientific and technological perspective – we need the economic and social perspective to understand better the influence technologies have on development, growth, and changes in societies. Speaking of the realm of economic benefit, where innovation lie as a second stage in the process of how a technology permeates the market, this would not be possible without invention. The importance of invention in technological development is considered so significant that an entire legislative system of rules was developed to regulate the economic activities of society members with this regard – the intellectual property system. Four theories dominate the theoretical writing about intellectual property: Utilitarianism; Labor Theory; Personality Theory; and Social Planning Theory, but from an economic perspective, each of the theories addresses three main points regarding the creation and use of intellectual products in general and inventions in particular:

- issues related to the reward of inventors - once the creator has put in a lot of effort, money, time, property, talent, etc., he deserves the appropriate reward, namely protection of his invention. This point of view has been advocated in many court decisions commenting on the risk taken by the inventor and his inability to recoup the money and time invested by making his invention freely available for production on the market.

- optimizing productivity models - Harold Demsetz (1967) argued many years ago that copyright and patent systems have an important role to play in enabling potential producers of intellectual products to know what consumers want and thus to direct productive efforts in directions most likely to enhance consumer welfare. Sales and licenses will ensure that goods get into the hands of people who want them and are able to pay for them. Only in the rare situations where transaction costs would prevent such voluntary exchanges could intellectual property owners be denied absolute control over the uses of their works, either through direct privilege (such as the fair use doctrine) or through a system of compulsory licensing.

- competing invention - its purpose is to eliminate or reduce the tendency of intellectual property rights to encourage duplicative or uncoordinated inventive activity. The basis for this approach was laid by a group of economists, led by Yoram Barzel, who studied the ways in which competition among firms compounds the impact of the patent system on inventive activity. They examined three stages in the inventive process at which economic waste can arise. First, the "pot of gold" presented by a patent for an innovative, commercially valuable invention, which can inefficiently attract large numbers of people and organizations in the race to be the first to reach the invention in question. Second, the race to develop a lucrative improvement to an existing technology. Finally, firms may attempt to 'invent' technologies patented by their rivals - i.e. develop functionally equivalent but non-infringing products that,

while rational from the individual firm's perspective, represent a waste of social resources.

1.3   Techno-economic paradigms

Techno-economic paradigms are the concepts that explain the interaction between technological change and changes of economic and social activities of people and companies. Every techno-economic paradigm evolves from specific technologies, which are the core around which innovation and economic activities take place. The current paper does not aim at studying these in detail, but rather built on the work of researchers of that topic like Conceicao and Heitor (2004) and Perez (2009), since whenever a major technological change occurs it disrupts not only the technological landscape and technological state-of-the-art bringing novelty and inventiveness to the next level but also it disrupts the modes of economic operation, leading to the emergence of a new techno-economic paradigm. As Christensen, Raynor, and McDonald (2015) write "the theory of disruptive innovation, introduced in 1995 has proved to be a powerful way of thinking about innovation-driven growth. Unfortunately…the theory's core concepts have been widely misunderstood and its basic tenets frequently misapplied." We would like to further elaborate on that, adding the technological change driven conflicts by disruptive technologies.

2. Disruptive technologies

2.1   Disruptive character of technologies from an economic perspective

The conceptual and applied forms of technology are non-linear and complex. The creation and deployment of disruptive technologies undermines the position of some professional and social groups at the expense of others, which carries with it significant risks for the effective functioning and development of socio-economic systems. With the advent of the Fourth Industrial Revolution and on the threshold of Industry 5.0, technological change is taking place at a much greater speed, accelerating the creation of new markets and value chains, disrupting or changing previously leading firms, products, business models and consumption patterns. Two new characteristics are coming to the fore that determine the disruptive nature of technological innovation - the exponential nature of change and the convergence of technologies. Much of today's advanced technology is disruptive, leading to the following characteristics of the environment: processes of turbulence and chaos; strong dynamics; accelerated rates of change; escalating uncertainty; increasing unpredictability; increasing levels of complexity; shortening decision times; and entry into the risk society of mass-produced uncertainties. These changes and the very nature of contemporary societal challenges bring to the fore the notion that a more productive approach is to analyse them as risks. Considering that our lives are and will be lived in a globalising, postmodern, networked, and high-risk society, a systematic understanding of these four dimensions of transformation will be helpful in finding solutions to the problems resulting from the disruption of established market principles and practices. In the recent years an understanding has continued

to gain ground that the powerful technological development that has given rise to globalization and accelerated from it, has alongside its positive effects, become a major generator of the increasing vulnerability of contemporary societies, crises and conflicts. Any economic activity aimed at creating value and competitive advantage in the face of continuous technological change faces the need to assess the risks associated with the deployment of disruptive technologies, whether the organization is the creator of these technologies (disruptive innovator) or is potentially threatened by their market penetration (defending against a disruptive challenger). Models are needed to assess the impact of disruptive technologies and the risks, crises and conflicts associated with their market adoption. These models should consider the factors associated with 'creative disruption' and assist organizations in managing it - key to their survival and strategic development. Such studies are limited to particular aspects of the problem at hand, without considering the importance of the risk-crisis-conflict nexus and its costs.

2.2   Disruptive character of technologies from a technological perspective

It may seem like a reversed line of analysis starting from the economic perspective of disruptiveness of technology, but it follows the development of the corresponding Christensen's theory (1995). In more recent studies of disruptive technology, which regards the phenomenon from an economic perspective as well Satell (2017) in his innovation matrix claims that disruptive technology happens in the domain where we can define the skill domain(s) needed to solve a problem very well, but we cannot define the problem well. As we argued in p.1 above technology is about problem solving and we believe that before its disruptive character manifests in economic activity on the market it manifests as disruption of the existing state-of-the-art. We argue that disruptiveness not only comes as a process as Christensen argues in his theory, but it also comes in stages, the first one of which is the disruption of the current technological state-of-the-art. Various factors can be taken into account in assessing if the technology is a significant step in the technological development, such as the unexpected technical effect of a new combination of known elements, the choice of specific process parameters within a known range, the difficulty the skilled person has in combining known elements, secondary indicia such as the fact that the invention solves a long-standing technical problem which there have been many attempts to solve, or the overcoming of a technical prejudice. All these, according to us, have the potential to disrupt first the technological field and then (possibly) the market. Since not all technologies, which are a significant way forward in the technological development manage to reach the market at the first place and then be part of a successful business model of product development and commercialization. Disruption of the technological field may or may not be correlated with a disruption of the market and this hypothesis will additionally be studied by the authors in their next works, since the current paper focuses on the conflict potential of disruptive technologies only.

3. Conflicts generated from the creation and introduction of disruptive technologies in the market.

3.1   About the conflict and the organizational conflict

Conflicts are an integral part of the life cycle of people and socio-economic systems, which they create to achieve their goals. Throughout history, conflict, as a universal human phenomenon has constantly excited interest in scientists from all fields of science. With the development of management there is a growing practical interest in conflict management in organizations. The interest in that problematic area is aroused by the need to look for solutions of several questions related to increasing the effectiveness of management and the overall activity of the business.

The development of such an understanding of the nature of the processes under study is based on the achievement of many researchers with acknowledged contribution in the science and practice of conflictology such as Boulding (1962), Kriegsberg (1982), Burton (1986, 1990), Darendorf (1990), Boardman and Horowitz (1994), Deutsch (1998) and many others more recent scientist and practitioners. Modern studies and researchers Furlong (2005), Booher (2013), Hansen (2013), Mukherjee (2014) report the wide awareness and recognition of the growing significance of conflicts in all spheres of life on a regional, national and world scale.

As a result of their theoretical and practical work the thesis was adopted that conflict management is of heuristic importance for creating a technology for taking complex decisions about the management of a business. There is the assertion that the mechanisms of conflict resolution play a significant role in the technology of conflict management in a business organization.

The generic definition of conflict we have used has been formulated by the founder of modern science of social conflict in Bulgaria – Prof. DSc. Dimitar Y. Dimitrov (2004a, 2004b). It is generally accepted that Conflict is a form of manifestation of contradictions – a universal and eternal human and public phenomenon, based on the dynamic interaction between at least two conflicting parties, caused by different interests, needs, goals, values, opinions, and lack of resources where means of various nature are used to achieve the goals and satisfy the interests; it ends in victory, defeat, compromise, or a mutually acceptable solution. Many definitions of conflict can be given here by classical and modern Western authors, but the idea is also to highlight the contributions of the Eastern school in the field of conflict management.

One of the focuses of the present paper is on conflict as a phenomenon related to individuals and business organizations, which people establish or participate in. Conflict is of interest in terms of the objective laws for its occurrence (prerequisites for its occurrence, development, ending, effects, and situations after its end) in their entirety. The "conflictological" character of the relations between individuals and social groups - namely business organizations and their activities, must be studied. The aim is to get to know various means and ways of impacting (analysis, forecasting, prevention, practice) conflicting relations of the interacting parties. All

of that in the context of the emergence and implementation of disruptive technologies become extremely interesting. It is a step forward in technologizing the acquired knowledge in the field of conflict management in the new era of Industry 4.0. In the end this is one of the ways for solving practical problems related to conflicting interaction in business organizations. Similar interactions will become more and more frequent in the light of the many turbulences of various kinds - within organisations and in the surrounding environment.

For the reasons stated above, it is important to define what organizational conflict is. In that case, organizational conflict will be defined as: a dynamic process of open confrontation between two or more interdependent parties (individuals or groups) working within the same organization over perceived incompatible differences (in interests, needs, goals, values, opinions, or available resources, power, authority, etc.) that affect their ability to work together and/or impact the work environment. We use this definition given by the Bulgarian researcher Iv. Mihaylova (2018). We apply this definition because it seems to us that Technological Change Driven Conflicts are overwhelmingly organizational in nature. Let us see why.

3.2   Type of conflicts in the organization and beyond - a classical perspective

The assertion that each organization is characterized by its own internal and external environment has long been widely accepted. The internal environment of an organization is characterized by its functional structure, aims and tasks, resources, technologies, and communications. The external environment of an organization in turn is determined by different in nature factors and social conditions of the environment. It is their adequate diagnostics that is at the base of the strategic analysis and the successful implementation of the views on the strategy of the business organization. If we set the strategic aspect of management aside, then our attention turns to the tactical and operational level of management. And there are lurking conflicts in the organization.

To a great extent contradictions along the axes of "Individual – Group", Intragroup and Intergroup conflicts are at the basis of conflicts in the organization. These kinds of conflicts play a prominent role in the process of social interaction and realization of human activities. And it is not only within the framework of a particular organization but also in the interaction between different organizations. Inadequate interaction along these axes, in their formal and informal dimension, together with interpersonal relations is often a major factor causing conflicts in organizations.

Figure 1: Conflict levels in the organisation (Gordon, 1993, pp. 449)

Intraorganizational conflicts include all the levels of conflict discussed so far. As Gordon (1993) presented they are usually defined as conflicts that are related to the overall functioning of the organization. In general, they can be vertical (between the manager and the managed), horizontal (between collaborators of the same organizational structural level) and diagonal (arising in the allocation of resources between different units in the organization).

Interorganizational conflicts are even more significant. That type of conflicts arises when, in addition to intra-organizational conflicts, conflicts spill over between organisations. In the studies of Assael (1969) and Pfeiffer (1976) is postulated that the level of these conflicts depends on the extent to which organizations create uncertain conditions for competitors, suppliers, or customers; their desire for access to or control of the very same resources; the extent to which they encourage communication among themselves; their desire to balance their market power; and the existence of procedures developed to resolve conflicts. A hypothesis we will try to logically prove is that most conflicts caused by disruptive technologies are of this type. Another task, which will be discussed later, is to precisely suggest a procedure for resolving Technological Change Driven Conflicts.

Such a short overview of the types of conflicts in an organization, based on the participants in the conflict, is the minimum required, but insufficient basis for dealing with conflicts. We should not fail to mention the sources of conflicts in organizations, which can be summarized into four types – structural conflicts, innovation conflicts, position conflicts and resource conflicts. We could add yet another characteristic for classifying conflicts in organizations –the type of functional system of the organization. It determines them as organizational-technological conflicts, conflicts in the socio-economic system of the organization

and conflicts in the administrative-management system of the organization. That typology comes to aid the overall technologization of the management of conflicts. Their effective solution, as the main goal of the study, is only an element (and a final one) of the whole process of managing them. Now it is time to deal with Technological Change Driven Conflicts.

3.3   Technological Change Driven Conflicts – definition and main characteristics

There are technological innovations that will fundamentally alter the character of, and perhaps serve as the direct cause of, significant levels of conflict in the coming years.

Conflict can be a generator of innovation, stimulating change and development. We need to understand whether and in what cases Technological Change Driven Conflicts have precisely that kind of character.

Specific attention must be paid to the causes of conflicts and the parties involved in them. The analysis here is going to reveal the role of the causes and ways of creating new technologies in the emergence of different types of conflicts and defines the types of conflicts arising when new products, services, business models, technologies, etc. are introduced into the market.

It is without a doubt that the studied Technological Change Driven Conflicts are innovative in their basic nature. In terms of the internal environment of the organization, they cause changes to the organizational structure, lead to errors in the allocation of functions and the implementation of processes, violate the usual norms and rules of relationships, and bring a mismatch of employee qualifications and innovative changes. In general, they cause disruptions in the organization's activities, unbalance creativity, and disrupt decision-making mechanisms.

Robbins (1978, p. 70) states that in general "there are also conflicts that obstruct organizational performance; these are the dysfunctional or destructive forms of the conflict. They are undesirable and managers should seek to eliminate them". The point is that Technological Change Driven Conflicts are at their core destructive. The thesis is that they are predominantly disruptive and create risks for organizations that are not the generator of disruptive technologies. If there is a positive character for the company, either as a creator or follower of the technology, then we should not talk about conflicts, but rather about opportunities (chances).

Pondy (1967) emphasizes the fact that organizations are open systems and highlights the need to account for changes in the environment that can also cause organizational conflict. As this is undoubtedly the case nowadays, the development of any conflict is determined by the combination of the effects of past conflicts in the organisation and environmental factors.

As a result of the outlined generic characteristics, we propose the following definition of Technological Change Driven Conflicts. From the organisation's perspective, the Technological Change Driven Conflicts are external or internal to the organization's dysfunctional (disruptive) conflicts, generated by innovations

that create new products, services, business models, technologies, etc. that are introduced into the market. Technological Change Driven Conflicts, when they occur in the organization, lead to a decrease in the performance of the activity, deterioration of organizational performance and disruption of the system of communications and interrelationships between the main structural units. Once the conflict is over, it leads to disruption or complete breakdown of relationships, loss of markets and suppliers, and a possible final – liquidation of the business organization.

Based on the Bulgarian research of Prodanov (2021) an attempt is made for a general typology of Technological Change Driven Conflicts. This typology is an effort for a basic systematization of this type of conflict and a starting point for future scientific discussions. Schumpeter's concept of creative destruction as a catalyst of disruptiveness plays a major role in it. From this perspective, Technological Change Driven Conflicts can be classified in a variety of ways. For instance:

- Innovative Technological Change Driven Conflicts – generated by competition through new technologies, new products, and new organizational forms leading to creative disruption. Particular attention is to be paid here to conflicts resulting from disruptive or sustaining innovation.
- Systemic Technological Change Driven Conflicts of global and local leadership – resulting from the realignment of economic, political, military, and cultural power in the world.
- Labour Technological Change Driven Conflicts – driven by changes in labour markets, the employed and the unemployed.
- Entrepreneurial Technological Change Driven Conflicts - at their core is the activity of entrepreneurs as main actors in the process of modern economic change. They are associated with the transformation from a "managed economy" to an "entrepreneurial economy and society".
- Corporative Technological Change Driven Conflicts – a result of the reactions of established market players to disruptive innovation and technology.
- Start-up Technological Change Driven Conflicts – a result of the activities of start-up companies providing previously non-existent products, business models and technologies.
- Political Technological Change Driven Conflicts (at the state level) – a consequence of the need to turn innovativeness into the main competitive advantage of states, the disposal of obsolete industries and sectors and the need for a new type of social mechanisms to mitigate the contradictions, conflicts and disruptive processes caused by disruptive technologies.

The focus will again fall naturally on organizations, where Technological Change Driven Conflicts can be divided into internal and external. The key question is what approaches and mechanisms can help to deal with conflicts of this type in organisations. An attempt to answer will be presented in the following lines.

4. Approaches and mechanisms for resolving conflicts in the process of creation and market implementation of disruptive technologies.

According to Gronval (2008) "The overarching change in the economy in particular is also expressed by the fact that in recent years the understanding has continued to gain ground that the powerful technological development that gave rise to globalisation and is accelerating from it, along with its positive effects, has in fact become a major generator of the growing vulnerability of modern societies, turning them into an organism woven into and woven by networks, systems, infrastructures on which its very existence depends".

In these conditions, the organisation can only survive if it is flexible and adapts to the constant changes in the environment. An organisation completely free of conflict is static and apathetic and does not 'realise' the need for change. Adaptation is only possible through change, and it is functional conflicts that initiate the search for new and better ways of "doing" things and disrupt organizational complacency. According to Robbins (1978; 1990), it is the conflict that drives the organization to change (Figure 2).

| Conflict | Change | Adaptation | Survival |
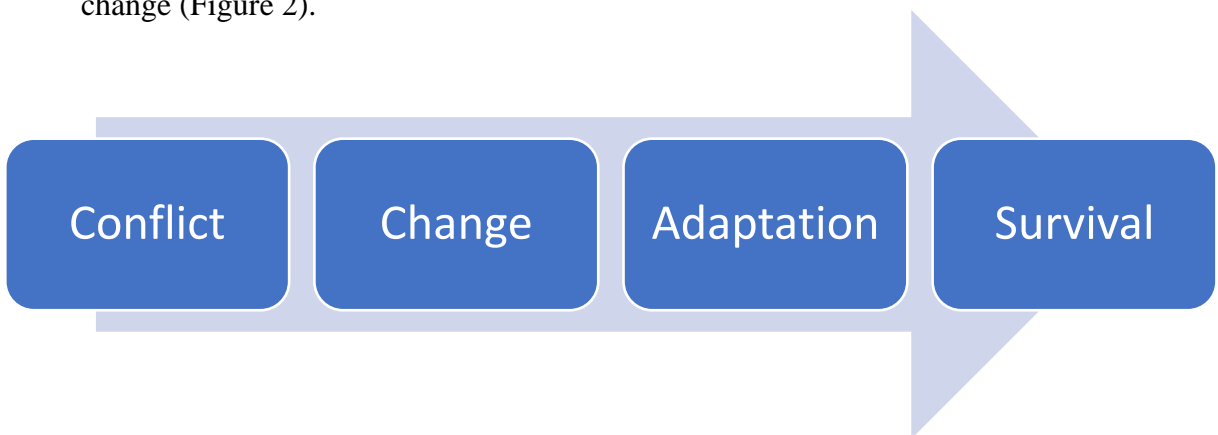
Figure 2: Conflict - Organizational Survival Model (Robbins, 1990, pp. 415)

The Robbins' (1974) view of organizational conflict is known as the modern (interactionist view) and is associated with:

- recognizing the need for functional conflict;
- deliberately encouraging functional opposition;
- conflict management, which, in addition to conflict resolution, also involves conflict stimulation;
- recognizing conflict management as the primary responsibility of all managers.

The issue in that part of the article is related to the development of an overall methodology for evaluation, analysis, and solution of conflicts, a result of the implementation of disruptive technologies. It is not about a methodology claiming to be universal, but rather one that to a great extent will take into consideration the specificity of the processes analysed and offer appropriate solutions. As a step in that direction, the task we have set ourselves is to seek the opinion of the representatives of science and of the practitioners on an existing, present in theory adopted verbal model of conflict resolution in business organizations. This model is specifically designed for conflicts caused by disruptive technologies implementation.

As Prodanov (2021, p. 219) analysed Disruptive technologies are destroying certain parts of existing systems, forms of employment, skills, consumption, social groups, and structures at an unknown speed, which with the acceleration of all processes can have highly destabilizing consequences. Risks and conflicts become inseparable and frequent companions in the life of organizations.

Managing conflict is a purposeful management impact. That impact is exerted on the behaviour and the actions of individuals and groups in their conflict and regarding their conflict interaction. The final aim is solving the conflict as a whole or at different stages of its dynamics unfolding.

In principle, the conflict management process is supposed to be considered in a broad sense, i.e., in all its stages and not only in its final stage. The management process is summarized in the application of social technologies to conflict management. It is related to the specific measures and steps to anticipate and prevent potential conflicts, and in case of failure or when necessary, it can be resorted to stimulate, regulate, and ultimately resolve the manifested open conflicts in the organization. According to Emelyanov (2017, pp. 149-181) a special place in the management of conflicts in the organization is occupied by communicative technologies. They are understood as a variety of means of effective communication interaction of subjects relevant to actual or potential conflicts. This includes the technologies of effective communication and rational behaviour in conflict, the technology of criticism in conflict, mediation as a communicative process, as well as the technology of the negotiation process (as an independent method or as a component of the mediation process).

The very process of managing the conflict is quite complicated but for the purpose of the goals set herein, it can be brought down to three main stages. They are: "Appeasing the conflict", "Resolving the conflict" and "Reaching a mutually beneficial compromise solution among the parties".

It is the area of Resolution of conflicts that is the focus of our scientific and practical work.

It is the area of Resolution of conflicts that is the focus of our scientific and practical work. The main aim is the following: – by means of the already acquired conflict logical knowledge to technologize the process of resolving the conflict, as the final stage in managing it. At the same time opportunities will be sought to mitigate the causes of conflicts and to overcome or minimize the consequences of the so-called

destructive and dysfunctional conflicts.

Which are, however, the other steps that are part of the process of managing conflicts and precede their final resolution. All steps presented below are taken by those making managerial decisions at different levels of the organizations.

First comes the forecasting of conflicts. That is the activity of the one who makes managerial decisions, and it is directed at clarifying the reasons for the potential development of a certain conflict or conflicts. What comes next is prevention of conflicts - an activity directly targeted at averting a conflict. Sometimes there is the need for stimulating a conflict - an activity targeted at provoking (causing) a conflict. Quite often it is necessary to regulate a conflict - an activity targeted at abating and limiting conflicts. In the end comes the resolution of conflicts, which includes all the activities of the manager related to ending the conflict. The maximum to be achieved is a complete resolution of the conflict through the elimination of its causes and the conflict situation. The result aimed at reaching a mutually beneficial, lasting, and final agreement regarding the real subject of the disagreement between the parties in the conflict. Robinson in 1978 explained the difference between the terms "Conflict Management" and "Conflict Resolution". And it is evident from the statement above. In general, the forms of conflict resolution will depend on the chosen strategies of behaviour in these situations. According to research carried out by Kilmann and Thomas (1977), and Rahim and Bonoma (1979) there are two classical instruments for identification of conflict behaviour strategies. It is important to mention them because often the adequate or inadequate adoption of any of these strategies determines the result of a conflict.

Here follows a short description of the proposed Descriptive Model of Technological Change Driven Conflicts Resolution. In essence, it is a staged, descriptive model of conflict resolution in general. The use of the word adapted in its description is due to the fact that it, when applied, takes into consideration the specificity of the business organization, for example, in organizing and conducting business negotiations, the specific actions for resolving the conflict, cultural characteristics, the limitations of the industry characteristics, the sphere of activity, the application of the situational approach and many other.

In essence that model for conflict resolution is based on the execution of the following five stages with their aims (see Figure3).
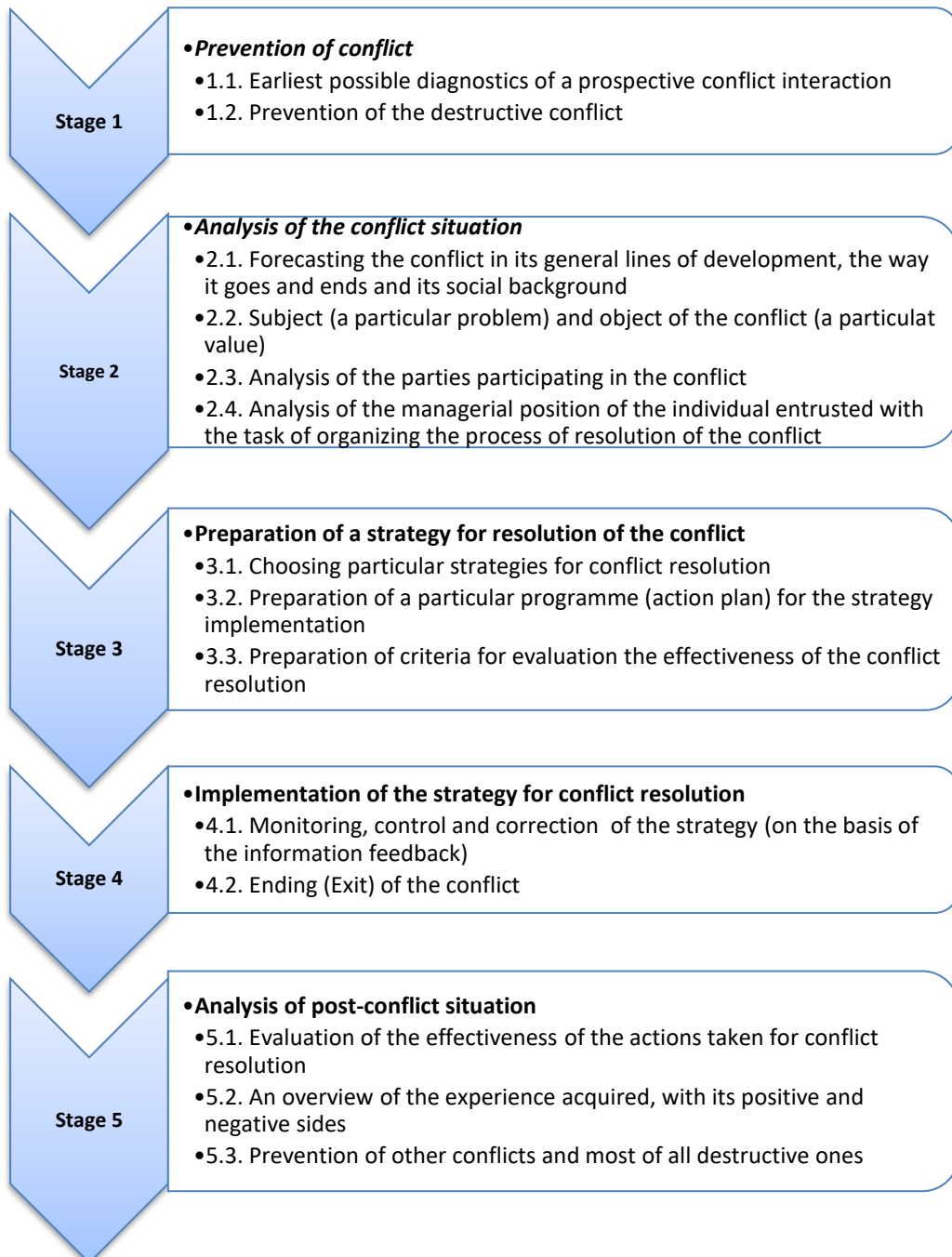
Stage 1
- *Prevention of conflict*
  - 1.1. Earliest possible diagnostics of a prospective conflict interaction
  - 1.2. Prevention of the destructive conflict

Stage 2
- *Analysis of the conflict situation*
  - 2.1. Forecasting the conflict in its general lines of development, the way it goes and ends and its social background
  - 2.2. Subject (a particular problem) and object of the conflict (a particulat value)
  - 2.3. Analysis of the parties participating in the conflict
  - 2.4. Analysis of the managerial position of the individual entrusted with the task of organizing the process of resolution of the conflict

Stage 3
- **Preparation of a strategy for resolution of the conflict**
  - 3.1. Choosing particular strategies for conflict resolution
  - 3.2. Preparation of a particular programme (action plan) for the strategy implementation
  - 3.3. Preparation of criteria for evaluation the effectiveness of the conflict resolution

Stage 4
- **Implementation of the strategy for conflict resolution**
  - 4.1. Monitoring, control and correction of the strategy (on the basis of the information feedback)
  - 4.2. Ending (Exit) of the conflict

Stage 5
- **Analysis of post-conflict situation**
  - 5.1. Evaluation of the effectiveness of the actions taken for conflict resolution
  - 5.2. An overview of the experience acquired, with its positive and negative sides
  - 5.3. Prevention of other conflicts and most of all destructive ones

Figure 3: Descriptive Model of Technological Change Driven Conflicts Resolution. Adopted from Ivanov (2021, pp. 101)

In general, this is what the Descriptive Model of Technological Change Driven Conflicts Resolution, proposed here for discussion, is about.

Looking back at the correlation "conflict management– conflict resolution "other applied tool can be added to the here presented model. They enrich the possibilities of analysing and managing conflicts in a business organization. These are the Methodology for anti-conflict behaviour, which is an algorithm of managing conflict by leaders, and the Methodology for anti-crisis behaviour based on risk management in the organisation. Both are developed by Ivanov (2021). They are based on a strict sequence of steps, whose execution leads to a potentially successful management of the conflict. Its logic does not contradict but rather appears as a first step and anticipates here presented practical tools for handling conflicts. The first methodology (for anti-conflict behaviour) is based on three scientifically applied models. The first is based on the model developed by T. Kalistratova (2019) - a methodology for preventing dysfunctional conflicts in the Bulgarian state administration. The second one is based on Douglas and Wildavsky's Grid/Group Typology. The second proposed methodology (for anti-crisis behaviour - crisis risk management) is based on one of the methods of N. Slatinski. The basis of the method is the 8-step model of risk-minimizing behaviour "METAPHOR" (METAPHORA). The model of Slatinski (2010) itself is presented on the author's research blog in Lecture 4 of the Four Lectures series in risk management (to help the beginning risk manager)".

The presented methodologies have the pretensions and the potential to become the basis of an integrated conflict management system in business organizations after appropriate testing. A set of empirical studies is foreseen for its validation. You will learn more about them and the results of our research on them in future publications. Conflict management is a part of risk management in the organization. Especially those related to disruptive technologies.

5. Conclusions

Interaction between technological change and changes of economic and social activities of people has long been studied from different perspectives. Much of today's advanced technology is disruptive and the analysis of its effects needs to consider not existing theories, methodological formulations, methodologies on the nature of technological change, but also "creative disruption" as result of deliberate intellectual endeavour, disruptiveness as a process starting from technological disruption toward economic disruption, risks, crises and conflicts. Studying the disruptive character of technologies from a technological perspective and from an economic perspective requires applying a holistic approach in uncovering the relations between technological change, problem-solving, 'creative disruption', risks, crises, and conflicts.

Conflicts generated from the creation and introduction of disruptive technologies in the market require new and different study approaches and models for their management and resolution. Technological change driven conflicts are defined, and

their main characteristics studied for the proposal of a descriptive model of technological change driven conflicts resolution. Study of the conflicts driven by the disruption of the technological field and the consecutive disruption in the economic activities of market players is the first step in studying the correlation between the two fields of disruption.

ACKNOWLEDGMENTS

References

[1] Adams, G. S., Converse, B. A., Hales, A. H., & Klotz, L. E. (2021). People systematically overlook subtractive changes. Nature, 592(7853), 258-261.
[2] Arthur, W. Brian. (2007). The structure of invention. Research Policy. Volume 36. Issue 2. March 2007. Pages 274-287.
[3] Assael, H. (1969). Constructive Role of Interorganizational Conflict. Administrative Science Quarterly, Vol. 14 (4), pp. 573-582.
[4] Berger, Eugene; Israel, George; Miller, Charlotte; Parkinson, Brian; Reeves, Andrew; and Williams, Nadejda, "World History: Cultures, States, and Societies to 1500" (2016). History Open Textbooks. 2. https://oer.galileo.usg.edu/history-textbooks/2
[5] Boardman S., Horowitz S. (1994). Constructive Conflict Management and Social Problems: An Introduction // Journal of Social Issues. Vol. 50. – No. 1 – pp. 1 – 12.
[6] Booher DD. (2013). The Conflict Resolution Bible : A Quick Reference Guide for Resolving Conflict in the WorkplaceColleyville, Tex: Booher Research Institute.
[7] Boulding, K. E. (1962). Conflict and Defense: A General Theory, New York, Harper.
[8] Burton, J. W. (1990). Conflict: resolution and prevention, N.Y.: St. Martin's Press.
[9] Burton (1986). The Theory of Conflict Resolution // Current Research on Peace and Violence. Vol. 9. – No. 3. – pp. 125 – 130.
[10] Carroll, La Shun. (2017). A Comprehensive Definition of Technology from an Ethological Perspective. Social Sciences. 6. 126. 10.3390/socsci6040126.
[11] Christensen, C. M., Raynor,M. E., McDonald, R. (2015). What is disruptive innovation? Harvard Business Review.
[12] Conceiçao, P., Heitor, M. (2004). GLOBALIZATION OF TECHNOLOGY – Techno-Economic Paradigms and Latecomer Industrialization Encyclopedia of Life Support Systems (EOLSS).
[13] Darendorf, R. (1990). The modern social conflict. An essay on the politics of liberty, Berkeley: University of California Press.

[14] Demsetz,H. (1967). Toward a Theory of Property Rights. American Economic Review.

[15] Deutsch, M. (1988). Constructive Conflict Resolution: Principles, Training and Research // Journal of Social Issues. Vol. 50. – No. 1. – pp. 13-32.

[16] Dimitrov, D. Y. (2004a). Conflictology and conflictological culture, Economic Alternatives (In Bulgarian), 4.

[17] Dimitrov, D. Y. (2004b). Conflictology Publishing complex "Stopanstvo". (In Bulgarian). Sofia, Bulgaria.

[18] Emelyanov, S. M. (2017). Practicum on Conflictology, St. Petersburg: Peter Publishers

[19] Furlong GT. (2005). The Conflict Resolution Toolbox : Models and Maps for Analyzing, Diagnosing, and Resolving Conflict. Mississauga, Ont: Wiley.

[20] Gordon, J. R. (1993). A Diagnostic Approach to Organizational Behavior, (4th ed.), Boston: Allyn and Bacon.

[21] Gronval, G. A. (2008). New leader In Societal Security Efforts in Sweden, The CIP Report, CIP Program, June 2008, Publ. by Zeichner Risk Analytics.

[22] Hansen, T. (2013). The Generalist Approach to Conflict Resolution : A Guidebook. Lanham: Lexington Books.

[23] Ivanov, I. (2021). Conflict management in organizations. Publishing Complex – UNWE (In Bulgarian). Sofia, Bulgaria.

[24] Kalistratova, T. (2019). Methodology for prevention of dysfunctional organizational conflicts, (In Bulgarian). Sofia, Bulgaria.

[25] Kilmann, R. H., and Thomas, K. W. (1977). Developing a Forced-Choice Measure of Conflict-Handling Behavior: The MODE Instrument. Educational and Psychological Measurement, 37(2), pp. 309-325.

[26] Kriegsberg, L. (1982). Social Conflicts. Englewood-Clifts, N.J.: Prentice-Hall,13, 394 p.

[27] Mihailova, I. (2018). Management strategies for dealing with organizational conflicts. St "Kliment Ohridski" University. (In Bulgarian). Sofia.

[28] Mukherjee J. (2014). Conflict Resolution in Multicultural Societies: The Indian Experience. New Delhi, India: Sage Publications Pvt. Ltd.

[29] Mumford, L. (1934). Technics and Civilizations.Harcourt, Brace & Company, Inc. New York.

[30] Perez, C. (2009). Technological revolutions and techno-economic paradigms. Working Papers in Technology Governance and Economic Dynamics no. 20. Technology Governance.

[31] Pfeiffer, J. (1976) Beyond Management and the Worker: The Institutional Function of Management. The Academy of Management Review, Vol. 1 (2), pp. 36-46.

[32] Pondy, L. R. (1967) Organizational Conflict: Concepts and Models. Administrative Science Quarterly, Vol. 12 (2), pp. 296-320.

[33] Prodanov, H. Exponentiality, Convergence, Disruption of the Digital Technologies, Economics and Societies. (2021). Publishing Complex – UNWE (In Bulgarian). Sofia, Bulgaria.

[34] Rahim, M.A. and Bonoma, T. V. (1979) Managing organizational conflict: A model for diagnosis and intervention. Psychological Reports, Vol. 44, pp. 1323-1344.

[35] Robbins, S. P. (1974) Managing organizational conflict: A non-traditional approach. Englewood Cliffs, NJ: Prentice Hall.

[36] Robbins, S. P. (1978) Conflict Management and Conflict Resolution are not Synonymous Terms. California Management Review, Vol. 21 (2), pp. 67-75.

[37] Robbins, S. P. (1990) Organizational Theory: Structure, Design and Application. London: Prentice-Hall International, Inc.

[38] Salomon, Jean-Jacques. (1984). What is technology? The issue of its origins and definitions. History and Technology. 1 (2): 113–156. doi:10.1080/07341518408581618. ISSN 0734-1512.

[39] Satell, G. (2017). The 4 Types of Innovation and the Problems They Solve. Harvard Business Review.

[40] Skolnikoff, Eugene B. (1993). The Elusive Transformation: Science, Technology, and the Evolution of International Politics. Princeton University Press. p. 13. ISBN 978-0-691-03770-7.

[41] Slatinski, N. (2010). Introduction to Risk Management (To help the risk manager starting out). Lecture 4. (In Bulgarian) [Online] Available at: http://nslatinski.org/?q=bg/node/301 [Accessed 10 January 2022]

[42] Stephen P. Robbins. (1978). "Conflict Management" and "Conflict Resolution" are Not Synonymous Terms. California Management Review, Volume 21 Issue 2, December 1978, https://doi.org/10.2307/4116480.