

Clarifying Project Management in the Crisis Situations: Concentrating on Covid-19 Pandemic

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ABSTRACT: The COVID-19 pandemic has had a major impact on business and project activities, particularly due to the lack of information about it. The experience of the pandemic indicated that due to the unknown nature of it and lack of suitable models, there was no clear strategy for managing projects in the crisis condition. Thus, the main objective of this paper is to develop a project management model for crisis situations and identify effective strategies to reduce project vulnerability during the pandemic period. For this purpose, a systematic review method was used. Based on this method, first the relevant articles were searched, then the relationships between their key concepts were plotted using VOSviewer, and finally 78 sources were selected in several steps. The results are presented in the form of answering research questions as well as developing a conceptual model that includes project management strategies in pre-crisis, crisis time and post-crisis situations. Accordingly, it can be said that Covid-19 pandemic has all characteristics of a serious crisis. Its origin is often external, and it usually happens all at once, so it reduces the opportunity for planning. Finally, it can last and continue. In addition, the model identifies key policy makers, participants, and project implementers in times of pandemic crisis. It is expected that the use of this model and strategies increase the PM's knowledge and capabilities in crisis management in projects.

KEYWORDS: crisis, COVID-19 pandemic, project management, PM elements, systematic review

1. INTRODUCTION AND PROBLEMATIZATION

Crises are an inevitable reality in projects. Crises of any kind always have important effects on projects and project management performance. The gradual emergence of crises has led to an increase in their number and diversity (Pearson & Clair, 1998), and in each period a specific crisis has been considered more. A review of the past shows that in the last hundred years, various crises have occurred, but the impacts of the COVID-19 pandemic have been different from all, as it is a great global war against humans (Hanushek & Woessmann, 2020; Kumar, 2020). In addition to health, the virus has had devastating impacts on personal, social, and organizational aspects of human beings (DEMİRBAŞ, BOZKURT, & YORĞUN, 2020). According to experts, its economic consequences may plague businesses for months or even years (Rodríguez-Caballero & Vera-Valdés, 2020). Due to the pandemic, most projects were shut down, or at least they must work in an environment that is different from what they used to do. Although the closure of these projects is necessary and inevitable to maintain the health and environmental health of the community, its negative impact on the economy has wide dimensions because projects have important position in the economy and budgeting systems of countries (Venkatesh & Venkatesan, 2017). Construction project, for instance, is a major industry, and an important contributor to the economy so that "in 2019, Canada's construction industries GDP was \$141.22 billion" (Statista, 2019).

Some crises are natural and occur instantaneously, but by understanding the crisis life cycle, many crises can be prevented or minimized. Studies show that crisis often have long incubation times (Lauge, Sarriegi, & Torres, 2009). That is, there are different signs and symptoms that warn of a crisis, but they are often ignored or not identified. In this regard, Coombs (2007) believes that "a crisis does not happen but evolves" (Lauge, Sarriegi, & Torres, 2009). Nevertheless, experience and evidence show that the managers response to crises often based on their experience and common sense, considering merely crisis event and post-crisis stage, but ignoring the prevention mechanisms and focusing on restoring the safety level in the affected zone while organizations and consequently projects can have different strategies to manage crisis effectively. These strategies can cover all stages of the crisis, i.e., precrisis, crisis event, and post-crisis, and make sufficient preparations to deal with each stage.

Although extensive research on crisis management exists, not much research has been done on project management in crisis situations, especially the Covid-19 pandemic. Thus, the main purpose of the research is developing a project management model in crisis situations by identifying effective strategies to reduce the vulnerability of projects in the pandemic period. Accordingly, the research seeks to answer the following questions: Given the characteristics of COVID-19 pandemic, is it a crisis? If yes, among the categories of crises, which one does Covid 19 belong to? What are the stages of the crises management in projects? What is the

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optimal conceptual model of project management in crisis situations? Finally, what are the effective strategies to manage the crisis in projects?

2. CRISIS CONCEPT IN THE CONTEXT OF PROJECT MANAGEMENT

In general, all areas have the potential for a crisis, but a project is more likely to have it because it is a temporary entity in which activities must be carried out within a defined period in accordance with standards to achieve its objectives. According to the PMBOK, a project is “a temporary endeavor undertaken to create a unique project service or result” (Guide, 2001) and differs from routine operations. All projects have a beginning and an end. They have a team, a budget, a schedule, and a set of expectations the team needs to meet (PMI, 2021). The existence of any problem or disruption in the components and process of the project can cause risk and ultimately create a crisis in the project. Therefore, when leading a team or project does not go well, it can be a sign of a crisis or beginning of a crisis in the project.

Crisis refers to sudden unplanned events which cause major disturbances in a team, project, or organization, and trigger a feeling of fear and threat amongst the employees (Juneja, 2019). According to PMI, a crisis can be thought of as an intense, high-risk project that must be managed to obtain the desired results. In the case of a crisis, the desired result is minimized damage (Sawle, 1991). Little considers a project crisis to be a situation that represents a strategic or existential threat to the organization (Little, 2020). Accordingly, if we define project management as the process of controlling the achievement of project goals, anything that prevents project management from achieving those goals can be considered a crisis.

Crisis in projects occurs in all forms and sizes, including financial, technological, managerial, operational, and so on. Covid-19 pandemic is a new type of crisis that has severely affected health of human resources in projects (Majumder & Biswas, 2021). The crisis which the study focused on, has not only led to the closure of many projects in countries, but has also led to fundamental disputes and conflicts among project managers and project owners, contractors, suppliers and even governments because due to outbreaking of the virus, the interests of all groups in the projects have been jeopardized. Furthermore, Covid 19 itself can lead to other crises because deficit of funding, termination of contracts, lengthening of time, performance decreasing, quality loss etc. are among the common crises in projects that the pandemic has intensified them.

Whenever a crisis arises, project managers take the necessary steps to prevent or reduce damage to the project. Thus, crisis management is an important concept in PM (Tahaei & Yakhchali, 2017). Familiarity with crisis management in projects enables PMs to come up with effective solutions to the crisis and know what to do in a project crisis. Experienced project managers adopt some measures and practices to handle the crisis to minimize their effects on the project goals. Thus, crisis management in projects is the process by which PM deals with a disruptive and unexpected event that threatens to harm the project or its stakeholders.

3. THE RESEARCH METHODOLOGY

In this research, the systematic literature review method has been used to review scientific sources in the field of project management in crisis situations. According to experts, this method is the appropriate way for reviewing large amounts of information (Petticrew & Roberts, 2008), carefully collecting sources, and making suggestions for future research programs (Rousseau, Manning, & Denyer, 2008). This method in a transparent and systematic way and by presenting coherent and comprehensive results, increases the knowledge about a phenomenon in scientific texts and directs the executive actions in the real world. To use this method, an instruction is written, then the search command is defined based on it and the search for resources begins. In this regard, the Cochrane Handbook for Systematic Reviews (2008) is pertinent, and according to the systematic review process provided by Kaufman (2011), several discrete steps were conducted. As Figure 1 shows, the steps begin with clarifying goals and searching for appropriate resources. Then, the best sources and information are collected, evaluated, and analyzed. Finally, it ends with the interpretation of the results.

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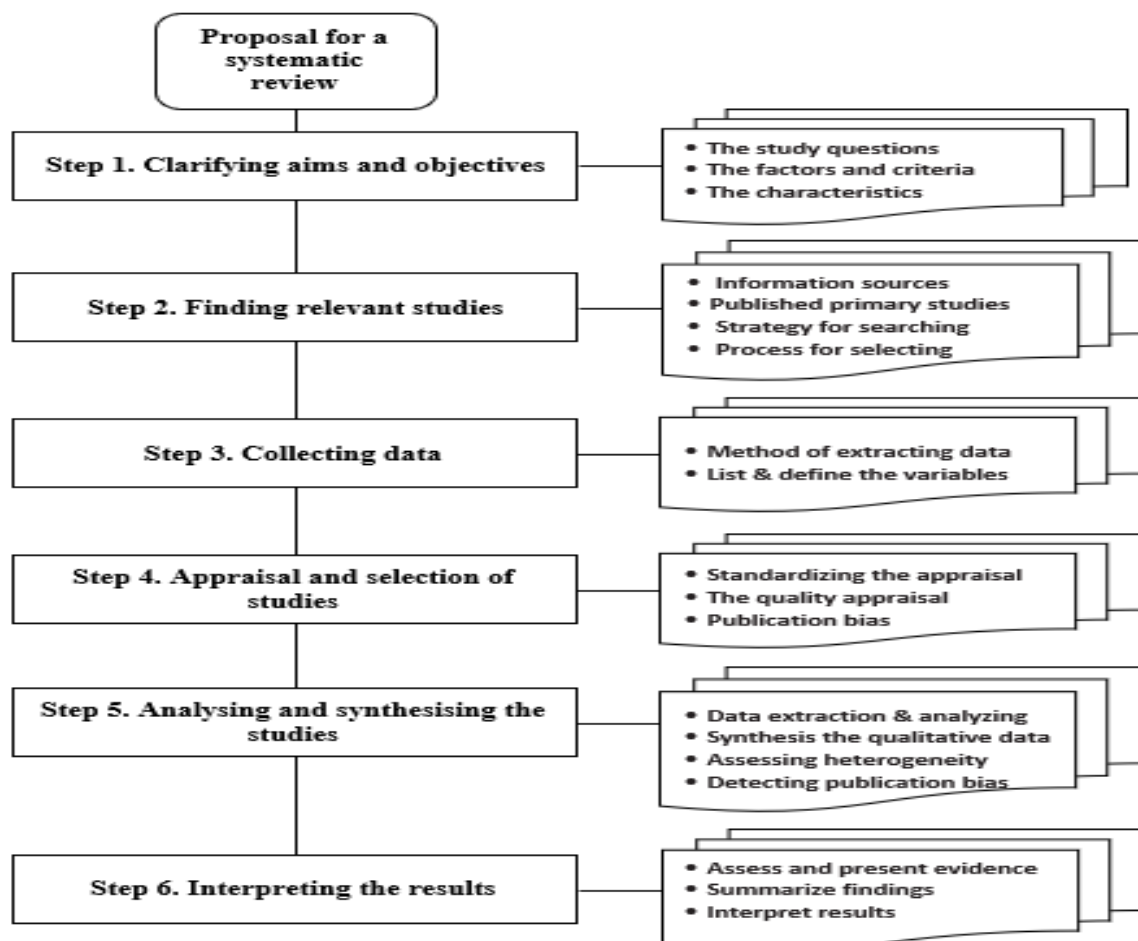


Figure 1. Systematic review steps of the research

Source: the author

To construct a systematic search that attempts to identify all studies, the research questions were broken down into four keywords including “project management”, “crisis management”, “COVID-19 pandemic”, and “strategies”. In the resource search phase, different combinations of key completeness were used, like “Project management AND crisis OR pandemic” and “Project management AND crisis management OR strategies”. In addition, most reputed keywords in past studies have been considered, and to have more valid results, both automated and manual searching options were used for each single bibliographic database. Furthermore, a preliminary investigation was taken to make sure all different perspectives and aspects of research domain had been identified. After finding research terms for identifying relevant studies, four electronic databases are searched which contains millions of international articles from hundreds of different international publishers: Google scholar, ScienceDirect, PMI, and Scopus. All databases were selected with attention to coverage of the scientific literature and level of overlaps (Kousha & Thelwall, 2008). In the process of searching for sources, various areas such as business, economics, engineering, mechanic, social science, environmental science, etc. were considered (see Figure 4). In addition, Endnote (version X9) was used for storing and managing different publications, and VOSviewer (version 1.6.15) was utilized for cataloguing, organizing, analyzing, and synthesizing the set of data. This software was especially useful since it made it possible to conduct content analysis of a vast number of resources and was subsequently instrumental in identifying the connections among publications. Figure 2 shows the output of the software including the main concepts, sub-concepts, and their connections.

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documents are diverse and include scientific research, reviews, conference papers, essays etc. which have been provided in various domains like business and management, engineering, computer science, social science, environment, decision making and others.

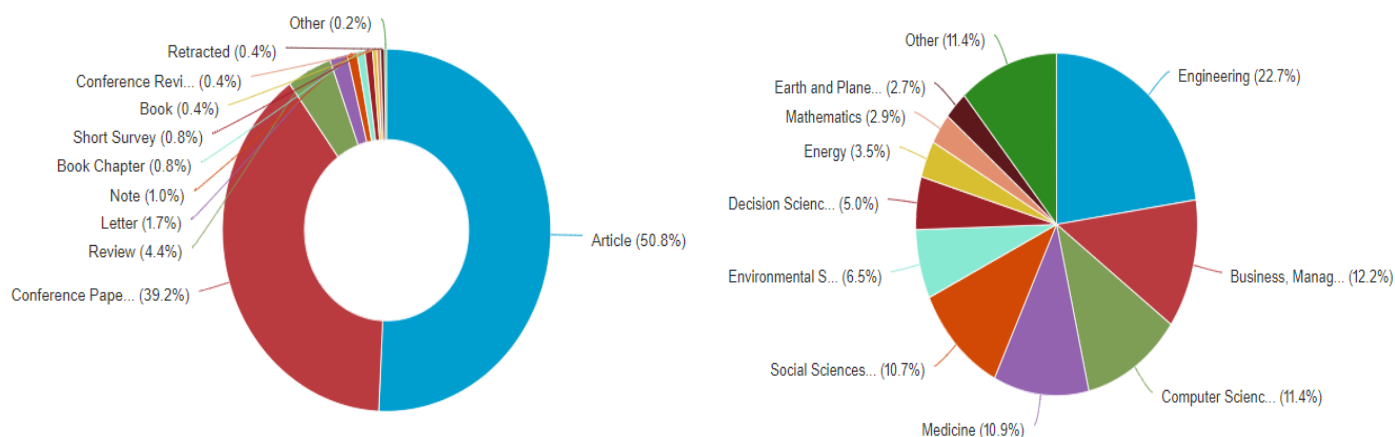


Figure 4. The documents by types and subjects' area

The papers' abstracts were carefully read and VOSviewer used to find textual segments within all publications. At last, 78 papers were selected that addressed the research title (figure 5).

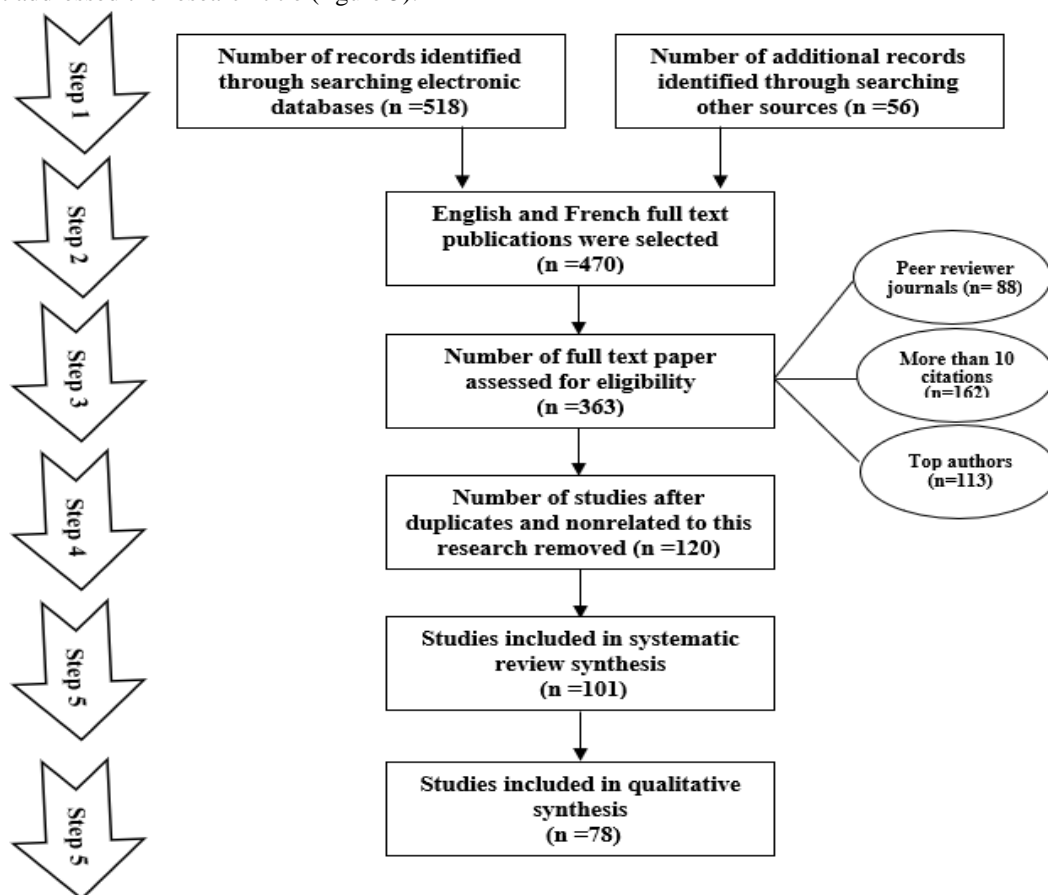


Figure 5. Stages of the research selection process

Source: the author

4. THEORETICAL FOUNDATIONS OF CRISIS AND PROJECT MANAGEMENT

For developing a conceptual model and providing project management strategies in crisis conditions, related theoretical foundations are presented in the form of answers to the research questions.

4.1. COVID-19 Pandemic as a Crisis

The symbolic definition of a crisis entails two basic points, as it expresses the negative turning of an event, from a positive to a negative reaction, and the ability for the individual to decide (Seeger, Sellnow, & Ulmer, 2003). The term crisis evokes a sense of threat, urgency, and destruction, often on a monumental scale (Cretu & Puentes Alvarez, 2011). Many authors, Puentes et al. (2010),

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Seeger et al. (2003), and Farazmand (2007), have defined crisis based on these terms however, most synthesize previous definitions to some extent which table 1 shows the summary.

Table 1. Definitions and Types of Crises

Auteur/ year	Title	Document's type	Industry	Crisis definition	Number of citations
Pearson & Clair, 1998	Reframing crisis management	Conceptual article	General	An organizational crisis is a low-probability, high-impact event that threatens the viability of the organization and is characterized by ambiguity of cause, effect, and means of resolution, as well as by a belief that decisions must be made swiftly	2527
(Coombs, 2021)	Ongoing crisis communication: planning, managing, and responding	Book	General	A crisis is the perception of an unpredictable event that threatens important expectancies of stakeholders and can seriously impact an organization's performance and generate negative outcomes	4094
British standards institution, (2011)	Pas 200:2011: crisis management – guidance and good practice	Guideline	Organizational	Crisis is an “inherently abnormal, unstable, and complex situation that represents a threat to the strategic objectives, reputation or existence of an organization	---
(Seeger, Sellnow, & Ulmer, 2003)	Communication and organizational crisis,	Book	Organizational	Crisis suggests an unusual event of overwhelming negative significance that carries a high level of risk, harm, and opportunity for further loss	963
(Farazmand, 2017)	Learning from the Katrina crisis: a global and international perspective with implications for future crisis mgt.	Empirical study	Crisis and emergency management during hurricane Katrina	Crises are born out of short chains of events, often unpredicted and unexpected, but they develop with dynamic and unfolding events over months, days, hours, or even minutes. They disrupt the routine events of life and governance, disturb established systems, and cause severe anxieties.	267
(Rosenthal & Kouzmin, 1996)	Crisis management and institutional resilience: an editorial statement	Research paper	Organizational	Crisis is an unwanted, unexpected, unprecedented, and almost unmanageable situation	53
(W. R. Crandall, Parnell, & Spillan, 2013)	Crisis management in the new strategy landscape	Book	Organizational	A crisis is an event that has a low probability of occurring, but should it occur, can have a vastly negative impact on the organization. The causes of the crisis, as well as the means to resolve it, may not be readily clear; nonetheless, its resolution should be approached as quickly as possible.	1115
(Juneja, 2019)	Crisis management-meaning, need and its features	Review paper	General	Crisis refers to sudden unplanned events which cause major disturbances in the organization and trigger a feeling of fear and threat amongst the employees.	3
James & Wooten, 2005	Leadership as (un) usual: how to display competence in times of crisis	Review paper	Organizational	Crisis is as a perception or experiencing of an event or situation as an intolerable difficulty that exceeds the person's current resources and coping mechanisms.	268

Source: the author

Most of the keywords extracted from the definitions provided are as follows.

- Low-probability, high-impact event

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- Threatens the viability and existence of the organizations and societies
- Ambiguity, high level of risk, and uncertainty
- Ability to impact different aspects and many variables.
- Abnormal, unstable, and complex situation
- Unusual, unpredicted, and unexpected event
- Vastly negative
- Harm and loss
- Destructive and disruptive
- Unwanted, unprecedented, and almost unmanageable situation
- Most of the time the causes and the means of resolve it, may not be clear.
- Its resolution should be approached as quickly as possible
- Feeling of fear
- An intolerable difficulty that exceeds the person's current resources and coping mechanisms.

Now, we must see here what are the destructive and threatening effects of the pandemic and to what extent? Experts consider COVID-19 one of the biggest challenges of the last hundred years, which as a pandemic has caused a global health crisis (Tabish, 2020). The COVID-19 pandemic expanded in early December from Wuhan, throughout China and was then exported to a growing number of countries so that it was declared a global pandemic by the WHO on the 11th of March 2020. The number of confirmed cases is constantly increasing worldwide (Di Gennaro et al., 2020). The pandemic is moving like a wave, and it is easily transmitted through the movement of people everywhere and involves more people.

Because countries were not prepared to deal with such a major crisis, the pandemic was able to affect almost all aspect of human life. In addition to its health and social effects, studies indicate that its economic effects are greater (Mackenzie Consulting Group, 2021). According to the study by the Center for Economic and Policy Research, Covid-19 had three major effects on the manufacturing sector (Baldwin & Di Mauro, 2020);

1. Decreasing in demand,
2. Disruption of supply chains,
3. Disruption of direct supply that hinders production.

These effects have been severe in the project area. The construction industry, for instance, as a significant growth driver of the economy has been often closed or at least operating under new conditions they have not experienced before. Many projects were postponed until future notice. So, this sector faced various challenges and obstacles, perhaps the most important of which was to create conflicts between owners and contractors. Since the contracts for the ongoing projects were concluded before Pandemic, there is no clause in them that mentions this type of challenge. Therefore, owners want the contractors to fulfill their obligations, while the contractors do not have the ability to adhere to the obligations. In addition, Pandemic has affected construction projects from various dimensions, the most important of which are cost, schedule, resources, logistics, and quality (Protivit, 2020).

Accordingly, Covid 19 as a pandemic has passed levels of hazard, incident, and disaster in many countries and in some others, it has crossed the level of crisis and turned into a catastrophe. Thus, unlike hazard, incident, and disaster, which can often be managed by a series of specific systematic actions, its management is beyond the control of many countries. In addition, unlike an organizational crisis that destroys at least one organization, or an epidemic that engulfs a region or city, this pandemic has the potential to create a worldwide crisis (Weiss et al., 2021) however, strategies and methods to deal with it have not been the same in different countries. The causes and effects of crises are vague or at least initially unknown.

A look at COVID-19 records from November 2019 until now shows that the cause and source of the virus are vague or at least initially unknown. In this situation, people blame each other for finding the culprit and the cause of the crisis, and often, the media also fosters these ambiguities. Also, Politicians do not give accurate information about it, and try to show themselves to be innocent of everything. The last human experience of a pandemic was about 100 years ago (1918) with the Spanish Flu (Trilla, Trilla, & Daer, 2008).

So, administrators did not expect such a crisis, and due to lack of planning, the pandemic management has so far failed. Finally, countries, like China, that made quick decisions and timely actions have been more successful in managing it, while some countries, despite having much time, did not take quick decisions and measures to control it, and therefore became involved in the crisis on a larger scale.

Based on what has been mentioned, in answering the first question, Figure 6 shows the extracted characteristics of the pandemic, which presents it as a crisis.

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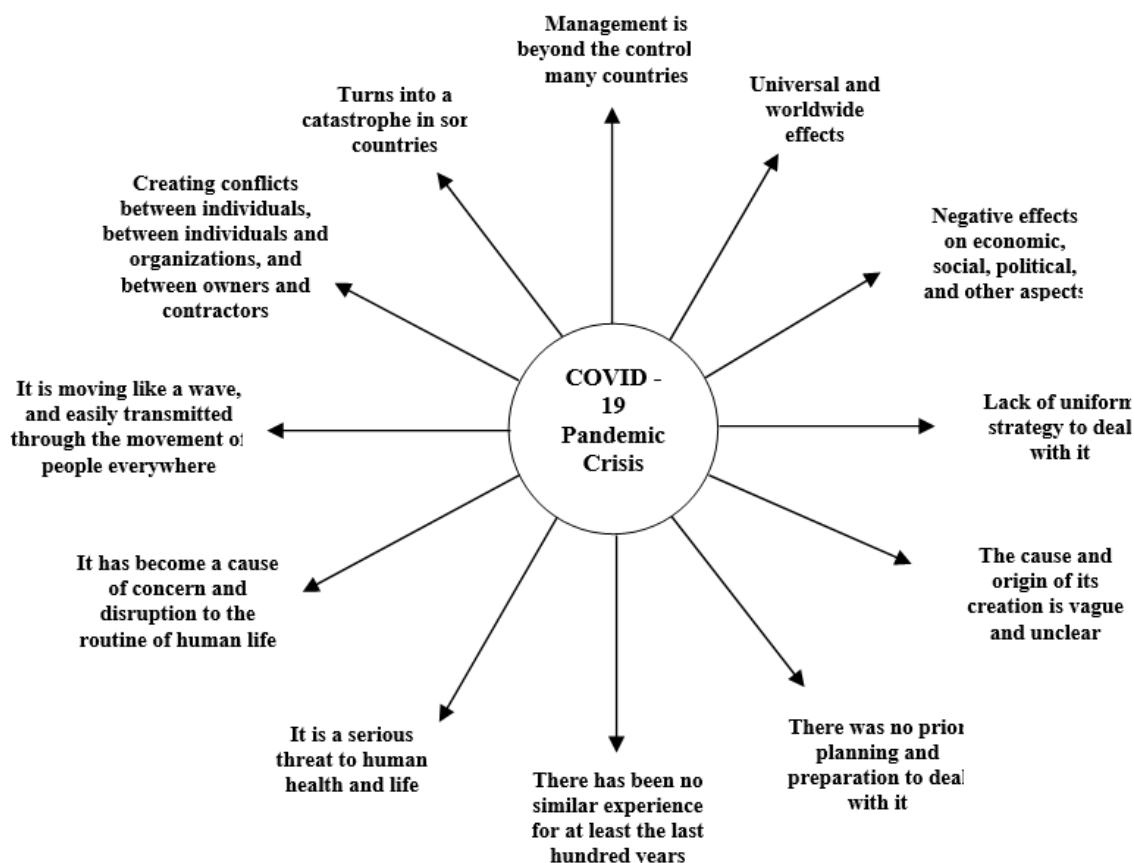


Figure 6. COVID-19 Pandemic crisis characteristics

Source: The researcher

4.2. The types of crises

In general, according to the different crises that occur, experts provide different classifications based on similarities and common characteristics. A framework which groups similar crises together, may allow organizations a realistic model for preparing for the variety of situations that may occur (Mitroff, 1988). Accordingly, researchers have classified crises in terms of nature (natural, and mad made) (De Saumarez, 2007; Pearson & Mitroff, 2019), in terms of origin (internal and external) (W. R. Crandall, Parnell, & Spillan, 2013), in terms of mode of occurrence (abrupt and cumulative) (Hwang & Lichtenthal, 2000), in terms of stability (transient or immediate and continuous or on-going crisis). Table 2 indicates the different classifications of crises which are offered by the experts.

Table 2. Definitions and types of crises

Auteur/ year	Title	Document's type	Industry	Crisis type	Numbers of cited
Pearson & mitroff, 1993	From crisis prone to crisis prepared: a framework for crisis management	Review paper	General	Economic attacks, environmental accidents, occupational health diseases, psycho events (e.g., sabotage, product tampering), damage to reputation, informational attacks, and breaks (e.g., recalls, product defects, computer breakdowns)	1114
Pearson & clair, 1998	Reframing crisis management	Conceptual article	General	Extortion, bribery, information sabotage, product tampering, vehicular fatality, copyright infringement, environmental spill, sexual harassment, computer tampering, escape of hazardous, executive kidnaping, personnel assault, product/service boycott, assault of customers, work-related homicide, product recall, malicious rumor, counterfeiting, natural disaster	2527

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Auteur/ year	Title	Document 's type	Industry	Crisis type	Numbers of cited
(Coombs, 2021)	Ongoing crisis communication: planning, managing, and responding	Book	General	1) attacks on organizations: computer hacking or tampering, rumors, product tampering, workplace violence, and terrorism, 2) when things go bad: defective products caused by company error, loss of key personnel, industrial accidents, transportation problems, and stakeholder challenges, 3) when the organization misbehaves: not addressing known risks, improper job performance that leads to an accident, legal and regulatory violations.	4094
(Marcus & Goodman, 1991)	Victims and shareholders: the dilemmas of presenting corporate policy during a crisis	Review paper	Organizational	Accidents, product safety and health incidents, and scandals	694
(Myers, 1993)	Total contingency planning for disasters managing risk--minimizing loss--ensuring business continuity	Book	Business	Natural disasters (floods, hurricanes, etc.), environmental events (Aircraft accidents, contamination events,	84
(W. Crandall, McCartney, & Ziemnowicz, 1999)	Internal auditors and their perceptions of crisis events	Review paper	Organizational	Specifically, they identified crises in terms of operational problems, negative publicity events, fraudulent crises, natural disasters, and legal issues	18
(Booth, 2015)	Crisis management strategy: competition and change in modern enterprises	Book	Business and organizational	1) creeping crisis which is defined as a gradually increasing threat to an organization. 2) periodic threat that is seen as routine, expected situations 3) sudden threat which puts the whole organization in immediate danger	504
(Burnett, 1998)	A strategic approach to managing crises	Review paper	Public relations	The two criteria of threat level, time pressure, and the severity of the events, classify and identify the critical. Burnett" using these three criteria and the criteria of reaction or response options, proposed a matrix to classify crisis where 16 houses exist	432
(Parsons, 1996)	Crisis management	Review paper	General	Immediate, emerging, and sustained.	173
De sausmarez, 2007	Crisis mgt, tourism, and sustainability: the role of indicators	Review paper	Tourism	Natural, or man-made crises	185

Source: The author

According to literature review, it can be said that a group of crises occur suddenly and have a sudden impact on the organization or society, such as accidents, natural disasters, sudden death, or disability of a key person etc., while others occur gradually. These crises start with a series of crisis issues and intensify over time and continue to a threshold level and then occur. According to Lichtenthal et al. (1999), abrupt crises come with swift forces that suddenly jolt organizations or societies away from equilibria, but

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cumulative crises gather momentum slowly although ultimately breaks out. They have introduced seven indicators to diagnose abrupt and cumulative crises (table 3) (Hwang & Lichtenthal, 2000).

Table 3. Indicators of abrupt and cumulative crises (Hwang & Lichtenthal, 2000)

Key characteristics crisis	Types of crises	
	Abrupt	Cumulative
Build-up speed	Rapid	Gradual
Predictability	Low	High
Specificity	Focused	Nebulous
Crisis recognition	Clear	Fuzzy
Trigger point	Specific events	Threshold-limit
Probability of occurrence	Time-constant	Time-increasing
Misalignment with environment	One/ few aspects	Many aspects

Given the characteristics of the Covid-19 already discussed, it has almost all the features of the cumulative crisis. The virus, for instance, does not occur all at once like a flood or an earthquake, but gradually spreads and becomes epidemic or pandemic. On the other hand, with the spread of this pandemic in one part of the world, it can be easily predicted that due to the rapid communication between people, it will spread to other parts as well. Another group of crises either occur naturally or a human factor is involved in their occurrence. Crises that occur without human intervention and by one of the natural elements, such as air (storm, fire, drought), land (earthquake, landslide, volcano), or water (flood), or a combination of these, are natural crises (March, 2002), but Man-made (i.e., anthropogenic, or human-induced) crises are defined as those “induced entirely or predominantly by human activities and choices” (UNDRR, 2018); the role of human may be intentional or unintentional (Pearson, 1993). This classification is important for prevention. Because natural crisis occurs due to natural factors without human intervention, their prevention may not be very meaningful, but the crises that the human factor plays a role in their occurrence are among the cases that can be prevented and controlled. Although it is not yet possible to comment definitively in this regard, it is more likely that humans will be involved in COVID-19 creation. Also, the role of humans in transmitting to others and spread it in societies is inevitable. Therefore, the Covid-19 crisis is closer to the human origin than to the natural origin.

Some crises have internal, and others have external origins. Internal crises are those that originate from within the country, like road accidents, but external crises have an external origin, such as terrorism, and war. Some complex crises have both internal and external origins, such as dust, and revolts (Moshabaki, 1992). According to official reports from the WHO, the Covid-19 virus originated in Wuhan, China, and spread rapidly to the rest of the world, infecting all countries (Cucinotta & Vanelli, 2020). Hence, for almost all countries, this pandemic has external origin. Because the source of this virus in most countries is external, people are more sensitive to its spread and expect more from governments to prevent it from outbreaking.

Parsons has categorized crises from another perspective. The first is immediate crises which have not any previous warning signs like earthquake. So, managers are not able to research and plan to repel them. The second are the crises that appear gradually. They created slowly and can be stopped by effective crisis management. Another one is ongoing crisis that last for weeks, months or even years (Maditinos & Vassiliadis, 2008). The strategies to deal with these crises depends on different situations including time pressures, the extent of control and a massive amount of these events. Given the nature of the virus, it can be said that it is an ongoing crisis because despite collective and international efforts to control it, the virus is still spreading rapidly. Experts believe it could infect humans and communities for years. COVID-19 can increase its stability by changing and upgrading itself. Therefore, human beings must learn ways to live with it.

4.3. Stages of crises management in projects

Researchers have classified the crisis management process into several stages. As table 4 indicates, they offer the stages in different models to help simplification of crisis management processes. A review of the literature shows that the models proposed by managers to deal with crisis are related to their attitudes, and based on the attitudes, the approach to crisis management will be different (Booth, 2015). In general, there are three perspectives on crisis management that are influenced by crisis management models.

A review of the literature shows that the models proposed by managers to deal with crisis are related to their attitudes, and based on the attitudes, the approach to crisis management will be different (Booth, 2015). In general, there are three perspectives on crisis management that are influenced by crisis management models.

1. Classic view- This view sees the crisis as essentially a negative and undesirable phenomenon that should be avoided in any way. According to this view, crises are quite destructive and deterrent in nature (Arbatani et al., 2009). Their research shows that most managers are not interested in thinking about the crisis (Meyers & Holusha, 2018).

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Table 4. Stages of crises

3 stages				4 stages		5 stages		6 stages	
(Lauge et al., 2009)	(Waryjas, 1999)	(Cretu et al., 2011)	(Coombs, 2014)	(Fink et al., 1986)	(Jaques, 2007)	(Mitroff, 1994)	(Pearson & Mitroff, 1993)	(Burnett, 1998)	(Chandler, 2008)
Precrisis	Pre-crisis	Pre-crisis	Precrisis	Prodromal	Crisis preparedness	Signal detection	Signal detection	Identification goal formation	Warning
Crisis event	The crisis hits	Crisis stage	Crisis event	Acute	Crisis prevention	Problem prevention	Preparation / prevention	Identification environmental analysis	Risk assessment
Postcrisis	After the smoke clears	Post-crisis	Postcrisis	Chronic	Crisis event management	Containment	Containment-damage-limitation	Confrontation strategy formulation	Response
				Resolution	Post-crisis management	Recovery	Recovery	Confrontation strategy evaluation	Management
						Learning	Learning	Reconfiguration strategy implementation	Resolution
								Reconfiguration strategy control	Recovery

Source: the author

2. **Natural law view** - This view considers crisis as a part of the nature of human life so that its occurrence is inevitable. Their attitude is still a negative one, yet they do not try to deny the crisis, but treat it logically (Arbatani et al., 2009).

3. **Inter-activism**- This view has a positive perspective of the crisis and believes that not only should it not be denied, but that it should sometimes be accepted. It considers crises as part of the social dialectic that are necessary for the growth and development of society (Sikich, 1993).

Based on the three types of views on the crisis, three approaches can be identified which the researchers consider them in developing crisis management models:

1. **Crisis flight**- Managers with this approach use passive and reactive strategies in crisis situations (Wester, 2011). They have no prior preparation or specific plan to deal with the crisis, and they will not act until a crisis occurs (Arbatani et al., 2009).

2. **Crisis fight** - Managers who take this approach do not deny it in times of crisis but accept it as a natural rule and deal with it with an active strategy (Wester, 2011). Therefore, this group of managers use all their abilities and capacities to predict the crisis and deal with it effectively when it occurs.

3. **Crisis acceptance** - Managers who have this approach not only accept the crisis, but always respond to the crisis by using a hyperactive strategy. They believe that any crisis can create opportunities, therefore, we must be prepared to use the opportunities for growth and dynamism (Arbatani et al., 2009).

The study of the introduced models shows that the initial models were not comprehensive, therefore, researchers have developed them over time and have moved towards rotational or wheel models of crisis management, such as Jacques' model. He (2007) rejected the idea that crisis management is a linear process that is managed one at a time. Jacques argued that important processes and activities often overlap or occur simultaneously, such as crisis prevention and preparation, and don't always proceed in one direction (Marker, 2019). His model has four primary elements including crisis preparedness, crisis prevention, crisis incident management, and post-crisis management, each with clusters of activities and processes. He concluded that understanding the relationship among these elements, and putting them in context of larger organizational management, diminishes crisis-related losses (Jaques, 2007).

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Because Covid 19 pandemic is a crisis, and at times it has even crossed the crisis level in some countries and turned into a catastrophe (Ritchie & Gill, 2021), standard crisis management steps can be used to manage it in projects. Thus, crisis prevention is the first and most critical step in managing the pandemic crisis because, given its rapid spread among the people, it is best to control the crisis before it outbreaks in the communities. In this regard, we must pay attention to the early warning signs of the imminent crisis. For example, from the time the Covid-19 was found in China until the announcement of a pandemic by the WHO, all countries had several months opportunity. Proper use of this time could help prevent it. When the prevention phase is not effective and the virus is spread in the community, immediate actions, such as respecting health protocols, closure of some centers and businesses, performing diagnostic tests, quarantine, and so on, must be taken to control the crisis. Since the experience of the crisis period can be useful for the future, the post-crisis phase can also be considered in the case of Covid-19 pandemic.

4.4. Conceptual model of project management in crisis situations

Based on what has been mentioned, the project management model in crisis situations is presented in figure 7. This model includes not only management at the time of crisis, but also pre and post crisis too.

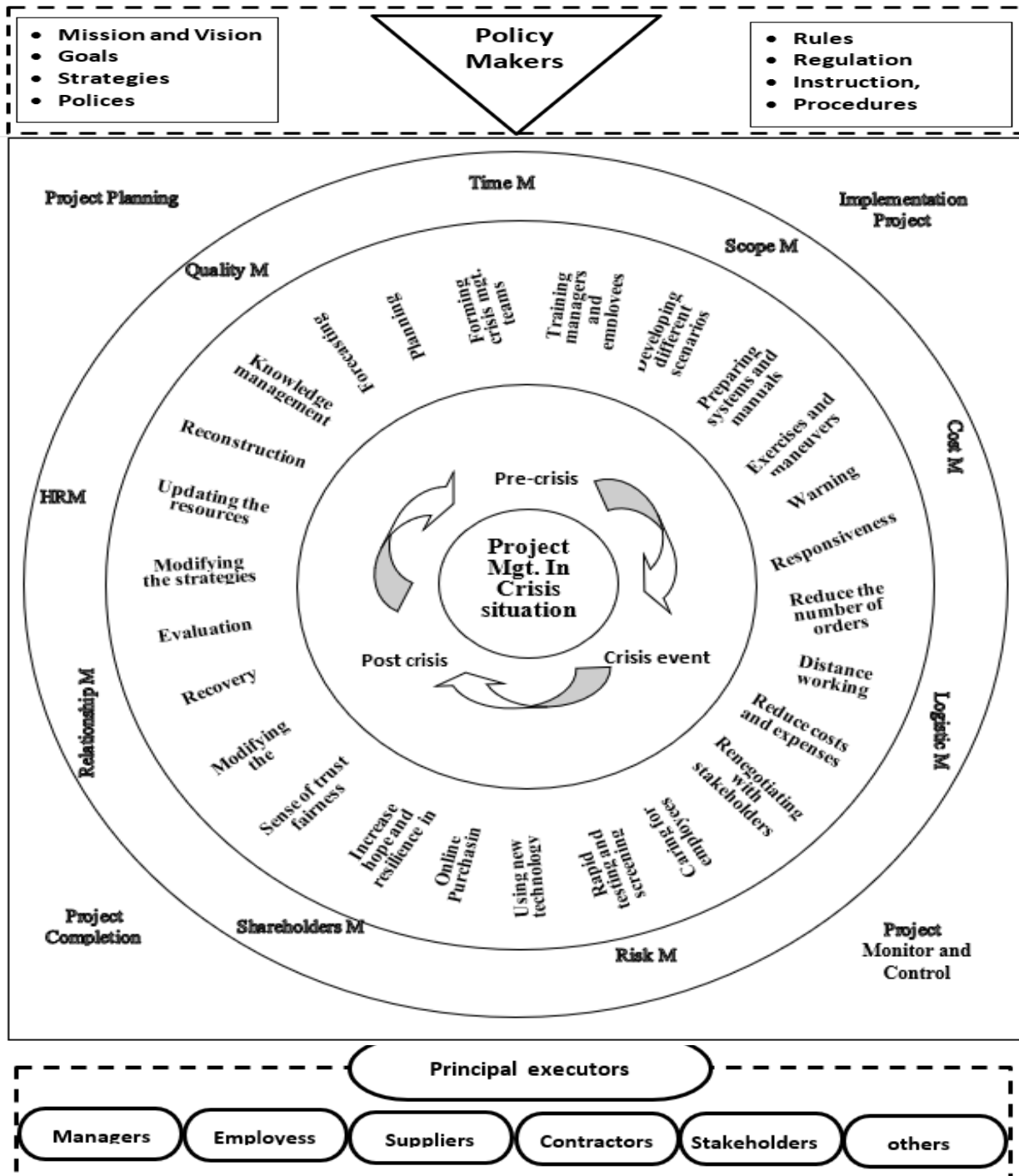


Figure 7. The framework of project management in crisis times

Source: the author

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As can be seen, to manage core of the model, i.e., project management in crisis situations, three main elements are considered. Each of these elements, which can sometimes not be done sequentially, includes various activities that will be introduced as project management strategies in crisis situations.

1. Pre-crisis: Project management activities are oriented to actions that must be taken to reduce known risks which could lead to a crisis. So, the focus of this stage is on crisis prevention. If we consider crisis management in projects as a kind of crisis management planning, then for project management, different steps must be defined and performed. First, it must predict the unfortunate phenomena or the crisis. Contingency plans must then be developed, and then crisis management teams must be formed, trained, and organized, and to complete the plans, they must be implemented on a trial and practical basis.

1.1. Forecasting - It is the first step in the proposed model, which is equivalent to the detection and expectation steps in general crisis management models. At this stage, the relevant authorities, including project management, are expected to anticipate various crises, considering the crisis management approach, and to adopt an appropriate strategy before the surprise occurs. For this purpose, project management can continuously monitor the environment from different dimensions. In this regard, the role of specialized and academic study centers can be very decisive.

1.2. Planning - After predicting the crisis, the needs are extracted and then the necessary resources are planned to address them. Although planning is an important step in crisis management, numerous studies have determined that a low percentage of managers have a crisis plan in place and even fewer have tested the plan to demonstrate that it is operational (Jaques, 2007). Therefore, at this stage, a high commitment must be created in the project management as well as the executors to plan and implement crisis management in the project.

1.3. Forming crisis management teams- It is one of the most important issues in crisis management in projects. After anticipating the needs, and planning to provide resources, it is necessary to organize resources. In addition, at this stage, roles, responsibilities, and ownership of crisis management processes in the project are also determined, and effective training provided to project managers and staff. This means that everyone within the crisis teams is fully aware of their duties and responsibilities. Crisis management teams can be diverse. Some teams, for instance, perform activities such as forecasting, planning, training, and so on, while others are responsible for responding quickly to crisis situations.

1.4. Develop different scenarios – If we look at the history of crisis management, we find that scenario writing is one of the planning models for crisis situations (Bouhaleb & Smida, 2018). Hence, scenarios can be used to design the crisis response preparations in projects. It is based on the scenarios that the needs to deal with the crisis in projects will be identified and the necessary planning is done for the future. Thus, scenarios by depicting a specific time in the future and expressing the factors and conditions of key variables of that period, are the basis for identifying capabilities in all areas to prevent, deal with and effectively recover from events in projects. Also, scenarios are the basis for performing various exercises to get more prepared.

1.5. Preparing systems and manuals - Includes crisis management infrastructure, equipment, “war rooms,” resources, documentation (Jaques, 2007). Preparing items for this step will ensure that PM and human resources are not confused in times of crisis in projects. Instructions and procedures provide time, place, how to use, users and much more information in crisis management. They also describe how resources and equipment are stored and maintained.

1.6. Training- Training is the main element in reducing human and financial losses in various natural and unnatural events in projects. Therefore, project management strategy to reduce risks and damages as well as effective crisis management can emphasize the training of managers and employees as well as project stakeholders including suppliers, contractors, engineers and so on.

1.7. Exercises and maneuvers - Crises are phenomena that occur under any circumstances. Therefore, it is necessary for the project management to always be ready to face and deal with various crises, despite the forecast and prevention measures. For this purpose, in addition to designing and implementing various systems such as communication, it is necessary to perform crisis management exercises in projects at different times and maneuvers in different scenarios to manage it. These exercises and maneuvers should be done based on scenarios. In mega projects, readiness must be created not only in the main project, but also in all stakeholders, including suppliers, contractors, and so on.

2. Crisis event: Project management must run procedures during the crisis until it is resolved. When a crisis is going on, PM must respond quickly, accurately, and consistently. This phase concerns crisis acknowledgment, and crisis response [8]. A set of measures at this stage will help control the crisis, but it should be noted that timely actions are more important at the beginning of the crisis. That is why some researchers (Jaques, 2007) consider the beginning of the crisis as a separate stage.

2.1. warning - At this step, the project management should first give the necessary warnings based on the signs of crisis, then, through the available facilities, create immunity for the human resources of the project. Awareness of the crisis can help PM to continue the activities in the project under the specified conditions and prevent a lot of human and material damage. In a related study, it was shown that project managers considered the detection of warning signals and awareness in the project to be important. According to their research, 33% of project managers consider this item necessary in project crisis management (Goździewska-Nowicka, Janicki, & Wilska, 2017).

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2.2. Responsiveness - At this stage, the crisis in project must first be prevented from spreading by emergency measures, and then it must be fundamentally controlled based on the developed strategies. Thus, the project management must take a set of measures to manage the crisis which the most important of them are presented below.

2.3. Reduce the number of orders - In times of crisis, the main goal of project management is to maintain the status quo. Therefore, they should refrain from receiving new orders until their conditions return to normal. According to a study by Gozdziwska et al. (2017), one-third of project managers participating in the survey were addicted that project management in times of crisis should reduce the number of orders.

2.4. Distance working - Because one of the most effective ways to control a pandemic is to prevent people from gathering indoors, project management should tend to distance working as much as possible using digital technology. Although large projects such as construction require staff to be physically present in the projects, many other projects do not require it. So, project management in times of the pandemic can extract the list of jobs that are able to operate in distance with usage superior technologies to prevent the presence of employees in the project.

2.5. Reduce costs and expenses - Project financing is one of the challenges of project management. In crisis, like the pandemic, PM must maintain sufficient cash flow to continue project activities. One potential strategy for develop project cash flow in times of crisis is to reduce short-term costs and expenses with the cooperation of suppliers so that normal operation of projects resumes. This strategy can give project managers the enough time they need to go through emergencies. According to a study by Gozdziwska et al. (2017) which is done as a survey, the project managers have believed “cost optimisation” (67%) is the most important action in crisis management in projects.

2.6. Renegotiating with stakeholders - The COVID-19 pandemic has led to the closure of many projects and delays in fulfilling commitments. This has reduced financially, revenue and cash flow, and made financial obligations to suppliers, lenders and other third parties difficult. In this case, the project management asks suppliers to extend the payment date and waive the costs of late payment, which are sometimes collected monthly. Project owners should also be reassured of their commitment to contracts, resumption of activities, and timely completion of the project. All these activities require renegotiation with which the project management is responsible.

2.7. Caring for employees - As an asset, employees are a crucial element through which project-based organizations perform their responsibilities. Consequently, whether based on instrumental or normative approaches to human resource management, PMs are concerned with their employees' well-being, especially during the crisis times when they feel monetarily and psychologically vulnerable. Hence, addressing and supporting for employees' issues is a critical responsibility of project management. As a result, the perceived organizational support (POS) on the part of the employees shows whether they are satisfied with organizational support initiatives and how successful is the organization or project in accomplishing caring responsibilities. Research shows that employees' POS affects their objective and mental performance and enhances their motivation, morale, capacity, and psychological ownership of the organization on the one hand and increasing their capacity for the implementation of the organization's core strategies on the other (Stinglhamber, Ohana, Caesens, & Meyer, 2020). Thus, the PM's support and care for employees in crisis times play a critical role in maintaining loyalty and strengthening employees' psychological ownership.

2.8. rapid testing and screening- Evidence suggests that Covid-19 is a crisis that may persist for years. On the other hand, for various reasons, it is necessary to resume business and project activities because a slowdown or halt in the project execution can have a significant impact on economic and countries. However, it should be noted that not all people with Covid-19 show symptoms. So, Covid-19 test for employee provides a safe workplace to promote project continuity. Therefore, project managers can help reduce the risk of outbreaks by regularly testing and screening staff. Regular rapid tests provide an extra layer of defence against the spread of the virus. Along with public health measures such as frequent handwashing, physical distancing, wearing a mask and vaccination, workplace screening will help to: slow the spread of COVID-19, keep the employees, their families, and the community safe, and safely reopen the workplaces and projects (Government of Canada, 2021).

2.9. Sense of trust and fairness - To increase Covid crisis tolerance in projects, a sense of trust and fairness must be created between employees and project managers. Trust and fairness in the pandemic period create a bilateral need for both project management and staff. On the one hand, employees need to feel that project management supports them in times of crisis. On the other hand, project management expects employees not to leave managers alone in times of crisis and to resume their activities with respecting health protocols. It is also difficult to follow health protocols without trust and fairness. Llewellyn (2020) believes: “in times of crisis, trust is the most important thing to consider if you want to communicate health advice” (Falcone, Coli, Felletti, Sapienza, Castelfranchi, & Paglieri, 2020). trust in project management positively influenced employees' willingness to adopt recommended behavior in the pandemic time.

2.10. Using new technologies - In times of crisis, new technologies allow PMs to be able managing effectively the crisis by using hardware and software. With the expansion of Covid, many companies and organizations have changed their type of activity and many of their activities are done online. This method can be done in many projects. Project purchasing managers, for example, will be able to make all purchases online using new technologies.

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2.11. Increasing hope and resilience - Experiencing different emotions such as fear and anxiety in times of crisis can take a lot of energy from project's human resources. These emotions cause HR to become more and more depleted and thus their performance decreases. Increasing hope and resilience can facilitate the ability to cope with a crisis mentally or emotionally or return quickly to a pre-crisis state.

3. Postcrisis: Management must put in place actions to recover from the crisis, which means the recovery process, evaluation of crisis management and next crisis' management preparation (Lauge, Sarriegi, & Torres, 2009). So, with crisis control and management, project management actions do not end, but they must prevent the recurrence by properly analyzing and evaluating the crisis, as well as the performance of crisis management in the project, and if they occur, they can take timely action to prevent heavy damage. Hence, "it is often necessary to take restructuring measures allowing restoring a state of balance and completing the project by obtaining its goals" (Gozdziewska et al., 2017). Important actions at this stage include:

3.1. Recovery - This step which refers to the post-crisis control, implies a set of measures that lead to the normalization of the situation in projects. Given that the crisis has created difficult conditions for projects and may have caused many changes and relocations, so the situation must return to normal; like a professional athlete who needs recovery after a heavy race.

3.2. Reconstruction – At this stage, PM is trying to reconstruct and clear the crisis environment of any signs and evidence of crisis. This stage is the stage of repair, improvement, rehabilitation, and redevelopment in projects. For example, spaces that have been temporarily created to control the crisis will be removed, or if someone has a problem due to the crisis, the PM will take the necessary measures to improve him and return to the workplace.

3.3. Evaluation - Evaluating the performance of project management as well as project teams in crisis management can reveal strengths and weaknesses. The information from these evaluations will be useful for modifying the plan and strategies. So, in this stage, based on the existing standards and criteria, the activities performed, and the performance are evaluated.

3.4. Updating the strategies – Project managers believe that changes in the strategy of the crisis team operation is an important post-crisis action (Gozdziewska et al., 2017). In this case, innovation helps to conducting strategic renewal in response to crisis. Studies show, crises open opportunities for strategic renewal, even for firms that rigidly stick to their strategy under business-as-usual conditions (Wenzel, Stanske, & Lieberman, 2020).

3.5. Updating the resources – In times of crisis, many resources are used in projects. At this step, project management replaces and updates new resources for potential uses. Therefore, all conditions and standards of maintenance and updating are observed.

3.6. Modifying the salaries – In times of crisis, project management may have changed the salaries of some or all employees to maintain the status quo. For example, it may have to pay some extra payments to prevent work from stopping, or vice versa, it may stop paying extra payments to some. At this stage, project management returns salaries to normal by modifying them.

3.7. Knowledge management - For all damage the pandemic has done, it has been a good experience for all of us. Project managers are no exception to this rule. Undoubtedly, in case of similar conditions in the countries or the continuation of the disease, we are expected to see more success and less damage by using the experiences gained in this period. So, it seems, managing experience and knowledge gained in this period play an important role in the effective management of similar crisis. KM is the management of corporate knowledge that can improve a range of organizational performance characteristics by enabling an enterprise to be more intelligent acting (Nickols, 2000). In other words, knowledge management is the process of converting tacit knowledge produced in an organization into explicit knowledge (Stinglhamber et al., 2020). Although knowledge management is one of the strategic assets of any organization, it must be pay attention more in managing the pandemic crisis due to the inefficiency of usual methods and providing more opportunities to present creative and innovative solutions. Obviously, in this context, not only successful experiences, but also failures and challenges must be considered.

Each of the steps and measures mentioned for crisis management are performed in the project management context. Therefore, they are managed as different projects based on the nine elements of project management, such as time management, cost management, scope management, quality management and others. Also, the project management process including project planning, implementation project, project monitor and control, and project completion, which are presented in the four corners of the model, are used.

Policymakers play an important role in developing project management system in crisis situations. They consider mission and vision, goals and objectives, strategies, policies, rules and regulations, and other resources to develop the system. In other words, all steps and actions are based on looking at these resources. Thus, these resources are the main basis for the development of project management in crisis situations. The implementation of the model also requires various factors, like PMs, employees, suppliers, contractors, and others, which are introduced in the lower part of the model. Organizing and coordinating these factors will play an important role in managing the crisis and continuing the project.

5. CONCLUSION

In conclusion, it can be said that the pandemic crisis, despite its many negative effects, has been a good experience for project managers. After the end of the crisis period, projects will fall into one of two categories: 1) Projects that PMs do nothing and hope such a crisis will never happen again. Managers of these projects take very dangerous risks. Therefore, their activities will be

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disrupted again with any crisis. 2) Managers who pay attention to the effects as well as the experiences left by this crisis and draw a new map and strategy to be more resilient in the event of a crisis. These PMs prepare everything to deal with any kind of crisis. Thus, they generalize crisis management to pre-crisis, during-crisis, and post-crisis. With the experience, they find that crisis management in projects is not just managing crisis at the time of its occurrence, but they must also have effective pre- and post-crisis strategies.

The use of pre-crisis strategies can prevent crises from occurring, or at least reduce its destructive effects on projects, because project agents can manage it by recognizing the crisis and the effective strategies. Also, crisis management strategies help project managers to control crises and be able to get out of crisis situations. Post-crisis management strategies play an important role in documenting experiences and using them in the future. For example, knowledge management can transfer past experiences among professionals and make them safer to deal with crises. Finally, it can be said that each component of the project management model in crisis situations, which is the result of this research, requires different measures to be implemented. For example, to use knowledge management as a strategy, the system must be designed and implemented in projects. Using these strategies and implementing them in projects is expected to increase management capabilities to prevent and control crises, particularly the Pandemic Crisis.

Although the paper enriches the PM literature in crisis situations, it also faces limitations, the most important of which is the use of limited resources. Naturally, more resources can provide more solutions. Also, using other research methods, such as survey, research results will be more valid based on the perspectives of project management experts.

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