Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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A business retrieval model using scenario planning and analytics for life during and after the pandemic crisis

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ABSTRACT

The COVID-19 pandemic crisis has fundamentally changed the way we live and work forever. The business sector is forecasting and formulating different scenarios associated with the impact of the pandemic on its employees, customers, and suppliers. Various business retrieval models are under construction to cope with life after the COVID-19 Pandemic Crisis. However, the proposed plans and scenarios are static and cannot address the dynamic pandemic changes worldwide. They also have not considered the peripheral in-between scenarios to propel the shifting paradigm of businesses from the existing condition to the new one. Furthermore, the scenario drivers in the current studies are generally centered on the economic aspects of the pandemic with little attention to the social facets. This study aims to fill this gap by proposing scenario planning and analytics to study the impact of the Coronavirus pandemic on large-scale information technology-led Companies. The primary and peripheral scenarios are constructed based on a balanced set of business continuity and employee health drivers. Practical action plans are formulated for each scenario to devise plausible responses. Finally, a damage management framework is developed to cope with the mental disorders of the employees amid the disease.

1. Introduction

Human life and business have always been affected by the risk of external events. Major historical events such as war, famine, epidemics, and natural disasters can change many of the strategic plans of organizations and businesses. Many jobs have been lost in these events and manpower has become unemployed. Unforeseen events must be an integral part of an organization's strategic decisions to enhance resiliency. Consider a factory where, due to the negligence of a worker, a fire broke out and the warehouse was destroyed. If the factory's managers have not taken the necessary precautions, such as installing safety equipment or taking out insurance, they will face far-reaching consequences. Therefore, it is better to get acquainted with the two concepts of crisis and resilience.

Generally, a sudden and unexpected event that leads to major unrest/panic among people at work is known as the organizational crisis. In other words, crisis is defined as an emergency situation that disrupts employees and leads to instability in the organization. A crisis such as an epidemic could simply overwhelm all functional parts of the societies [1]. Millar and Smith [2] define the term crisis as "a major disorder in the organization that has been widely reported and people's curiosity about it affects the organization's normal activities and can have a political, legal, financial, and governmental impact on the organization".

An organizational crisis is a phenomenon with a low probability of occurrence and high impact that threatens the viability of the organization. It is characterized by ambiguity, and its decisions must be made quickly. According to Pearson and Clair [3], crisis management is a systematic effort by members of the organization to work with employers outside of the organization to prevent or effectively manage crises. Crisis characteristics are as follows:

- The crisis is a sequel to sudden events that hurt the organization.
- Crisis generally occurs in a short warning.
- Crisis is a life-threatening phenomenon which makes people feel scared.

According to Duchek [4], organizational resilience is defined as "an organization's ability to anticipate potential threats, to cope effectively with adverse events, and to adapt to changing conditions". Since global events are unpredictable, organizations need to be able to deal with drastic changes in their businesses. Crisis management often needs to be decided in a short period of time, often after an event. Organizations often create crisis management plans.

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COVID-19 or Coronavirus is one of the most terrifying crises of our world today. All of us these days have experienced a strange phenomenon that happens maybe once every hundred years. Travel restrictions, sharp drop in stock prices, lack of goods supply, considerable rate of infected cases, etc. are the first consequences of this event. Other concerns are the fear of getting infected by the virus for ourselves or our families, or the financial consequences for our business. One of the ambiguities that organizations face is how long this crisis will last? The uncertain future is the biggest challenge for organizations, and there is still no definitive answer to this question. So, organizations need to be able to have a variety of strategies for different scenarios of this crisis.

Currently, the widespread effects of Covid-19 are prevalent around the world, and we are witnessing the daily news of anxiety and instability in countries and businesses. In fact, in times of crisis, the mental state of the organization's employees, who in turn are members of society, has become very challenging and can affect everything they do. Now the question is, how do you get along with these people and safely survive this great challenge?

Today, the spread of the virus has forced organizations to redefine how they do their daily activities. For example, some businesses are temporarily closed or forced to close by the country's laws. Other organizations these days have opted remote wok for their employees. On the one hand, this helps the organization to preserve business continuity, and on the other hand, it keeps the employee's sense of dynamism, and ultimately prevents the spread of the virus in society. To do this, it is necessary to create and provide infrastructure such as VPN, communication and video conferencing and task management tools.

Coronavirus has become one of the biggest human challenges facing all countries in the world. Doctors, nurses and medical staff around the world have sacrificed their lives to fight it. Scientists and researchers are trying to find a miracle cure or vaccine for the disease. The government seeks to enact laws and regulations to protect the health of individuals and to support those affected in various ways. Different industries also try to perform their social responsibility according to the type of their function. Under these circumstances, various harms have befallen to the businesses. Perhaps the first task of the leaders of the organization in this situation is to understand the current situation. After understanding the situation correctly, they should be able to take the right steps to protect the health of their employees and advance their organizational affairs with proper forecasting.

At the time of writing this article (August.2021), more than 217 million people have been infected with the virus and more than 4 million have died. More than 200 countries around the world are affected by the disease [5]. Some governments have implemented a social distance plan and advised people to use masks, gloves and sanitizers. Several countries have announced lockdown in the entire country. According to many experts, the disease may lead to dramatic changes even in human interactions. Some say that the growth of digital businesses will be one of the important results of this event.

Due to the ambiguities that exist in the current situation, organizations face deep challenges in their decisions. Some organizations have had ambitious plans that are being implemented, and time is an important factor for them. Perhaps the biggest challenge for many organizations is the business continuity. They need to answer the question of what solutions to choose that will both protect the health of their employees and prevent disruptions in the organization. Imagine a employer handing over a project to your organization that needs to be delivered on time because delays cause economic losses to the employer. Also, imagine that your organization has the task of supporting important communication infrastructure in an area that cannot be closed for even a few minutes. All of these show the complexity of decision making for managers.

One of the most common options is to choose remote work and flexible working hours. This can help keep the work going, but only if the necessary infrastructure is in place. At the same time, this may put a lot of pressure on your infrastructure, and the risk of security issues increases. But long-term remote work can also hurt employees' work style, as well as quarantine conditions and the family environment. Employee health monitoring should also be considered by the organization's managers. In case of illness of any of the employees of the organization, his/her care protocols should be performed and the loyalty of the organization to the sick person should be proved. Maintaining employee spirit can also have a positive effect on remote work.

Another major challenge for organizations in crisis is making decisions in uncertain circumstances. Labor productivity has fallen and the company's revenue has naturally declined. Managers must now decide to continue the organization's path by gathering and analyzing the right information. Changing the scope of the organization's activities, prioritizing projects, changing or canceling contracts, or even dismissing manpower can be some of these decisions. Providing appropriate data and collaborating with all employers is also one of the most important things to do.

There is no doubt that Coronavirus is one of the deepest human crises at least in the last hundred years. But there are many cases of global crises in history, which show us important points for making the right decisions at this time. In fact, previous events such as pandemics, natural disasters, and crises can provide a good guide to answering ambiguities and how to determine appropriate policies and their possible long-term consequences.

In Spanish flu, which struck in 1918 and killed 50 million people, reduced production index by up to 20 percent, and a sharp drop in unemployment were some of the consequences [6]. In 11 September 2001, after the attacks on the World Trade Center, many flights were canceled and it led to an attack on Afghanistan. The 2008–2009 financial crisis caused a deep recession and was finished with extensive bailouts [7]. Valuable lessons can be learned from these crises.

In the lessons of the pandemic situation, it would be prudent to learn whether to protect the lives of employees or to keep the business going in any possible way. The answer is definitely clear that the more attention is paid to the health of employees and when they feel that the organization values their health, their dependence and commitment will definitely increase and they will enhance their efforts. Another lesson is not to rush to make decisions. Some events become more important over time, and other events will ensue. Managers must make the best decisions at the right time by carefully monitoring the situation. The best way to do this is to look at all the possible scenarios and make a comprehensive action plan for each of them. These plans must be compatible with data that is constantly being updated.

This article tries to explain how a large-scale information technology (IT)-led Company deals with the crisis of the Coronavirus. FANAP Co. is a huge IT holding that has been providing infrastructure, software products and total industrial solutions for more than a decade. The company, with more than 14 subsidiaries operating in various fields, has adopted integrated policies to deal with the COVID-19 crisis. In this article, several scenarios are presented and some action plans are described according to the proposed scenarios. Also, a model for managing damages of employees in the crisis situation is presented.

The remainder of this article is as follows: In the next section, we will review the literature of crisis management and resilience of organizations and highlight the main contributions of the current study. In the third section, possible scenarios for different parts of the organization are expressed. Also, in Section 4, action plans for each of these scenarios will be described. Finally, in the last section, we will discuss and conclude how organizations deal appropriately in these critical situations.

2. Related works

To review the related works in a classified manner and truly convey the new aspects of the current study, the application of business analytical modeling under pandemic is discussed by Section 2.1. Section 2.2 enumerates the crisis management of business-incentive works whereas Section 2.3 highlights the contributive position of the paper in comparison with the previous studies.

2.1. Business analytical modeling under pandemic

Enhancing the preparedness over the consequences of an catastrophic event such as a devastating pandemic entails using an analytical modeling. The application of analytical modeling can be grouped into four categories including, descriptive, diagnostic, predictive, and prescriptive analytics [8]. Concerning business management under the outbreak of Coronavirus, descriptive statistics (e.g. infectious and fertility rates, and so on) is a basis for either adopting a new plan or following the previous one. The diagnostic approaches specify the reasoning behind the current situation that is extracted by the descriptive data while the predictive analytics is to shed light on prospective scenarios of the business environment in the future. Lastly, prescriptive analytics suggest the best maneuvers for creating and preserving the necessary actions for business' resiliency. According to Lepenioti et al. [9] previous studies have majorly focused on the descriptive and predictive analytics for businesses. In the context of COVID-19 ramifications, the majority of papers have analyzed the behavior of the virus and prescribed mitigating decisions to overcome the challenges over the humanitarian health aspects [10,11]. Such studies could be also put into the practice to bring about the businesses' continuity while expressing a pandemic.

Among the others, Bertsimas et al. [12] concentrated on both prediction and prescriptions analytical modeling for different scopes. Considering descriptive analytics on the demographic spreading characteristics of Coronavirus and via epidemiological modeling, the underlying risks were predicted and prescriptive analytics to support efficient decision making were provided. In this way, the industrial participants could utilize the result of their analytics to inject optimal strategy into their day-to-day resiliency planning. Choi [13] examined risk analysis in logistics systems in-between and after pandemics. The author addressed risk hedging and risk pooling policies to capture business operations when there was uncertainty in dispatching commodities of a supply chain network due to the lockdown of cities. Conditional value-at-risk was one of the suggested analytical sorts of modeling for risk-averse decision-makers in a business. In our study, descriptive analytics are used to derive the scenarios' drivers whereas the action plans are prescribed by taking the practical business implications into account.

2.2. Crisis management of business-incentive aspects

To some extent, the concern of our paper is inherently linked to the associated theories such as business continuity, business resiliency, disaster response and recovery, and risk management. Despite differences, all these concepts imply consideration of unprecedented and disrupting phenomena and events and mitigative actions into account to bounce back businesses from catastrophic situations.

Ramsay [14] provided a broad spectrum of requirements to protect the degradability of businesses from the emergency condition into a crisis and a crisis to a disaster. To take adequate steps for increasing the readiness of businesses in practice, the study focused on capturing the lessons-learned from previous incidents as well as testing emergency plans prior to occurring a catastrophe. Page et al. [15] considered the case of spreading Avian Flu in 2005 and illustrated the performance of businesses associated with the tourist sector by scenario planning exercise. The scenarios were categorized into two phases based on whether the flu has been entered the targeted region or not. In the former scenario, one of the typical required actions was to monitor tourist trends while in the latter scenario the tourism sector looked for curtaining the expenditures.

Smith et al. [16] examined the preparedness of the businesses located at Omaha over possible pandemic outbreaks. Using a questionnaire-based survey, the businesses were supposed to respond to a number of questions to highlight their level of sensitivity and consideration over prevailing maneuvers in times of a pandemic situation. The questionnaire aimed at exploring some facts such as the pre-defined rest period of sick employees, quarantine plan for sick employees, procuring masks and gloves in the workplace, monitoring employee's business trips during a pandemic, the availability of the respiratory devices, immunization of employees and handwashing agents. Since only 73 out of 1000 available businesses completed the survey, the authors concluded the minimal concern of the corresponding managers about such low frequent but prohibitive catastrophic events. The respondents were unanimous in recruiting the infection control professionals for enhancing their awareness of the potential problem of pandemic crisis.

Using mathematical-based programming, Sahebjamnia et al. [17] approached the business continuity coupled with disruptive circumstances through efficient resuming and recovering of critical operations. The problem was to allocate the required resources among candidate continuity and recovery plans in order to conquer the catastrophic condition in different levels of tolerable losses. Clark [18] addressed the pandemic circumstances as the most prospective challenge against the survival of the business. In terms of organizational preparedness and response, he recommended three categorizes of preparing activities associated with creating a healthier working environment, building the crisis plan, and exercising the plan. One of the main steps in his pandemic plan consideration is to define/update new roles and responsibilities during the crisis. The primary business objectives were laid out based on reducing the risk of virus transmission as well as minimizing illness among employees/clients, sustaining the critical delegated operations and services and lessening social and economic ramifications of a pandemic. Xu et al. [19] stated that apart from fatality, injuries and diseases of a disaster, individuals are considerably susceptible to mental disorders needing to be considered in the relate studies.

Schätter et al. [20] leveraged the characteristics of the decision support system in the context of business continuity to explore critical consequences and required strategies in the disaster environment. Concerning a procedural model, they employed a two-stage scenario construction to describe the prognostic and hypothetical states by provoking a disaster. A robust alternative of actions was recommended to the decision-makers considering the risk-averse preferences. Niemimaa et al. [21] concentrated on enhancing the business model by analyzing the contingencies that could jeopardize business continuity. The authors proved that such an intersection, between business model and business continuity, would flourish the proactive culture of considering the likelihood of disruptions and catering for effective solutions.

In the proposed theory of Wang and Laufer [22], the crisis management of business was synched to the political environment of its country. For instance, they implied that in a centralized political system (e.g., China), the businesses were under the ultimate control of the government to either be supported or punished during the crisis. Their key managerial implication related to the businesses was related to the necessity of redesigning even the best existing crisis plan practices on basis of the domestic governmental and societal environment. To enhance businesses' and communities' responses to the pandemic of Coronavirus, Djalante et al. [23] called for resorting to the United Nations agenda of Sendai Framework for Disaster Risk Reduction. It was pointed out that the governments should at least localize a part of supply chains' businesses related to some critical items to build resilience against the virus. Steering businesses amid the Coronavirus crisis, Reeves et al. [24] hinted that a systematic rapid reporting cycle could be essential in keeping track of turbulent impacts on businesses and subsequently adopting mitigating measures. In this regard, a cyclic, empirical approach needs to be designed to discover the upcoming events as well as survival actions that would possibly work.

McKibbin and Fernando [25] highlighted the macroeconomic impacts of Coronavirus on the financial markets and businesses by elaborating on various epidemiological scenarios. The scenarios' construction entailed attributing a range of values to the three criteria associated with Chinses' community based on the existing epidemiological models.

Those criteria embraced the proportion of infected cases, cases' fatality rate and mortality percentage of total individuals. As a multi-faceted crisis, the study also indicated that cutting the interest rate could be a potential short-term measure being imposed by treasuries to alleviate the disrupted businesses. The Center for Risk and Economic Analysis of Terrorism Events (CREATE) stipulated that labor force participation, supply and demand trends of commodities besides behavioral factors are highly exposed to be interrupted amid a disaster [26]. Using the same terminology, the center estimated that a one-year lengthening of the Coronavirus outbreak could bring about a $1.4 trillion loss in the gross domestic product of the US [27]. Curia [28] investigated a complex problem from clinical viewpoint as Dry Eye Disease (DED) and presented clinicaldecisionsupportsystems using machine learning and artificial intelligence.

Deciding on the optimal allocation of limited health care resources is a challenging issue in this crisis. Yip [29] addresses this question of how medical resources can be optimally distributed during the current epidemic, and an ethical analysis was conducted from the ethical perspective of distributive justice. In Azizi et al. [30] a comprehensive study is reviewed to identify unusual challenges, strategies, and decisions related to human resource management other than clinical organizations during the COVID-19 epidemic. Tengilimoğlu et al. [31] examined the level of anxiety, depression, and stress of healthcare workers during the COVID-19 epidemic in Turkey and found that the main cause of anxiety or stress among healthcare workers was due to fear of infection with the COVID-19 virus to their families. Sørengaard and Saksvik-Lehouillier [32] investigates insomnia among employees in occupations important to community (such as health, education, welfare, and emergency services) during the COVID-19 epidemic. As a result, staff reported higher levels of insomnia symptoms compared to normal data collected before the epidemic.

Meyer et al. [33] examines how businesses will respond to the Corona crisis till August 2020. Based on this study, a greater proportion of firms reported major or severe disruptions to sales activities than supply chains. Craven et al. [34] proposed a contingence planning for businesses based on three scenarios. They also introduce seven immediate actions for companies in the pandemic crisis. Seetharaman [35] emphasized the role of digitization for firms. The author compared firms that produce physical product with firm that produce and deliver information.

The aforementioned studies have highlighted that businesses' preparedness against a crisis should eclipse all other routine managerial activities and concerns due to unprecedented, prohibitive and reckless ramifications, particularly in terms of epidemic and pandemic stages of infectious diseases. In this regard, the present manuscript can be regarded as a significant extension of the previous studies by providing a non-trivial yet applied business retrieval framework in the midst of the global crisis caused by the Coronavirus. In fact, our study identifies the multi-faceted scenarios as well as workable actions that could cover the prospective requirements of each sector associated with a real large-scale information technology (IT)-led Company. Therefore, this practice is different from the relevant studies in designing a real retrieval plan that is exactly mapped to hedge against the adverse behavior of the ongoing Coronavirus instead of providing general recommendations. To provide a much more crystal-clear towards the contribution of present paper and its practicality facet, we focus on our proposed scenario planning approach to capture uncertainty of Coronavirus consequences.

2.3. Position of current study in the literature

Scenario planning is, indeed, one of the most common approaches to predict the future and consequently, Table 1 summarizes the relevant disease outbreak/business-oriented papers in the context of crisis literature. It covers a broad spectrum of topics concerning air transportation, livestock industry, and financial turmoil resulted from epidemic/pandemic ramifications. In all these topics, the future outcomes are partitioned into different scenarios affected by specific drivers stemming from economic/societal concerns. In response, there are action plans that either can be generalized or customized for certain domains of corresponding industry/economy/business. Herein, the studies have proposed action plans in terms of a set of rigid scenarios though it seems impractical for businesses to quickly switch from one condition to a another one at once. To fill this gap, our paper considers some in-between scenarios to propel shift process for businesses in practice. Additionally, most of the proposed action plans provided generalized remedies and neglected to consider specialized solutions for different domains of their working scopes. In contrast, our paper deems the appropriate reactions for different elements of our large-scale case study leading to enhancing the applicability of such contingency plan. Finally, almost none of previous studies addressed the employees' benefits along with the business continuity measures in the proposed scenario drivers and action plans. Nevertheless, the present paper takes a combination of both business and employee-led factors into account while proposing a framework to alleviate the mental disorders of employees in presence of Coronavirus.

3. All possible scenarios

As mentioned in the previous sections, Coronavirus has strangely and surprisingly affected the whole world. These effects can be seen both in the realm of individual life and business style. Many experts believe that the economic impact of this crisis will be the most severe economic crisis in recent decades. Therefore, corporate executives and shareholders are looking for ways to save their organization from this crisis. The most important ambiguity is that we do not know how long this crisis will last. Therefore, we need to examine all possible scenarios for the future of this crisis and its consequences and make different decisions according to each scenario.

According to this theory, in the early days of the crisis in Iran, FANAP Co. decided to set up a crisis committee. The committee made a variety of decisions by holding emergency meetings, which are held every few days and appropriate decisions are made based on the new statistics obtained. In addition to making short-term weekly decisions and issuing health guidelines to employees, the committee also advises the senior management team on the future of the business. This led to the development of a comprehensive plan that included all possible scenarios for the occurrence of this crisis and its consequences, according to which the company's action plans were identified. In the following, we will get acquainted with the framework of the implemented model in FANAP company. In an organization, there are different parts that can be affected. Here, three optimistic, realistic, and pessimistic scenarios that are likely to occur are investigated. The transitional steps as the peripheral the scenarios will also be described. The action plans for each of the organization's sections in these scenarios will be explained. All possible scenarios are shown in Fig. 1.

3.1. Optimistic scenario

According to the optimistic scenario, the number of patients will decrease significantly and the mortality rate will decrease accordingly. This means that the peak of the crisis and disease is over. According to this scenario, the maximum duration of the crisis will be next month, after which the situation will return to normal.

According to this scenario, all basic precautionary measures must be taken to protect the health of employees. In this scenario, all parts of the business are responsible for determining the initial steps to advance their goals. If there is a need for employees to be present in the organization, the social distancing and health protocols must be maintained throughout the organization until the entire crisis is resolved. The financial part of the organization should be able to control the liquidity of the organization by quickly examining the current situation. It is also important to connect with customers and suppliers at this time

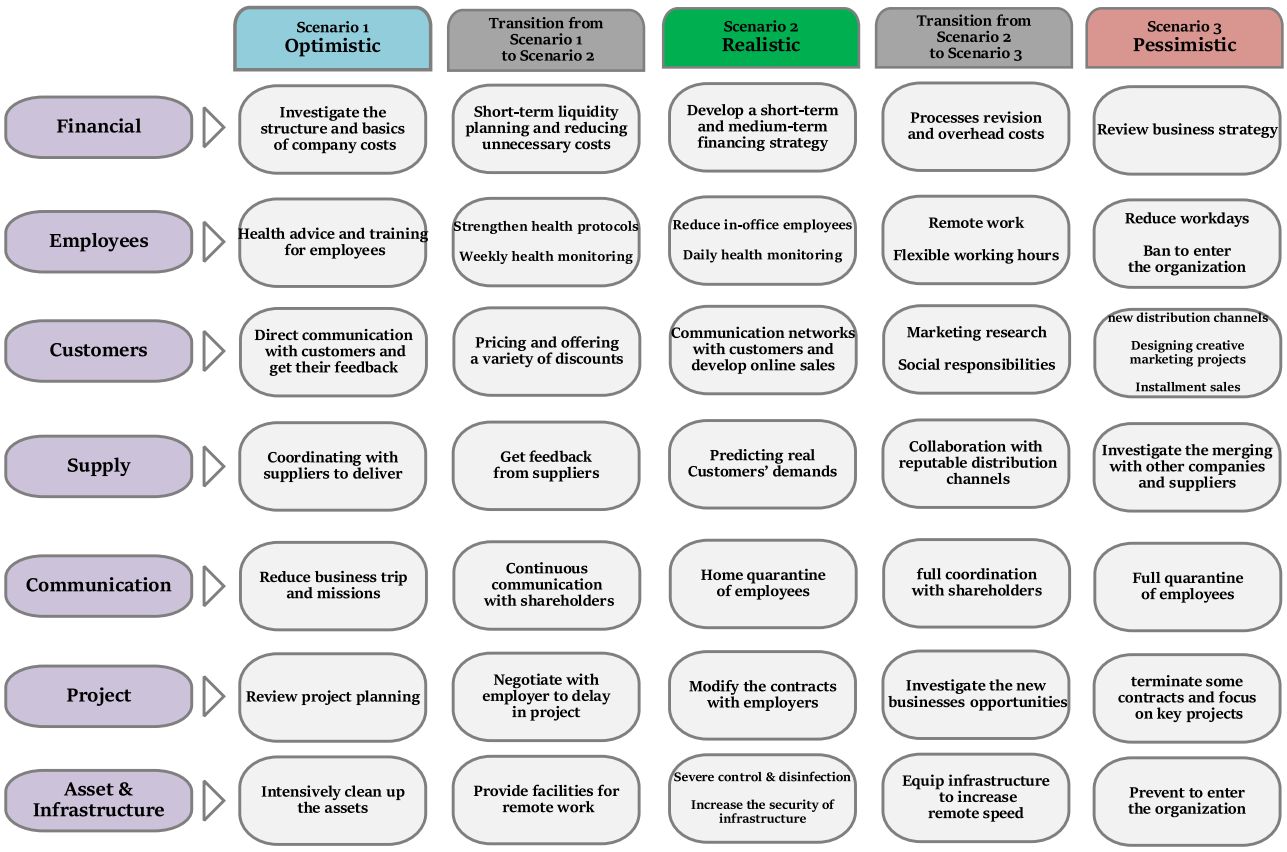

Fig. 1. Possible scenarios.

and review their contracts. The necessary infrastructure must also be provided for employees who work remotely.

On the other hand, we may reach a peak of illness again due to some mistakes in dealing with this crisis in the community or organization, as well as mistakes in forecasting. This mode is called the transition from Scenario 1 to Scenario 2 working as peripheral in-between step. In this case, preventive and protective measures should be increased and more serious efforts should be made to maintain health.

3.2. Realistic scenario

Based on this scenario, we are currently in the peak of the disease. This means that the highest number of patients and the mortality rate has already occurred and will decrease after that. In this case, the outbreak of the disease will be declining so that the situation will return to normal in a few months.

In this case, we are in a very critical situation, but the statistics published by reliable government agencies show that the situation will probably improve. It is better for all employees of the organization to perform their duties remotely and all health protocols should be observed. Continuous monitoring of employee health is also important. The organization's projects and contracts should be changed as needed, and cooperation with suppliers and customers should be reformed on contracts.

On the other hand, due to the pandemic nature of this crisis, if the peak continues or our assumption on the peak is wrong and the statistical parameters increase dramatically (meaning that the real peak occurs later), we may transit to scenario 3. In fact, any indication of the likelihood of further crises could be significant, and all members of the organization must be prepared for a fundamental overhaul of their activities and projects. Planning and making decisions based on the worst state can prevent future disasters.

3.3. Pessimistic scenario

Regarding this scenario, the peak of the disease and crisis has not yet reached and the trend of patients and deaths from this disease is increasing. This is the worst-case scenario that could last for several months and create serious business and also human risks.

In this scenario, participation is now at the highest level of crisis, and the future situation is very dangerous. In fact, the statistics provided show that the economic and business situation will not improve in the near future, and fundamental changes must be made to the macro business strategies. Some of the organization's projects may need to be canceled, or even some the company's sub-diaries may shut down, or even some of the organization's employees dismissed. Projects that have more priority for the organization should be considered and resources allocated to them. In this case, the health protocols must be at their most extreme.

3.4. Understanding the existing scenario

The environment of any organization and the society in which it is located can be effective in future decisions. It is clear that even in a country or a related society, there is a different organization, each of which can make different decisions in the current situation. Therefore, in this section, we try to determine the status of our organization with the help of qualitative and quantitative decision-making methods.

As shown in Table 2, a qualitative scenario recognition matrix is used to help managers make better decisions from a qualitative perspective. According to this matrix, the factors influencing decision-making in the current situation are listed in the table, and for each of them, different levels are specified. One might be interested in adding other factors to these two tables. Also, some thresholds offered in this table obtained based on our case and it would be different based on each organization's environment. Depending on the current state

Table 1
Concise review of scenario-based approach in the relevant business/disease outbreak crisis literature.

References	Topic	Scenario drivers	Proposed scenarios	Typical action plan	Domain	Focus
Meuwissen et al. [36]	Feasibility of farm business interruption insurance for livestock fever epidemic	The frequency of epidemic in a 5/10-year interval.	Most likely (20% occurrence probability of epidemic), pessimistic (40%), optimistic (10%)	Expanding the surveillance zone of herds, preemptive slaughter program for herds being in touch with infected ones	Generalized	Economic
Page et al. [15]	The performance of Tourist sector during Avian Flu	Changes in market, transportation and employment.	Regional pre-entrance and post-entrance of the virus.	Monitoring tourist trends/curtaining expenditures.	Generalized	Socio-economic
Franke and John [37]	Air transportation recovery from crisis.	Capacity adjustment and demand.	Standard U-shape (negligible recovery time lag in comparison with economic cycle), extended U-shape (considerable), Long-term L-shape (massive).	Partnership and alliances, offering lean business model.	Generalized	Economic
Tennant [38]	Private sector responses to financial turmoil	Economic growth/unemployment rate/inflation rate/GDP rate/annual exchange rate comparing US$.	Taking economic performance of Jamaica throughout a 17-year interval into the account.	Reducing non-labor-costs/Stop new hiring/Start downsizing in a socially sensitive way.	Generalized	Socio-economic
Gordon [39]	Future of HIV epidemic	The levels of economic growth and social collaboration (e.g. partnership, sexual violence).	Autumn of limited opportunity (high economic growth/low social collaboration), winter of discontent (low/low), spring of hope (low/high), Summer of all people (high/low).	Intensifying Leadership by all at all levels (e.g. individual, family, community, institutional, and macro level).	Generalized	Socio-economic
Boden et al. [40]	Pre-disaster resilient planning for Livestock diseases outbreak	Farming demographics, governmental support/regulation, and the capacity for technological innovation.	Professional (highly uncertain risk depending on livestock sector), empowered (low risk), capitalist (low risk but relatively uncertain due to low import), and opportunist (high risk).	Pharmaceutical legislation, educational program for farmers, incentive for good farming practices.	Sheep and cattle	Economic
McKibbin and Fernando [25]	Macroeconomic impacts of Coronavirus on financial markets	Infectious cases, and fatality and mortality rates besides affected countries and nature of shock.	Seven scenarios in which infectious, case-fatality, and mortality rates ranges from 1% to 30%, 2% to 3%, and 0.02% to 0.90%, respectively.	Cutting interest rate	Labor supply, production cost, governmental expenditure	Economic
Carlsson-Szlezak et al. [41]	Economy recovery under Coronavirus	Demand status, shock degree, structural damage.	V-shaped (gradually bouncing back of growth), U-shaped (partially shock persist), and L-shaped (totally damage the economy).	Being aligned with the worst trajectories, looking for new opportunities, adapting to new technologies/processes.	Generalized	Economic
Fernandes [42]	Global economic cost of Coronavirus	Shutdown period of economy, decline rate in GDP ranging from 2.8% to 10.7% on average.	Mild scenario (1.5 months shutdown), moderate scenario (3 months shutdown), extreme scenario (4.5 months shutdown).	–	Generalized	Economic
Craven et al. [34]	Managing evolving consequences of COVID-19 for businesses	Discovering economic impact and efficient recovering plans	Quick recovery, global slowdown, global pandemic and recession	Caring employee, Setup cross functional responsive team, Stabilize the supply chain, Strengthening customer relationship management	Generalized	Socio-economic
Margherita and Heikkil [43]	Action plans of leading companies under pandemic	The influence demand and sales evaluation on the customer support, human capital, change management, and social engagement	Not focusing a specific scenario	Improve digital channels and strengthen customer contact centers, define sick-leave and quarantine policies, Communicate assets/services available to the community.	Generalized	Socio-economic
Charles-Edwards et al. [44]	Assessing population size of Australian community in the aftermath of COVID-19	Economic and demographic factors	Four prospective scenarios of the future state of aging, migration, and growth rate	Re-opening international borders, adapting tax revenues	Community-based	Socio-economic
Fior and Mpampatsikos [45]	Focusing on urban planning to minimize the virus spread to the large cities	Geographical-based data, age of individuals, and mortality rate	Partitioning territorial districts to indicate aging, death, and excess-death rate of an urban area	Enhancing the accessibility to the health services, improving mobility and public transportation capacity features	Community-based	Social
Parra et al. [46]	Recovery plan for boosting coal market after the pandemic	Coal demand across the world, investment decisions in some key countries,	Short, medium, and long-terms consequences on demand being specified by small and big shocks to the coal market	Decrease in coal prices, rising maneuvers for switching to the green and sustainable energies	Coal market	Socio-economic
Budd et al. [47]	Airlines strategies for responding to COVID-19	Flying schedule under obligatory quarantine	Considering capacity, labor, fleet, and flight operations-incentive items.	Considering bio-security mechanism in the airport, consolidating international coordination for quarantining intervals	Air industry	Economic
Current study	Business retrieval plan under Coronavirus	A combination of both business and employees-led factors.	Realistic (peak of disease), optimistic (passing), and pessimistic (not reaching) besides two in-between transitional scenarios to shift towards severe condition.	Applied recommendations for preserving business continuity and caring for employees' mental and physical health, simultaneously.	Different functional units/facets/elements of a large-scale IT Company	Socio-economic

of their organization, the organization's managers or decision-makers determine the level of these factors. After determining all the levels, and connecting them in the matrix, the scenario belonging to each organization is determined. The factors influencing decision making and can be regarded as the main drivers in constructing scenarios are as follows:

- Business Prosperity Status: The desirable status means that the profitability and economic status of your business is in good shape and has good financial and strategic reserves. The undesirable is the situation in which your organization is not in a position to endure a critical situation for several months and be resilient.
- Local Death Rate: This factor shows the number of people killed by the virus in the city or country where your organization is located, which is divided into three states: less than 5 percent, 5 to 20 percent, and above 20 percent.

- Local Infection Rate: This factor shows the number of infected people with the virus in the city or country where your organization is located, which is divided into three states: Increasing, Fixed and Decreasing.
- Percentage of People with High Infection Risk: This factor indicates the number of infected people with the virus in your organization or those who have severe symptoms of the disease, which is divided into three states: less than 5 percent, between 5 and 20 percent, and above 20 percent.
- Percentage of People Susceptible to Injury: This factor shows the number of people who have a history of dangerous diseases like Diabetes and HIV and are more likely to get the disease, or one of their relatives has the disease, which is in three cases less than 5%, between 5 and 20% and above 20%.

4. Applied maneuvers

This section recommends resilient comments about how to cope with the underlying challenges of per scenario. In this regard, Section 4.1. provides business action plans under the realization of scenarios. Also, considering the psychological consequences of the pandemic crisis, a model will be provided to deal with the problems that arise for employees in Section 4.2.

4.1. Business action plans

Now, according to the introduced scenarios, we will provide practical suggestions and actions in the face of each of these cases. These measures can vary depending on the type and structure of the organization or the environment in which the organization is located.

4.1.1. Optimistic scenario

In this scenario, all measures will be prudent. It is assumed that the current crisis will soon be resolved and will have minimal impact on the organization, and the situation will return to normal. At first, it is necessary that all healthcare warnings be imparted to the employees of the organization and, if necessary, health items be provided to them. Health protocols must be established when entering and operating the organization's staff. Employee health should also be controlled with tools like thermometer when entering the organization.

Information and communication channels should be created to provide immediate instructions for employees and, if necessary, training courses should be held virtually for them. As long as there is no disruption in the organization's affairs, some employees should be allowed to work remotely. Therefore, it is necessary to first create a working manual in remote mode. The method of reporting, the means of interaction and the establishment of meetings and the recording of working hours are the requirements of this instruction. Also provide infrastructure such as VPNs, laptops and equipment needed for the activities of telecommuting employees. Urban and intercity trips of employees should be made only when necessary.

Communicate with customers whose orders arrive without any problems at the appointed time or with minimal delay. Also, ask the opinions of all customers and shareholders of the company. In the case of organizational projects, some things may not go as planned and some reforms may be needed. This should be done through interaction with the employer. Re-planning projects is essential. In the financial discussion, the liquidity of the organization should be examined, and the costs (especially overhead costs) should be reduced and controlled as much as possible. In the financial sector, they must be prepared for anything that happens.

It is essential to establish a daily employee health monitoring system and record information by employees on a daily basis at this stage. In case of symptoms in one of the employees or their relatives, the cases should be reported, and the person should not be allowed to enter the organization for at least two weeks.

In FANAP Co., the health monitoring system is designed to identify people at high risk to get infected to COVID-19 disease. This system can be used in all scenarios. Factors observed in the designed system include:

- The city where the employee resides
- Behaviors that violate the rules of social distance, such as attending public places or traveling by public transportation
- Physical symptoms Covid-19 mentioned by WHO and Ministry of Health. It also diagnoses people with certain rare diseases that can increase their risk of developing the virus and the risk of death.
- Physical symptoms of an employee's relatives,
- Monitoring the mental health of each person.

Finally, using these factors, a score is assigned to each employee in terms of risk.

4.1.2. Realistic scenario

In this case, almost all employees must work remotely. Only employees whose physical presence is required can be present at the company. Employees who come to work must follow all health protocols like using face masks, observing social distance from other employees and sanitizing hands before using the general equipment of the organization. It is necessary to disinfect the workplace of employees on a daily basis and to prevent them from gathering in certain places of the company, such as restaurants, etc. As much as possible, the staff should be responsible for preparing the food themselves. Flexible working hours can be effective in employee productivity. All intercity and intercity missions must be canceled, and meetings must be virtual if necessary.

Provide an online shopping system for customers. Also, for in-person visitors, a website and virtual tour must be designed. Marketing and sales teams need to be able to build strong networks to be able to communicate more extensively in absentia. If possible, the sales programs will be more diverse and will benefit from appropriate discounts. It may be necessary to quickly explore new business opportunities and prioritize entry into them.

In the financial sector, all unnecessary expenses must be stopped, and the cost structure re-examined. A short-term and medium-term strategy must be developed to overcome these conditions. In the field of projects and contracts of the organization, by negotiating with employers, it is possible to make corrections to the previous cases. Constant communication with the employer will lead to trust. In the current situation, they may need to make changes that do not conflict with the interests of the organization, so we must work with them to the fullest. It is also necessary to create a positive atmosphere for employees and motivate them to do their work. Employees need to feel that the organization is with them in difficult situations, and that their health is more valuable than anything else. Receive and review employee suggestions quickly are other important activities.

The support and human resources teams should also anticipate basic needs such as food and hygiene items for employees and help staff to provide them (both in this scenario and in the pessimistic scenario). To help employees' mental well-being, their contracts should be extended, and benefits should be considered. Planning new work paradigms (such as turning the workflow of some departments into a completely remote one) and a way to evaluate them (such as better personal reports and presenting a report on the progress of the related project) are also important. Efforts to improve the work environment of employees should also be considered to reduce the possibility of contracting the virus when returning to the organization, like separating workplaces and not using common tools and facilities.

Table 2
Qualitative scenario recognition matrix.

Scenario drivers				1. Business Prosperity Status																	
				Desirable									Undesirable								
				2. Local Death Rate																	
				Decreasing			Fixed			Increasing			Decreasing			Fixed			Increasing		
				3. Local Infection Rate																	
				Decreasing	Fixed	Increasing	Decreasing	Fixed	Increasing	Decreasing	Fixed	Increasing	Decreasing	Fixed	Increasing	Decreasing	Fixed	Increasing	Decreasing	Fixed	Increasing
4. Percentage of People with High Infection Risk	Less Than 5%	5. Percentage of People Susceptible to Critical Symptoms	Less Than 5%	S1	S2	S2	S1	S2	S2	S1	S2	S3	S1	S1	S2	S1	S1	S2	S1	S2	S3
			5 To 20 Percent	S1	S2	S2	S1	S2	S2	S1	S2	S3	S1	S1	S2	S1	S1	S2	S1	S2	S3
			Over 20%	S1	S2	S2	S1	S2	S2	S1	S2	S3	S1	S1	S2	S1	S1	S2	S1	S2	S3
	5 To 20 Percent		Less Than 5%	S1	S2	S2	S1	S2	S3	S2	S3	S3	S1	S1	S2	S1	S1	S3	S1	S2	S3
			5 To 20 Percent	S1	S2	S2	S1	S2	S3	S2	S3	S3	S1	S1	S2	S1	S2	S3	S1	S2	S3
			Over 20%	S2	S2	S3	S1	S2	S3	S2	S3	S3	S1	S2	S2	S1	S2	S3	S1	S2	S3
	Over 20%		Less Than 5%	S2	S3	S3	S2	S3	S3	S2	S3	S3	S2	S2	S3	S2	S2	S3	S2	S3	S3
			5 To 20 Percent	S2	S3	S3	S2	S3	S3	S2	S3	S3	S2	S2	S3	S2	S3	S3	S2	S3	S3
			Over 20%	S3	S3	S3	S3	S3	S3	S3	S3	S3	S2	S3	S3	S2	S3	S3	S3	S3	S3

S1: Scenraio 1; **S2**: Scenraio 2; **S3**: Scenraio 3.

4.1.3. Pessimistic scenario

In this scenario, employees are not allowed to enter the organization and employees are in full quarantine. All the activities of the organization are based on remote work. Support and infrastructure teams must do everything necessary for all activities, such as speeding up servers and so on. The health of employees and their families must be monitored on a daily and continuous basis. Employees should be advised not to leave the home as much as possible and not to be in public places. Any behavior of employees who oppose the health protocol should be reported and the employee should be punished.

It is necessary to hold several meetings with the company's shareholders and, while reviewing the latest information, to provide a suitable strategy for continuing the company's path. It is possible to check the possibility of merging some sub-companies or closing some working groups. There may have been a problem in some parts with the supply of raw materials, which led to a temporary shutdown. Reviewing the business strategy and financial strategy of the organization and gradually reducing the benefits of managers and employees is one of the most important tasks of financial management. In this case, depending on the situation of the company, some contracts with suppliers may have major reforms. Also, projects that are not a priority for the organization can be canceled and the organization's resources can be used for priority projects.

New communication protocols must be defined in each work team. In a working day, a team must have one or two virtual sessions. On the one hand, this will help them better understand the projects and activities being carried out, and on the other hand, from a human point of view, seeing, hearing and talking to other colleagues will help reduce the problems of isolation. Providing a program and a complete employee support system (mental, financial, financial) to help each employee initially leads to increased employee productivity in this type of work style and ultimately leads to better performance of the organization economically.

FANAP is a large company in the field of information technology and is located in an area that is in a critical state of Corona pandemic. Therefore, the managers of the company, taking into account the current situation, implement the proposed scenarios. After the formation of a Central Crisis Committee, measures such as implementing maximum remotely work, prioritizing organizational projects, establishing remote infrastructure, and reducing costs as much as possible were implemented. Employees' physical and mental health status was constantly monitored, and infected people were given compulsory leave. These measures resulted in a significant reduction in employee infection or virus transmission at the company level. From an economic point of view, providing a virtual service infrastructure for other businesses was also considered an effective measure for a large IT company.

4.2. Managing employee damage in crisis situations

In the previous section, all possible scenarios in different parts of a business in a corona pandemic were examined. Another aspect of this pandemic, however, is the effects it has on the physical and mental health of a company's employees. In this section, an approach is provided to minimize these effects. People in stressful situations, such as common infectious diseases that require social isolation (including Coronavirus, SARS, etc.), react differently. Common damages during this period include:

- Feeling fear and anxious
- Loneliness
- Anger
- Despair
- Symptoms of Post-Traumatic Stress Disorder (PTSD)
- Obsession
- Tendency to take medication and alcohol

Each of these damages can occur at different levels, and each is a serious threat to a person's mental health. Also, each of these cases

has a different treatment protocol. Unfortunately, due to the huge volume of correct and incorrect news in the media, the positioning of governments and organizations, environmental conditions and the way people deal with this phenomenon, the occurrence possibility of any of these damages has increased. Given the above and the fact that the current situation in the country and the world is unprecedented, so there is still no specific treatment protocol for it. The treatment model presented in this study is based on the modeling of past experiences and current conditions.

Although there is information about the history of pandemics in the world, the current situation has been somewhat unprecedented in the last hundred years, and the way in which people respond to it in the new era is completely obscure with its myriad variables. Therefore, a protocol based on experience and new conditions has been proposed that can identify important damages as much as possible with a regular approach and be effective in modifying its symptoms. Fig. 2 shows the implemented flowchart model in FANAP Co. This model includes three stages of evaluation, diagnosis, and treatment.

4.2.1. Evaluation

The evaluation is done online by psychological tests related to these disorders. For example, a checklist of symptoms of mental disorders (SCL-90-R), general health (GHQ), etc., will be used, which will be periodically filled by the organization's staff.

4.2.2. Diagnosis

This phase consists of two stages: (1) Scoring and analysis of tests; according to the standard of each test, the final score is calculated and the results for the whole organization, specific groups, and in special cases for each person are analyzed separately. (2) Classification of individuals based on the amount of periodic monitoring-based disorders; this classification provides an overall assessment for the organization. It also helps to suggest specific treatments and prevention methods for a particular organization, group, or individual.

4.2.3. Treatment

The proposed default treatments are cognitive-behavioral therapy (CBT) and educational content as multimedia. The peculiarity of these methods is that in addition to being universal, it pays attention to individual differences, and is also compatible with the nature of the crisis. Depending on the degree of the disorder, protocols are implemented; as an example, for people suffering from weak to moderate disorders, educational content can be provided in multimedia formats. Part of it is broadcasted to the public and the other part is only given to the target group and its feedback is naturally received for that group separately from the whole organization. In addition to educational content and subgroup therapies, people with severe disorders will need individual therapies (private conversation and feedback to the therapist) and, in special cases, referral to a psychiatrist and pharmacotherapy. The best-case scenario is a lack of occurrence, or a small number of people being managed by the psychologist of the organization, and if the issue is extensive, external expert help is needed.

4.2.4. An example of how the model works

If we consider one of the most common and important damages mentioned in the previous sections, depression caused by the crisis, the effects of which are transmitted to the post-crisis period. The first step in diagnosing depression and its extent with the help of a standard checklist questionnaire is to identify the symptoms of mental disorders that have been selected from among the possible cases due to their simplicity, speed, and aggregation with other injuries in the form of a questionnaire. In this stage, the questionnaire is filled in online by the employees and its score is obtained. Based on scores, people are classified into healthy, sick, and psychotic categories. The first group of people are healthy, and they do not spend resources on them, and only the public education is available to these people, although they are re-tested in each period.

People who are sick are encouraged to see the proper content provided in the organization and the content in the media (such as a healthy group). They are also offered a type of cognitive-behavioral therapy (CBT). It should be noted that the treatment of depression in the cognitive-behavioral field requires knowledge about depression and doing things by the damaged person in order to improve well-being and moderate symptoms. The second group needs to follow the treatment in the middle of the period (before re-evaluation) and they should be informed about the correctness of the work performed by them.

In addition to the second group treatment model, third-party people benefit from telephone counseling and direct conversations. If the symptoms worsen, these people should be referred to a psychiatrist, who will be diagnosed by a psychologist. This simple case will vary depending on the changing the frequency of people in the group, the number of concomitant damages, the change in environmental status, and other factors that affect the treatment process.

5. Discussion

Human beings are facing many crises throughout their lives. These days, the coronavirus has had a great impact on human life and workstyle. Businesses have also shown a different impact on this crisis, given their nature. However, many businesses look to the future with fear and need to re-plan their medium- and long-term macro-strategies. Due to the uncertainty of the virus, it has made it very difficult to predict the future, so we need to consider all the possible scenarios for this crisis and plan accordingly for each of them. This study looked at a crisis management framework at an IT company, FANAP. However, the models presented in this study are not just for IT companies, and with a few modifications, they can be implemented in other companies as well.

According to the proposed model, the future of businesses is described based on three scenarios: optimistic, realistic, and pessimistic. In the optimistic scenario, it is assumed that the crisis will disappear in the near future and the situation will soon return to normal. Therefore, some basic steps need to be taken to prevent the spread of the virus among employees of the organization and to monitor their health. The possibility of remote work and providing its infrastructure for some employees, planning the basic needs of employees, reviewing the current liquidity of the organization are important measures appropriate to the optimistic scenario. Creating a system for monitoring employee health in all scenarios is also essential. In the optimistic scenario, this monitoring can be weekly, but in other scenarios, the monitoring can be daily.

In a realistic scenario, employees work in remote mode, as much as possible. The liquidity of the organization must be seriously controlled. It is also important to reduce unnecessary costs and monitors staff health on a daily basis. If necessary, the current contracts of the organization should be amended according to the current conditions. Continuous communication with shareholders and customers and the establishment of steady communication channels have particular importance. In pessimistic situations, the organization must have a re-planning on the future of its business. In these circumstances, difficult decisions can sometimes be made. Changing the work areas of the organization, prioritizing important projects and paying attention to new areas of business are the most important measures of this scenario.

In this study, a method is presented to determine what scenario we are currently in. Internal and external factors can be effective in determining the current situation. Information technology organizations or any other organization can include various factors in this method. After determining the scenario in accordance with the company's conditions, action plans should be made. The study also provides a model for managing employee damage in crisis situations. In this way, the damages inflicted on the company's employees can be evaluated, diagnosed, and

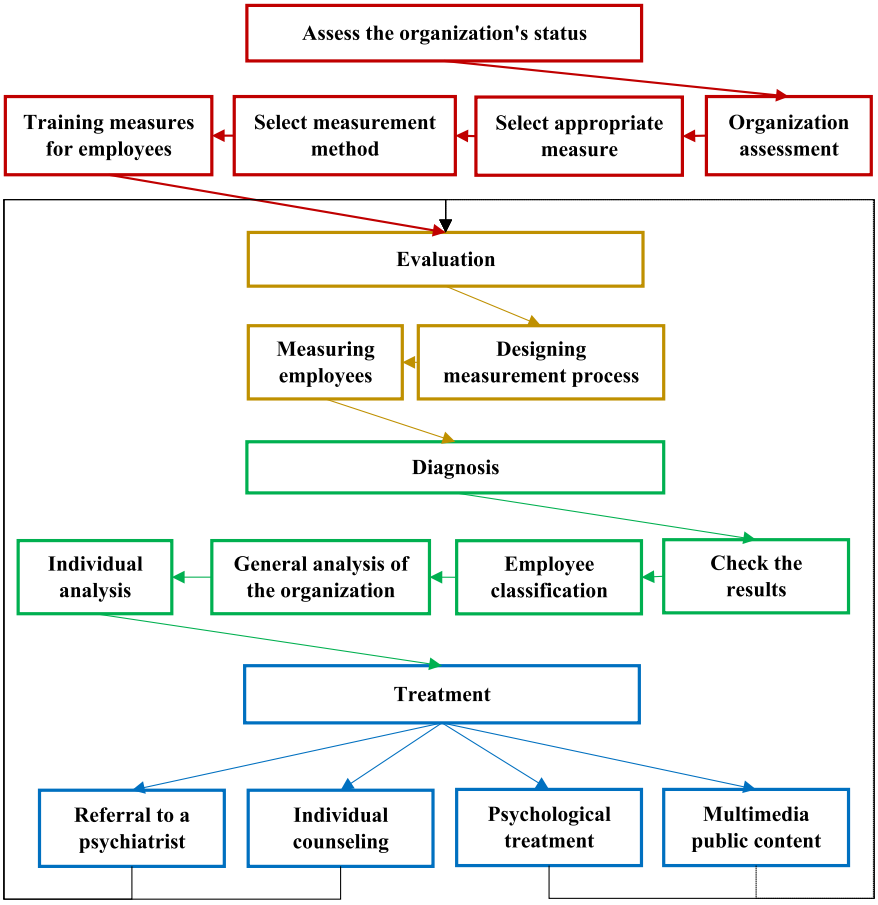

Fig. 2. Proposed model for managing the damage of the current situation in the organization.

treated in three stages, and the occurrence of mental and intellectual crises among them can be prevented.

No matter what the type of business is or how big it is, all the businesses need to anticipate the situation ahead. This can only be achieved with up-to-date information and proper analysis. Any inappropriate predictions can lead to misguided planning and waste of the organization's resources and may have irreparable consequences. Future opportunities can be used, or future crises can be prevented. In addition to the macro perspective that managers have on the future of the business, the work environment must be safe for employees. On the one hand, the processes should be such that the health of the employees is assured. On the other hand, employees should not be afraid about their job security. It is very important for employees to feel comfortable and cheerful in the remoted work. Note that dismissal is the last option that any organization can use it.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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