THE PESTEL DYNAMIC OF PANDEMICS: THE THEORY OF MANUFACTURED CRISIS, THE COMMERCIAL, ECONOMIC ENTERPRISE OF PLAGUES, PESTILENCES AND PATHOGENS

by

Gerline Ferguson

DISSERTATION

Presented to the Swiss School of Business and Management Geneva

In Partial Fulfillment

Of the Requirements

For the Degree

DOCTOR OF BUSINESS ADMINISTRATION

SWISS SCHOOL OF BUSINESS AND MANAGEMENT GENEVA

June 2025

THE PESTEL DYNAMIC OF PANDEMICS: THE THEORY OF MANUFACTURED CRISIS, THE COMMERCIAL, ECONOMIC ENTERPRISE OF PLAGUES, PESTILENCES AND PATHOGENS

by

Gerline Ferguson

Supervised by

Dr. Dejan Curović

APPROVED BY

Vasiliki Grougiou

Dissertation chair

RECEIVED/APPROVED BY:

Admissions Director

Dedication

This research paper is written in honor and in memorial of my very special, deceased eldest brother, the late Dr. Jim. B Saint Remy (1977 – 2023). Jim was my inspiration, an instrumental consummate trailblazer, and a studious person. He was the first in the family line to attain a doctorate degree, which was such a noble accomplishment, and I shall continue to carry the mantel of achieving academic success on this lifelong journey of learning.

This dedication is also shared with my three (3) amazing and wonderful children Kendrick, Kendreya, and Kendall Ferguson. My everlasting encouragement and inspirations to succeed in life and to thrive non-stop. They are fuel behind my inspiration which have propelled me to embarked on this honorable quest and academic journey of excellence. I am forever grateful. Also, to my husband Kendrick "Kenny" Ferguson Sr., to demonstrate that all things are truly possible to the thirsty soul that is unwaveringly willing to take the baton of wisdom and the mantel of knowledge and run with it. All achievements are only close to one who is willing and dares to attain it. There are absolutely no impossibilities but only the self-limiting beliefs we ascribe to ourselves. There are limitless possibilities to be attained to the willing heart and mind.

To the future generation yet unborn, this remarkable academic achievement is a testament to let them know that "I did, so to can they too". Take the opportunity to excel in life. Education is key to success and it can make a vast difference in one's life. It is the key that opens doors, it breaks barriers, it liberates and it can create wonderful opportunities, experiences to the great big world of limitless possibilities and potential.

Acknowledgement

Acknowledgement is extended to the DBA Mentor, Research Supervisor, and Professor, Dr. Dejan Curovic for insightful guidance. I give my sincerest appreciation for all the supervision rendered during the course of this research study and throughout the process of compiling the thesis manuscript. I value the technical direction, support and consultation. To the UpGrad team, to my assigned UpGrad peer buddy, Ms. Hiral Patani, 'thank you!" for the all the assistance and follow-ups. I would also, like to convey "thank you" to the SSBM faculty and Dr. Ace that assisted with the various online webcast presentations. To my son, eldest Kendrick Ferguson Jr., (KJ) who read, edited, and provided insightful constructive feedback to this research paper work, I say a heartfelt "thank you"!

To all those persons that willingly helped in the review process, editing and giving constructive feedback, I sincerely thank them all. My peer editors that gave constructive critical feedback including Miss Nerissa Hamilton, my chief editor who worked tirelessly to help in the finalization of this research.

I even acknowledge the silent dissidents, those who may have doubted the vision and mission for higher academic attainment. This is to demonstrate that with faith, persistence, and perseverance anything is possible. Oppositions when used constructively is a tool to help fuel the vision, when transmuted it propels the necessary actions that foster positive results.

ABSTRACT

THE PESTEL DYNAMIC OF PANDEMICS: THE THEORY OF MANUFACTURED CRISIS,
THE COMMERCIAL, ECONOMIC ENTERPRISE OF PLAGUES, PESTILENCES AND PATHOGENS

Gerline Ferguson
2025

Dissertation Chair: Dr. Vassiliki Grougiou
Co-Chair: Dr. Jose Ramon Bronet Campos

The purpose and intent of this academic thesis research paper is to fill in the knowledge gap of current academic literature. To add to the existing repository of scholastic knowledge. It seeks to take an in-depth look at pandemics wholistically by thoroughly examining the current empirical evidential data on disease outbreak on economies globally and throughout history. This paper will assess pandemics through the theories of economic crisis. It will also evaluate the Political, Economic, Social, Technological, Environment and Legal forces using the "PESTEL" framework, crisis management concepts, and strategic management on disease control and outbreaks. It will observe pandemics through the microscopic and macroscopic lenses of business, investments, global trade, commerce, economics and finance, using business models, methods, systems, cycles, tools, strategies and frameworks. This academic paper seeks to analyze the scientific notion, and the spillover effects of pandemics throughout history juxtapose to the present era, whereby

mapping out possible predictive future patterns, and probable trajectories, of both short-, medium-long-term patterns.

This research is a thorough multifaceted approach and it is an elaborately meticulous assessment to explore and dissect the vast impact of pandemics on society and global economies on all levels. This paper seeks to deeply analyze the evolutionary process both the physiological characteristics, the psychological, the sociological, the theoretical, the philosophical aspects from ancient pre-historic antiquity to this modern era and beyond. It offers a comprehensive evidentiary evaluation of pandemics and their widespread impacts on societal developments and global advancements.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I:

INTRODUCTION

1.1 Introduction

Pandemics are not novel phenomena within this era or within this dispensation of time. They are ancient occurrences found throughout the epoch of time, transcending history and antiquity. They have propelled society, and affected economic systems, civilization and the entire evolutionary process of societal development for countless eons and millennia (Glatter and Finkelman, 2021). They have impacted the trajectory and the fundamental fabric of life by steering the path of globalization, economic trade, commerce, investments, finance, shifted cultures, impacted social progress, propelled scholarly empirical research, advanced clinical studies (Boire et al., 2014). Pandemics have fast-tracked new medical discoveries, pioneered radical revolutionary improvement in research, development, innovation, and have fostered rapid growth in technology. They have accelerated academic knowledge, enhanced public political policies, caused swift enactment of legislations and quickened reforms (Sampath et al., 2021). Pandemics have also, pushed for immediate modernization of structures and systems. They have propelled the legal systems to move rapidly, whereby recalibrating the core principles that govern life. Pandemics have caused the immediate governmental powers to be extended drastically and instantaneously, whereby initiating sweeping restructured improvements on national, regional and global levels (Antràs et al., 2020).

These various extremely reformative measures have catapulted civilization to new frontiers of unprecedented leaps and bounds, heights and depths which has formulated the very basis for creating this transformative modern era we currently live in. (Jorda et al., 2022). Pandemics are

tumultuously disruptive forces (Huremovic, 2019). They have thrusted civilization into new spheres and dimensions, and have brought about everlasting indelible system overhauls (Sarfraz et al., 2021). They have imprinted permanent impressions on humanity. The PESTEL framework has brought greater insight and deep profound perspective on this dynamic topic of pandemics (Rubicnic, 2020).

1.2 Research Problem

The research problem statement is a very significant aspect of this thesis as it relates to the broad discussion and perspectives (McGaghie et al., 2021). The subject matter will be both microscopically and macroscopically explored and evaluated through data assessments and various tools such as the SWOT matrix, Root-Cause assessments, PESTEL analysis. The evolutionary dynamics of pandemics and their effects on systems, community, economy, society, humanity and civilizations has always impacted humanity, economies, and civilization in so many ways(Callegari and Feder, 2022). Therefore, looking at both external and internal factors and analyzing them is crucial. Pandemics are deep probing conundrums, a vast puzzling enigma and an interesting mysterious challenge for countries, and economies. To fully comprehend the vastness of this topic this merits detailed investigation into historic data. It calls for assessing and excavating past academic research findings, evaluating most recent and current landscapes and possibly predicting future pandemic trends and outcomes using the PESTEL model and factors (Thakur, 2021).

This study will seek to share broader perspectives and a cross-section of insights through examination and use of multiple credible academic reference sources. This is to evaluate both the conventional and unconventional means and methods of pandemics with relation to both short-, mid- and long- term financial socio-economic impact. The co-existing factors such as political and

governmental strategies, trade-zone economic warfare, trade wars, regulations, legislations, resource management, financial modeling, strategic management, resource distribution, demographics, population control, powers and wealth redistribution, infrastructural evolution, commerce, supply chain, logistics, transferences (military, legislative and political), bio-terrorism research, social reengineering global catastrophic risk management (Bostrom and Cirkovic, 2011), and the fundamental aspects of the financial systems and commercial operations will also be examined (Hyman et al., 2021).

The research will deeply assess the legal, business, commercial, social, psychological effects of pandemics on nations, sovereign states and economies throughout history from a political, governmental and legislative view, mapping a correlation from antiquity until now, ending with the most recent outbreak of the novel corona virus 2019 global pandemic (Hyun 2020). To illustrate the rationality of this theory, the study will also look at the different aspects of bottom-line profits, impact, economic spill-over effects within sectors by observing pandemics from the microeconomic and macroeconomic point of view, and assess the underlining factors they yield in totality (Van Bergeijk, 2021).

This academic research paper seeks to coterminously evaluate pandemics vis-a-vis with the financial outcomes from past, present and perhaps possibly predicting and mapping a detail sketch, of potential outcomes and pathways of what pandemics may resemble in the near or distant future (Kilbourne 2008). What pandemics of the future might perhaps look like is another interesting phenomenon to explore and how to address or approach this global problem with an opportunistic set of perspective, knowledge and ingenuity. This paper seeks to investigate and connect the various aspects implication ramifications observed.

1.3 Purpose of the Research

The aim, objective and purpose of this academic study is to thoroughly review the relationships between the occurrence of pandemics and the PESTEL framework merged with various academic theories such as economic theories, the societal lifecycle theories that affects humanity, society, history, anthropology, and civilization (Petruneko et al., 2022). The social psychological theories intersecting with political science, and economic science theories that is related to social behaviors. The research will look at both mainstream, conventional, familiar, scholarly notions, and the unconventional, unfamiliar research models, concepts and philosophies into this specific topic and then evaluate all key evidentiary facts. This paper will also look at instances where theories crossover, intersect or mesh into the greater economic domains, perspectives and concepts.

This thesis documents empirical historical, scholarly data of how pandemics have affected humanity, business, economics, monetary and fiscal policies, governmental expenditure, political interventions, strategies and legislative developments (Gunkel, 2020). It will look at how pandemics have affected human migration, demographics, population, segments and social and religious trends, and systems. The eco-system is such a broad and dynamic subject but the PESTEL model amalgamates and aligns it well into one unified central focus field. The overall purpose, aim and objective of this academic research is to:

- Fill-in and bridge the gaps of current academic literature.
- Augment to the existing body of knowledge.
- Objectively educate by presenting fresh new perspective and insight on the multifaceted topic of pandemics and highlighting the various PESTEL influences and systems.

- Stimulate engaging broad dialogues and discussions.
- Dispel and demystify the trepidation on the subject matter.

The novelty of the research work, and the new knowledge and insight it brings to the forefront by expanding on current academic literature is important. The overall contribution is the practical, applicable knowledge and the business solution to and life it brings. Expanding on existing data repository can stimulate new research within this domain and within the PESTEL context along with other frameworks, models and tools.

1.4 Research Significance

The findings of this research study can act as a catalyst and reference repository and depository by adding significantly to the vault of existing academic knowledge that will benefit a wide range of audiences including academia, professional, financial, business, investments, industry and services sectors, military, governmental organizations, legal, law enforcement agencies, non-profit "NGOs", public organization, students, peer researchers, around the world and the humanity at large. This type of critical research is vitally important and necessary to the wider global community and for academic knowledge database. It is vital for political information transferal and for meaningful engagement with keen, introspective insight to chronical such important independent scholarly research development. In the technological and medical arena, it is vital to research and assessment, both the financial and economic components. And in the free-market enterprise system where profit is a critical key component in-depth comprehensive evaluation is essential. It is necessary for political, governmental, military and national security, law discussion. This research paper seeks to amalgamate all the conventional wisdom, sources, understanding and advancement in this field of knowledge. Pandemics cannot be looked at in siloed perspective but must be assess on a general scale (Antras, 2020)

This paper also speaks to the 'hesitancy and skepticism views and standpoints surrounding the topic of pandemics', and looking at skeptical notions, opposing dissenting views and reluctant stances in an unprejudiced, unbiased, constructive, objective, rational and logical way by assessing their veracity and or validity using empirical evidence and current credible academic research literature to gauge and measure these perspectives (Elyassi, 2021). Some aspects may even be seen as taboo topic areas despite a large body of acceptance by a greater segment of the global population that questioned the measures, strategies, legislative powers, and intervention deployed by the governments or single global entities during a pandemic, where they are conventional or unconventional, mainstream or otherwise (Denmark, Harper, and Attwell, 2022). This research to assess all these perspective (Fukuyama, 2020).

1.4.1 Research Hypothesis

This investigative research paper aims to look at the micro and macro factors of pandemics, economies, diseases, outbreaks, financial reforms alongside their greater fiscal and quantifiable dynamics throughout society and human civilization (Boire et al., 2014). This paper is a thorough in-depth comparative analysis, used in conjunction with interdisciplinary research methodologies, to assess the current historical data quantitively (Bowen, 2009). The research study seeks to use academic qualitive comparative studies, and resources derived from secondary, conducting of both fundamental, technical analysis by using comparative assessment methods (Azungah, 2018). It will use various theoretical frameworks, perspectives and theories on the subject objectively. Hence, this research will expound and illustrate the relationship of pandemics with the human evolutionary process, societal cycles, breakthroughs and the advancement of history and civilization (Rubicnic, 2020).

Pandemics have in one way or another significantly and drastically changed, molded and influenced societal concepts, patterns, behavior and psychological perceptions from ancient millennia to the present time (Bramanti et al., 2016). Throughout time, pandemics have shifted wealth, prosperity, and resources with both the governmental and political interventions which have been applied in extraordinary measures in all areas necessary to support the greater economic infrastructure through enactment and implementation of numerous monetary and fiscal policies, deployed within governmental agencies, and quasi agencies. The federal government, central banking and monetary systems have enacted various stabilization measures, strategies and economic models in tandem with government strategies to steer the economy. Governments sanctioned various economic stimulus packages and dispended social incentives along with implementing several quantitative easing measures. These systems and strategies were most prominently visible in the Covid-19 pandemic 2020-2023 (Gunkel, 2020) There are also post pandemic initiatives being rolled out after the pandemic was declared endemic by the various government health regulatory agencies and medical experts in tandem with International Monetary Fund (IMF), World Bank, Bank of International Settlement (BIS), the United Nations (UN) and global supra-agencies. The most salient hypothetical question is, "Can pandemics be a tool to reshape systems, or resetting of systems, economies? And can it have a trifactor effects on multiple regions, sectors, for the shifting, balancing of control, or redistributing powers?" (DaSilva, et al., 1992). Hence, it is hypothesized that pandemics are monumental wealth and paradigm shifters that may bring sweeping reformative and landmark changes that touch all aspects of the PESTEL spectrum (Sarfraz et al., 2021). Are they the rhythm, ebb and flow, the ripples of economic structures and systems?

Can pandemics be a gateway transitory strategy, governmental, or military technique for short, mid, and long-term for transformative growth and shift in progress that can recalibrate

complex systems, cycles and structures? (Gibson et al, 2021). Could modern pandemics through gain of function (GOFR) be used as a socio-economic fiscal, monetary tool, or quantitative easing technique in order to harness possible economic outcomes - the type of outcomes and momentum as postulated by DaSilva (1999) and Kadlec (1995)? An in-depth investigative analysis approach into this area is critically important, hence, our investigative evidential research to test the theories, and notions with PESTEL Are pandemics a hierarchical mechanism or an economic framework apparatus, in the lenses of crisis management and influences global finance, markets, commerce, economics, social policies, framework and to influence human behavioral psychology? (Surico and Galeotti, 2020).

1.4.2 Background of the Research Hypothesis

Pandemics, disease outbreaks, epidemics have been fundamentally known to be all naturally occurring phenomena of nature's own evolution and biological processes (Christopher et al., 1997). They are classified as extraordinary evolutionary occurrences from the wild ecosystem manifesting throughout the passage of time, and erupting sporadically and spontaneously and causing sudden chaos death and disruptions, which occur in normal scenarios from time to time (Perlman, 2020). They are known to have been derived from sometimes unexplainable complex mysterious yet natural origins in the ordinary evolutionary ecosystem and development in the wildlife. Some pandemics and disease outbreaks have been shrouded in scientific anomalies, great unexplainable mysteries and irregular nuances as such with the Covid-19 pandemic 2020 (Daszak, Olival and Li, 2020). This is where "gain of function researches", "lab leaks theories" and ethics have emerged. These subjects have morphed, emerged and have now opened the portal to greater, deeper questions, concerns ethically, theologically, socially, philosophically and has brought significant insight for more discussions, investigations and broader dialogue and other scientific

aspects (Skopec, 2020). The observation of the "Gain of Function Theory" phenomena (Selgelid, 2016), and the "Lab Leak Theory" (Baker, 2021) as presented has prompted the scientific, academic, legal, social-civic community to ask questions and seek answers (Duprex et al., 2015).

According to congressional hearing by the former Chief of Staff and Director at the United States, the Center for Disease Control (the CDC) Dr. Robert Redfield has presented federal testimonial into the matter. Again, these latest developments have opened the gateway into newer concerns and fresh, profound curiosity into the subject matter. Have pandemics been used for centuries as a viable economic, political tool? As we assess various views, theories, perspective and analyze them with both current data and past historical facts we can see the various patterns and analyze and interpret the information differently.

Pandemics have their economic advantages and disadvantages ranging from political intervention strategies, to governmental influences, such as mobilizing security and armed forces, states law enforcement services deploying military officers including placement of the national guards, and the mobilization of tactical forces, as threats to safety and national security. Can pandemics be used as bio-terroristic activities as postulated by DaSilva, (1999), and by Kadlec, (1995) as strategic warfare operations and as biochemical weaponries? Can pandemics be used as terroristic tools for hostile invasion? (Allen et al., 2009), The global narratives have brought to light fresh perspectives and insights alongside volume mounted evidence toppled with the unanswered questions and suspicions (Moosa, 2021)?

Looking at this subject matter of pandemic and its underlining sub-topics from many directions and standpoints of how they have impacted past activities and influenced business cycles, market forces, the economy systems, global financial movement, trade, investments, commerce, logistics, distributions can provide a greater insight and appreciation and understanding of the subject. This is necessary to objectively assess the problem and challenges then to garner a

greater understanding from all angles and perspectives on this topic of pandemics as presented as presented (Kilbourne, 2008). This subject is both very elaborately provocative, yet intriguingly necessary for academic broad discussion. It is immensely enlightening and an intensively sensitive, expansive topic as it probes further depth as there are inherently various aspects and facets to it, both known and unknown variables (Boire et al., 2014).

All things are not always equal in all matters as presented and require further deep assessments and investigative research. Many of these topics seem as dubious or are classified as interestingly far-fetched, or eccentric ideologies and subjectively speculative views. This subject matter can be labeled as hazardous perspectives or conspiratory theories. Therefore, bridging the empirical data gap, the knowledge gap, the temporal gaps, and evidence gap will help in the greater comprehension of this. This topic that has never been fully scoped, analyzed, rationalized and fully explored in the conventional fore-front narrative and global main stream discussion forums on these perspective and ideological gaps as highlighted. The quest for engaging in meaningful, insightful discussions that will incite intelligent engagement and feedback into the various probing questions is needed. More dialogue is needed to assess the general census, and conventional narratives data as presented. However, all these questions warrant credible answers and comprehensive unbiased investigative approaches into this critically important subject matter (DaSilva, 1999).

1.4.3 Justification for the Research

The justification of this research paper is to intelligently examine and critically assess what is known about pandemics, seeking alignment by evaluating the prior works that have been done and research conducted by quality, credible and valuable academic sources, using secondary data, tertiary data, academic researches and case studies. The aim is to present a significant, cohesive

and logical argument and to demonstrate an objective interpretation with unbiased evidence. The historical aspects of pandemics are intriguingly elaborate and the concept of modeling pandemics as a forged economic tool used to reshape and redesign civilization is a possible explorable factor to assess (Sampath et al., 2021). There are various theories and hypotheses to give a broader possibility and perspective on the subject matter, especially as a business subject area when looking at globalization and trade wars technological advancement, (Nkirote and Murtuzalieva, 2021), deep quantum science, and futurism (Petrunenko, 2022). This research is seeking to provide understanding of this concept of pandemics and the intimate connection that exists with economics and civilizations as a whole (Bramanti et al., 2016).

This research is necessary because it will help academia to expand the knowledge and forge greater discussion of the subject on multiple levels and disciplines. It will help other academic and professional researchers, nations, city, states, region, industry, sectors, businessmen, government to link the gaps and see how this phenomenon has impacted civilization throughout history (Huremović 2019). This critical topic is crucial as the possible impact is far-reaching and broad. It can lend to proposing robust solutions and devise strong strategies that may possibly impact outcomes and decisions for the future. It can provide fresh unbiased, comprehensive insight and perspective on all spectrum so that rational, logical decisions can be made by law makers, legislators, civilians, academicians, statemen, businessmen, scientific professionals, medical experts public and private institutions, and all persons. In short, better informed, objective and cohesive decisions concerning this poignant topic issues surrounding pandemics can be made (Dry 2010). This would foster great, candid, clear engagement and forge broader, meaningful dialogues by furthering awareness, galvanizing multi-level inter-discipline support and meaningful discourses about pandemics, rather than a narrow perspective (Glatter and Finkelman, 2021).

This thesis offers an unbiased, broad-based, explorative view of all the relevant facts, both current and historical past data, alongside credible, academic data, peer review research, books, periodicals and associated empirical information on the subject matter. Research will be conducted to gather, assess all the necessary pertinent evidence to formulate an unbiased and constructive conclusion.

1.4.4 Reason for Chosen Topic of Interest

During the year 2020 the whole world absolutely stood completely still. All physical, face-to-face, exchange, transactions halted. Every nation, state, city, region, locality, metropolitan whether large or small, rich or poor, rural, urban or suburban, each and every one was literally brought to a complete screeching halt as the devastating novel pandemic unfolded. Governmental, medical mandates, directives, edicts, sanctions for violation of protocols of unprecedented measures were imposed instantaneously. The novel corona was a sudden monumental new experience that occurred around the world nearly simultaneously. There were immediate, lockdowns, shut-downs, and restrictions of an astronomical global scale which impeded movement, physical interaction, physical travel and trade. Flights were instantly grounded and cancelled, isolation, quarantine, a halt to everything and life took place (Ferguson, 2020). The novel corona virus, a severe acute respiratory syndrome virus 2 (SARS-Cov-2 or covid-19) a sub-variant of the predecessor Middle Eastern Respiratory Syndrome (MERS) virus immediately reconstructed life. The newest Covid-19 virus was coined the deadliest, contagion to hit the global world highly transmutable and transmissible. It brought global panic, pandemonium, market collapse, financial uncertainties and economic instability, hysteria and much trepidation, anxiety and fear (Mitroff, 2020). It came with a tremendous number of uncertainties and fear across the globe. This chaotic virus unraveled itself as an unrelentless pandemic of the grandest proportion

on a global scale. All the major cities essential shutdown from London to Madrid, Spain, Paris, France, Germany, Hong Kong, Tokyo, Tawain, Canada, the United States of America (Al-Hashimy 2022).

The pandemic affected all countries and basically touched all continents and all humans concurrently. All nations, regions, countries were simultaneously affected and impacted at once during the Covid-19 pandemic, no country or region was spared globally (Ferguson et al., 2020). All governments worldwide were in tandem deploying mutually critically drastic immediate public policies, measures, mandates, restrictive orders, edicts, limitations, sanctions, protocols, federal emergency disaster plans with severest military intervention and penalties which were enacted immediately and impacted over 7.5 billion people simultaneously (Bennett, 2021).

The pandemic of 2020 was truly an incredible event that resonated globally (Perlman, 2020). The novel Corona virus "Covid-19", was "The worse crisis in every sense", according to many professional experts (Mitroff, 2020). The very deadly and highly contagious infectious strain of influenza which presents itself with "flu like symptoms" included severe fever pneumonia that resulted in respiratory distress and sudden death as was with the Middle East Respiratory Syndrome 'MERS' outbreak of 2012, its predecessor outbreak. Professor Dr. Shi Zhengli, Virologist Scientist, conducted gain-of function research at the Wuhan Institute where The Novel Corona Virus plague was reported to have started in Wuhan China in the Hubei province in the winter of 2019 and published finding in the Nature Magazines in 2019 (Cui, Li, and Shi, 2019).

1.4.5 Research Study Motivation: Covid-19 Pandemic

As a result of the Covid-19 pandemic, we see and observe the execution of instantaneous major landscape sweeping measures to curtail the effects along with drastic transformative changes in all the aspects of life (Mercola and Cummins, 2021). The PESTEL framework gives an

interesting and broad perspective to the topic and thesis presented. The PESTEL unlocks the topic and looks at pandemics through the lenses of economics, politics, scientific and all the dynamic inter-related factors and facets of this subject. In the medical arena, we see that the topic *"Gain of Function Researches"* bio-medical grants, academic funding, and patents have emerged in the educational, scientific and within the technological realm.

These changes have all been patterned in the way pandemics have been dealt with in the past eras in their unique and transformative ways. The drastic economic impact, the proposed great resets, and the spillover effects have been presented. It is a paradigm shifting moment which is predicted to radically accelerate society and the digital transformation that it brings (Schilirò, 2021). Currently, the digital and technological economies marked a sharp rise for the 'great reset' as mentioned by Professor Klauss Schwab and Zahibi (2020) from the World Economic Forum (W.E.F). This is visible during periods of pandemics, epidemics, outbreaks as many are seeking how best to handle, manage and resolve the issue at hand which hinges on life or death and quick decisions (Schwab and Zahibi, 2020).

1.5 Research Purpose and Questions

There are myriads of relevant yet granular questions surrounding this very important and dynamic topic of pandemics, economics, finance, supply and demand, spending, logistics, inflation, unemployment, recession, crisis management, politics, jurisdictional regulations, regional social reforms, human psychological behavioral patterns (Elyassi, 2021). The key research questions posed in this paper are the following:

- "Can pandemics be used as a diversified apparatus to shape society as it relates to the PESTEL framework for positive long-term economic growth and a catalyst for specific strategic outcome?"

- Are pandemics a device and tool used on a grandest scale to shift, propel and sway economic activities and to advance civilization and steer pre-determined economic, social, legislative outcomes into the future whether naturally or artificially, hybridized, engineered or both?"
- Could pandemics be used as a method to steer monetary tool and fiscal policies, strategies?
- Could pandemics with the use of "*gain of functions research practices*", be used as a device that closely works in tandem with greater economic cycles and systems for comparative and comparable advances or advantages in an economic warfare setting?
- Can a series of pandemics or outbreaks be artificially pre-planned or created in advance and planted within the economic life cycle systems for mobilizing social reform?
- Can pandemics be pre-planned and be carefully curated and strategically rolled out in a systemic way?
- Can pandemics be used as a viable economic system to maneuver various business life cycles?
- Can pandemics and outbreaks be used as a catalyst for long term economic growth such as social modeling forged to "build back better" and stronger concepts, strategies recalibration, engineering focus and pioneering social reform?
- Do all deadly disease outbreaks and pandemics just haphazardly materialize from nature and evolve in the ecology of natural habitats into the ordinary landscape wreaking havoc and terror on humanity for centuries and millennia or are they economic strategies or can they be artificially created as economic warfare tools?

- How does the covid "*Lab Leak Theory*" (Baker, 2021) open another dynamic aspect into the way pandemics are assessed and what does this mean for finance, investment, commerce and economic warfare strategies"?

These are great hypothetical, theoretical, philosophical and significant questions which require deductive, inductive and adductive reasonings, rational logical explanation alongside thorough investigative analysis (McGaghie et al., 2001). Also, a look must be taken at the ethical challenges all these dynamics might present. This research paper seeks to serve as a catalyst to analyze all these aspects and questions.

Moreover, there are other deep probing, salient, unanswered questions which forms the core impetus and great thrust of this paper. This paper seeks to answer the more prominent, and poignant questions and to establish the notion presented in this thematic dissertation such as "Are pandemic outbreaks some isolated randomly extraordinary event, a natural selection phenomenon, or are they perhaps more precise artificial sophisticated and elaborate strategic PESTEL tools, or hybrid devices deployed from ancient antiquity to modernity used as a mechanism for resource management strategies? Are pandemics apparatuses?" (DaSilva, 1999). How do pandemics impact and propel society's economic advancements, social, psychological and intellectual development? (Kadlec, 1995). Can they be sophisticated elaborate hierarchy financial strategic tools and tactics with embedded political, governmental and military features to steer great economic activities and influence in order to propel societies, economies, nations, states, civilization into a predestined or predetermined direction or trajectory (Çitilci and Akbalık, 2020).

1.5.1 Other Pertinent Auxiliary Questions

Other significant yet ancillary and secondary questions emerge which are profoundly relevant to the subject matter. These are pertinent questions and must be assessed as presented. These are listed and detailed below:

1. How has past pandemics changed the trajectory of history and civilization throughout the ages?
2. What significant changes and developments have pandemics or plagues caused?
3. Are pandemics and epidemics different from economic crises such as disasters and wars? Is there a fundamental correlation?
4. What are the significant micro and macroeconomic correlations and after effects of pandemics?
5. Is capitalism destroyed or strengthened in and during a great pandemic?
6. What are the overall impacts of the market forces, on business and capital investments during and after a pandemic?
7. Are there long and short-term benefits of pandemics - pros and cons?
8. Is a pandemic a subtle tactic catalyst of economic warfare and military warfare?
9. What are the different types of economic wars? What are they used for and how have they impacted economic decisions and affected supply demand, consumption, and logistics?
10. What is the general life cycle of pandemics, super imposing on the business life cycles, economic life cycles of boom and bust, social life cycles?
11. What is the bearing on trade, commodities, futures derivative securities, and the easing or pressure bear versus bull stock markets forces globally such as the boom-and-bust business life cycles?

12. How has this pandemic, Covid-19, changed the current course and past course of our history into the information and technological age?
13. How has technology evolved and changed as a result of various past pandemics?
14. How have economies changed throughout history as a result of pandemics?
15. Is there a correlation between wars and pandemics?
16. What is the correlation between educational advancement, scientific discoveries, medical development, clinical trials, technological inventions and pandemics?
17. What are the changes that prior pandemics brought and how have they impacted or influenced the PESTEL dynamics within society, humanity and civilization?
18. Can mapping, tracking pandemics and historical disease outbreak reveal a predictive pattern or economic model?
19. Where have pandemics originated in history and how? Has the genesis been assessed and the source of origin evaluated to determine if they were naturally occurring or artificially engineered?
20. Who ultimately benefits the most from crisis and pandemics and the outliers?
21. Who are most at risk and more adversely impacted in a broad general pandemic scenario – demographics and segment, ethnicity of the population and geographic region?
22. Who and what sector or segments of the population benefits the least and who benefits?
23. Who or which sectors, if any, benefits the most from pandemics?
24. How can plagues be viewed in the future and where does this quest lead humanity.
25. Can pandemics be a viable economic model and economy tool and catalyst for resetting societies and civilization for future prospects and momentum?
26. Are pandemics and diseases a strategic tool or can they be used as a model to evoke paradigm shifts?

These profound, emerging auxiliary questions further propel a deep inquiry and requires a thorough and elaborate investigative stance and logical research approach, with deep investigative insight analysis into the hypothesis presented. Pandemics and their outcomes have been pivotal in advancement discoveries and have evoked fear, trepidation, hysteria, panic and chaos (Christopher et al., 1997). There is much hesitancy and fear of the unknown and fear of uncertainty and skepticism as related to the topic presented.

1.5 Summary

This research seeks to amalgamate broader theories, academic approaches, perspectives and academic research into a unified field by inciting meaningful engagement, insightful dialogue, discussion and engaging analysis from various aspects using various approaches, (Peffer et al., 2012), methods and concepts (Hevner, 2007). This is what academic research and empirical analysis is all about - scientific, philosophical epistemological, theoretical engagement and insightful knowledge (Easterby-Smith, Thorpe and Jackson, 2012). The conclusion and the evidence will be presented at the end of this research with an unbiased perspective and void of any influences, and interference or preconceived notions or judgmental biases on the subject matter (Vom et al., 2020).

CHAPTER II

REVIEW OF LITERATURE

2.1 Theorical Framework

The fundamental objective of the "Academic Literary Review" is to look at prior compilations of scholarly repository work concluded and assess what credible sources, references and empirical data are available to expound on such as "what was done before?". What foundation preliminary work and research was conducted prior on this topic? Hence, a robust literature review forms the anthesis to evidently present and assess previous works performed. This caliber of work hinges on authentic and strong credible academic research databases, solid empirical evidence, reliable case studies, educational, dependable supporting sources, authentically reputable investigative reports, statistics, qualified analysis and expert opinions. These will all be derived from renowned articles, quality data such as books and periodicals, scholastic contributions, reputable sources and quality excerpts and specialist findings from professional subject matter experts in order to fully delve into and develop the thesis through exploring and expounding on all aspects of the topic presented (Peffer et al., 2012). The theoretical constructs of this paper and its core composition are built on the premise of data (Vom et al., 2020). Data derived from prominent academic writers and their works on the topic presented, will be supported with secondary reference source statistics (Hevner, 2007).

There are inexhaustible amounts of reputable evidence and research papers from renowned and prominent scholars, expert professionals to support this perspective as presented throughout this paper. The secondary reference sources further give substantial credence to this stance. This paper seeks to evaluate current academic data on the subject and analyze the existing concepts, theories, and notions on all sides of the spectrum in order gain full comprehension of past.

2.2 Operationalization of Theoretical Constructs

This paper will also assess how wealth, power, economic resources, policies, legislations are distributed in times of pandemics, crisis, disasters and turmoil using the PESTEL model (Carruthers 2009). What are the various systems within the PESTEL models that are impacted (Martinez-Contreras et al., 2022) and how do pandemics act as a strong catalyst for shift in long term and medium-term growth? This research will juxtapose and align various pandemics crisis throughout history in various time periods and eras. This research will also evaluate the positive and negative adverse aspects of pandemics, such as, who or what is either affected adversely; and who or what area benefits positively during a pandemic, and how these are filtered into the greater economic matrix (if any). The focus is how the business cycle shifts, in tandem with the economic cycle, civilization, cycles by the observing the following evolutions within the PESTEL context (Çitilci and Akbalık, 2020).

These areas are meticulously and methodologically assessed as follows:

1. Government: policies, policing, law enforcement, national public safety, homeland security, immigration, regulations, legislation, political reforms process, military (research and development) and federal budgetary expenditure;
2. Population: demographics, ethnographic society, sociology, psychology, social behavioral pattern, shifts in supply demands;
3. Economics: business, finance, commerce, central banking economic life cycles, monetary and fiscal policies investment, economies of scale and sectors (pharmaceutical sectors, medical manufacturing, capital markets), merges, acquisitions, industries such as stock market boom and bust economic cycles, microcosmic factors;

4. Resource management: operations and supply administration, trade, logistics supply chain, distribution, transportations;
5. Technology: research and development, innovation, research biotechnology, BioNtech, nanotech, quantum and smart technology, digitization, robotization, information data mining, track and trace, digital AI, global surveillance, universal identification and tracking systems, medical research and integrative technology;
6. Education: medical clinical breakthroughs, advanced scientific research, scientific medical advancement., breaking new scientific discoveries, research development clinical studies and testing.

2.3 Exploring Existing Theories: Organizing Thesis

A wholistic investigative assessment into all aspects and theories is vitally important to gain a broad-based understanding of these prevailing subject matters. This requires for both inductive and deductive reasoning and logical critical insight (Jameson, 2009). The basic fact and importance of this research was motivated by curiosity into the inner mechanisms of how the entire system operates, broader spectrums analysis. These are the theories and broad academic perspectives into the subject matter:

I. Economic Theories (Adam Smith: "Wealth of Nation"), (John Maynard Keynes: "Essays"), (Milton Friedman: "Essays on Positive Economics");
II. Business Strategy and Management Theories (Hofer, 1990);
III. Theory of Financial Crisis (Allen et al., 2009);
IV. Theories of Economic Warfare (Zeuthen, 2018);
V. Economic Science Theories, Concepts, Tools, and Frameworks;

VI. Global Crisis Management Strategies (Bostrom and Cirkovic, 2011);

VII. Theory of Manufactured Crisis (Mandel, 1989);

VIII. Theory of Political Crisis (Sebők, 2019);

IX. Political and Military Science such as Polemology and global warfare (Roman, 2014):

- Law Reform, Legislations, and Regulatory Compliance;

X. Sociology:

- Psychology;
- Anthropology (history/culture civilization);

XI. Cyclical Theory of History and Social Cyclical Theory (Persons, 1954);

XII. Social Science Theories and Approaches such as "Framing Theory" and Social Construction of Reality Theory (Peter Burge, Thomas and Luckman, 1966);

XIII. The Hegelian Method, Principle Hegelian Philosophy and Theory (Smith, 1987) Bristow, W.F., (2007);

XIV. The Strategies and Dynamics of a Chess Game (Martinez-Contreras et al., 2022);

XV. Theory of Incentives (Laffont and Martimort, 2009);

XVI. Theory of Evolution "Survival of the Fittest - (Claeys, 2000);

XVII. "Charles Darwin Origin of Species" the Theory of Evolution and natural selection 'Darwinism' (Bowler, 1996), (Darwin, 2016), (Claeys, 2000);

XVIII. The Theory of Population and the Malthusian Approach (Robert Malthus);

XIX. The Lab Leak Theory (Baker, 2021);

XX. Gain of Function Research "GOFR" (Duprex et al., 2015) and (Selgelid, 2016);

XXI. Theory of Disease and Germ Corpus Hippocraticum;

XXII. Biological, Chemical Warfare Strategies, Terrorism Theories (DaSilva, 1999) (Kadlec, 1995), (Alibek and Handelman, 1999).

2.4 Inclusion Criterion Contrarian Postures, Perspectives and Alternative Variables

It is necessary to ask and pose the both conventional and unconventional pertinent and hard yet fundamental questions to seek meaningful answers and solution to the existing problems. In a pandemic setting there are much instances of concerns for misinformation, limitations, restriction, censorship. During the Covid-19 there were limitations and restrictions on dissemination of relevant information and no leeway to obtain other alternative perspectives. The contrary posture is vitally important and necessary to compare and contrast the arguments as we look at different evidence and stances using inductive, deductive and adductive reasoning with logic (Heit and Rotello, 2010). What does the evidence and details say and show? How does one evaluate the content? How does this affect the current stances? How does it relate to past, current events, and can the data be used to predict or effect future events? The novel corona virus Covid-19 presented various challenges and was a global enigma. The recent pandemic reveals an anomaly that is still developing as new evidence surfaces ‘post-covid’, as various assessments and research are being compiled and gathered (Easterby-Smith, Thorpe and Jackson, 2012).

Analysis of existing systematic literature and key data indicated that prior studies have not fully delved into major aspects of the PESTEL analysis on the subject matter. There are selective perspectives and insights into the subject matter as this is a broad and dynamic all-encompassing topic with many tentacles and outliers to analyze, but the PESTEL framework marries all of the overarching factors into one unified composite.

2.5 Core Aspects of the Focus Research

These are the main central emphasis and thematic focus that forms the impetus of this academic research paper. The points and topics listed below are all subject for profoundly elaborate debates and discussions:

- Pandemics as a vital PESTEL device for global development, societal advancement and long-term economic growth;
- Unmasking pandemics throughout history and exposing the good, the bad, and the ugly (pre-history, medieval ages: 1st Industrial Revolution, 2nd, 3rd now 4th and 5th economic revolutions);
- Pandemic Economics "*Pandemonic*" systems such as "Pandemic Economics" or "Economics of Pandemics", resource management, redistribution of wealth and resources;
- Pandemics, developments, profits and economic activity;
- The economics: financial markets and pandemics effect on sectors;
- Exploring and unveiling dimensions of truth about pandemics throughout history and assessing new emerging economies and economics of scales;
- Pandemics as a tool: resource management;
- Pandemics demographics: control population, control and eugenics, lifespan expectancy, segment of population, age of population, health of population, financial capability and classification, educational level of the population;
- Pandemics as government strategies;
- Pandemics as a tool for quantitative easing money supply; elevating economic pressures and navigating the trajectory;
- Gain of function research fundings and pandemics;

- Scientific research development and global germ diseases, pestilence;
- Governmental and military security forces, border patrol and warfare;
- Political and economic warfare strategies;
- Technology and academics and the pharmacy industry;
- Quantum science, technology and pandemics;
- Pandemics and human evolution;
- Pandemics and technology - paradigm of reset and recalibration;
- Technology, biology and science integration;
- The road to singularity 2045, transhumanism in a digital age;
- Sustainable resource management the business of global germ warfare and pharmakeia, pharmakoi (pharmaceutical sector) as a business powerhouse;
- Science assessing the commercial enterprise of pandemics;
- The Hegelian Method and application, theory, principles, constructs and Hegelian philosophy (Smith, 1987);
- The ushering of the 4th industrial revolution and the new digital technocracy;
- Pandemics and politics, law enforcement, military, defense, polemology, border patrol, national security, geo-political events and environment, deployment of guards' armed forces surveillance (extraordinary tyranny interventions coercive measures);
- Post pandemic initiatives and programs;
- Sustainable development, preservation, conservation;
- The anatomy of pandemics - joining the dots and connecting the points to the remote digital technology ecosystems;
- The fear factor of pandemics, disease and irrationalism—bridging the narratives.

- The Great Reset – post covid-19 era; and the ushering of a new paradigm and the restructuring of economies and
- Post Covid-19 era the great digital paradigm shifts and society 4.0.

2.5.1 Important Factors and Focal Points

1. Pandemics throughout the course of history;
2. The social science of cyclical evolution, social life cycles;
3. Disruption: a necessary evil to recalibrate (pruning the economy);
4. The global economy, post pandemic resetting strategies and systems;
5. Pandemic outbreak and public budget management and Tax;
6. Liquidity steps, policy actions taken by Federal (Central Banks) local, international regional, and transnational during pandemics;
7. The Technocracy era and the technologies of pandemics;
8. Evaluating outbreaks on public policies and governmental intervention strategies;
9. Crisis: an assessment during pandemics and disasters – A hypothesis analysis;
10. Increase public expenditures during pandemics, governmental monetary and fiscal interventions and strategies;
11. Public expenditure during pandemics combatting the economic impact and factors;
12. Electronic payment methods, digitalization, the advancement of new systems post covid-19;
13. The world within the scope of “Global Public Goods” and resource distribution (GPGs);
14. Global Public Goods analysis, logistic and supply chain during pandemics.

15. Analysis assessment of outbreaks global outbreaks from historical perspective and fiscal and monetary policies.

2.5.2 Types of Business Frameworks, Models, Analytical Tools & Strategies

I. PESTEL Analysis Framework;
II. SWOT Analysis;
III. GAP Analysis;
IV. Root Cause Analysis (causes and effects assessment);
V. Five (W's) Analysis "5 Whys";
VI. Pros and Cons Analysis;
VII. Porter's Five Force Models;
VIII. Scenario Analysis Simulation Matrix;
IX. Assumption and Constraints Analysis;
X. Balance Score Boards;
XI. BCG Growth Share Quadrant;
XII. Value Chain Analysis;
XIII. ADL Matrix or Strategic Conditioning Guide;
XIV. QSPM Quantitative Strategic Planning Matrix;
XV. Competitive Profile Matrix (CPM);
XVI. McKinsey Seven (7s) Model; and
XVII. VRIO Framework.

2.5.3 Framing Complex Societies

This is a concept of perpetuity, continuity and the evolving changes of systems with a social construct. Pandemics play an essential and pivotal role in the development of society (Bennett, 2021). The "Cyclical Theories" of society also called the "social cycle theories" approach firmly postulates that all civilization systems and structures will inevitably experience various cyclization phases such as rise and fall, boom and bust, growth and decline, genesis birth and decay or death.

These various "*epistemological*" *systems* use cycles, interpretations and inferences that touch on all aspects of civilization advancement and lifespans such as politics, economies, social cultures, religion etc. There are various influences and precursors to this notion. Those that lend to these theories are proponents such as Thomas Carlyle, English Historian (1795-1881), Nikolay Danilelevesky, Russian Philosopher (1822-1885), Hans Freyer, German Philosopher sociologist (1887-1969), Pitrim Sorokin, American-Russian sociologist (1889-1968), Arnold Joseph Tonybee British Historian (1889-1975), Kroeber, Alfred Louis American Anthropologist (1879-1960) and other proponents such as Oswald Spengler, German Philosopher (1880-1936). The spillover effects of these scenarios and incidences on human civilization are monumental. The various areas of the PESTEL framework can be fully assessed and observed.

These fields of research encompass a wide range such as civil society, civil liberty, classes, education segmentation, hierarchies, caste systems, demographic and, supremacy, culture, art, media, religious denomination, beliefs, rationalization, ideologies, psychology, industry, revolutions, cultures and so on. It also touches on other related subject matters such as politics, diplomacy, civil wars, state wars, feudalism, ethnic cleansing, anarchy, genocides, democides, eugenics, unrest, crises, conflicts, government, sovereignty, state, civilization, anthropology, evolution, ecology, innovation, technology and so on. Also as denoted by Pareto (1935), in the book entitled "*The Mind and Society*" (1935, in Italian 1916), a reductionist, preservationist

concept is presented as necessary for preservation of resources and sustaining life at minimal. This posture is another perspective of the natural selection stances and ‘survival of the fittest’ as presented by various predecessors and within the Darwinian perspective and frame of mind (Sanger, 2020), (Sanger, 2007). There are also other social notions such as collectivism, universalism versus individualism, and pluralism and other constructs that exist. The collectivism perspective focuses on civilization not just on individualistic ideologies and notions.

CHAPTER III:

METHODOLOGICAL APPROACH

3.1 Overview of Research Problem

The research topic can be expansively vast when assessing the impact of pandemics, crisis management, and overarching impact on society and population (Schwab and Zahibi, 2020). However, the PESTEL tool makes this topic specific and addresses various key areas within the PESTEL framework concept. The aim of this research is to successfully analyze this subject matter within the parameter and scope of the PESTEL framework by thoroughly answering the critical questions on pandemics as a system and economic tool to propel society (Worden, et al., 2003) and as a vehicle ushering in the fourth industrial revolution, the digital economy. The fourth industrial revolution is marked by accelerated technological and scientific breakthroughs (Sarfraz et al., 2021). This premise is derived by drawing conclusion based on the various evidence presented, and published in scholarly reviews (Kurzweil, 20025).

This research paper will look at all the major influential factors and the financial dynamics of pandemics. This multilayered investigative academic approach will assess the widespread influences of pandemics, and diseases on an existing evolving landscape and their effects on economic outcomes, financial activities, social and psychological behaviors, political regimes, governmental systems, political structures and legislative reforms, regardless of whether the regime is constitutional, democracy, monarchy, diarchy, aristocracy, oligarchy, plutocracy, timocracy, noocracy, nomocracy, meritocracy, autocracy, anarchy, kleptocracy, dictatorship, Marxism, communism, socialism, imperialism, feudalism, fascism, federalism (federation), authoritarian, liberaltarian, totalitarian, republic, doctorship, hybrid-quasi or dualistic systems etcetera. This research thesis will assess the intervention measures, the economic outliers, the

societal consequences, social progress, the psychological and religious impacts, the technological advancements, environmental ecosystem effects, educational developments, governmental, and military influences on pandemics (Bramanti et al, 2016).

This research will seek to assess various theories making connections and correlations which can advance the broader scientific scholarly perspective. It will link the relations and the global census with the broad existing conventional mainstream narrative by augmenting to the existing archive of academic depository of knowledge in these crucially critical topic areas, and merge this new understanding with the core dynamics of pandemics (Huremović 2019). So, in order to intrinsically understand and appreciate the fundamental nature of pandemic, epidemic, and disease outbreaks, it is expediently necessary to assess it through the intrinsic lens of the PESTEL framework, therefore, evaluating the vast monumental economic spillover effects of all sectors of the economy and society both then, now, and in the future. Whether they (the pandemics) occur as a naturally evolutionary process, an artificially engineered process, a recombination, hybrid, or even supernaturally materialized in our sphere of existence. Their permanently lasting effects on humanity and civilization have been existential in all aspects. (Christopher et al., 1997).

3.2 Operationalization of Theoretical Constructs Methodological Approach

This research will assess a series of case studies, using secondary approach method data collection. The bulk of the research will be framed on the foundation of secondary research evidence. The methodological approach used throughout this paper is a combination of secondary, tertiary statistical figures, graphs, charts focusing on previous academic case-works and case studies alongside secondary data sources supplemented with direct surveys, interviews, and briefing sessions in order to produce the required data for the analysis directly emanating from those previous works done. All details are presented logically within the assigned

parameters and variables based on the key logic presented (Easterby-Smith, Thorpe and Jackson, 2012)

3.3 Research Design

The research method design and approach chosen for this academic research paper is the *Design Scientific Research* (DSR). This method is used for assessing quality of information, systems gathering and assessing (Peffer et al., 2012). This DSR approach may include the use of case studies, field data, testing, analytical evidence, control experiment, random sampling, simulations, observable and investigative information. It establishes clear and precise objectives and assesses the problems, challenges, and obstacles, presenting with solutions, with opportunities for resolution and answers to the research question.

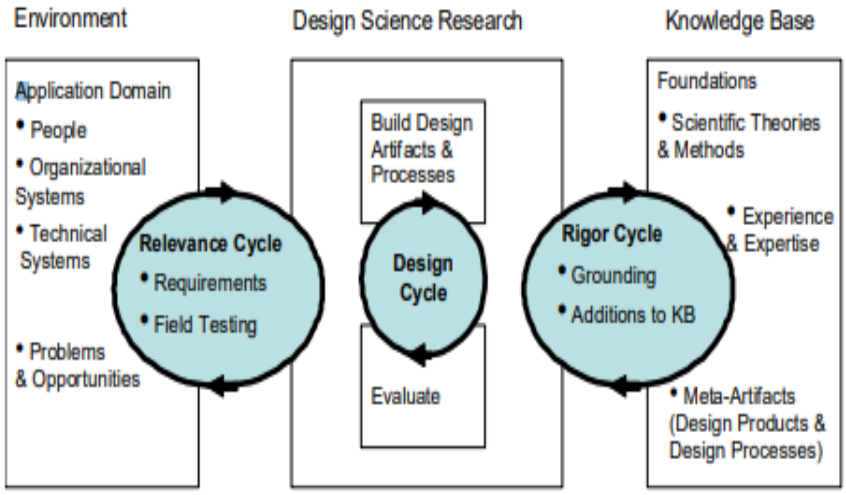


Figure 1: Design Science Research Cycles "DSRC" source: (Hevner, 2007)

The figure illustration presented above shows the schematic techniques used in the DSR methods and the various steps which the system employs. It is an elaborate algorithmic process to assess problems, evaluate the existing data, draw a critical and logical conclusion. (Heit and

Rotello, 2010). The Design Science Research 'DSR' method focuses on understanding the overall context, applied knowledge, theories, hypotheses, which include various, prototypes, algorithmic practices, frameworks, empirical data and metric of assessment, in order to justifiably answer certain core critical questions and solve various problems or specific issues. This approach works successfully with the PESTEL analysis. The DSR steps are propose, design, develop, evaluate, validate and present the final conclusion, (Hevner, 2007),

The Design Science Research "DSR"

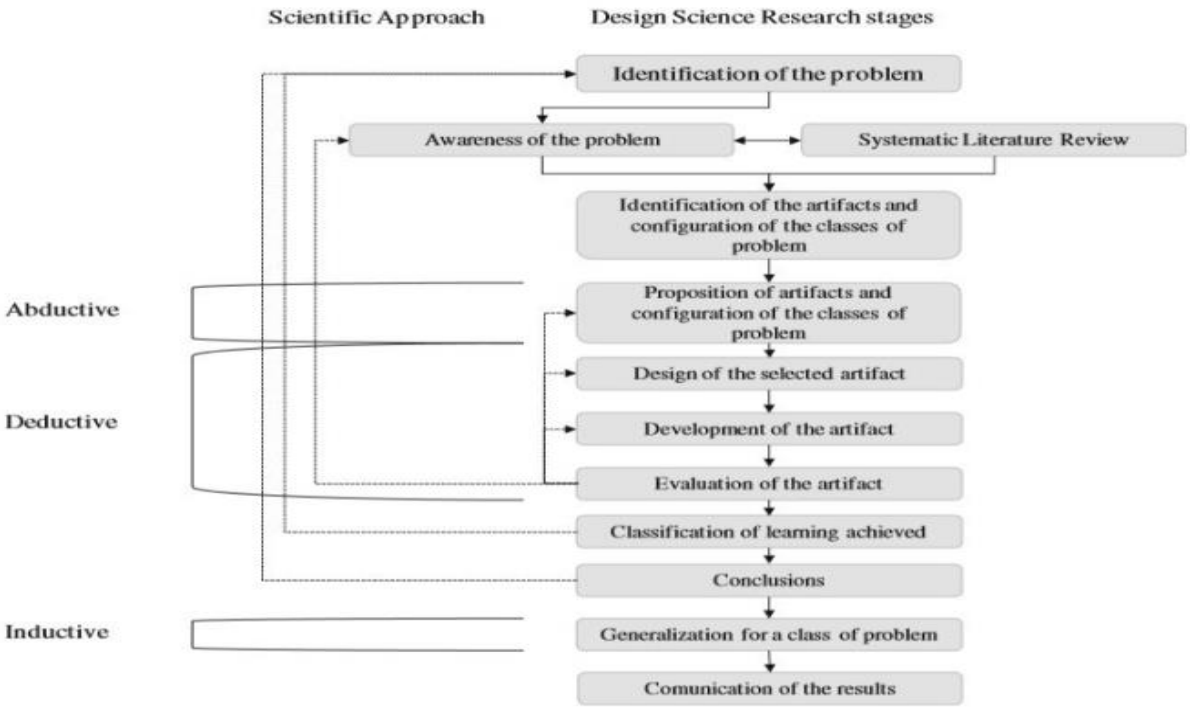


Figure 2: The Main Steps to conduct a DSR: source (Dresch et al., 2015)

The DSR process is to assess the following areas listed below:

- Identify the specific problem or issue;
- Awareness of the problem or issue;
- Reviewing various literary articles;
- Identification of and supports;

- Configuration and conforming;
- Designing and development;
- Observation, evaluating and the reference;
- Learning from the data, evidential, information and observation;
- Generalization and
- Summary conclusion.

The Information System Research Cycle Chart

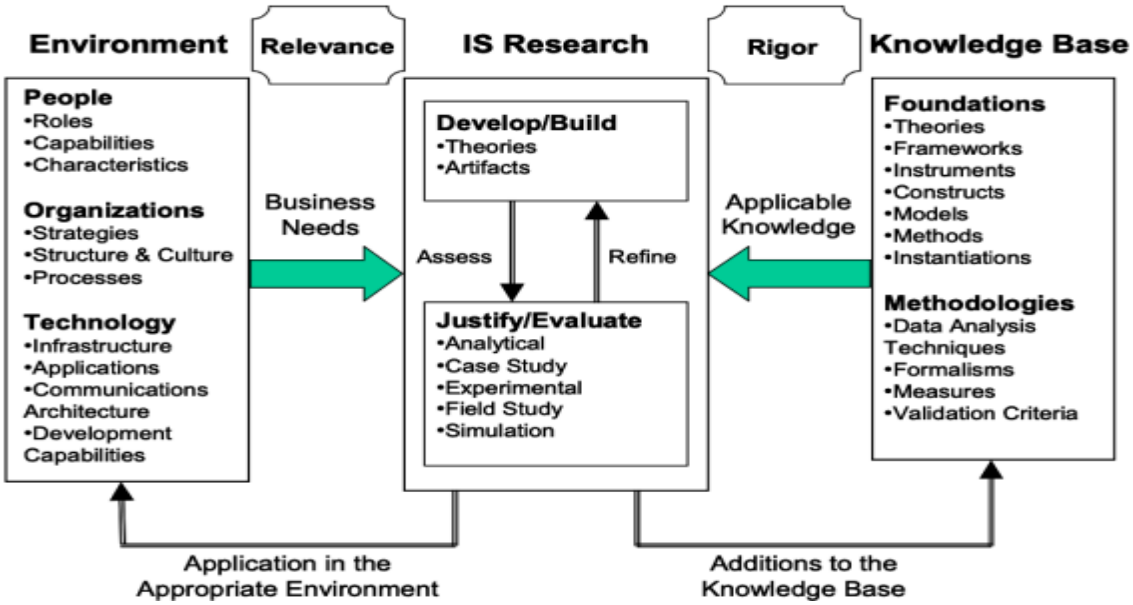


Figure 3: Information of Systems Research Framework: source (Henver et al., 2004)

As this research seeks to provide full understanding and investigate the subject matter in depth and apply data composites, academic knowledge with the aims and objectives to solve the problem using frameworks and factual data. According to Henver et al., (2004), the result of the design-scientific method in research is to foster and create justifiable unbiased scientific evidence with meaningful conclusions based on the indications, abstractions and information presented and

observed (Vom et al, 2020). This research focuses specifically on analysis and secondary sources collection. No primary data and no artefacts were created for this research

- Information gathering (brainstorming and organizing the data)
- Analyzing the evidence presented by previous researchers and case studies.

3.4 Identification of Paradigm and Data Gaps

The research methodology is centered on evaluating academic and empirical evidence. It seeks to identify and look at the current existing data gaps and to bridge those together for greater insight and perspective (McGaghie et al., 2001). The logical steps are to understand pandemics throughout history and assess that with current data; whereby analyzing prior findings with recent hypotheses and then merging those for a conclusive result, to further assess this thesis from both data, secondary sources such as case studies (Miles, 2017) and the use of analysis from pervious sources such as transcripts, interviews, structured empirical data, alongside case files, archival records, tertiary data collection.

The key research method for this study is literature reviews, and existing references, follow-up with feedback questionnaires, and third source industry information, professional feedback from industry experts, and conceptual modeling (Patton, 2002). Although the use of direct data from survey and interviews asking both open ended questions and closed ended questions is preferred in the global context there are previous existing data to draw conclusion (Yin, 2014). The research analysis, findings, surveys, academic research and the final assessment of the perspective view of this topic will be summarized (Erikson, 2020).

3.4.1 Bridging the Research Gap

It is critically important to identify and bridge the gaps that can be identified in all aspects as related to the topic and thesis presented by connecting current academic papers and empirical evidence that already exist. This paper seeks to provide a thorough deep, investigative, unbiased insight, along with profound understanding, and perspective surrounding the questions of pandemics, economics and profits, powers and politics, governmental and military interventions, law enforcements, border patrol, economics using the PESTEL framework (Van Bergeijk, 2021).

The PESTEL framework is a broad tool to bridge in the literary gaps and the various divides that currently exist. When looking at the inexhaustible and prolific topic of pandemics, there are numerous tentacles that present, but the PESTEL seamlessly and uniformly harnesses all aspects. The research gap also consisting of any missing links, under research areas, and other unexplored areas or under-explored themes. Conducting a comprehensive literature review is critical in order to assess the current landscape and bridge multiple source data qualitatively, using secondary case study review analysis, existing peer edited review articles from credible academic sources of all aspects of information compilation to be used exploring and asking questions of who, what, when, where and how on conditions, variables, methodologies, analysis, results, conclusions and the possibility of other open gaps that might present itself which are unanswered. Also, bridging the gaps and looking for root causes, by conducting deep 'root cause analysis" (RCA) and employing the "five (5) whys framework or 5 whys, (5Ws)", external and internal factors analysis, hence one is able to derive meaning, conclusion and obtain answers to probing questions. The problem-solving method will also be integrated into this paper which seeks to investigate and explore the roots of a problem by assessments, evaluating risks, events impacts and cause - effect root case analysis (Andersen and Fagerhaug, 2006). This is done by continuously asking why the critical

problem occurred or exists. It requires successive searching and brainstorming analysis in order to ultimately derive the root cause of a problem.

So, by forging distinct links between the financial and economic, political, governmental, social factors associated with pandemics and then analyzing their effects on societies across regions and timelines, including cross-boarders, cross-cultural, regional jurisdictions, nations, states, communities, countries, continents occurrences one can deduce certain trends and patterns of how they have shifted systems. The PESTEL framework model brings all aspects into one unified, perfect and consolidated field of understanding and perspective (Carruthers, 2009). This paper seeks to coordinate the knowledge and leverage the transference data by showing the various concepts and strategies used throughout the ages by thoroughly investigating the outcomes of the pandemics and its effect on economies throughout history (Blaylock, 2021). All these facets will be investigated in order to answer the salient and critical questions and to bridge various identified gaps. These gaps can be presented in the form of either evidence gap, knowledge gap, methodological gap, population, data gap, conceptual, historical temporal or chronological gaps, empirical gap, practical gap, interdisciplinary gap, or theoretical gaps (Miles, 2017).

Research Gap Taxonomy *(Inconsistencies, contradictions, conflicts, contravening and controversies)*	
Literature review	Research Opportunity
Past conceptual framework	***New theoretical framework (novelty)***
What is existing	What is required or expected
Known	Unknown
Types of Gaps	
Population gap	Interdisciplinary gap
Temporal historical chronological gap	Analysis gap

Empirical, data gap	Practical (application) gap
Implication gap	Methodology gap
Evidence gap	Emerging Knowledge gap—for example, perspective gap and conceptual (understanding) gap
Theoretical gap	
Methods/Approach gap	
Historical, temporal or chronological gap	

Table 1 Research Gap Taxonomy: source student author Gerline Ferguson 2025

3.4.2 Novelty of This Research

This research seeks to delve deeply into historical past facts; factors; empirical data; back dated historical files; literature; academic profiles, scientific records, historical information; and evidences of how various disease outbreaks, epidemics, pandemics have brought into existence sweeping changes throughout history that touch all facets of the PESTEL framework. This paper explores the landscape of extensive changes through technological, medical, educational, socio-political, governmental, legal reforms, and sweeping comprehensive changes that pandemics have brought about (Dry and Leach, 2010). This research seeks to *"bridge gap"* the connection of historical evidence by excavating, the complex nature and dynamic mechanism surrounding this topic of pandemics and economics throughout history -how they are intertwined and closely connected to the past and present, evaluating various preponderances presented on all aspects. The importance of this research is to link pandemics to economic resetting of societies, economies, systems and how they have brought about the drastic changes in various epoch and timeline throughout the ages in history (Bramanti, 2016). It examines the historical precedents, challenges and opportunities of how policymakers, researchers, experts, specialist and practitioner can

mitigate the effects of future pandemics, diseases, outbreaks and harness potential possible opportunities (Gunkel, 2020).

3.5 Logic and Reasoning: Alternative Perspectives

There are various alternative perspectives and contexts which have brought about the drastic policies and systems during the most recent pandemic Covid-19 (Moosa, 2021). The transformative effects and economic impact of these pandemics have reshaped the architectural landscape of societies, remodeled civilization, brought about new social settings, and birthed military infrastructures, expanded governmental capacities, law enforcement, military intervention, political influences, and has brought about massive sweeping transformation touching all aspects of the PESTEL spectrum (Gurria, 2020). These are paramount in the legal system, social fabric and political reforms by shifting and touching all levels of the PESTEL.

3.6 Research Purpose Justification of Methodical Perspective

The research methodology and logical steps to be used will seek to bring understanding about pandemics, and identify the gaps that exist in current research, and the PESTEL framework that can bridge this gap. This is done by analyzing and juxtaposing the hypothesis with current and past research with the PESTEL tools and models using surveys, questionnaires, interviews, archival records and third-party data collection (Bowen, 2009). The research method for this study is literature review and survey information and conceptual modeling (Patton, 2002). The use of direct data using from survey and interviews asking both open ended questions and closed ended questions asking the how, what, why, how and who will also be implemented (Yin, 2014).

3.7 Research Data Analysis and Design

There are many views and perspectives such as the practical, theoretical, methodological, epistemological, philosophical all of these approaches are necessary when addressing these topics (Jameson, 2009). They will formulate a precedent and foundation for future research opportunity and perspectives.

The epistemological "*the theory of knowledge*" addresses concerns and key areas relating to cognitive science (Lehrer, 2018), cultural studies, historical evidence involving the known aspects of reality, justifiable truths, beliefs, dogmas, rationalism, subjectivism, conventionalism, foundationalism, empiricism, externalism, internalism, existentialism etcetera (Chisholm et al 1989).

Types of limitations theoretical assessments:

1. Methodical: to quantify, qualify, and diversify the information presented through fundamental and technical analysis;
2. Empirical: to justify and validate the data (visibility, validity reliability, relevance);
3. Analytical: to evaluate the accuracy and the fundamental significance of the data;
4. Ethical: to verify credibility of data.

The philosophical aspect is centered around central pillars of logic, ethics, metaphysics, epistemology, political philosophy, and aesthetics. These are the dimensional spheres, approaches, concepts, dogmas and aspects which are emphasized in philosophy. Ethical concepts are integrity, honesty, principles, values, honor, conscience, fairness, responsibility, and standard. It is what is considered universally right and wrong. They are concepts that transcend geographical, societal and cultural barriers. These are further broken down into these areas listed below:

- Ethics - What is value?
- Logics - What is reasoning and what is it consciously?
- Epistemology - How do we know?
- Aesthetics - What is beauty?
- Metaphysics - What is reality?
- Political, social science, psychology - How should social structures and society be governed?
- Philosophy – How do structures impact humanity and civilization?

3.7.1 Ethics and Understanding

Ethics is a very important word and concept. The entomology is derived from the Greek word ‘Ethos”. This idiom forms the basic common perspectives globally. It is the branch of philosophy that deals with concepts such as: principles, beliefs, customs, attitudes, ascribe moral values, ideologies, precepts, that are derived from a community, nation, region, state, society, and country. Ethics are usually associated with universal laws, codes of principles or core concepts of what is considered right and wrong, good and evil, accepted and forbidden practices. It hinges on ethical appeal, credibility, trustworthiness, honesty, right-standing, justice, fairness, integrity and are the basic yet fundamental universal principles. It is application and transcends all boundaries such as religion, culture, region, jurisdiction, territory, ethnicity and demography.

3.7.2 Ontological Perspectives

The word ‘ontology’ is derived from Greek origin. The word “ontos” meaning “being’ and “logia” meaning study. It emanates from the branch of philosophy of being, reality, existence.

Philosophically and more profoundly the word ontology gives a deeper view and broad perspective by bridging visible insight and constructive standpoints from various angles (Sookermany, 2024). When looking at these critical topics and areas it is imperatively integral to factoring objectivity, neutrality and a stern unbiased perspective.

Furthermore, there are various analytical approaches used for broad-based research. Elaborate studies requires strong and robust bibliometric repository, databases and analysis into the subject matters when presented. The reason for a qualitative and quantitative or mixed method examination is based on how the subject is examined. Quantitative and statistical mathematical frameworks are used, to understand trends and to fully comprehend the patterns, the dynamics of the past, and to assess the new revelation and discoveries, behaviors, norms regularities and irregularities. They are also used to evaluate the dynamics and structures and the impacts relations variables etc.

1. Authors
2. Publication
3. Journal
4. Groups
5. Alternative metrics

Reasoning and logic view	
Inductive	Deductive
Specific observation	Existing theories
Pattern of recognition	Formulate hypothesis
General conclusion	Collect data

	Analyze data
	Accept or reject hypothesis

Table 2: Reasoning and Logic: source student author Gerline Ferguson 2025

Paradigm/hypothesis/theory	
Inductive (specific to general)	Deductive (general to specific)
Observation	Theory
Patterns	Hypothesis
Tentative hypothesis	Observation/Experiment
Theory	Confirmation

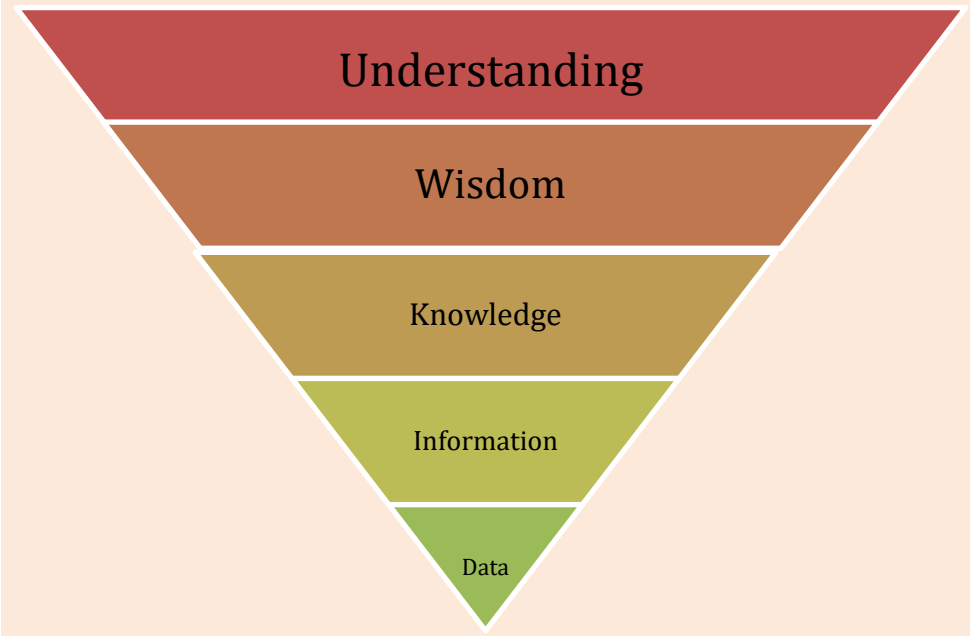
Table 3: Inductive Deductive Paradigm: source student author Gerline Ferguson 2025

Reasoning General Spectrum		
Inductive (specific to general)	Deductive (general to specific)	Abductive
Uncertain	Certain	Uncertain
Bottom-up reasoning approach	Top-down reasoning approach	Create new ideas
Leads to the truth	Comes from the truth	May be truth
Suggest truth	Can prove truth	Best prediction
Specific observations lead to general conclusion	General rules lead to specific conclusion	Incomplete observation

Table 4: Reasonings General Spectrum: source student author Gerline Ferguson 2025

Deductive reasoning research is tested with empirical evidence and observations. It moves from general concepts to specific on a particular position where variables are assessed. The

inductive reasoning is developed from broad observation of reality or a mixed method of both inductive and deductive strategies. The abductive reasoning and rational as postulated by Donnelly (2017) look at premises, validity, usage and confirmation to establish a conclusion (Trochim and Donnelly, 2001). Also, other frameworks such as the contextual understanding tools for interpretating information will be used in the final analysis. Understanding data and interpreting the data is critical, what do the facts show or reveal. Below is the data pyramid and the details of how information, knowledge and wisdom shape understanding (Azungha, 2018). The context of what is presented and the way it is perceived and understood determines how it is applied. It involves gathering, collecting, connecting, joining and then forming conclusions.



Data, information, knowledge, wisdom continuum models

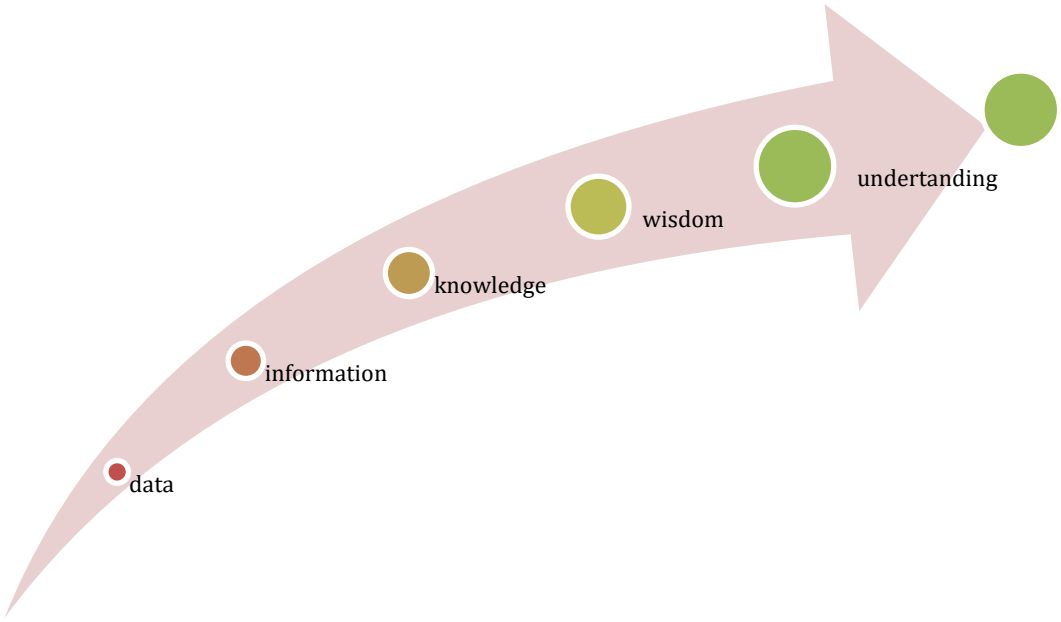


Figure 4: Data Pyramid: source, author Gerline Ferguson 2025

Understanding and Context The Wisdom Hierarchy Continuum					
Data	source	collecting, organizing, gathering	past	researching	relations
Information	who, what, when, where	interpreting, evaluating, investigating, connecting	present	absorbing	patterns
Knowledge	how	integrating, forming	future	interaction	reasons
Wisdom	why	formulating joining		reflecting	principles
Understanding	applying, perspectives on facts presented - novelty and progress				

Table 5: Understanding and Wisdom: source student author Gerline Ferguson 2025

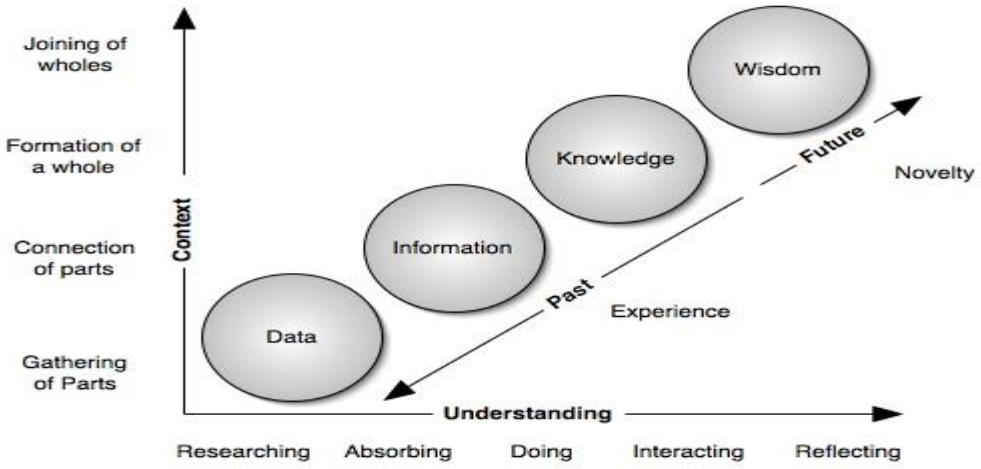


Figure 5: Information as a Resource – Futurist, (Cleveland, 1982)

3.8 PESTEL Framework Analysis Background

The PESTEL or PESTLE analysis was initially created and proposed by the American scholar Francis Aguilar over 50 years ago, who specialized in "Strategic Planning". In 1960 he published the book entitled, "Scanning the Business Environment". This tool was first coined as the "PEST" and it has had numerous variants thereafter (Aguilar, 1967). It has the aspect of the PESTLE or the STEEPLE that engages the ethical aspects such as areas of bribery, reputation, confidentially, ethics and responsibility, and intellectual property (Carruthers, 2009). The PESTEL is one of the most popular yet basic frameworks and tools used in the business world and in modern contemporary society. The PESTEL is used with the "SWOT" matrix.

The cascading effects that trickle and emanates from to all levels of the PESTEL framework is observable in all facets. This also affects all the essential services operating in a society. The essential pillars of society include: economy, education, science, healthcare, justice and legal, family, media, religion, and business. These are the core fabrics of society that form cultural beliefs, and shape arts, humanities, civic views, religious and spiritual concepts, political and governmental principles (Erikson, 2020). During Covid-19, there were only a few selected services and segments of the economy were deemed critical or essential (Bennett, 2021). The medical

profession sector alongside the political, governmental, law enforcement, military and media were all classified as vitally essential services and were critical during the Covid-19, 2020 pandemic (Blaylock, 2021).

3.8.1 The PESTEL Framework Model and The Thesis

When understanding market forces and economic dynamics it is essential to use key metrics to assess, quantify, substantiate and analyze the presented factors (Mitroff, 2020). The PESTEL framework is a great tool to analyze market external forces and evaluate their impacts on the internal environment and how they influence internal factors. It works great with the SWOT analysis to identity strengths, weaknesses, opportunities and threats. The pros and cons are effectively evaluated.

The PESTEL is an abbreviated acronym and it is a mnemonic device aimed to be a well-used tool for analyzing data and gaining broad- based awareness and understanding. It gauges various observable behavior patterns and factors. This framework established an effective criterion for objectively analyzing various strategies and concepts under one integrated framework model. It forms a critical feature when analyzing crucial topical issues and it provides a comprehensive range of features to explore. This is a very important tool when analyzing complex subjects and navigating complicated discussions (Martinez-Contreras et al., 2022).

The PESTEL analysis is a dynamic versatile tool for business, organizations, even nations or individuals to use in order to comprehend, analyze current and potential market forces, risks, and opportunities for making sound strategic decisions. It addresses the external and internal influential factors and their associating impacts that might exists. It also gives insight of what might potentially exist in the future, so solution can be populated in anticipating a crisis or potential problem (Çitilci and Akbalık, 2020).

PESTEL Analysis Definitions and Acronyms	
Acronym	**Definitions**
PEST	The initial acronym Political, Economic, Sociological and Technological
STEP	The same as PEST but in different arrangement of order.
SLEPT	This is an abbreviation with the Environmental aspect omitted.
STEPE	This is an abbreviation without the Legal aspect.
PESTLE or PESTEL	PESTEL or PESTLE is derived from the initial acronym Political, Economic, Sociological (socio-cultural) and Technological to include Environmental and Legal factors.
PESTLIED	This format includes International and Demographics.
DESTEP	Demographics, Economics, Sociocultural, Technological, Ecological Political (governmental/legal/legislative)
STEEPLE	This is additional to the PESTEL which includes an extra E letter representing "Ethics".
LoNGPESTLE	This is an extended version of PESTEL. The LoNG acronym stands for Local, National and Global matters and influences (multinational organization and geo-political factors).

Table 6: Types of PESTEL: source author Gerline Ferguson 2025

The Political, Environmental/Ecological Social/Psychosocial, Technological, Educational, Legal aspects and factors have an interplaying modality in the entire construct and eco-systems of the pandemic within the pandemic life cycle as it coexists in a symbiotic relationship. Hence,

accessing known variables and also looking at the possible unknown variables and the forces that governs these dynamics is very important when evaluating the entire aspect of pandemics within the PESTEL framework.

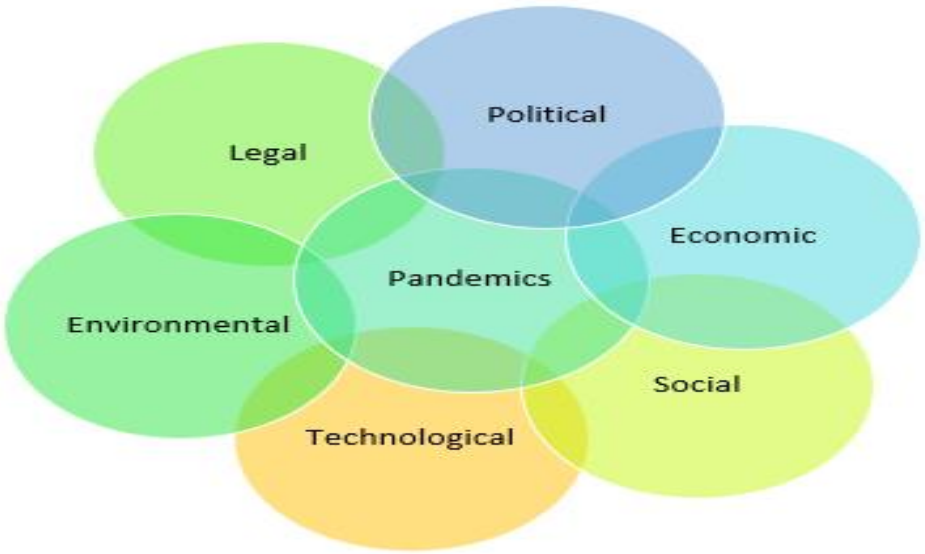


Figure 6: PESTEL and Pandemic Relationship: source, author Gerline Ferguson 2025
Sub categories and integrating areas

- Political – Law Enforcement/Military Policing (research development and science technology),
- Economics – Political/Tariffs/Policies, Law, Trade,
- Social – Social Science/ Psychology, Anthropology, Class ‘classification’, Economics, Education, Lifestyle, Demographics, Financial Status.
- Technology – Science, Research Development, Education/Academics, Medicine (Integration Bio-science), and
- Environment – Environment Social Governance (ESG), Emission, Pollutions).

Exploring the multiple interconnectivity and intersectionality of pandemics outliers:

1. Pandemics and Economy;
2. Pandemics and Politics;
3. Pandemics and Legal Reform;
4. Pandemics and Financial Trends;
5. Pandemics and Technology, Innovation, Research Development;
6. Pandemics and Science and Medicine;
7. Pandemics and Theology;
8. Pandemics and Philosophy;
9. Pandemics and Anthropology;
10. Pandemics and Sociology; and
11. Pandemics and Psychology.

There are sub-categories that emanate from the major categories of the PESTEL as relates to social aspects:

- Socio-economic;
- Socio-legal;
- Socio-technological;
- Socio-environmental;
- Socio-political;
- Geo-political; and,
- Psycho-socio-economic.

The segment and sectors of the economy are:

- Healthcare/ Medical/Pharmaceutical/Insurance/Hospital;
- Information Technology (Telecommunication);
- Media/Art/Entertainment/Information/Communication;
- Banking/Finance/Commerce/Investments/Capital Markets;
- Construction/Real Estate;
- Chemical/Drugs (wholesale) Cosmetics & Toiletries;
- Energy and Mining, Raw Material Resources;
- Agriculture/ Fishing/Forestry Industrials;
- Manufacturing/Materials, Retail; and
- Transportation/Distributions.

Specific Factors within PESTEL Framework	
Political Transformation	The effects of pandemics on political structures (past, present and future), governances, fiscal policies, reform, governmental responses strategies and during pandemics, shift or the balancing of power, emergency measures orders, edicts, sanction, imposition, leadership authority, responsibility, influences, policy-making, public health mandates (national health care, sanitization initiatives fogging fumigating exercises, vaccine distribution campaign, logistics enforcement, penalties sanctions/fines), embargoes, tariff , trade restrictions, security, national safety (the military national security) law enforcements, border patrol, homeland security, immigration.

	Governance public policy-making, procedures, practices, mandates, orders, edicts sanctions, restrictions, interventions penalties which amounted to public revenues, new legislations, military and defense, national security government vaccines provision and distribution, logistics, supply (supply demands), transshipments, public record management, national registry, medical requirements, national healthcare, containment national health expenditure budget allocation.
Economic Dynamics	GDP and GNP national input and output, recessions/depressions, fiscal and monetary policies, business and economic cycles, unemployment data, interest rates, market trends, inflation, taxation, tariffs, imports/exports, commerce, distribution in trades/commerce, logistics transportation, logistics supply demand, international shipping, shipping maritime trade investment, business production, manufacturing commercial transaction, money flow and money supply, overall economic activities, sectors or industry, consumption, consumer price index "CPI", macroeconomics microeconomic factors, capital markets, investors and traders, stock market, commodities shares/equity/indices, , bond, treasuries, liquidity, capital asset development initiatives, reserves, revenues, capital expenditure, profit and returns to investor on Wall Street, Industrials, oil, finance, technology, media, legal son on and so forth.

Social Forces	Demographic variables, cultural changes, community resilience, social customs, standards, behaviors, response effect on literature, art, media, music, faith, religion spiritual, ritual, principles, rules, laws, norms, mores, beliefs, values, ethics raising attitudes, beliefs, collective consciousness, major events, lifestyle, population trends education, socioeconomics, Sociolegal, psychological, (Smith, 1987).
Technology Advances	Innovative healthcare solution, advanced medicine, medical information, development of alternative modern medicines, technological solution to treatment, preventative measures, cures, digital international surveillance tracking, organized and central tracing systems, record management, Tele-Health/Tele-Medicine. Integration nano medical procedures, automations, digitization, acceleration on scientific discoveries and technologies, alternative medicine i.e. telemedicine, education and academic, new discoveries, research development, clinical studies and trials. Leap and paradigm and methodologies into technology, medicine, science, academics.
Environmental Factors	Analysis of environment, ecosystems, advocacy reduce in pollution, greenhouse gas, emissions, ecosystem degradation, conservation wildlife dynamics, climate awareness, mitigations, adaption efforts, sustainable practices containment, natural risks.

Legal Legislative reforms	Legal frameworks for pandemic response. human rights, exploring areas of civil liberties, bioethical legislation, pandemic treaties. consumer protection, environmental laws and legislation, enactment of regulations, and legal requisite requirements.

Table 7: Specific Factors with The PESTEL Framework and Pandemics: source student author Gerline Ferguson, 2025

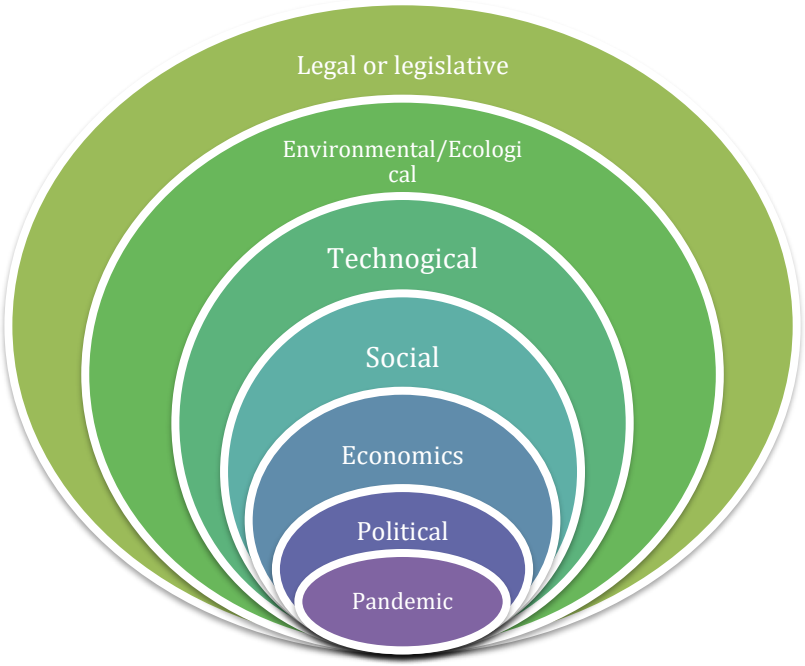


Figure 7: PESTEL Illustration Pandemics Ripples Through Systems: source author Gerline Ferguson 2025

General Factors Relating to Pandemics	
Factors	**Area and Description**
Politics	Governance: public policy-making, procedures, practices, mandates, orders, edicts, sanctions, legislations, regulations, citizenship, civil liberties, governmental national country stability

	law enforcement, military, court Judicial systems, national defense, health safety and security, military, disaster management and recovery, national resiliency and continuity administration of government grants, subventions, incentives, and government systems quazi or dual or joint governmental systems, health care sectors. Economic fiscal and monetary policies, trade tariffs, taxation systems such as tax administration compliance and legislations.
Economics	Resource distributions, labor force, market trends, economic cycles, supply/demand, logistics, manufacturing, distribution, trade and commerce, investments, finance expenditure and incomes monetary and fiscal policies, money supply within the economy and currency flow, GDP, GNP
Social	Ethnographic, demographic, population segment, lifestyle, health behaviors society (sociology, psychology), psychosocial shift, classification (class) financial status, lifestyle, lifespan and expectancy, hygienical practices adopt to medicines products, consumer behavior/patterns, welfare, safety financial. religion, culture, believes, values, customs.
Technology	Innovation, creativity, quantum computing information academic system educational, intellectualism academic, medical advancement, research development, biology, science, public and private healthcare systems practices, clinical studies, innovation, science and technology integration, symbiosis.
Environmental	Ecological: nature, biology, health science) ecosystems (wild life preservation, sustainable development, climate, global warming. pollution,

	Environmentally Sustainable Governance (ESG), biodiversity, habitat, and conservation
Legal	International law, regional, local, state, and medical legislations, data security regulations, legislation and reform, human rights laws, environmental laws etc.

Table 8: PESTEL Factors Assessment Pandemics: source author Gerline Ferguson 2025

3.8.2 TOWS or SWOT Analysis Matrix

The SWOT Analysis matrix is a central key component to formulating important critical strategic business actions, monitoring problems, and implementation of control measures. This was initially called the SOFT *(Satisfactory, Opportunity, Faults, and Threats)* the precursor to the TOWS or SWOT analysis by Robert Franklin Stewarts in the 1960's. This framework involves the usage of analysis, techniques, approaches, in a matrix, model, to scan and assess the environment internal and external factors and influences. It can be used in both the macroeconomic context and micro-economic aspect to assess critical factors. The SWOT analysis works very well with the PESTEL. When used with the PESTEL framework it provides in-depth insight into various issues.

The SWOT identifies both favorable and unfavorable factors and conditions to address. The SWOT is an acronym for "***S***trength, ***W***eakness, ***O***pportunities, ***T***hreats". The SWOT analysis is a vital tool to assess both the internal and external environment of any system and assess the organization (Puyt et al., 2003). It measures and evaluates the key aspects of a situation. It can be used as a strategic tool, to harness strength and opportunities and minimize the weaknesses and threats wherever possible.

Crucial aspects of the SWOT Matrix are as follows:

- Strength weakness opportunities threat quadrant;
- Satisfactorily safeguarding current operations;
- Opening opportunities for effective operations;
- Fixing any current or future faults or failures; and,
- Thwarting averting or ameliorating any threats of current and future operations.

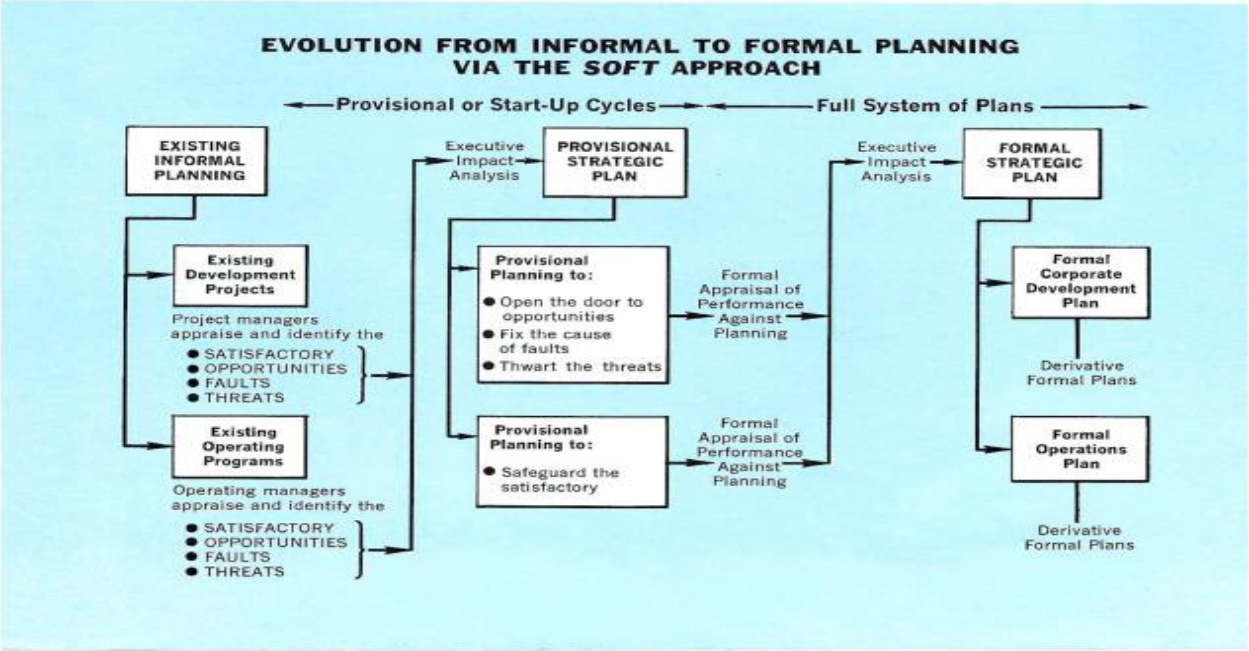


Figure 8: Evolution of SWOT. The Origins of SWOT Analysis, Long Range Planning, Source (Puyt et al., 2023)

3.9 Limitation, Delimitation Restrictions and Assumptions

There are various limitations, delimitations, restrictions and assumptions towards this subject that warrants specialist subject expertise in the medical field and in the military field, technological, pharmaceutical space and scientific arena. But, however, this research is solely objective, analytical general and purely delve into the facts as they are presented with the parameters and scope of PESTEL business, management, finance, commerce, economics,

entrepreneurship, banking and capital markets operations, investment administration etc., using the external factors as presented in the PESTEL framework. This is to provide a keen insightful understanding, clarity, assessment, and gathering of thorough empirical evidence, data sources, industry experts' perspectives, consultation, credible sources articles et al. It also juxtaposes the information gathered to the previous pandemics and how they shaped the global economies, changed the political landscape, altered the course of economic trade, commerce and ushered in new technology systems. In addition, this research is to provide a guide for future research on the topic presented and for further long-term investigative work to continue within this domain (Christopher et al., 1997).

3.10 Analysis Data Collection Procedures Research

The various method used are based on data presented and information presented to the academic community on this topic. There are various methods used in gathering the requisite data. These methodologies are: relevant case study, statistical analysis, previous interviews, questionnaires, surveys and relevant current secondary source analytical data derived from the following:

- Analysis Data Collection Procedures
- Participant Selection
- Raw Data Output Sample Analysis
- Collection and Population Sample
- Evaluation Data Quality, Components, Data Parameters
- Report Analysis
- Board Data Analysis

- Previous Case Study Mixed-Method Analysis
- Metrics and Weigh Measurements
- Fundamental Analysis Data
- Quantitative and Qualitative Data
- Deviation Variance Analysis
- Valuation Indicator
- Probable Deviation Modality Indicators
- Statistical Testing
- Modality Markers per Region

3.11Summary Conclusion

This research will explore the possibility that pandemics, outbreaks, epidemics, diseases and major crises may have a direct positive correlation to the evolutionary advancement of civilization, technological ingenuity, and medical science, fiscal and monetary policies. This notion is a transitionary point for major positive breakthroughs to occur, a gateway for economic innovation, acceleration and to gain momentum. These are shifting thrusts that prompt and prepare economic systems for long term growth with direct parallel momentum and acceleration. Pandemics and its relation to business, strategy, economic and society within the PESTLE framework is an ancient primitive concept as alluded by Christopher (1997). There are both positive and negative aspects to pandemics and its dynamic mechanism. But the positive when aligned and juxtaposed to the PESTEL framework yield more overreaching beneficial to society nation states, economies and civilization in the longest-term perspective as related to economic

momentum, recalibration and advancement in knowledge and when analyzed against the PESTEL framework (Çitilci and Akbalık, 2020).

These are all theoretical outliers and concepts, ideas, notions, perspectives of understanding and interpreting the world (Jameson, 2009). All of these areas presented and the problems faced by humanity and civilization as a whole are not uncommon or novel in nature. Hence, as we seek to understand and interpret the world and interact within the dimensions they contain, it is imperative to have a broad prospective and clear understanding of all key areas in order to gain logical rational insights and perspective of life.

CHAPTER IV:

THE RESULTS

4.1 Research Questions

- "*Can pandemics be used as a diversified elaborate economic apparatus to shape society as it relates to the PESTEL framework for positive long-term economic growth and a catalyst for specific strategic management outcome*?"
- Are pandemics a device on grandest scale to motion for economic advances and shift civilization and steer pre-determined economic social outcomes into the future whether naturally or artificially or even hybrid?"

4.2 Assessing Depth and Effect of Pandemics

As pandemics are dissected, and analyzed within the various context and content of economics, business and finance various business models, tools and framework can be integrated into the mix of assessments to understand and interpret fundamental, technical, quantitative, qualitative and theoretical dynamics that currently exist. It is relevant and necessary to apply the PESTEL analysis into this perspective when assessing pandemics in its entirety on a higher dimension of understanding and interpretation. By using these existing application and concepts to understand pandemics, we can comprehend the effects on civil systems such as the economy, politics, society, structures, and the legal system. It is beneficial to understanding the past and what occurred throughout history in order to gauge a clearer perspective of what is happening now, and what to anticipate for the future. The objective approach is to gather and analyze the various data and records presented in an unbiased, objective systematic way. This is the best way to fully

appraise, appreciate and asses the data presented and make future rational predictions. The PESTEL tool aids in the overall objective assessment as the fundamental tool in this research.

Pandemics are grand pivotal events of astronomical proportion occurring continuously all over the world that traverse time space and millennia through the dawn of human civilization (Hertati et al., 2020). They have monumentally integral aspects that shape society, human evolution and the very course of history from antiquity to modernity impacting humanity and civilization (Antras et al., 2020), They are not just mere healthcare crises, chaotic periods, and tragic eventualities that just haphazardly emerge or vicariously materialize within the passage of time (Huremovic 2019),

This chapter concentrates and sets the precedence to a complex discussion into the realm of pandemics diseases, outbreaks and their effects on various nations, states, societies, economies, commerce, financial markets, trades, business, social structures, politics, government entities and the world. This academic paper further assesses and evaluates the national public intervention policies, strategic reforms, national and global tactics, along with the psycho-social and social practices associated with crisis and pandemics (Sampath et al., 2021). The business, economics and the financial aspects of pandemics will be fully discussed and investigated and its spillover and compounding effect on the positive spectrum using the PESTEL model to illustrate this theoretical notion

But Pandemics, epidemics and disease outbreaks are catalysts for motioning radical sweeping national changes, regional and global shifts in society that have catapulted civilization throughout history (Boire et al., 2014). This paper seeks to establish that pandemics are beneficial in the long term when assessed with the PESTEL factors. This research will assess the topic through the panoramic lenses and panaceas of history and the gleaning of insights through comparative studies and examination of past empirical evidence and critical credible data. The

economic impacts are always seen or presented in the negative aspect but there are greater positive aspects other factors and dynamics that are unconventional as the PESTEL framework will reveal certain deep realities once explored and applied with other theories.

The infamous term “pandemic” was first used in 1666 and was coined to explicitly describe an ongoing spread of disease or an outbreak” (Sampth et al., 2021) Other terminologies such as endemic, epidemic, outbreaks are synonymously used but both the word “pandemic” and “epidemic” are often used interchangeably. Moreover, in recent years the US Center for Disease Control and prevention, the (CDC) defines pandemics as a disease outbreak or an epidemic which spreads over many countries, regions, territories at a specific time affecting a very large segment of the people or population. Understanding economic conditions, social cycles, political systems that influence civilization is critical when looking at the topic of pandemics. Civilizational cycles and technological transitions are also important to evaluate in this context (Petrunenko et al., 2022).

4.3 Summary of Findings: What the Evidence Reveals and Meaning

It helps us to investigate, analyze, classify, prioritize and interpret key valid information extrapolated from various relevant portals, internet search engines, books, periodicals, academic database resources. It also helps to gain valuable understanding of the wider views and perspectives. It merits broad logical reasoning and investigative approach into the subject in order to fully understand the various factors it presents. The external factors and internal mechanisms that interplays in the entire subject of pandemics within the eco-system of PESTEL framework is transparently and better analyzed in all context (Çitilci and Akbalık, 2020).

Current Factors of Covid-19	
Areas	Area and Description
Politics	UN General Council; UN (affiliates and ally international NGOs); World Health Organization (WHO); G7 Nations; Regional heads and governmental partnership, supranational organization and affiliates; North Atlantic Treaty Organization (NATO); Mandates and penalties for breaches; Orders, decrees and declaration from government authorities locally and abroad.
Economics	Bank of International Settlement (BSI); International Monetary Fund (IMF); International Labor Organization (ILO); World Bank, which issued pandemic subventions and aid, loans; Local, regional global health expenditure and economic analysis; International Credit Rating Agencies such as Moody's, Standard & Poor's, Fitch
Social	Social distance protocols Human wellbeing and interaction Heighten awareness for sanitization Wearing of masks to prevent spreading of disease

Technology, Educational, Academic,	Research development scientific, breakthrough clinical studies by • John Hopkins University – medical studies; • Wuhan Institute of Virology (WIV) research; • University of Boston – novel Corona-virus Scientific Studies "Gain of Function Research - 2022); • Imperial College of London (pandemic: forecasting – mathematics and statistical modeling); • Eco-Health Alliance; • Imperial College of London reports, (Ferguson et al., 2020) • Bibliometric studies on social isolation, quarantine, mandates • Clinical Studies, Testing, evaluation, Clinical research development; • Technological Research Boston University "*Gain of Function Research*" - exploring disease ecology (Chen et al., 2022) • Georgetown University - Professor Dr. James Giordano, faculty Department of Neurology – military strategies in combating viruses, Neuro-Warfare (Graham, 2021), (Giordano, 2021), (Giordano, and DiEuliis, 2021); • Five Generational Warfare (5GW) – Social engineering strategies and control Artificial Intelligence, influences and agents (Reed, 2008), (Krishnan, 2022); • Military science DARPA Research and advance technical science; • Wuhan Lab and Alliance with NIH "Lab Leak: BioEthics" (Baker, 2021);

	• Peter Daszak, president Eco-Health Alliances (Deszak, 2016) and (Husseini, 2020), (Moreno, 2004) "DARPA on your mind" Technology and Neuro Science Quantum Technology.
Environmental or Ecological	Ecological (health science), ecosystems (nature) forestry wild life, green and sustainable development initiatives, green smart cities reducing waste, pollution, carbon emission, Environment Sustainable Governance (ESG) regulations and corporate responsibility programs, population growth management, recycling initiative (reduce, reuse, repair), pollution problems and sickness disease from atmospheric (air), land, water pollutions, carbon-credit system
Legal Legislative	Global UN Pandemic Treaty, (universal coordinate cooperative governance alliances, coalitions, accords). Uniliteral accords Agreements

Table 9: PESTEL Current Factors: source student author Gerline Ferguson, researcher 2025

The LoNGPESTEL Framework – Pandemics Assessment						
	Political	Economical	Sociological	Technological	Environmental	Legal
Local National	Rules Regulations Policies Governmental systems	Economic impact GDP/GNP Monetary fiscal measures taxes Exchange rates Inflation	Education Lifestyles Health Safety	Integration of novel technologies tool devises and innovation for advancement network	Restrictions Geographical location Climate weather Health Natural local risk	Legislative, justice Military/policies court and judicial systems law enforcement

		Employment Consumer price index (CPI) Industries/sectors	Social services factors Workforces (knowledge education levels) Population size Income levels	Communication local, regional national	Environmental factors	
regional	Jurisdiction Regional regulation Cross boarder relationship and treaties Trades agreements Regional foreign affairs relations	Immigration issues Unions /operative alliances Important export/tariffs	Regional attribute and demographics Regional laws	Adapting to tech competitive advantage Communication	Regional laws	Regional courts
Global	Access to grants funding initiatives Geo-political coalition within the hemisphere international diplomatic relations and alliances	Inflation Supply logistic import/export Embargoes/tariffs/sanctions	Global social strategies alignment and enforcement of human rights (laws) Configuration and integration	International influences Technology transfer	Infrastructure Global environmental	International law International policies mandates Sanctions Internation courts Treaties/alliances Environmental laws

Table 10: Long-PESTEL source Gerline Ferguson, DBA student researcher 2025

4.4 General SWOT of Pandemics

The SWOT analysis can further be dissected into individual PESTEL segmentations; this is a great combination analysis when looking and addressing the subject matter presented on all spectrums.

The SWOT Analysis and the PESTEL Framework and Pandemics General SWOT of Pandemics	
Strength	**Weaknesses**
• Political intervention opportunities and authority • Increase medical, clinical scientific and technological research and development • Governmental reform legislations and mandates • Increase in government power • Increase in government budget (monetary and fiscal policies) to finance cures, access to health care and medicine • Acceleration in e-commerce and virtual sales activities • Increase online virtual sales • Profit to sectors and industries such as pharmaceuticals, • Virtual platform hosting web-based businesses	• Psychological chaos • Economic uncertainty • National and global panic, fear, pandemonium • Mental health crisis anxiety • Vulnerable volatile situations market shocks • Instability and uncertainty factors on global industries and sectors • Rippling multiplier and spillover adverse effects

• Sanitizing disinfect innovation increase sales hygienics and pharmaceuticals in these sectors and enterprises	
Opportunities	**Threats**
• Economic long-term growth prospect new industries formed and economies • Quick implement systematic and comprehensive overhaul of medical systems • Rapid launch national emergency action plans systems and strategies • Advancement and financial resetting • Legal medical reform opportunities • Medical advancements • Advance technology • Health mandates • Recalibrate and paradigm shift • Revamping and reshaping health emergency systems • Development of new policies and framework accelerated changes • Increase in financial support for emergency education	• Economic upheaval, stock market collapse • Small and mid-size enterprise vulnerability • Instability, short term panic, sell-offs, valuation Supply chain and logistic distribution disruptions, resource management: operations and supply administration, trade, distribution, transportations, import exports. • Impact on manufacturing • Unknown variables • Death toll to elderly, morbid, vulnerable and ill population • Threat to small micro businesses • Challenges of monitoring surveillance of pocket outbreak

• Virtualization instead of physical mobility • Market penetration for well capitalized enterprises and cash cow, seed and angle investors seek greater return and profit on investments on news discoveries and innovation.	• Impact on small micro businesses especially mom and pop self-employed unemployment economic hardship on the poor • Financial shockwaves • Cost cutting measures • Decline in work hours remote working • Transformation industry adverse impacts • Service sector face-to-face • Education face-to-face operational adjustments

Table 11: SWOT, PESTEL, and Pandemics - source student author Gerline Ferguson, 2025

Pandemic Pros and Cons – cost benefit analysis	
Description assessing the positive and negative	
Pros	**Cons**
Long term growth prospects	Short term **Adverse economic impact**
Paradigm and reset of economy Opportunity to "build back better" and improvement.	Chaos, disruption, panic, pandemonium, fear.
Gain of function research, knowledge increase medical, technical and clinical data.	Death tolls (vulnerable population at risk).

Advancing medicine and science, merging of medicine such as. biology and technology, opportunities	
Long term improvement and societal development	Uncertainty stagnation, inflation such as stagflation, hyper inflation, unemployment, recession, depression, economic collapse

Table 12: Assessing Pandemics Pro and Cons: source student author Gerline Ferguson, researcher 2025

4.5 Mapping Pandemics Historical and Chronical Timelines

A crisis is a disruptive force, a critical period marked by disturbing event(s) which suddenly manifest in an adverse manner that sends shock waves within an organization or even in a greater economy, nation or on the world stage. Crises are classified as catastrophically dangerous events with overarching detrimental ramifications. Crises include areas such as natural disasters, terrorism, warfare, technological attacks, cyber threats, national security invasion, vulnerability, which results scarcity, panic, uncertainty Innovation and technological advancement which in the short-term caused chaos but in the long run yield positive momentum (Schiliro, 2021). have been at the epi-center of human civilization (Hertati et al., 2020). Pandemics have birthed new leaps into human society that touched all aspects of the PESTEL framework on all levels both positive and adverse categories, (Stocker et al., 2023), but the bulk of it has been framed for the greater good. Science and technology, (Nkrirote, 2021), education are areas that accelerate during pandemics (Schwab and Malleret, 2020).

There are always multifaceted approaches and there are also two sides to the same coin. Hence, through deep investigative analysis and excavation keener understanding and conclusion can be presented. In a pandemic there is one observable universal invisible common enemy with multiple

implications. But the reversal on the alternative view and on the flip side, is that it can be regarded a beneficial in the long term. These instantaneous disruptive events when it is deeply analyzed with the PESTEL lenses can foster through a deeper impact on economic activities and trajectories positively (Martinez-Contreras et al., 2022). Each age, era and epoch in history was a launching pad for humanity and civilization in its evolution process of systems, development and maturity (Mahoney, 2023). From the stone ages and its tools and development to the metal ages of copper, bronze and iron, into pre- modernity classical, early, mid and post to the contemporary ages to the modern age of information technology digital artificial machines and the integration of these concepts into business, economic, finance (Mihalis, and Kristikos, 2020).

Historical Chronology of Timelines Throughout the Ages					
Histography of Pandemics: The various Timelines in period Throughout History					
	Time/period	**Ages**	**Era**	**Approx. year circa**	**Millennium Century**
Time prior to development of human records and writing	Pre-History	Stone Age (Lithic Era)	Paleolithic (old stone age)	c. 2.5Mil - 6000 BC	Ancient time antiquity
			Mesolithic/Epipaleolithic (Middle stone age)	6000-4000 BC	
			Neolithic New (stone age)	4000 -3000 BC	
		Copper Age Era	Chalcolithic Eneolithic	3000-2000BC	
	Ancient Era Antiquity	Bronze Age	Early Bronze Age	2000-2100BC	
			Middle Bronze Age	2100-1550 BC	
			Late Bronze Age	1550 - 1200BC	
		Iron Age	Iron Age	1200-800BC	1st millennial BC

Development of writing systems	Classical Era	Classical Age	Greek	800-400 BC	1000-1BC
			Macedonian Era	400-300BC	10th century to 1st century BC
			Hellenistic Era	300-AD 146	1st millennial AD
			Roman Era	146 - AD 479	AD1-1000
	Medieval	Middle Ages Post Classical	Early Middle Age	AD476-1000	1st century AD- 10th century AD
			High Middle Ages	AD 1000-1300	2nd millennia AD
			Late Middle Ages	AD1300-1450	AD1001-2000
	The Renaissance Era	Contemporary	Early Modern Era The Renaissance	AD 1450-1600	11 Century AD to 20th
	Baroque		Modern	AD 1600-1750	
		Age Of Discovery	Industrial Revolution Progressive Era	AD 1750-1990	
	Atomic Era Technology Era	Space Age Information Age/ Technology	Nuclear Age	AD 1990 - present day	
			Digital Age, Machine and Internet Age	AD 2001-present day	3rd Millennial AD AD 2001-present 21st century

Table 13: Eras in History: source author, student researcher Gerline Ferguson, 2025

In the Greco Gregorian Christian calendar and context of systems and cycles, the dates are set by the Roman Catholic the Vatican and the Anglican Episcopalian religious counterparts which are under the auspices of the monarchies of the systems as affixed below in the table presented.

- Before Christ denoted as “BC” and BCB then there is the before “Common Era” (CE) Common Era same as AD in secular; and
- AD Anno Domini medieval Latin for “year of “Our Lord”, the year after the birth of Jesus Christ in the Roman and Greek (Greco) calendar.

	Description and Phases
	Earlier modern: age of exploration 15th CE to 17th Century, age of enlightenment or reasoning.
	Pre-colonial, geopolitical shifting.
	Colonial America & revolution UK, New nation 1783-1860) civil wars (1861-1865) reconstruction and Industrial revolution (1750-1890).
	WW1 1914 to 1918, Interwar Period 1920 to 1939, WWII 1939 to 1945, cold war 1947 to 1991, great depression (1929-1940).
	Post-cold-war era 1991 to current.
	Globalization, international trade, investment, borderless, universal access.

Table 14: Timeline Describing Phases in History: source author, student researcher Gerline Ferguson, 2025.

4.6 Industrial Revolutions that Shaped Economic Trades, Transformed Societies, and Civilization

There are major industrial paradigm and dynamic shifts throughout various epoch in history in the passage of time which have been propelled by pandemic shift causing systemic shifting of the fundamental socio-economic and geopolitical aspects of humanity. They have been principally propelled by universal catastrophic seismic events, very disturbing chaotic moments, marked wars, famine, upheaval, economic unrest and financial uncertainty along with by natural disasters, infectious disease outbreaks, pandemics, public health crises, safety security threats, terrorist attacks, national tragedies and so forth (Rubinić, 2020).

4.6.1 Types of Industrial Revolution in History

Identifying the various industrial revolutions and their phases through history is important when analyzing pandemics, wars, disease outbreaks and major destructions. What is the first, second, third and now 'fourth industrial revolution". What is ahead into the pending "fifth industrial revolution'? These cycles and systems are ushering in another dimension of the current "digital revolution" (Schwab and Zahibi, 2020). The question now is, 'how have pandemics influence these revelations?' What pivotal roles have pandemics played in their development or how have pandemics affected the revolutionary phases of society and the economics?

The "fifth industrial revolution' is forecasted as the greatest projected shift in the human evolution process. This paramount shift will catapult civilization into another socio-economic paradigm (Sarfraz et al., 2021). This consists of the merging of machine and human, the quantum computing, singularity, transhumanism, AI integrated symbiosis, nano particles, synthetic biology and technology and convergences. Through each phase of the revolution efficiency and input is accelerated exponentially Society advances, and there are consequences such as rapid expansive

shift, increase in population lifespan, demographics, increase in wealth distribution, increase in technical knowledge, complexity from the prior or primitive agrarian societies, acceleration rapid growth and expansion tends to evolve, alongside new social organizations that fits the industrial society development (Worden, et al., 2003).

The "*First Industrial Revolution"* used water and steam engines to power and produce higher efficient volumes of input and enhanced mechanized production. The Second used electric powered systems to create mass production. The Third *Revolution* used electronics and information technology to automate production. By identifying the various industrial phases such as the first, second, third, and fourth industrial revolutions and how they affected and facilitated societal growth and development we can assess the data and make meaningful and justifiable interpretations (Rubinić, 2020). Through these phases and stages pandemics played a pivotal role in their development and transition. The first industrial revolution was marked with the use of propeller water and seam powered mechanical or manual engines. The second revolution ushered in the electrically powered systems that created mass production. The third industrial revolution was the advancement in engineering and automation. The fourth industrial revolution is electronic acceleration advance robotics technology. The era of the fourth industrial is in full development and making acceleration for fifth industrial wave of system and evolution. Society 5.0 and the concepts of fifth generation things such 5G technology, AI, and possible transhumanism is now in development.

Charting Economic Movement						
Timeline of industrial revolution and the evolution of society amidst the 2020 Covid-19 pandemic						
Agriculturalization	Mechanization	Electrification	Automation	Digitalization	Personalization	**Integration**

Manual labor agronomy						
Pre industry Revolution	1.0	2.0	3.0	4.0	5.0	**6.0**
1300	1780	1870	1970	2010	2020	**2030**
Rural Farming	Equipment powered by water and steam	Characterized by mass production electrical energy Assembly lines	Automated process and production Telecommunication Computer	The use of cyber systems connections digitalization	Physical system machine learning, cognitive system, mass customizations for human	**futurist**

Table 15: Charting Pandemics: source author, student researcher Gerline Ferguson, 2025

	Dates and Timelines: Industrial Revolutions
1	First Industrial Revolution: Coal in 1765. Industry and Society 1.0
2	Second Industrial Revolution: Gas, Petroleum in 1870. Industry and Society 2.0
3	Third Industrial Revolution: Electronics and Nuclear in 1969. Industry and Society 3.0
4	Fourth Industrial Revolution: Internet and Renewable Energy in 2000. Industry, digitization, information age- Society 4.0
5	The Fifth Industrial Revolution: Artificial Intelligence (AI) Big Data Information of Technology (IoT), cyber tech augmented reality devices, robotics, digital healthcare, integrated science, digital systems, industry and society (Sarfraz et al., 2021) propelling civilization to smart society bridging Society 5.0

Table 16: Industrial Revolutions: source author student researcher Gerline Ferguson, 2025

Observing the prehistorical eras, and geo- political wars, and the various disastrous events such as plagues, disease, outbreaks, pandemics, famine, it is important to gained the understanding of anthropology and history. It has always been a dominant theme and how society act, behave. Major transitional periods of history are marked by plagues of the past that influenced human civilization and the social elements and economic impacts:

- Athenian Plague,
- Antonine Plague,
- Justinian Plague,
- Small Pox,
- Black Death “Bubonic Plague”,
- 1st, 2nd, 3rd Plagues,
- The Seven Cholera Pandemics,
- Great Plague of London
- Yellow Fever,
- Italian Plague,
- Spanish Flu “the Great Influenza”,
- Japanese Flu,
- Asian Flu,
- Hong Kong Flu,
- HIV/AIDS,
- Severe Acute Respiratory Syndrome (SARS),
- Swine Flu. MERS Virus,
- Ebola Virus and,
- Covid-19 SARS-CoV-2 Corona Virus.

Mapping Trajectory Pandemics Through the Centuries and Ages

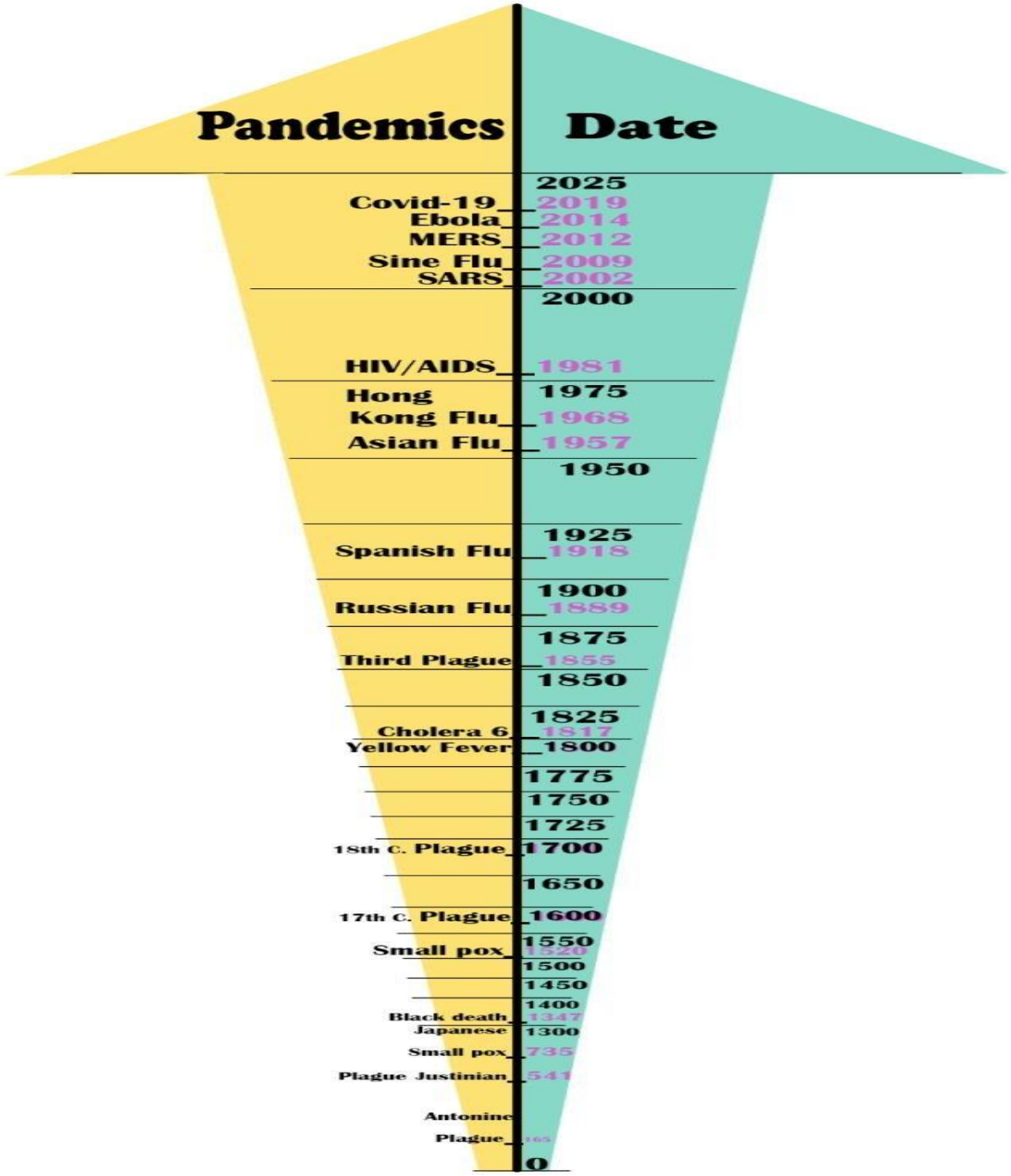


Figure 9: History of World's Deadliest Pandemics: source (Eltarabily and Elghezanwy, 2020).

History of Pandemics

Industrial Revolutions and the Evolution of Society

Industrial Revolution through the ages and societal phases of social and financial evolution and development

Pre-History	Ancient Civilization	Antiquity	Communal Society	Modernization	Society 1.0	Society 2.0	Society 3.0	Society 4.0	Society 5.0
430-26BC	165 -180 AD	541-543	1300	1780	1870	1970/1980's	2010	2020	2022 and beyond
Stone Age (Lithic Era)	Rural Farming	Industrial Farming War Occupation Territorial	Farming Large Scale Formal Distribution	Mechanization	Electrification	Automation	Digitalization	Personalization	Technology Integration Singularity
Nomad Hunter gatherers, wonderers	Battering systems Exchange Farmers markets horticultural	Rural living Egypt & Spread through Roman	Agronomic Agriculture Agricultural Revolution	The first industrial revolution production equipment driven water and steam power manual labor to electrically powered advancements	Mass production of electrical energy A/C D/C power invention of light	Production of automated telecommunication start of the computer	The use of digital system connected devices	Interdependence of man, robots machine using AI cognitive mass customization singularity cybernetics cryptocurrency programable money digital assets transhumanism injectable bio nano technology, bio electronic medicine Digital ID and currency	Implants and imbedded technology Open Ai Generative Ai, ChatGPT Machine-learning Neuro-link network Artificial interlink and quantum computing, deep learning Algorithm Self-driving vehicles Strong Ai

									Open surveillance Internet of things Smart technologies Singularity, trans-humanism futurist tech devices
Athenian Plague	Antonine Plague "the Plague of Galen"	The Plague of Justinian	Black death the great mortality era (1347-53) Black death killed up to 200 million Europeans, Asia and North Americas	Great Plague of London (1667-1666) The Bubonic plague of the mid-17th century killed nearly a quarter of London's population in 18 months	The Russian Flu 1889-1893 Spanish Flu 1918-(killed 50 million worldwide	HIV AIDS	Hin1 Swine Flu Avian Mad cow MERS Zika Ebola	Covid 19 Monkey Pox 2022 Cholera outbreak 2022 Marburg (isolated pocket outbreak Africa 2025)	
				The seven great cholera pandemics 1800 to present					
	Rome First known pandemic impacting the roman empire	Egypt	East Asia	America	America	Europe America	Global Warming	Climate Change, ESG Carbon Credits Climate Emergency, green revolution suitability Techno Feudalism Technocracy	

Table 17: Pandemic History: source author Gerline Ferguson, DBA student researcher 2025

Pandemic Historical Chronological Tracker and Impact						
#	Pandemic	Year	Region	Impact	Pathogen	Vector
1	Athenian Plague aka the Great Plague of Athens	430 BC	Athens Greece	Europe		
2	Antonine Plague “the Plague of Galen”	165 AD to 180 AD	Rome	Europe		
3	Small Pox	735	Japan			Variola virus Orthopoxvirus
4	Plague Of Justinian	540-542	Egypt	Africa	Bacterium Yersinia Pestis	Fleas Associated to Wild Rodents
5	Black Death ‘Bubonic Plague’	1346-1353	Western Eurasia North	Europe	Bacterium Yersinia Pestis	Fleas Associated to Wild Rodents
6	Typhus Also Known as Camp Fever					
7	Great Plague of London	1665-66	London England	Europe	Bacterium Yersinia Pestis	Fleas
8	Yellow Fever	1793 -1800	Caribbean			
9	First Cholera Pandemic Severe Cholera	1817-1824	India Myanmar (Sri-Lanka) Ganges Delta Jessore	Europe	Toxigenic Bacterium Vibrio Cholerae	Contaminated Water Supply
10	Second Cholera Pandemic	1826-1837	British India	Eurasia America	Toxigenic Bacterium Vibrio Cholerae	Contaminated Water Supply
11	Third Cholera Pandemic	1839-1856			Toxigenic Bacterium Vibrio Cholerae	Contaminate Water Supply

12	Fourth Cholera Pandemic	1863-1875			Toxigenic Bacterium Vibrio Cholerae	Contaminate Water Supply
13	Fifth Cholera Pandemic Sixth Seventh Present ongoing sporadic cases	1881-1886 1899-1923	India Middle East		Toxigenic Bacterium Vibrio Cholerae	Contaminate Water Supply
14	Third Plague	1885-Ongoiong			Bacterium Yersinia Pestis	Fleas Associated to Wild Rodents
15	Russian Flu	1889-1893			Influenza A/H3n8	Avian
16	Sixth Cholera Pandemic	1899-1923			Toxigenic Bacterium Vibrio Cholerae	Contaminated Water Supply
17	Typhoid Fever Typhus Also Known as Camp Fever	1908				
18	Spanish Flu	1918-1919		Global	Influenza A/H1n1	Avian
19	Asian Flu	1957-1959	China			
20	Seventh Cholera Pandemic	1961-2010		Asia, Middles East	Toxigenic Bacterium Vibrio Cholerae	Contaminate Water Supply
21	Hong Kong Flu	1968-1970	China		Influenza A/H3n2	Avian

23	Human Immunodeficiency virus) HIV Acquired Immunodeficiency Syndrome (AIDS)	1975- Ongoing	Central Africa		Virus Viral Infection	
24	SARS Severe Acute Respiratory Syndrome	2002-2003	Asia		Sars-Cov Corona Virus	Bats, Palm Civets Mammal
25	Swine Flu H1N1	2009-2010	Central America Mexico			
26	Avian Bird Flu H5H1					
27	Ebola	2016	Central Africa	Global		
28	MERS Middle East Respiratory Syndrome					
29	Zika			Latin America		Mosquito
30	Covid 19 Sars-Cov Novel Corona Virus	2019-2024	China	Global Impact	Coronaviridae Betacoronavirus Genus and Subgenus Sarbecovirus	Bat horseshoe
31	Monkey Pox Outbreak	2023	**Global**	Global Impact		
32	Bird Flu	2024				
33	Marburg	2025	**Africa**			

Table 18: Pandemic Tracker: source author, student researcher Gerline Ferguson, 2025

4.7 Pandemic Driven Economic Shifts in Society Affecting Civilization

The Darwinian theory of natural selection and "the fittest survives" is critical when looking at pandemics and PESTEL (Darwin, 1859). This theme of natural selection is not only identified in biology, evolution and in nature, but also intrinsically related to social and economic systems. It exists in the realm of finance and business within the economic and business lifecycle. Furthermore, it exists in micro and macro systems as well, and in the spere of pandemics. In the state of pandemics only the fittest is guaranteed survival. The weak, the vulnerable and old will not survive. In the economic system there are mergers, acquisitions, hostile takeovers, demergers, bailout strategies, dissolutions, restructurings and discontinuations all for dominance, continuity and perpetuity in the cycle of things all of this form the foundation to economic structures (Ma et al., 2020).

In a pandemic scenario, the susceptible, the elderly, the vulnerable children, marginalized segment, compromised sickly with comorbid factors and the poorest are the most susceptible and adversely affected. In most instances the more affluent can obtain the best possible health care and medical intervention, they can travel easily for health care services. It also hinges in socio-economic factors "the money or for health and quality of life or death". The reality is preference and biased priority is given to economics. Economic and wellbeing health and cost and availability of cure is based on economics. Causality and collateral damages are greater in the more vulnerable population and demographics.

Pandemic outbreaks require robustly tough, draconian, firm and swift governmental, political, legal measures and interventions. Many of these postures, attitudes and actions taken under instant immense pressures which hinges on the economic stabilization factors and national interest matters; thus, economic models and theories are used to stabilize momentum and control outcomes. The PESTEL frame gives a greater and broader, panoramic perspective of these

outcomes that can evoke military powers of great national security, safety and protection of social interest and which propels immediate medical advances, and technological developments. These are yielding trade-off opportunities for security, and safety. Pandemics evoke so much dread uncertainty and panic that actions are instantaneous (Moosa, 2021). These scenarios required carefully crafted plans. Many of the temporary measures and deviations from the normal activities and decisions are immediate to bring normalcy and order. In the *Complex Activity Systems (CAS)* this can be influenced whether positive or adversely as forces are played out. The CAS method can be evoked through pandemics or chaotic destabilizing events in one way or the other. Forces can principate induces various factors to emerge, whether it is latent or sudden. The various associating factors can be predictable or unpredictable events and their associating effects and influences (Mihalis, and Kristikos, 2020).

The figure depiction below is the "The spiral of civilizational cycles and Economic Development" (Petrunenko et al., 2022)" and the relationship to timeline and technological transition and global pandemic, diseases. The mathematical quantification in context to the "Fibonacci spiral as nature" a natural element and indicators to the occurrences of system cycles and their ecological development and evolutionary process and progress Sarfraz (2021) depiction pictograph presented below:

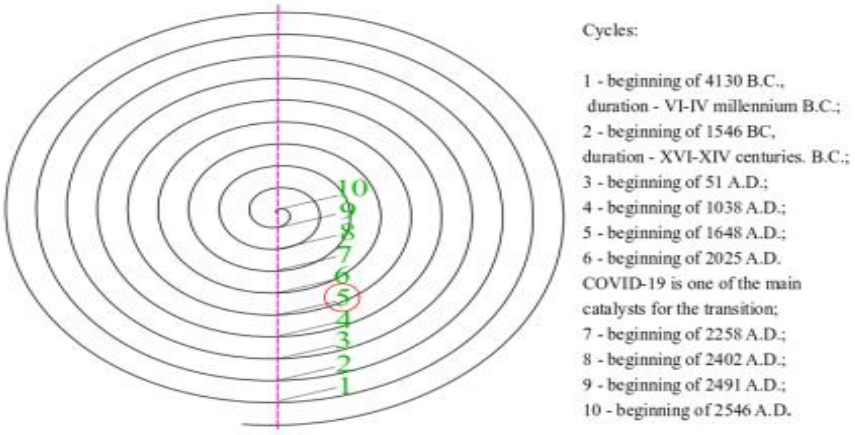


Figure 10: The Spiral of Civilizational Cycles and Economic Development Technological Transition and Global Pandemic: Source (Petrunenko et al., 2022)

4.8 The Autonomy of Pandemics

Pandemics and crises have always been an enduring catalyst (Shang et al, 2021). They can also be seen as necessary evils and thematic aspects in civilizations and the human existence throughout history (Christopher et al., 1997). They have been infamously known to immense cataclysmically shifts that re-shape, redirect, and reset cultures, and civilization. Pandemics are like thermostats that can control the trajectory of an entire economic system. This research dissertation explores the complex mechanics and impact of pandemics and outbreaks on various critical aspects of human landscape, structures, systems, including political structures, economic systems, social constructs, technological advancements, environmental conditions, educational paradigms, and legal frameworks (Dry and Leach, 2021). Looking at this thorough the PESTEL reveals various interestingly dynamic correlations. The economic and financial status, social class, demographic, segmentation, population, ethnicity, education all interplaying factors and each of these dynamics are all impacted during a pandemic.

4.8.1 Pandemic Life Cycle

In a pandemic setting, and within the pandemic lifecycle there are ordinarily the short term, midpoint aspects presented. There are casualties and chaos at the onset. However, order, stability, ingenuity, advancement arise in post- pandemic phase in the future when analyzing the and long-term impact. Therefore, assessment of the aftermath and long-term effect is also vitally necessary. The PESTEL spectrum reveals that these new development and advancement are beneficial to the modernization, advancement and development of human civilization. This is imperatively crucial and information to understanding past, present events to simulate and hypothesis future events in order to predict future events and potential outcomes (Mihalis, and Kristikos, 2020). Understanding the complex network of pandemics and how they interact and mesh to form the dynamic civilization especially when looking at "gain of function scientific research", development of new medicine, treatment, invention on innovative technology, clinical research, academic repositories and data banks and peer review journals.

Overall lifespan, phases, timelines and cycle from community outbreaks, implications policy, response and preparedness prevention control, public health actions, recover and then reconstruction such as start, middle, endpoint or aftermath. This might span from an average days or weeks or even perhaps couple months not extending one or two more years. The endemic follows the aftermath. The pre- to post has a general two-to-three-year years. Sporadic pocket of the illness and then full containment or natural herd immunity. There are phases to the endemic, hyperendemic and cluster cases which are contained and not a thereafter in the after math of the chaos (Gibson, et al., 2021). Financial stability and government fiscal, monetary measure and then stabilization quantitative easing strategies, government injection to stimulate the economy, stimulus measures, and incentives. All technical fundamental analysis and feasibility studies et all quantitative measures all deployed through the central bank and currency and monitory controlling

system in the economy. Risk impact assessment, continuity and disaster recover mechanism implored on the macro-level with the national areas affected. Pandemic mitigation like other national disaster requires awareness preparation such as the following: advance, preparedness strategies, response, recovery and reconstruction planning (Cespedes et al., 2020).

But, unfortunately the immediate and the long-term effects of pandemics are long term and those positive aspects are even far greater, which far more overreaching in the short-term period. The effects of immediate chaos and catastrophe are presented as far as technological progress, medical discoveries, academic advancement. It is the attempt of this research to sketch what the future landscape may look like in the era post-Covid (Bramanti et al., 2016). This paper will intricately explore and expand the pandemic life-cycle and the economic life cycle and the vast changes it brings (Antras, 2020).

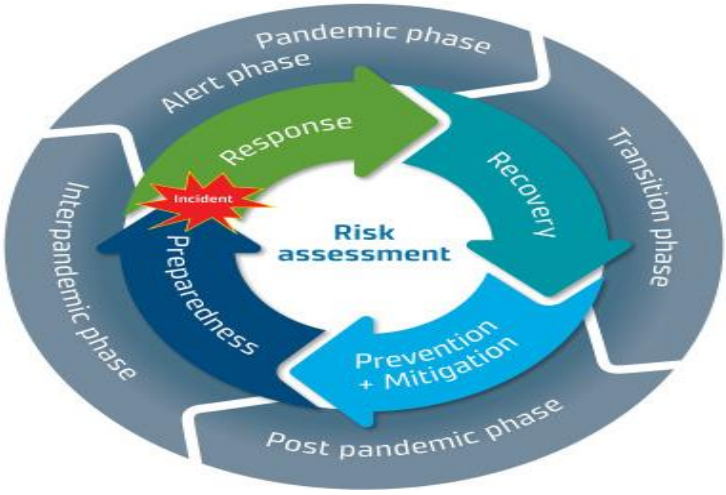


Figure 11: Pandemic Phases and Risk Assessment: source (Fakhruddin, et al., 2020).

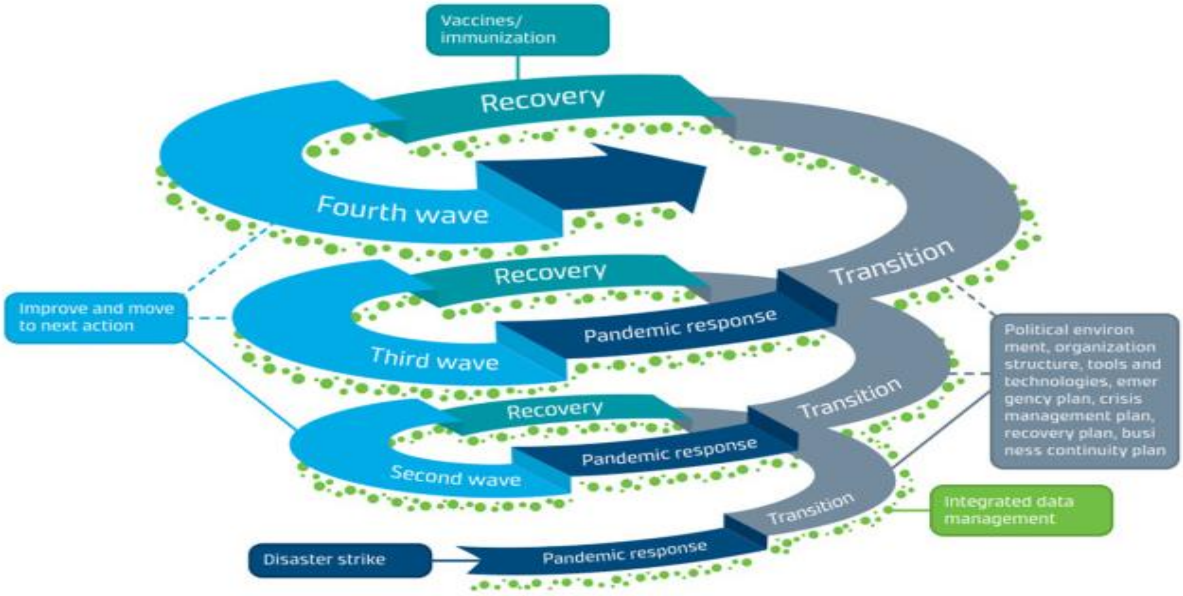


Figure 12: Pandemic Map to Recovery: source (Fakhruddin, et al., 2020).

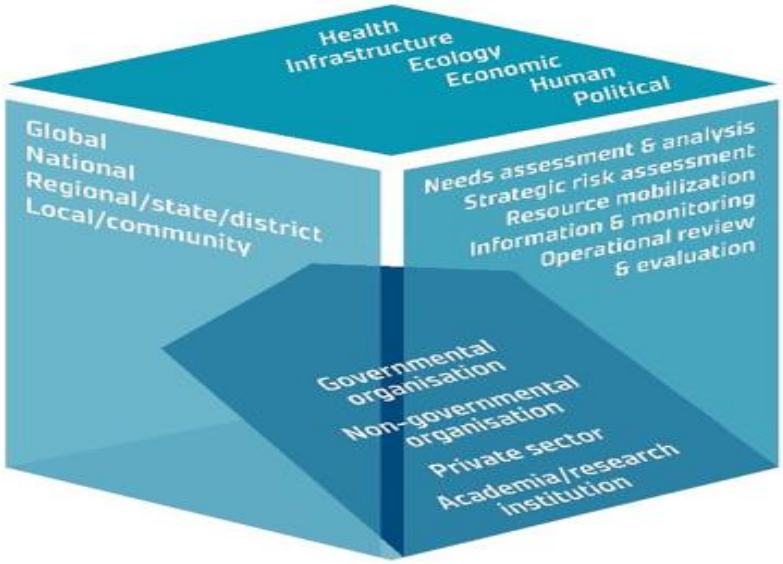


Figure 13: Pandmic National Respose: source (Fakhruddin, et al., 2020).

Pathogens such as microorganism and diseases are known to have killed hundreds of thousands and even millions, transformed the landscape of economics, reshape social settings and structure, brought about massive sweeping transformation to the legal system, social changes and political reform by shifting and touching all levels of the PESTEL spectrum the 'Political, Economic, Social, Technological, Environment Legal' (Chace 2016). This is also the premise of

“The Germ Theory” 1870’s which was a precursor to the ancient Greek philosophies postulated by Hippocrates in the “Corpus Hipporcraticum” also the Hippocratic Corpus, (Kadlec, 1995), (DaSilva 1999).

As detailed and presented in Thakur (2021) the pandemics and epidemic outbreaks such as severe acute respiratory syndrome (SARS), and Middle Eastern Respiratory Syndrome (MERS), precursory to the Covid-19, have affected millions (Petersen, 2015), (Shang 2021). Moreover, Influenzas such as the Avian Bird Flu (H5H1), Swine Flu (H1N1), Human Immunodeficiency Virus (HIV), Acquire Immunodeficiency Syndrome (A.I.D.S), Pax disease, Smallpox, Monkeypox, Dengue Hemorrhagic Fever Zika Virus, and Chikungunya Virus, and now most recently the COVID-19 ‘SARS-CoV-2’, Cholera outbreaks, have cause deaths caused deaths and wreaked havoc on humanity (Huremović, 2019). Other diseases like tuberculosis, leprosy, measles have also taken their toll on the world. The commonality is that all plagues and pandemics have serious, threatening ramifications to the survival of humanity and which have endangered civilization and, continuity of the human race, whether it be through bacterial, viral, fungal, or parasitic vectors (Kilbourne, 2008).

4.8.2 Pandemics: Business and Economic Lifecycles

As highlighted, there are many correlating aspects to a pandemic. Pandemics cannot be assessed in insolation. Therefore, inspecting the various facets of pandemics and their spillover affects into the business cycles and economic cycles is important. Pandemic affect behavior patterns and influence micro and macro systems that impact the core the greater economy (Ma, et al., 2020). All these aspects are intertwined in the hierarchy of life (the economic, social, legal, political, theological) fabric of life and existence.

4.8.3 Economic Lifecycle During Pandemics

Pandemics and other interconnecting cofactors are all interrelated. These are the various facets presented below as pandemics are deconstructed (Ma et al., 2022). Expansion, and prosperity, peak (growth/boom), contraction (recession or depression), trough (slump or bust), recovery, the wave of economic activities. The ebb and flow of economic movement the rhythm pulse and heartbeat of the system, denotes that it is not static. It is dynamic pulsating and constantly transitioning. This reflects times of hardship and prosperity in relationship to economic lifecycle episodes. There are internal and external factors contributing to the cycles such as internal PESTEL influence and external PESTEL factors.

The internal factors comprise of fluctuation in aggregate demand, supply shocks fluctuation in investment, money supply, macro-economic policies, variation in government expenditure factors, and political instability. The external factors and influences include wars, post war, national infrastructure and reconstructions, technology shock, natural factors, disasters, such as pandemics and similar occurrences. The graph listed below shows the waves and movements within the economic cycle.

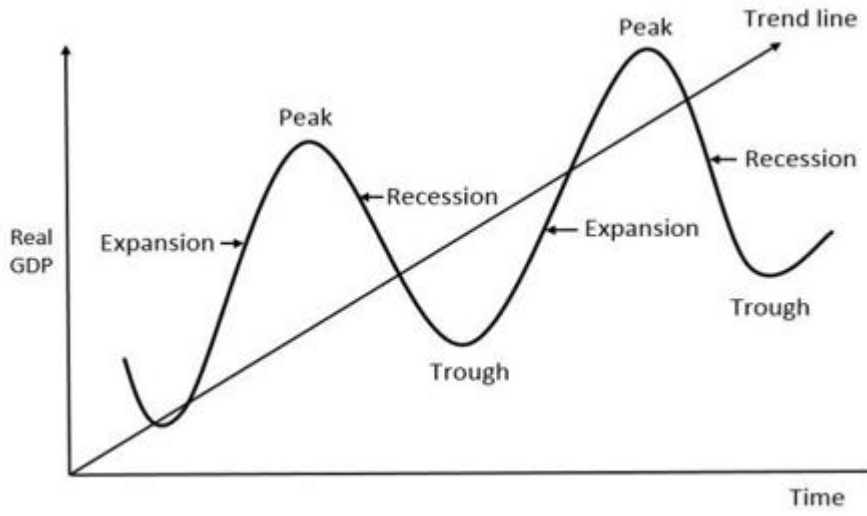


Figure 14: Business Cycle and Economic Cycle: source High Rock Education accessed March 14, 2025 https://www.higherrockeducation.org/glossary-of-terms/expansion

4.8.4 Business Lifecycle

How are these phases affected during a pandemic and the different aspect to financial stability and economic growth, strategies and impact on business and productivity input and output such as gross domestic products/ gross national product (GDP/GNP).

Stages, Phases and Development		
Stage 1	Entry/ Launch/Birth/Genesis	Discovery/Startup
Stage 2	Growth Expansion	Breakeven
Stage 3	Crucible maturity, Established	Profitability
Stage 4	Cruise, Expansion	Sustainability
Stage 5	Declines/transition or Renewal	Scalability/ Success or Exit/Closure

Table 19: Phases of the Business Lifecycle: source author student researcher Gerline Ferguson, 2025

The Major Pillars and Sectors of the Economy	
Primary Sectors	Raw material such as mining resources
Secondary	Manufacturing
Tertiary	Services
Quaternary	Knowledge
Quinary	Extended sectors eliminating from tertiary level and quaternary

Table 20: Pillars and Sectors of the Economy: source author, student researcher Gerline Ferguson, 2025

The segment and sectors of the economy are:

- Healthcare/ Medical/Pharmaceutical/Insurance/Hospital;
- Information Technology (Telecommunication);
- Media/Art/Entertainment/Information/Communication.
- Banking/Finance/Commerce/Investments/Capital Markets;
- Construction/Real Estates;
- Chemical/drugs (wholesale) Cosmetic & Toiletries;
- Energy and Mining, Raw Material Resources;
- Agriculture/ Fishing/Forestry Industrials;
- Manufacturing/Materials, Retail;
- Transportation/Distributions;

CHAPTER V

DISCUSSION

Research Question Two (2)

5.1 Research Questions Discussion and Results

- Could pandemics such as in the use of "*gain of functions research practices*" be used as a device that closely work in tandem with greater economic cycles and systems for comparative and comparable advances or advantages in an economic warfare situation and shift technological development?
- Can a series of pandemics or outbreaks be artificially pre-planned or created in advance in the economic life cycle systems and in the social theoretical construct?

5.1.1 Pandemics Technology, Educational Knowledge, Scientific Research Development, and Medical Advancement

Pandemics are vehicles to accelerate the advancement of new technologies, scientific developments, insight into academic research, clinical trials acceleration new breakthroughs, innovative discoveries, pioneer inventions, and immense progress. All of these occur and are at their highest peak in and during phases of pandemics, catastrophic events and disease outbreaks. The latest medical treatments and research are activated and rolled out, and medical experiments are all fully deployed, and fully engaged during the pandemic phase or in time of natural disasters (Poongodi et al., 2021). This is in order to bring stability to economic systems, neutralize the adverse effects of such events, and to maintain a degree of normality in the entire eco-system of

life. This eco-system involves the deployment of the entire PESTEL forces in each and every aspect to gain a greater appreciation of the dynamics that exists.

5.1.2 Technologies Rolled Out to Fight Covid-19 Pandemic

Pandemics bring operational disruption, short term instability and uncertainty but ultimately in the short and medium stage bring the elements of newest technological advancement, and pioneering scientific medical discoveries. Also, in the long term they bring innovation, momentum, shift and reset society and events propelling civilization forward. Pandemics enhance and technological acceleration, intelligence increase medical transformation, and accelerates long term economic development (Nkirote et al, 2021). They have even brought various sectors and sub-sectors into the economy. Pandemic have cause nations and organization and individuals to implement contingency plans. The PESTEL factors businesses are impacted. This calls for business continuity planning and disaster recovery management contingency and resiliency planning aspect of the pandemics nationwide and worldwide. Covid-19 pandemic has brought astronomical changes and instant reforms and has swiftly thrusted the world into the digital technical state (Schiliro, 2021). The full rollout of the digital architecture has unfurled. AI enable frontier advance scientific technologies have been unveiled (Mihalis, and Kristikos, 2020). The technologies, innovation, scientific breakthroughs and modern advance medicine of pandemic covid -19:

1. BioNtech therapies and technologies integrated science;
2. mRNA vector and DNA inoculations – clinical researches;
3. Inhalable vaccines;
4. Vaccine microarray patches (VMAPs) dissolvable skin patches

5. Encrypted RNA (spike and vector protein);
6. Synthetic biology, symbiosis;
7. Genomic, Crispr gene cas9 editing technologies;
8. Autonomous therapeutics;
9. Nano-technology, nano-lips, graphene technology;
10. Tele-Medicine and remote medical services;
11. Science and technology symbiosis integrated systems;
12. Universal Health certificate technology, track and trace;
13. Pandemic-based business emerges and smart industries
14. Automated Digital Tracking;
15. Digitalization automation, innovation globally;
16. Smart cities community concepts for safety national security;
17. Smart homes, smart appliances;
18. Digital Identification – digital transactions;
19. Central Banking Digital Currency;
20. Sustainable development “Green spaces”, carbon and climate initiatives;
21. Cybernetic concepts and futurist evolution; and
22. Transhumanism, machine human interfacing, robotics, cyborg.

5.1.3 Modern Technologies and Medicine to Fight Covid-19 Pandemic: The Migration of Biology and Technology

During the 2020 pandemic there were monumental and sweeping breakthroughs in medicine, clinical studies, trials and the astronomical roll-out of such advance medicine as the “mRNA. Technology stocks rose nine hundred and thirty seven percent “937%” valuing $7.5 billion”,

according to Forbes.com article dated May 4, 2023 by contributor Chrisian Stadler entitled “Pandemic Winners: the 10 best performing US companies”. The newest features of, Crispr CAS9 gene editing technology, integrated geonomics and various Tele-tech innovation alongside released. New technology companies such as Moderna, new generation of novel medicines administration. There were other emerging main key players in the pandemic arena like those technology organizations such as Nvidia Corporation, a US company that rose to immediate prominence and gained quick recognition. The leading drug and pharmaceutical manufacturing companies developed swift vaccines during the pandemic 2020 for the Covid-19.

- Moderna
- Pfizer
- Oxford AstraZeneca
- Johnson & Johnson
- Novavax
- GlaxoSmithKline
- Novartis
- Eli Lilly
- Grifols
- Tonix Pharmaceuticals
- Soberana
- Sorrento Therapeutics
- Immonu-Precise Antibodies

Other main conventional pharmaceutical therapies during Covid-19

- Codidecia or AD5-nCOV – vector vax inoculation technology
- Jenssen by Johnson and Johnson
- Comirnaty mRNA Pfizer
- Sputnik V- Russia (Gam-Covid-Vac)
- Novavax
- CorronaVAX
- SinoPharm BIBP
- Covaxcin
- CoviVac
- QasVac-Kazakh
- CovIran Bareka – Iran
- Valnera Covid-19
- EpiVacCorrona - Russia
- Cobervax
- Sonofi-GSK Vaxcine
- Zifivax – China
- Abdal -Cuba
- Soberena Cuba and Iran
- CoviVax Russia
- Medigen -Taiwan
- QazCovid- Kazasktan

- MinHai- china
- Corbervax
- ZyCov-D
- Razi cov Par
- Turkovac
- Sinopharm
- Walvax
- iNCovacc
- Gemcoac
- IndoVAc
- Lunar-Cav-19
- Kostaive- Japan

Other innovative technological medicine developed and rolled out in 2020-2022:

- Intranasal Aerosol inhalable vaccine (inCOVACC, Razi Cov Pars, Sputnik Convidicia
- Remdesivir ® by Gilead Science
- Paxlovid® by Pfizer- covid pill
- Electronic signal ingestible chip pill (Pfizer) Albert Bourla CEO WEF 2018 summit.

Alternative previous medication and intervention and probable therapies (*which were rejected*) and prophylactics interventions

- Hydroxychloroquine
- Ivermectin® Merck

The financial gain and benefits to the pharmaceutical sectors, the spillover effects in the medical arena have and into other areas of the economy is astronomically great with the testing, vaccines, medical products such as operations management, logistic, distribution, manufacturing of pandemic related medical devices and services.

There are various rapid advancements in clinical researches into advance science such as the mRNA, BioNTech with over forty (40) deployed brands and prototype therapies and pharmaceutical products, vaccines, medication therapeutics, launched during Covid-19 distributed worldwide under COVAX and UN initiated global vaccination programme, (Selgeled, 2016).

5.1. 3.1 Technology and Medicine to Fight the Common Invisible Enemy

According to the Mihalis Kristikos (2020) *European Parliament* the Proposed "*Ten (10) Technologies to Fight Corona Virus*" technology is the one of the best ways to fight disease outbreak. In the report presented an in-depth analysis was rolled out by the EPRS European Parliament Services April 2020. The points highlighted and presented:

Emerging technologies to fight pandemics SARS COV-2 and future outbreaks

1. Artificial Intelligence and data science
2. Synthetic biology,
3. Nano-technology, technological integrated mRNA BioNTech vector vaccines,
4. Crispr Tech Gene-editing technologies, regenerative medicine,
5. Robotics, hybrid technologies, drones' surveillance, virus track and trace systems,
6. Remote Telehealth technology,
7. Digital Identification, electronic wallet (track and trace digital system),
8. Universal health care,

9. Medical Drones and software/hardware,
10. Open-source technology,
11. 3D CAD three-dimensional printing,
12. Block chain and technology,
13. Central Banking Digital Current “CBDCs”,
14. Automatous drones, self-driving cars, and
15. “Gain of Function” research projects and supranational scientific

The World Health Organization (W.H.O) has classified China as leading pioneer region in advanced in technology according to the WHO 2017. In Wuhan China the epicenter for the novel corona virus there is advance futuristic technological development has emerged. As the invisible cataclysmic treat to humanity unleashed its furious threats to humanity started in China. Post covid-19 China still leads in technical innovation (Mahoney, 2023).

5.1.3.2 Technological Acceleration During Pandemics (Digital Revolution)

With the advent of the novel corona virus “Covid-19” pandemic there is a rapid shift acerated shift and move to the digital economy (Elyassi, 2021). The roll-out and unveiling of central bank digital currencies (CBDCs) globally. The fast pace of changes toward technological advancements the fifth industrial revolution with such development of Artificial Intelligence (AI) the Internet of Thing (IoT) Cyber big data, various accelerations of digital platforms, robotics, machine learning, augmented and virtual realities, smart society, and digital currency (Kaplan and Haenlein, 2020).

The technological digital era is marked by open and cross border trade, commerce, globalization. There are cycles of mass innovation rapid acceleration in technology and movement

from analog to digitalization. This digital era is marked by rapid advancement in medicine and medical technology (combination of technology and biology) CrSpr gene editing technology mRNA BioNtech, nanotech, vector medicine administration, nanobots vaccines final bridge and mass integration of human and machine Artificial Intelligence, logistic "Cyber-Physical Systems (CPS), Internet of Things "IoT" tools and automation smart devices, biometrics communication and the evolution of mankind, Human beings 2.0, humanoids, cyborg, reengineered bio-systems and hybrid (Sarfraz, 2021). The full deployment of IA, (artificial intelligence) and quantum computing systems alongside fully automated intelligent digital system, the speed of development, ingenuity during the Covid-19 crisis.

During the pandemic online platforms such as "Google® for education", Microsoft Teams®, Skypes®, Go To Meeting®, Zoom®m Google Meet®, video conferencing platforms, all these online platforms gained full usage during the Covid-19 pandemic. The use of virtual project management remote software apps, software, headsets, streaming services gained notoriety during 2020.

- Face interfacing technologies;
- Virtual reality goggles;
- Remote alternative realities headsets and systems;
- Quantum computing;
- The META-verse artificial alternative realities.

Computational Intelligent Systems (CIS):

- Biometrics;
- Artificial Intelligence;

- Machine Learning; and
- Virtual World, Alternative Reality, (MetaVerse).

Technologies and advance medical intervention

Analytics Storage and Procession Environments

- Blockchain Technology
- Cloud Computing
- Data Analytics

Autonomous Transformation devices and Communication Technology Interfaces

- Internet of Things (IoT),
- Robotics,
- Autonomous machines integrated systems and drone vehicles,
- 5G Mobile Cellular Technologies,

Figure 15: Zoom Stock during pandemic Covid lockdown: source (Yahoo Finance 2020)

Past technologies of prior pandemics have driven historical perspectives and advanced societies**.** Aspects that delve into quantum science, mathematics computational, quantum computing and nano-technology and biology integration at the finest level into the quantum dynamics. Moving from digital and transitioning into calculations, coding, analogue. This is the domain that goes into the biology, physicality atomic and subatomic levels which is another branch of this dynamic (Kaplan and Haenlein, 2020). Analyzing tomorrow's technology today in a pandemic and post pandemic setting. There are the main stream technology terminologies listed below

- Machine learning
- Neural network
- Deep learning
- Transformers

- Generative AI (GenAi)
- Wearable technology and patches
- Generative Pre-train transformers such as GPT4 and Chat-GPT

5.1.4 China as the New Emerging Leader of Technology Post Covid

China is said to have now surpass all the leading developed nations in futurist technology development, implementation and advancement (Mahoney, 2023). This is now coined Digital orientalism as the country transitions from civilization state to a modern technically advanced society. In the hierarchy and hegemony of things, as China is a rising super power in the global arena for economic production, trade and technology. This quantum "*great leap*" of the modernization process within the progression of science, technology, industries, sectors, national defense, the new discussion is ethics and responsibility (Mihalis, and Kristikos, 2020). The core question now is existential threat of foreign domination and diplomatic relations and foreign policies, sovereignty and geo-political systems cyber security, digital resource mining, the integrity as related to this new leap technology (Worden et al., 2023).

- Technical to Technology (Technological societies Technocracy);
- Technical innovation;
- Big data;
- Data mining;
- Bio Technology (BioNTech), metagenomics; and
- Quantum computing and quantum science.

Technological momentum timeline

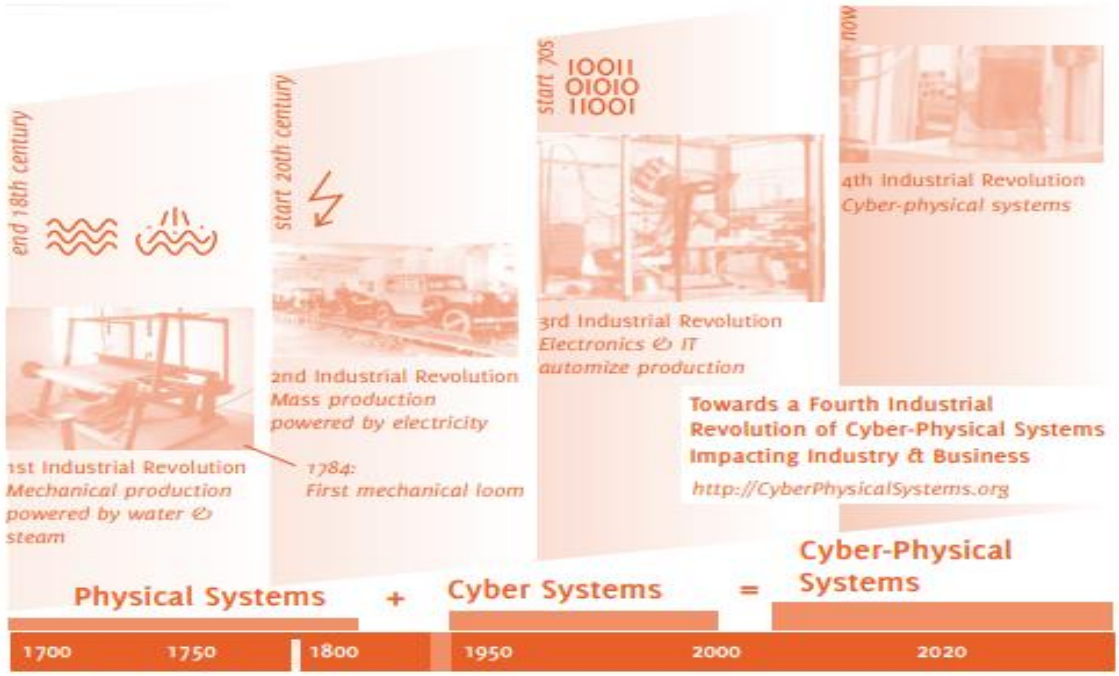


Figure 16: The Fourth Industrial Revolution, Things Tighten source: (Bloem, Van Doorn, Duivestein, Excoffier, Maas, and Van Ommeren, 2014)

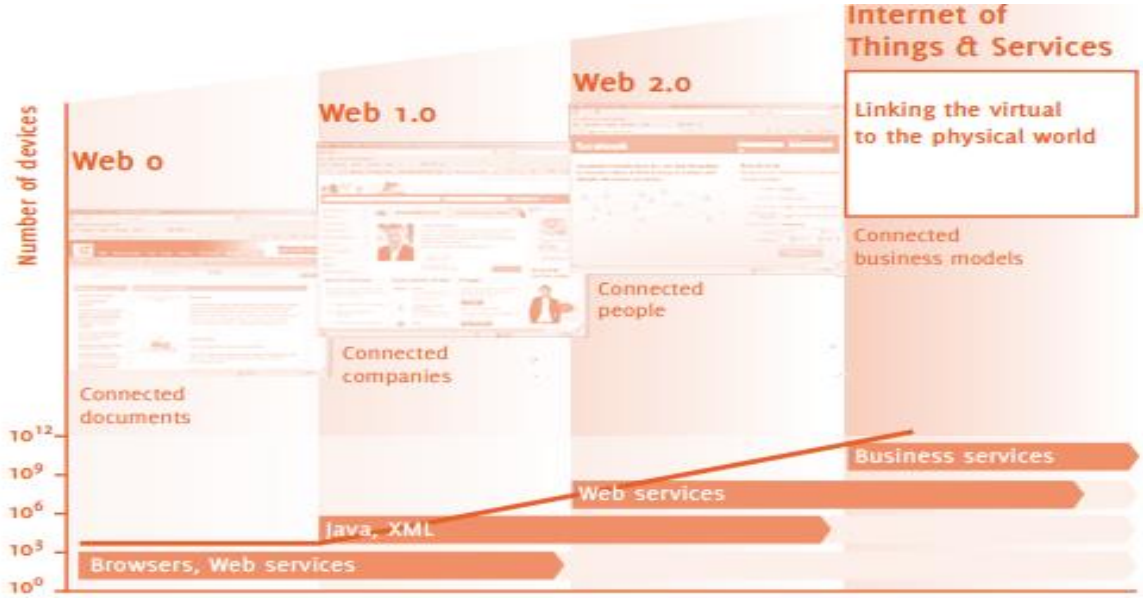


Figure 17: The Fourth Industrial Revolution, Things Tighten., 8(1), pp.12 (Bloem, Van Doorn, Divesting, Excoffier, Maas, and Van Ommeren, 2014)

5.1.5 Reinventing and Reassessing the Path of Pandemics

Reinventing the path of pandemics and pathogens could possibly be a necessary PESTEL evil in the entire panacea of systems. Currently as it relates to political, legal, environmental. ecological, socio-economic, technological, scientific of the various historic revolutions and their impact and importance to societies' modern advancement. (Stocker et al., 2023) The current digital age is critical where information technology, artificial machine and the integration of these concepts become reality post pandemic (Nkirote et al, 2021). The issues are deeply immersed into business, economic, finance activities within the economy such digital currency, crypto, bitcoins, emerging technologies as the path forward. The digital acceleration has impacted the human biosphere and entire ecosphere of civilization where digital integration and real are intertwined (Schiliro, 2021)). The advent of such technologies such as augmented realities, cyborg, transhumanism, Crispr technologies, gene-editing, genomics, medical technology futurist society, cybernetic, blockchain powered platforms systems.

5.2 Pandemics Economics: Law, Reform and Politics

Pandemics are often a gateway for great wealth distribution and economic momentum, acceleration of technology and other futuristic concepts (Antras et al., 2020). Pandemics have launched humanity and civilization forward towards industrialization to modernity and future (Bramanti et al., 2016). The theories of civilization and social cycles proponents such as social cycle theories have predicted the phenomenon. The human population for millennia has been morphing, shifting, growing and evolution. Humanity and civilization have progressed from basic status survival that is wonderers to nomads to hunter gatherers to agronomics to super sophisticated agriculture societies, warriors, conquerors and military and cultural and sophisticated structures and now sophisticated technological society. The information, technological and digital is here.

The era of postindustrial advancement where machine, robotics, nano-technologies, artificial intelligence, transhumanism digital asset, crypto currency are valuable commodity such as gold, precious metals and natural resources.

The global world population has just reached its peak of eight billion according to UN statistics and the World Economic Forum, WEF, (Schwab and Malleret, 2020). Threading on the critical threshold is critical considered an existential threat to humanity, civilization and survival on population growth. This is threshold point as denoted by various proponents (Lesthaeghe, 1980). Nation states, the Group of Seven (G7) countries are all calling for counter measures to slow the economies, to retard global population growth, to manage resource and consumption.

According to the World Economic Forum (WEF) report on the "Great Reset", pandemics can shift gears for new sustainable opportunities. Understanding the major areas and of focus of plagues, pandemics, pestilence and outbreaks on societies, behavior, psychological behavior, patterns and their spillover effects on nations, states, regions, economies, finance, commerce, investment, strategies, planning, business continuity, disaster recovery, government, political landscapes, law reform, crisis management, continuing contingency planning, infrastructural development, by using the PESTEL framework is vital and able to meticulously evaluate, dissect and analyze their economic spillover and multiplier effects on societies with long-term study analysis (Çitilci and Akbalık, 2020).

5.2.1 Financial Impact of Pandemics

According to S&P Data statistics and the reviews below entitled "*Industries most and least impact by covid-19 from a probability of default perspectives"* – January 2022 updated by Luka Vidovic date Feb. 2022, this article is juxtaposed annex with the concept presented by Fan, et al., (2024) "Financing the Pandemic Cycle" and the *Theory of Incentives* "moral hazard spillover as

proposed" by Laffront (1993) and Mortimort (2002). In a pandemic environment and setting it is postulated that there are both beneficiaries and benefactors meaning that, there is an interesting dichotomy of both winners and losers, victims and victors. There are positive and negative aspects and outcomes, long term, medium and short-term spillover effects. Therefore, looking at cost benefit analysis is also critical when assessing pandemics and its financial impact on nations, states, economies and even individuals or households and community and the entire socio-economic spectrum. Furthermore, there are also many consequences vis a vise rewards that needs to be evaluated. There are both long- and short-term trade-offs and benefits, risks and rewards both short, medium long term and impacts on pandemics (Callegari and Feder, 2022), (Mercola and Cummins, 2021).

5.2.2 Pandemic Profitable Sectors

In a pandemic environment the most affected adversely are the small to medium size business enterprises. According to UN analytical review publication issued at the end of 2020, '90% of all economic entities worldwide falls within the category of micro, small and medium business enterprises' Total assets and gross profits of the pharmaceutical industry injection into the global economy during pandemics, the larger corporation with leverage and with various economics cushion mechanism such as reserve cash flow, and long-term strategies can navigate the turmoil of uncertainties, and the impact of disaster. They can weather the storm successfully in contrast to the small micro and mid-size mom- and pop enterprises that cannot absorb the shock or sustain the blows that a pandemic might bring (Açıkgöz, 2022).

5.3 Pandemic Politics and Economics

How wealth is distributed and redistributed during a pandemic and policies which are created over that time is also critical area. This forms a sub-set with the PESTEL matric and how it affects various pillars and facet of society. A deep analytical look at pandemics economics, finance, commerce, with the PESTEL approach reveals various meaningful aspects of Pandemics as a viable long term economic model (Oscar Jorda et al., 2022). With an immersive dive into and probing deeply into the dynamics of pandemics past, present we can predict the trajectory and outcome of what future pandemics and outbreaks may potentially look like, (Shang, Li, and Zhang, 2021).

The need for political and governmental stimulation, economic intervention and strategies is an ongoing strategic process. Pandemic affecting macro and micro variables such as GDP, GNP, trades, investments, inflations, consumption, employment and labor force such as production, supply demand, logistic, supply chain. Implantation of counter tactics and sustaining measures and economic tools (Surico and Galeotti, 2020).

Governmental and political intervention during pandemics is necessary. According to various school of economics, intense proactive and robust governmental involvement measures are essential to rally and turn the wheels of entire markets, systems, economies and financial systems during a crisis.

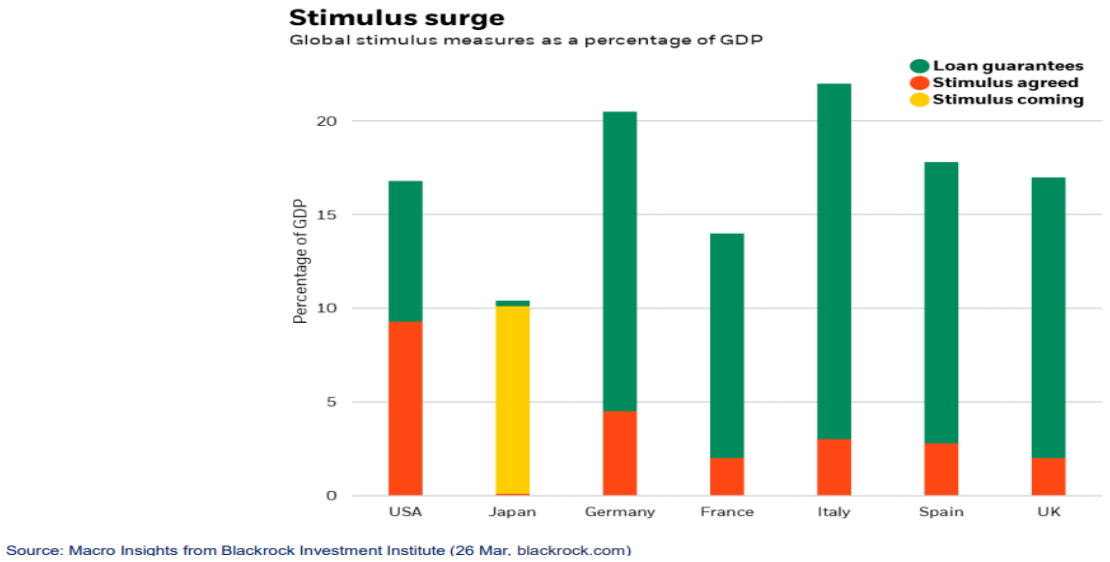


Figure 18: The Economics of a Pandemic: The Case of Covid-19. Wheeler institute for Business and Development, LBS. London: pp.1-93. London Business School, Graph Source: Adopted from case study (Surico, and Galeotti, 2020)

5.3.1 Pandemics Statistics, and What the Data Reveals

Sectors, industries and companies that were least impacted by the Covid-19 pandemic:

- Health care industry for instance: health care equipment, medical supplies, health support administration and services;
- Life science tools and services;
- Pharmaceutical;
- Technology, information communication;
- Cleaning, disinfectant sanitary hygrines services products;
- Insurance digital care;
- Pioneering behavioral health provider;
- Psychosocial and mental-health care;

- Home care for the infirmed and disabled, such as hospices, chronically ill, cognitive palliatively impaired, age-related essential services doctors;
- EMS, first responders, physicians, medical personnel;
- Automated Tele-medicine; and,
- Lab workers, phlebotomist and all healthcare professionals.

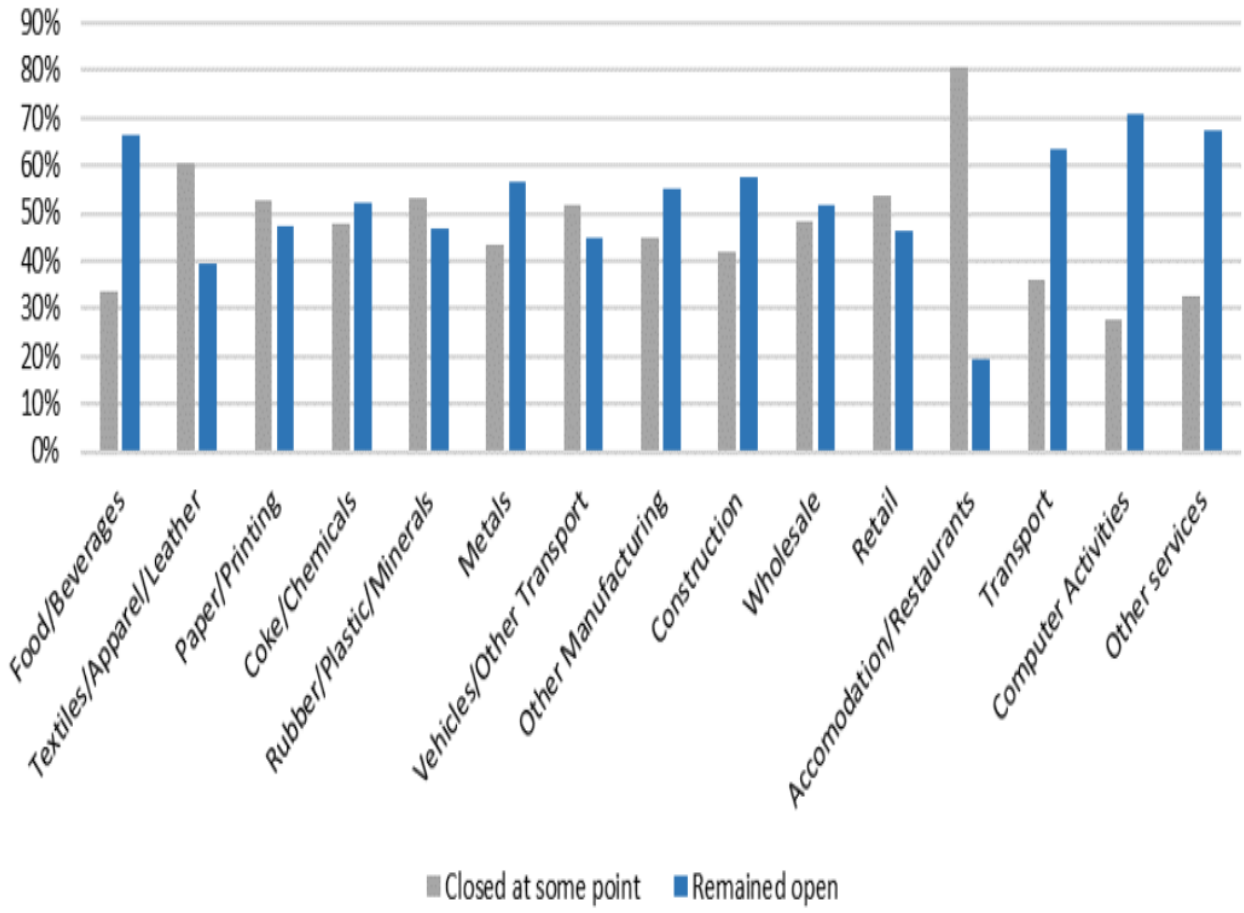


Figure 19: Impact of pandemic by sectors according n to ILO working paper pg. 97 Graph Source: ILO.org (accesses 11/11/2024)

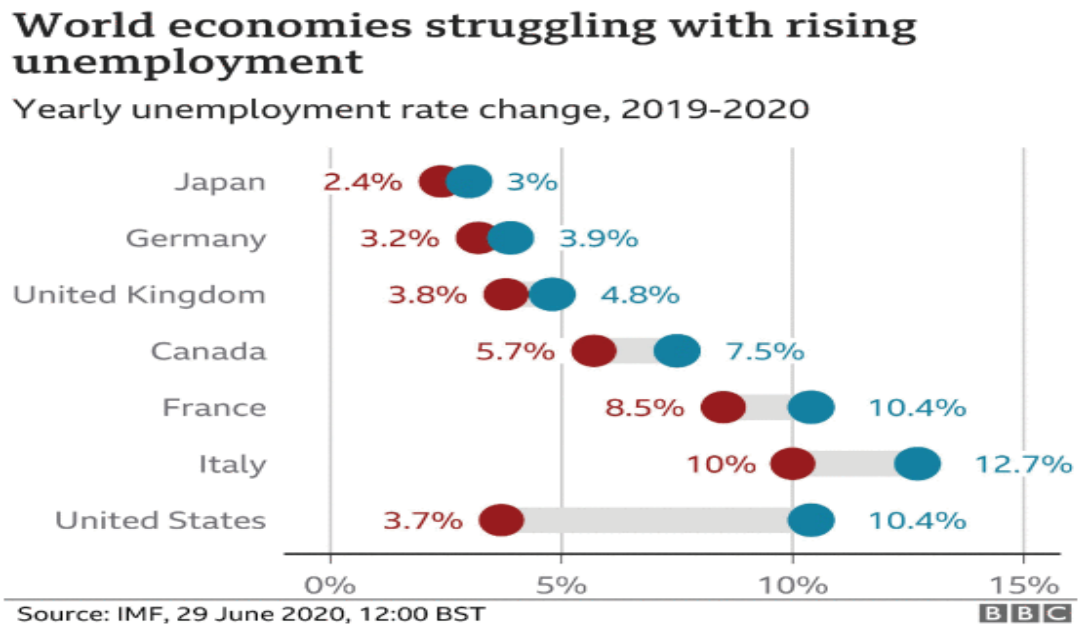


Figure 20: Graph Source: World unemployment IMF June 2020 and quoted in BBC online

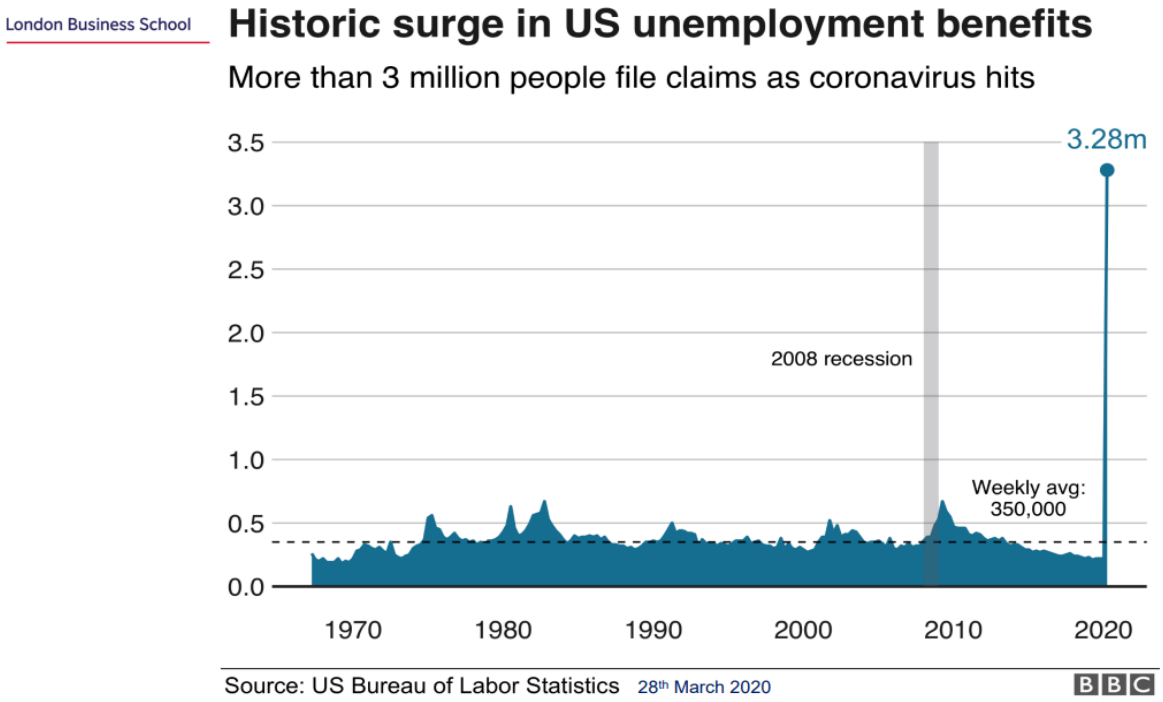


Figure 21: The Economics of a Pandemic: The Case of Covid-19. Wheeler institute for Business and development, LBS. London: London Business School, pp.1-93 US Burrow of Labour Statistics March 202018 Graph Source adopted from case study, London School of Business and posted in the BBC *(Surico, and Galeotti, 2020)*

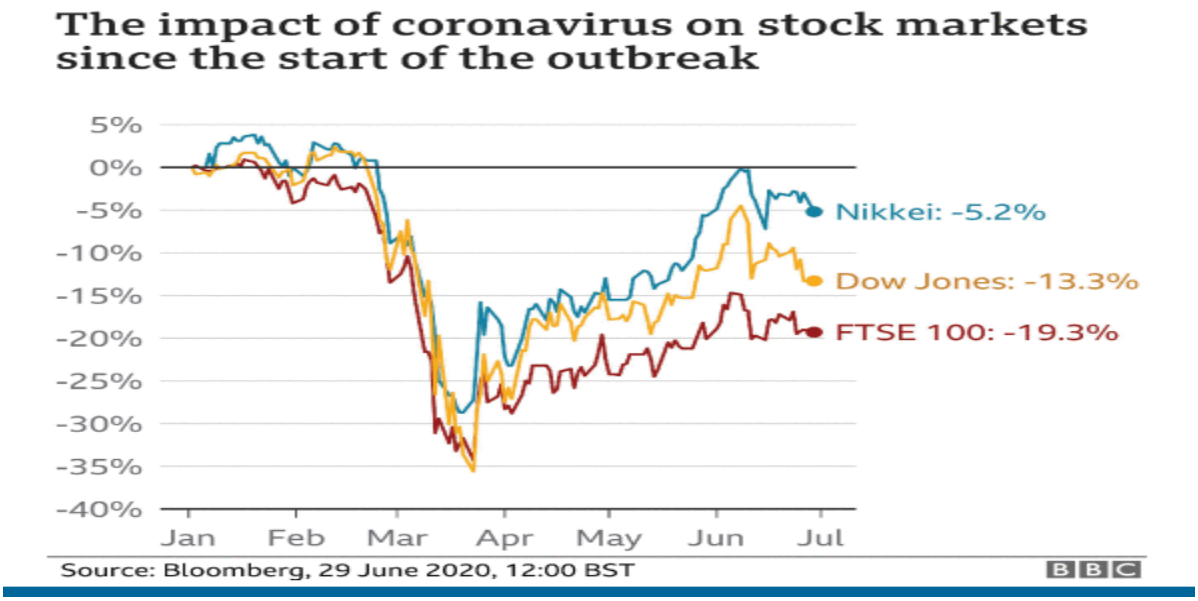


Figure 22: Coronavirus and stock-market Graph: Source: (Bloomberg June 2020 adopted from BBC)

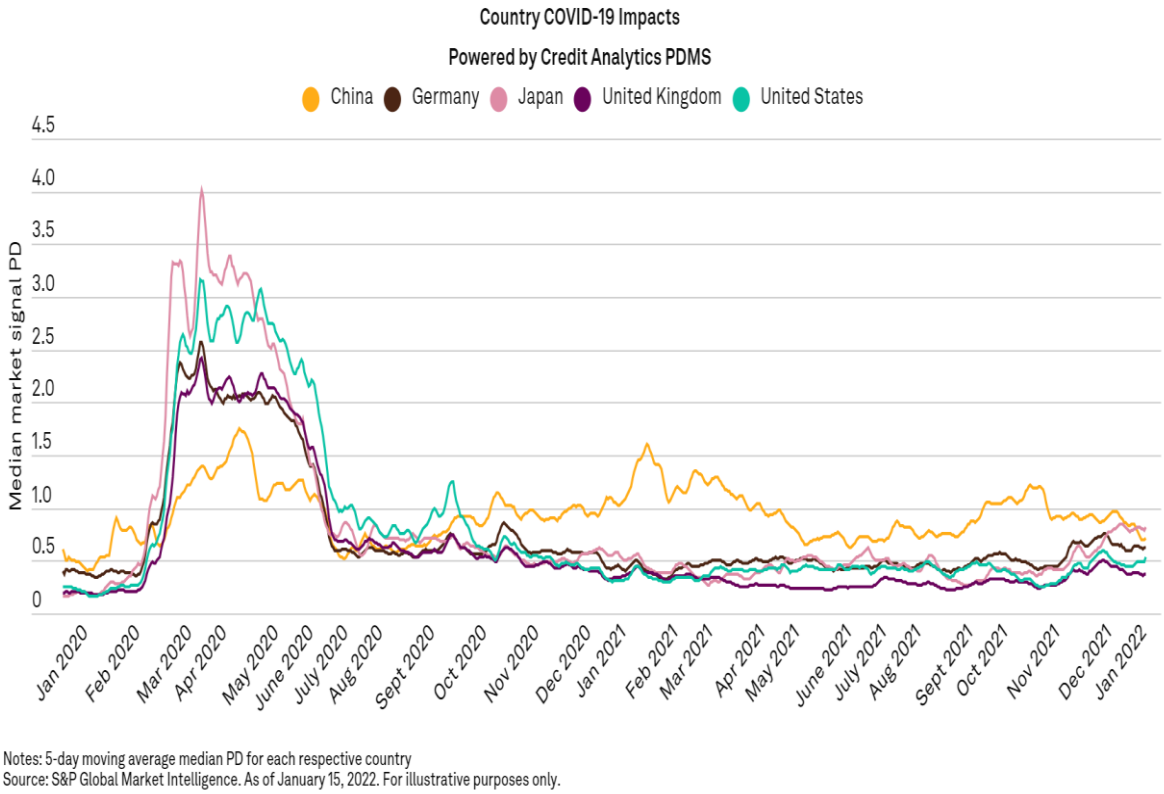


Figure 23: Major Countries Covid-19 Impacted: The case of Covid-19. Wheeler institute for business and development, LBS. London, pp.1-93.: London Business School S& P global market 2022 Graph Source: Adopted from case study Surico, (Surico, and Galeotti, 2020)

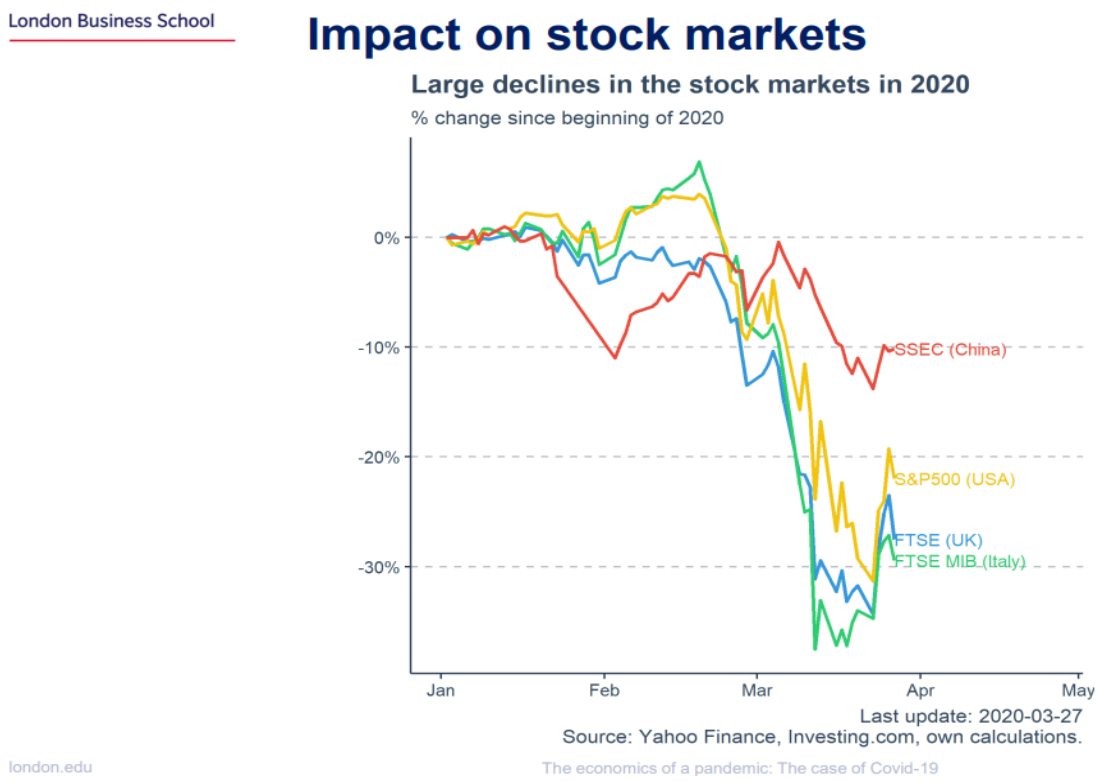


Figure 24: Covid-19: "Impact on Stock Markets" The case of Covid-19. Wheeler institute for business and Development, LBS. London: London Business School, pp.1-93. Graph Source: Adopted from case study (Surico, and Galeotti, 2020)

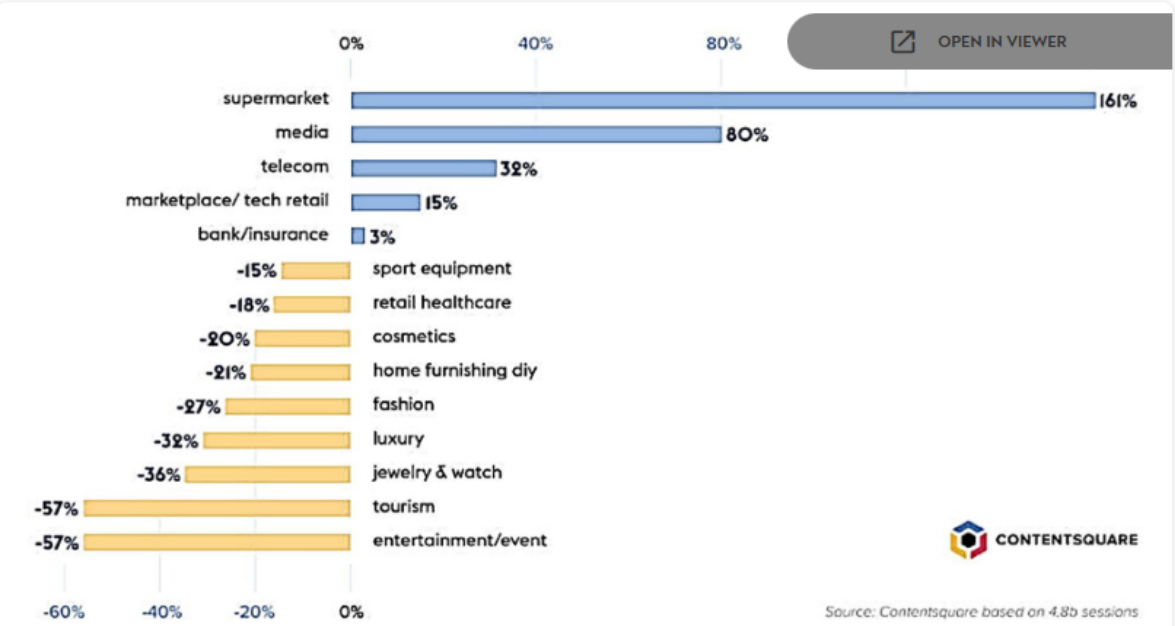


Figure 1. Coronavirus impact on online traffic by industry by Jean-Marc Bellaiche, 2020. Retrieved from https://contentsquare.com/blog/impact-of-coronavirus-on-ecommerce-consumers-settle-into-quarantine. Copyright 2020 by Contentsquare. Reprinted with permission.

Figure 25: Coronavirus Impact on Online Traffic: Source adopted Westcliff University (Nishant, 2021) in Content Squared (Bellaiche 2020)

5.3.2 Pandemics and Economic Lifecycles, Product and Business Lifecycles

In this section, pandemics impacts, activities, and development. The risks are closely evaluated. Pandemics have a lifecycle, society has a lifecycle, business has a lifecycle and the economy has its own rhematic lifecycle. They are observed to move in pattern and evolving. There is much devastation during pandemics but the long-term aftermath and ability to reset is pivotal. Pandemics are evidently categorized at great economic disruptors (Hyun et al, 2020). The Covid-19 pandemic gave rise to various new markets, created niche for entrants and startups such as Moderna, BioNTech, Novavax, Vaxart, the impetus for a cure and solution such as vector vaccines administrations, nano nasal injections spray, covid tele-health care business, the polymerase chain reaction PCR testing kits, the antigen tests. All of these healthcare concerns also gave rise to digital

startup companies. Other businesses emanated from pandemic that filled in the market needs with the inventions new modern and technological developments such as telehealth, e-learning systems zooms and go-to-meeting virtual.

5.3.3 Pandemics and Economics "*Pandemonics*": Pharmaceutical Industry (Research Development Medicine)

During the 2020 pandemic, the pharmaceutical sector accelerated. Share prices soared and profit skyrocketed as new medicine, technology and innovative development presented in the global arena. There were monumental breakthroughs such as the mRNA technology, Crispr gene editing, geonomics technologies and various TeleTech new technology companies such as Moderna, with a new generation of novel medicines. The total aggregate assets and gross profits of the pharmaceutical industry injection into the global economy has been astronomical. The leading drug manufacturing company of covid vaccine and new medication development and their incurred profit margin. Dominant players emerged as champions pioneering advance research, development, accelerated clinical studies and new scientific discoveries heighten and climaxed during the Covid-19 pandemic environment. Novel medicine and the merging of science and technology was at is pinnacle globally. Military research, scientific research, academic studies on all levels were initiated during the global pandemic The key players listed below as follows:

- Moderna
- Pfizer BioNtech
- AstraZenneca Oxford
- Johnson & Johnson

- Merk
- GlaxoSmithKline (GSK)
- Sanofi
- Sinovac Biotech
- Sinopharm
- Novartis
- Novavax
- CureVac
- Inovio
- Eli Lilly
- Grifols
- Tonix Pharmaceuticals
- ImmonuPrecise Antibodies
- Sorrento Therapeutics

Drug manufacturers with the highest number of Covid 19 vaccine doses in million dosage (March 2021) are presented in the figure graphical depiction illustrated below.

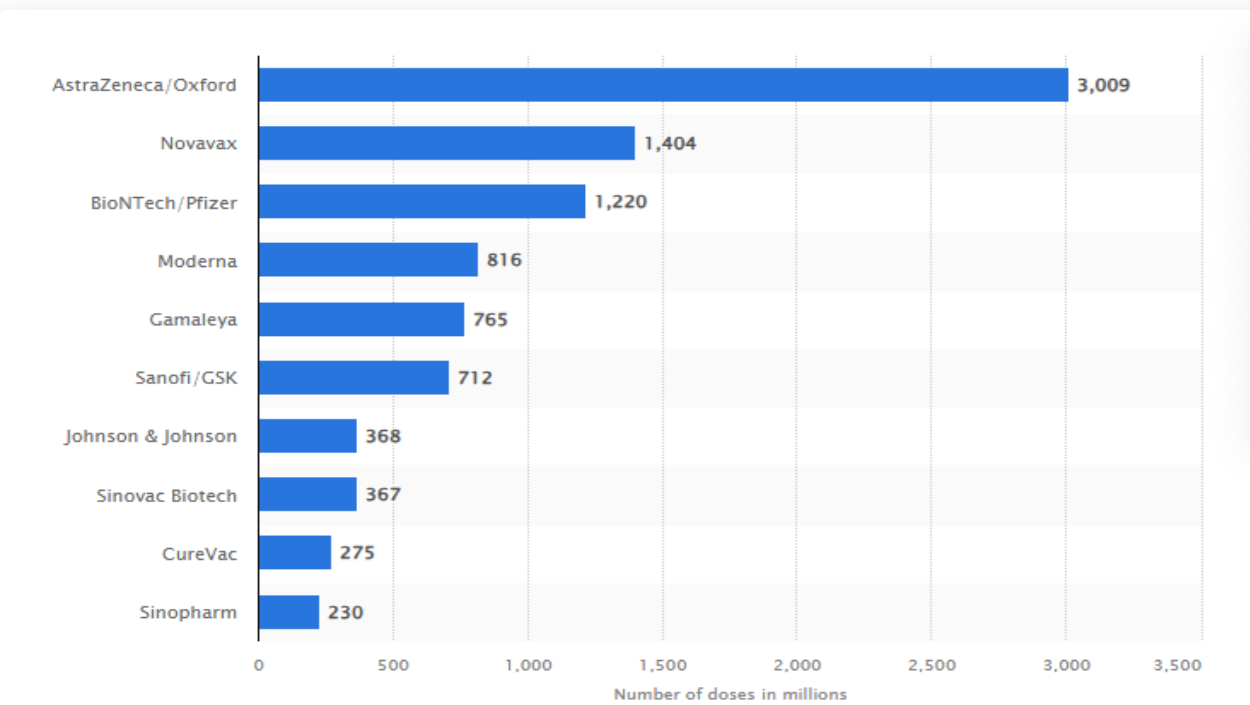


Figure 26: Pandemic Vaccines Statistics: sources Published Statista Matej Mikulic, (2023) accessed November 10, 2024 *https://www.statista.com/statistics/1195971/number-of-covid-19-vaccine-doses-by-manufacturer/*

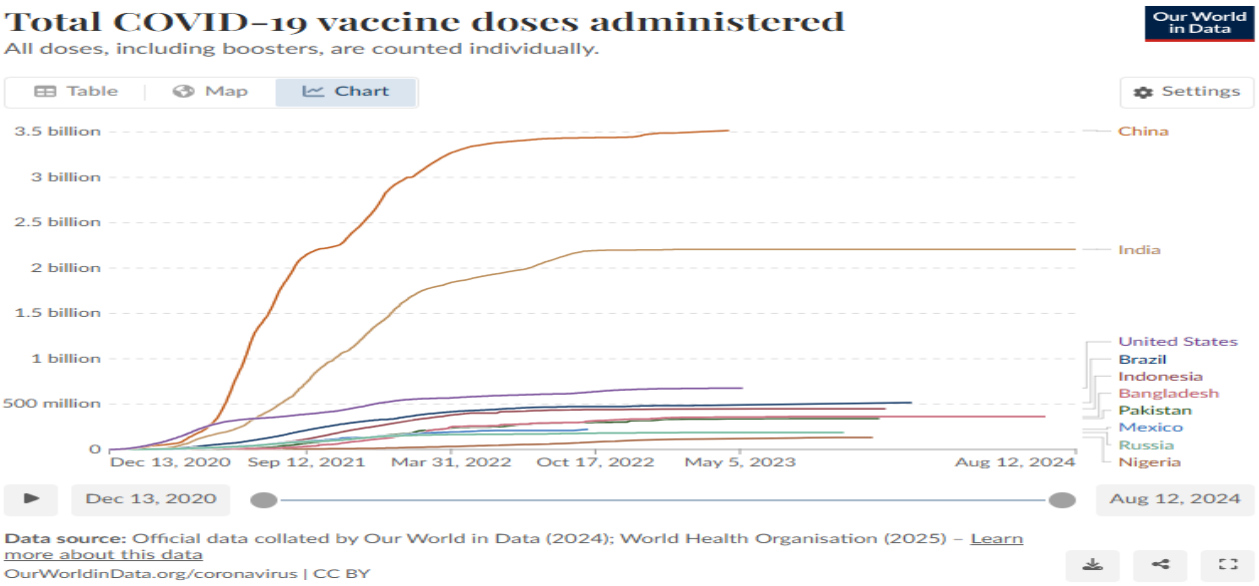


Figure 27: Our World Source in Data (2024) https://ourworldindata.org/grapher/cumulative-covid-vaccinations

The pharmaceutical sector amassed an extraordinary sum of nearly 100 billion profits approximately with the rolled-out of Covid-19 vaccines initiative. The revenues soared. This represented a collective amount from research funded, investments, grants for development, clinical studies, production and governmental advance purchase agreement (APA), pledges, subventions, pandemic accord commitments, treaties, and alliances incentives.

5.3.4 Pandemic Gateway and Wealth Distribution

According to Edgar J. DaSilva, Director of UNESCO Division of Life Science, "The main goals and objectives of scientific, financial and economic warfare are undermining and destruction of economic progress and stability" (Smart 1997, pg. 11). Assessing pandemics as an economic model which can be used as a resourceful tool to motion and wield the ball of the economic progress and propelling political social, legal, financial momentum and yielding purposeful positive and stable results (Stocker, Lehr, and Smaragdakis, 2023).

Profit sectors during pandemic birthing new accelerated wealth were:

- Technological Industry such as Huawei Technologies,
- Pharmaceutical sectors,
- Facebook Meta,
- Amazon,
- Starlink, SpaceX Shuttle,
- Blue Origin Spacecraft,

5.4 Pandemics, Politics, Legislative Reform, and the Law

From antiquity times diseases, plagues, pestilences seemed to be a common theme (Huremović 2019). From modern day Capitalism, Republicanism to Colonialism, Fascism, Totalitarianism, Socialism, Imperialism, Marxism, Communism, Tribalism, Feudalism, Barbarianism, Clannism, one common factor existed: “diseases and pandemics”. Colonel Rober P. Kadlec, (1995) states that ‘military power and dominance is very importance as well as economic supremacy and resource management’, so in the realm ancient of civilizations, empire, kingdoms there were constant feudal economic wars, clashes, mediaeval rivalries all seeking economic supremacy, power, dominion, absolute advantage (Kadlec, 1995), (DaSilva, 1999).

According to Kadlec (1995) and DaSilva (1999), it is postulated that pandemics are elaborate and sophisticated tools, profound technical devices of political, economic warfare components. ‘They are military platforms, and social-psychological apparatuses for the advancement policies and other socio-economic causes’ (Kadlec, 1995), (DaSilva, 1999).

Furthermore, Kadlec postulated that ‘the political, military economic, competitions are enormous and the focus of developing nations’, therefore there is the research and development aspect of it and the need for advance tools, technological systems, scientific, social, political alliances arsenals to disrupt or coerce entire ecosystems, targeting critical infrastructure subtly subdue nations, region, populations in order to devastation to impact the political social economic sectors of society threaten potential national survivals’ (Kadlec, 1995), (Cohen, 2002), (Mercola and Cummins, 2021). The military, law enforcing, legislative aspect for security and safety plays an important role in a pandemic outbreak when maintaining law and order (Sebők, 2019).

5.4.1 Pandemics and Political Military Intervention

The Covid 19 pandemic started in China, presented as spillover leap from zoonic means and then the leak theory emerged because of international investigation, suspicion and full depth inquisition so the gain of function research narrative also emerges. This according to lead principal corona virus expert virologist, Dr. Shi Zhengli, senior research scientist of the Institute of virology in Wuhan China and peer review article published in Nature Magazine and Science. There is an ongoing strife, economic rivalry and clash between China the West namely the United States America. Also, there is the constant battle for technological power, economic supremacy and military dominance. The race for the cyber advancement, cybersecurity, and space-wars that clashes in the midst this quest.

5.4.2 Economics: Warfare and Pandemics

As a result of war and economic warfare, alongside military and pollical strategies, each major nation has its own bio-lab with continuous governmental and military funding. The Center for Disease Control and Prevent acronym (CDC) is a federally funded in the US. Houses that largest database and stockpile biobanks of all know deadly pathogens contagious diseases and viruses. With major grants and funding for research. The Wuhan Institute of Virology (WIV), The United States NIH national library of medicine has published a thoroughly detailed list called *Appendix D* of all federally funded laboratories, as listed in the URL for access to the direct data. https://www.ncbi.nlm.nih.gov/books/NBK568355/ These projects and the agencies are classified and some fall under the US Department of Commerce, Department of Agriculture Department of Defense, Department of Energy, the Department of Health and Human Services, the National Science Foundation, Nuclear Regulatory Commission Environmental Protection Agency National Aeronautics and Space Administration Department Homeland Security and so on. Again, all

aspects of this falls under and can be funneled and easily defined within the PESTEL model and business economic models and explanation.

According to other research proponents on the subject weaponized agents, diseases, sickness, pathogens, germs microbial, spores, fungi, viruses, bacteria, parasites, pollutants, invasive species superbugs, toxins chemical can be used to affect entire states and populations to gain a competitive or comparative advance over crop production, natural resources, and technology (Kadlec, 1995), (DaSilva, 1999). It has been cited that various outbreaks have been deliberately used for economic reasons and financial momentum (Sebők, 2019). The usages have always been associated with mighty weapons and financial supremacy from antiquity to modernity (Christopher et al., 1997). The ideal preference of subtle tactics for control of civilization for economic advancement (Barras and Grueb, 2014). Bowart and Sutton (1990) in their research entitled the "Invisible third world war" also alludes to the how powers are fought both visibly and invisibly (Bowart and Sutton, 1990). This also can be tied to cyber war and space war or other levels.

This is a great threat and continuous debatable mystery. Scientific specialists such and other medical professionals and Microbial Forensics in the 18th century tried piece these puzzles and facts. Scientists such as forensic microbiologists, immunologists, epidemiologists, pathologists, virologists, parasitologists, and vaccinologists are now trying to piece these puzzling facts together by amassing strong data and robust empirical evidence on the subject. However, there is differences in perspectives in their specialist field. More specific area of concern is the biological warfare "biowarfare" component and agents and chemicals warfare aspect used for ill purposes (Frischknecht, 2023). As we seek to understand the intrinsic dynamics of pandemics, PESTEL and the business forces and economic cycles, we must understand the topic biowarfare as an integrated component.

5.4.3 “Economic Wars” and Pandemics

In the prehistorical era, pandemics and diseases were essential a tactics of economic warfare strategies and tactics (Carus, 2017). Even in the Iraq war biological chemical agents were deployed in the battle field to gain oil field reserve and resource reservoirs (Ansari et al., 2020). There are geo-political wars that arise sporadically from time to time and pockets of insurgence or conflict. There is also the threat of terroristic attack using plagues, diseases outbreaks to gain dominance and governmental control of society and economies (Robinson et al, 2017)

Epic economic wars have been fought for millennia to gain prominence, over land and sea resources such as, minerals, mines, marine resources, real estate, human capital and so on. The wars are ongoing, even in this present era. All these constant battles are fought in order to gain dominance or power and to sustain viability, advance an agenda, and ideologies. Wars are also fought to push a certain race, class or segment of the population such as genocide, ethnic cleansing and civil wars. There are aspects of economic wars that can be rolled out as punitive measure such as tariffs, sanctions, embargo, supply chain, penalties, tactical trade wars, import and export impositions involving both military and foreign policies have been used as strategies. They have also been enacted to demonstrate superior authority using military posture social wars, economic wars, information and propaganda wars. Information wars have been at the forefront in order to gain the superior absolute and competitive advantage over rival nations, cities and states; also, to maintain affluence (Fukuyama, 2020). This concept always existed throughout civilization and throughout ancient history for millennia. The absolute quest for dominance, power, control is the key reasons. This entails seizing valuable infrastructures, resources, economics assets, capital, land, population and mineral mines (Barras and Grueb, 2014).

5.4.4 Pandemics: Political Governance and Economic and Wars

Pandemics are catalysts for economic shifts and are juxtapose to wars. According to DaSilva (1999), the concept of bio-economic warfare is real. There are other methods used such as economic warfare, tariffs, sanctions, embargoes these are economic and political tools. "Polemology", the study of war also gives further details on this subject matter (Roman et al., 2014). History of wars, as observed in polemology, it is observed that ancient wars were carried out for economic resources with the use of various the tactics, strategies, logistics, operation. These methods can be traditional or non-traditional conventional and unconventional when engaged in warfare of any time (Fukuyama, 2020).

With the advent of Covid-19 we see other visible and emerging dynamics which are intermingle and interplay simultaneously (Stoker et al., 2023). The factors such as rapid technological advancements, biological integration of technology and medicine. The speed of knowledge, clinical studies are being by passed. The question of ethics and morality are unfurling. What are the transparency measures and barriers or parameters on academics and medical funding.

Technological Era and Pandemic Outbreaks and Major Military Wars							
13th 14th to 17th century	*1700-1980*	*1979-1980's*	*1991*	*1998*	*2009-2018*	*2019-2024*	*2025 – beyond*
14th Century Bubonic Plagues Black death *Polio*	*Great Plague*	*Influenza Outbreak* *HIV /AIDS 1980 to present*	*Cholerae Outbreak*	*Outbreak*	• *H1n1 Swine Flu* • *Avian* • *Mad Cow disease* • *MERS* • *Zika*	• *Covid* • *Monkey pox*	*The next major pending global pandemic*

					• *Ebola*		
Industrial	*Post Industrial Revolution*	*1 G Tech*	*2 G Tech*	*3 G Tech*	*4 G Tech*	*5 G Tech*	
Wars and Pandemics							
The Great Napoleonic War 1780-1801 *French Revolution* *Battle of Waterloo 1815* *American Revolution*	*1918 -1920 Worldwide* *WWI*	*WWII* *Afghan War* *Kosova* *Bosnian*	*Iraq War* Iran/Iraq war Persian Gulf War	*Afghanistan* Syrian Civil War	*2002-2004 SARS* *2009 Avian Flu* *2014/2016 Ebola*	*Russian vs Ukraine* *Israel vs. Palestine /Hamas*	*Global tariff economic warfare*

Table 21: Pandemics and Wars: source author, student researcher Gerline Ferguson, 2025

There are numerous legendary wars fought from ancient to medieval time

- Greek Trojan war;
- Peloponnesian Greek war between Athan and Sparta;
- Hundred-year war England and France (Middle Ages);
- Byzantine-Seljuk War (Byzantine empire and the Seljuk Turks);

Early modern wars:

- Dutch war for independence (Dutch Republic versus the Spanish Habsburn rule);
- Arauco War- Spanish and the Chile Mapuche tribe;

- First Anglo-Afghani war;
- Great Northen War between Sweden Russian and other adjoining territory (forging political pillars to shape the landscape of Eastern Europe);
- World War I- global conflict;
- World War II;
- Korean War (US, UN forces communist nation Koren peninsula);
- Vietnam war (south Vietnam US and communist forces);

Recent ongoing conflict and wars

- Guatemalan civil war;
- Second conga war;
- Iraq war (US and the removal of Saddam Hussein);
- Kosovo War (Kosovo and independence for Serbia);
- Bosnia War (Bosnia Yugoslavia);
- Yemen conflict (Houthi rebels Saudi-led coalition and the Yemeni government);
- Syria conflict (Syrian government and international forces);
- Ukraine War (Ukraine and Russian boarder and geopolitical indifferences;
- Israeli Hammas Palestina – territorial conflict and political rancor;

According to the Britanica wars may be divided into several categories Philosophical, political, legal, sociological, psychological, economic, technological as defined by theoreticians.

5.4.5 Unipolar, Bipolar, Multipolar Wars, Pandemics and PESTEL

Unipolar wars of the past such as the World War I, (WWI); World War II (WWII), and other cold wars all bring massive shifts and transition of power and resources according to the author Wohlforth (2009). In the research entitled, "the Unipolarity for Status, Competition and Great Power Wars" (2009), it is postulated that the concept of wars such as unipolar wars are to attain great power. Unipolar wars can shift and morphed into bipolar or multipolar. In the unipolar wars, the emphasis is on material prosperity and physical security are the status quo philosophies and ideologies The wars are all concerned with resource distribution based on political posture, foreign and international polices and diplomacy, sociological and psychological aspects (Wohlforth 2009).

During the Iraq war, the key target was natural resource such oil reserves. There were release of toxins to subdue soldiers and opposition forces and to gain momentum and military dominance over the opponents. North Atlantic Treaty Organization (NATO) was established in 1949 as an international organization composing of America, Canada, Britain and other European nations for "collective security" and the use of advanced technology as rolled out by the Defense Advance Research Project Agency also known as DARPA. There were other research studies conducted by Boston University of Corona Virus Research 2022, which developed a corona virus combination great then Covid-19 (Schneider and Grinter, 1995)). We also see that every developing nation has its own bioweapon labs (Kadlec, 1995), (DaSilva, 1999). The aspect of "gain of function" and scientific lab research, financing of educational research and technological development has garnered much international attention. There are economic wars, financial wars, industrial wars, military interventional wars, psychological wars, information war, technological cyberwars being fought on various level. The digital age has, heightened levels of cybercrimes, mass migration and shifts alongside other paradigms which calls for "A Great Re-set" so

eloquently presented by the World Economic Forum "WEF" to address potential cyber system threats to nations and government globally, (Schwab and Malleret, 2020), against the proposed notions presented by other opponents (Mercola and Cummins, 2021). This being and how all there are interplayed factors with the economic aspect nudging and propelling societies (Schneider and Schneider, 1995). A paradigm for new world economic model in the Great Reset (Schwab and Malleret, 2020). Geopolitics covert and overt economic wars.

5.4.6 Pandemonic: Financial Profits and Economics

Evidently these correlating themes of 'pandemic and economics' as a social factor for reform are on in full display in such ravaged jurisdictions. This is evident in economic war-plagued nations in Africa nations with dense population such as Uganda, Kenya, Zimbabwe, Tanzania, south Africa, Angol, Botswana where these nations have been battling against the devasting plague of H.I.V., the A.I.D.S., malaria disease, tuberculosis, meningitis, and outbreaks of hamburger diseases. These wide spread occurrences have the capacity to wipe-out the entire civilization populations and to shift the economy adversely. These has brought about drastic legal, social changes and political changes. Pandemics are known to have a hard knock strike to economic growth prospects 2020 the worst of global economic growth for centuries (Asrifan, 2020).

As Christopher et al., (1997) postulates, wars are not just physical natural occurrences but pathogens are a device of war, so juxtaposed against the theories of *gain of function research projects* and now "lab leaks theories"" or "lab or leap theories" the conversation has shifted dynamics and focus (Baker, 2021). There are silent wars and invisible agents used as weapons both nano particulars as well this is according professor Dr. James Giodano (Giordano, 2021) and (Giordano and DiEulis, 2021) to a larger degree technological agents and wave technology. The book entitled the "*Benality of Ethnic Wars*" and other research documents, essays, scripts and

literature, speaks to the history and theoretical question on war. There are national security, policies and agenda which speaks to conflicts, problems, arms proliferation, both and the use of biochemical or biological weapons. This salient discussion also leads into the study of polemology and the study economic wars, financial warfare, rivalry, competitions and territorial conflicts

5.4.7 Assessing Facts: Current Research Premises and Theories on Economic

Wars and warfare: territorial wars, military, economic war, mind and physiological wars are all thematic and timelines within the system as they are all seemingly interrelated or connected (Wohlforth 2009). It is vitally important to look at, investigate, analyze without bias and evaluate all salient facts, factors, presented evidence, data and meticulously assess all findings on this matter without prejudice and predisposed views. Other various salient research references are listed below:

1. History of Chemical Biological Warfare Agents (Szinicz, 2005);
2. A Short History of Biological Warfare (Metcalfe, 2002);
3. Biological Warfare Agents (Pohanka and Kuca, 2010);
4. Biological Warfare: A Historical Perspective. (Christopher, Cieslak, Pavlin, and Eitzen 1997), (Kadlec, 1995), (Morse, 1998); (Marshall ,1999) and (Monath, 1998);
5. Chemical Warfare since ancient times? Early "Military Toxicology" problems in Germany (Martinetz, 2005);
6. "History of Biological Warfare" in Hebrew (Choen et al., 2002);
7. "The History of Biological Warfare" Human experimentation, modern nightmares and lone madmen in the twentieth century (Frischknecht, 2003);
8. Neurology and Military Strategies Neuro-Warfare (Graham 2021), (Giordano, 2021) and (Giordano and DiEulis, 2021);

9. Silent Weapons for Quiet Wars (manual); and,
10. Mind-Wars, Lt. Michael A. Aquino (books).

In this is a highly sensitive and classified area of economic warfare there is another possible topic emerging such as national security and pandemics, military research and development, terrorism surveillance and border patrol.

1. Biotechnology
2. Biodefense
3. Biosafety
4. Biowarfare
5. Bioweapon
6. Biosecurity and strategies
7. Bioterrorism
8. Bio-crime
9. Biohazardous toxins
10. Biochemical agents
11. Bio-control
12. Bio-remediation

5.4.8 Supporting Evidence and Factual Data: Wars, Science, Research Technology

- Boston University "*Gain of Function Research*" - exploring disease ecology (Chen et al., 2022);

- Georgetown University - Professor Dr. James Giordano, faculty Department of Neurology, military strategies in combating viruses, Neuro-Warfare (Graham, 2021), (Giordano, 2021) and (Giordano and DiEuliis, 2021);
- Five Generational Warfare 5GW – Social engineering strategies and control Artificial influences and agents (Reed 2008), (Krishnan, 2022);
- Wuhan Lab and Alliance with NIH "Lab Leak: BioEthics" (Baker, 2021); and
- Peter Daszak, president Eco-Health Alliances (Deszak, 2016) and (Husseini, 2020). "DARPA on your mind" Technology and Neuro Science Quantum technology (Moreno, 2004).

In an "economic and pandemic" scenario, have always been fought for century. This along with other type of wars have been fought for centuries to seize vital resources using the deployment of the military strategies economic war tactics, armed forces including the armies, pandemics are all common. According to Amir Cohen (2002) economic wars and pandemic wars can promote various planned respective, ideologies, and advance social interests, and agenda (Cohen, 2002), (Christopher et al.,1997), (Carus, 2017). It is also, essential to assess pandemics, the PESTEL framework and polemology and looking at these key areas listed below:

- Power and Control;
- Prominence, Dominance and Governance;
- Position;
- Politics and Government;
- Policies such as: laws, legislations, reform, regulations, and compliance;
- Law enforcement, police and military;

- Processes and procedures; and
- Intervention.

Other areas of concern and social factors are:

- Pandemics and political diplomacy;
- Pandemics migration;
- Pandemics and demographics;
- Pandemics and national security;
- Pandemics social and psychological factors;
- Pandemics and government assistance, subventions, stimulus
- Pandemic and socio-economic factors

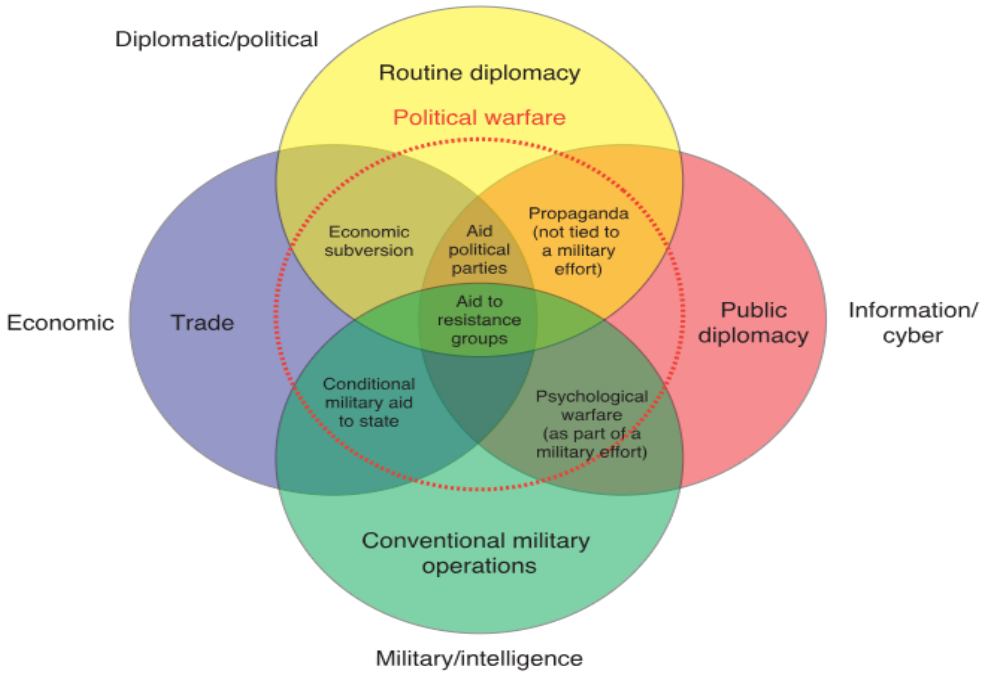


Figure 28: Modern Political Warfare *(Robinson et al., 2018)*

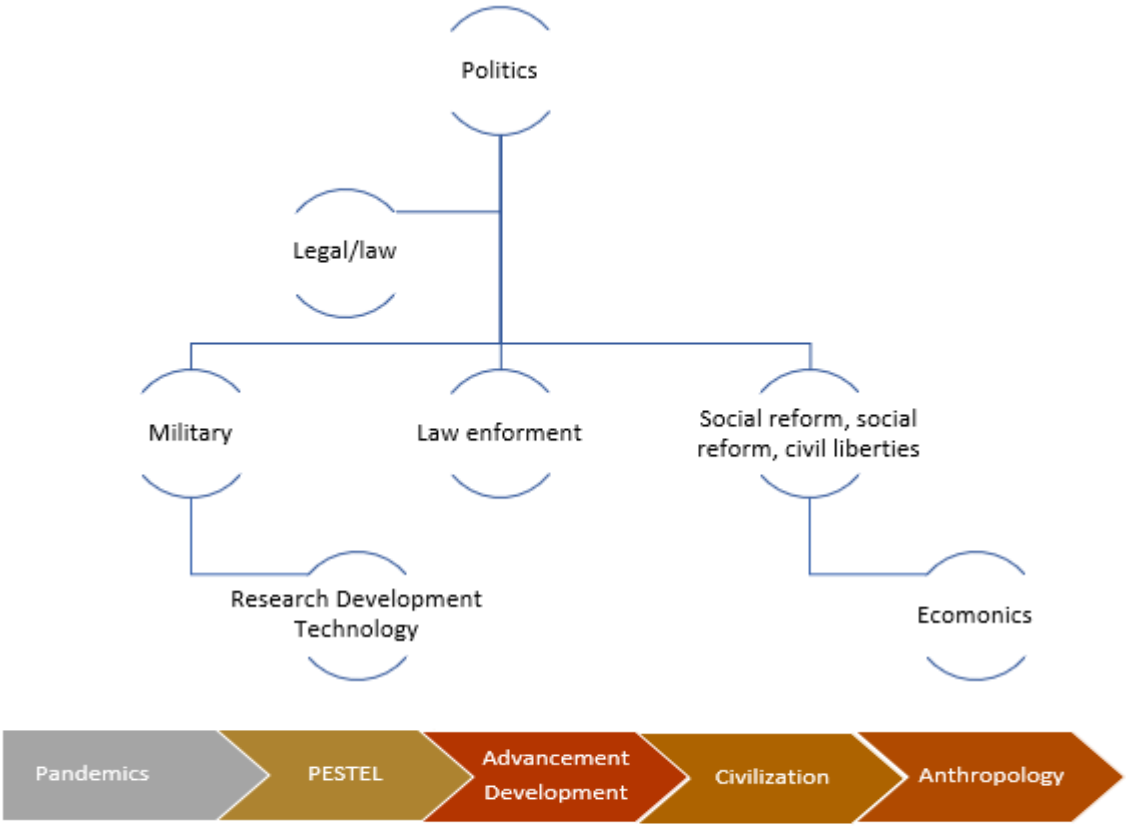


Figure 29: Pandemic Outliers, Governmental and PESTEL: source student researcher Gerline Ferguson 2025

Sub categories and integrating areas

- Political – law enforcement/military policing (research development (science Technology)
- Economics- Political/Tariffs/policies, law, trade,
- Social (social science/ psychology, anthropology, class 'classification', economics, education, lifestyle, demographics, financial status
- Technology (science, research development, education/academics, Medine (integration Bio-science)
- Environment ESG environment social governance, emission, pollutions)

5.4.9 Socioeconomic Effects of Pandemics

The tools used are based on the desired end results in the economic sphere (Mihalis, and Kristikos, 2020). All aspect of a pandemic affects human and society internally and externally on

all facets and levels (Ma et al., 2022). There are many financial adverse ramifications but whilst accessing the various transformative changes, there are many long-term development and advancements.

In a pandemic environment the poorest individuals, the vulnerable, the weakness are experience the greatest suffering and causalities. Also, macroeconomically poorest or most impoverished nation, the weakest institution or business organization suffers the greatest casually potential. This is truly "the survival of the fittest" in these unfortunate scenarios. Although pandemics brought many deaths and chaos segments in the capitalist system, but there are opportunities to reap high levels of great gain and wealth. In general, the affluent are in a better posture to withstand the brutal brunt force of a pandemic.

5.4.10 Research Data and Case Studies Analysis: Hypothesis Study Results

In the research case entitled "The Effect of Economic Crisis on Business Finance" analysis is done on a business scale in a micro level, but the same concepts can be applied on a macro nationwide level when assessing crisis management pandemics, the economy, and finance on a grander scale and proportion (Hertati et al., 2020).

In the case study entitled "Data Analytics to Evaluate the Impact of Infectious Disease on Economy: Case Study of Covid-19 pandemic, the author postulate that the pandemic threatens the entire global economic system (Hyman et al., 2021). The global economy at risk for record global unemployment, reduction in labor forces, GDP low demand and supply affecting both input and output, receding markets, low economy production, backlog in logistics, supply chain, with great risks and consequences for global collapse and recession and even a depression. And also, another case study by Nkirote, G.B. and Murtuzalieva, S., (2021) entitled "Economics of Pandemics: A

Case for Social Innovation and Digital Democracy" also glean major interesting perspective on the topic as presented in this research thesis.

Other adopted study information presented by authors Surico, P. and Galeotti, A., (2020) called 'The Economics of a Pandemic: The Case of Covid-19' published in the *Wheeler Institute for Business and Development, LBS. London: London Business School*, pp.1-93., it is emphasized that most critical information and important data on pandemics outbreaks are centered around developing and high-income and wealth countries. Therefore, there are gaps and biased on risks consequences for those developing nations and lesser prominent territories. The intervention and mitigation strategies are primarily geographic in natures and they give distinct in types and eventual outcome excluding the poorer nations and states. There is certain severity, frequency in characteristics and threats that may exists but overlooked. There are also methods of with treatment mortality and morbidity challenges which are not factors in current statistics. There are various simulation probability and mapping used to model by the insurance industry called catastrophe modeling to gauge risks and variables of all sort of natural disasters such as earthquakes, hurricanes, natural disaster, tornadoes, tsunamis, parameter distribution can give correlation statistical to compilations catalogue scenarios and provide schematic diagrams. Some historical records are infrequent, sparse, may contain gaps and incomplete. But the more accurate ones reveal startling details.

5.5 Pandemics and Ecology: Population and the Environment

Climate changes factors, sustainable development issues, carbon emission concerns, pollution control, global warming, these forge global discussion for smart technological cities and energy efficiency, carbon credit and ESG factors, population growth, population control, human migration and demographics. Hence, scaling these various matters are very important issues and concepts to

address both long and short term. Thus, the concepts of smart cities are being discussed on international scales by major key economic players presented by the World Economic Forum "WEF", (Schwab and Malleret, 2020).

5. 5.1 Pandemic and Population

Currently to date the is approximately 4.5 nearly 5 billion people accounting for 56% of the total world population that lives in metropolitan area cities, this figure is anticipate and projected to possibly increase by 50% that is to double by the year 2050. The increase urbanization also called agglomeration which is a concentration of economic and commercial cities. Because of pandemic phenomenon there is promise reset, smart cities increase in technology for efficiency these are expected to impact living, commuting, living, housing price, alleviate traffic congestion and sustainable economic equality.

There are other relatable topics such as sustainable developments and green solution, climate change, global warming, renewal energy, resource management, recycling (reduce, repair, renew, reuse etcetera) and related anomalies, natural disaster, catastrophes, carbon emission, pollution, carbon-footprint, waste management, environmental aspects geoengineering and scientific research, ESG laws, resource management allocation distribution, all of these areas are intermingled in the entire spectrum and uniformly aligns into the entire investigation and again the PESTEL analysis has essential merged all these bits and pieces together seamlessly (Ma et al., 2022).

Major economies and sectors impacted Markers per continent - Geographic and demographics	
Region	**Population size**
USA	**335 million approx.**
UK	**68.35 million**
India	**1.43billion**
China	**1.411 billion**
Africa	**1.373 billion**
LATAM & Caribbean	**67 million**
Russia	**144 million**
Australia	**26.64 million**

Table 22: Major Global Economies and Population Size Impacted by Covid-19: source by author, student researcher Gerline Ferguson 2025.

5.5.2 Expert and Contrary, Non-Conventional Perspectives

Leading professional and industry experts' views and input have impacted the trajectory of this pandemic Covid-19 and the pattern of how it has been handled and managed globally. It is important to assess pandemics from various perspective in order to obtain a rational logical comprehensive constructive understanding. There were several leading experts, specialists and physician throughout the Covid-19 pandemic whose input were silenced. There were standpoint and perspectives from other prominent physicians such as Dr. Scott Jensen. Dr. Jenson a former politician and governor of Minnesota was elected to the state senate in 2016. Dr. Jensen emphatically disagree with the lockdown and the Covid-19 mandates. Dr. Jensen liaised with numerous prominent doctors from the around the world including prominent doctors such as Dr.

Robert Malone (American Physician and Biochemist), Dr. Peter McCollough (Cardiologist Epidemiologist and chief Medical Advisor of Truth Health Foundation), Dr. Harvey Risch (Professor of epidemiology of Yale of Public Health), Dr. Scotte W. Atlast (Stanford University), Dr. Kerryn Phelps (out of Australia and former MP 2018 New South Wales, Councilor, Author, Writer and Health Care Advocate) all of whom questioned the current pandemic narrative and the global mandates. They have come on heavy adverse censoring, threats and licenses revokes.

The American Frontline Doctors and other international doctor associations harnessed their voices and perspective on Covid-19 pandemic along with other well-known prominent doctors such as Dr. Scott Jensen. Dr. Jensen in his book alluded to the Covid-19 pandemic and empathized his skepticism of the pandemic measures. He was against the various draconian intervention techniques that ensued and still exists after three and a half years of mandated measures. He alluded to the exploitation of profits of the pandemic. The margin and gains on new medication against known cures and acceleration of science only focusing on specific narrative which are not subjective on the main narrative. Dr. Scott Jensen further alludes to the profit margin by “big-tech and big-pharma” on censoring of constructive professional objective perspectives. He mentioned ethical collapses and compromising seen in the censoring, cancelling opposing voice from prominent renowned voices.

Other prominent competent voices are Dr. Kerryn Phelphs (*former MP 2018 New South Wales*) amongst other expert officials such as Dr. Kelly Victor, ER Trauma Physician and Specialists on Disaster Preparedness, Health Care Consultant, who also talked about the hesitancy by the CDC, NIH, NIAID FDA, UN, WHO, GAVI, CEPI, BGI to actively engage into meaningful dialogue and conversation concerning the matter. The Florida Surgeon General, Dr. Joseph Ladapo, also contents on these mandates when presented. The Florida Republican Governor Ron DeSantis also

hosted various forums and asking critical questions. The Covid-19 narrative according to the aforementioned physicians was hostile towards alternative perspective and solutions.

Alternative Expert Views on the Pandemic 2020 List of Doctors and Professionals Opposed to Mainstream Covid-19 Narrative		
#	Names	area
1	Dr. Joseph Ladapo- Florida	Florida Surgeon General, United Stated
2	Dr. David E. Martin	Author, Activists
3	Dr. Stella Emmanual	American Frontline Doctors Alliance
4	Dr. Kerryn Phelphs	*Former MP 2018 New South Wales*
	Dr. Simone Gold	Founder, Frontline Doctors Alliance
5	Dr. Scott Jensen	Former Politian and Governor of Minnesota elected state senate 2016.
6	Dr. Scotte W. Atlast	*Stanford University*
7	Dr. Peter McCollough	*Cardiologist Epidemiologist and Chief Medical Advisor of Truth Health Foundation*
9	Dr. Robert Malone	American Physician and Biochemist
10	Dr. Harvey Risch	*Professor of Epidemiology of Yale of Public Health*
11	Dr. Kelly Victory	Emergency Roon (ER) Trauma Physician and Specialists on Disaster Preparedness, Health Care Consultant
12	Dr. David Drew Pinsky	Internist and Specialist also Dr. Drew Show
13	Dr. Bryan Ardis	Authors, Functional Medicine Practitioner Texas & Tennessee
14	Dr. Jay Bhattacharya	Scientist, Health Economist and professor Standford University
15	Dr. Eric Nepute	Talk Show “Real Talk with Dr. Eric Nepute and Friends”, St. Louis Chiropractor
16	Dr. Pierre Kory	Trauma Surgeon Physician Front line Covid-19 Critical care Alliance “Better Way Conference”

		Co- Founder Independent Medical Alliance
17	Dr. Sherri Tenpenny	Author, "Plague of Corruption"
18	Dr. Judy Mikovitz	Author; The Plague of Corruption and coauthor Ending Plagues, The Plague
19	Dr. Deborah Birx	Government Covid response President's Trumps Administration and Author book: "*Silent Invasion the Untold Story of the Trump Administration and Preventing the Next Pandemic Before it is too Late*".
20	Dr. James A Thorp	Maternal Fetal Medine OBGYN
21	Dr. Joe Dispenza	Author You are the Placebo
22	Dr. John Campbell	Podcast, Clinical Nurse England
23	Dr. Rima E. Laibow	MD and Author
24	Dr. Petter Glidden	Holistic Doctor
25	Dr. Shiva Arrydurai	Inventor, Entrepreneur, Engineer
26	Dr. Matta Strauss	Physician
27	Dr. Kulvinder Kaur Gill	Opposed the Covid-19 vaccines
28	Dr. Jean Marc Benoit	Posted on the pandemic measure and got castigated
29	Dr. Patrick Philips	Posted against global pandemic Covid-19 measures and got license revoked
30	Randy Hillier	Former Member of Provincial Parliament of Ontario Canada
31	Senator Gerard Rennick	Senator, Queensland, Australia
32	Senator Ralph Babet	Senator, Victoria Australia
33	Hon. Matthew Canavan	Senator, Australia
34	Senator Alex Antic	South Australia
35	Senator Marielle Smith	Senator, South Australia
36	Hon Anne Ruston	Senator, South Australia
37	Senator Pauline Hanson	Senator, Queensland, Australia
38	Dr. Paul E. Marik	Physician Front line Covid-19 Critical Care Alliance Independent Medical Alliance, Co-Founder
39	Dr. Johan Launer	Activist
40	Dr. Rashid Buttar	Author, Activist

41	Dr. Vladimir Zelenko	Family Physician, Author
42	Dr. Charles Hoffe	ER and Family Physician
43	Optimist Bahamas	Physician Alliance – Advocacy in The Bahamas https://www.optimistbahamas.org/
44	Dr. William Makis	Physician
45	Dr. Peterson Pierre	Medical Doctor (MD)
46	Mr. Riccardo Umberto Guerrino Bosi	Former Lieutenant Colonel Australian Army Secila Forces, Author
47	Mr. Cristian Vasile Terhes	Politician, MEP, Romania,
48	Ms. Francesca Donata	Politian, Italy
49	Ms. Christian M. Anderson	MEP
50	Mr. Robert Roos	MEP, Vice Chair of European Conversative and Reformist Group
51	Dr. Robert Redfield	Virologist, 18th Director of CDC
52	Dr. Thomas Binder	Immunology, Virologist, Internal Medicine
53	Mr. Carlin Georgescu	Former Executive Director of the UN
54	Mr. Pascal Najadi	Investment Banker, Author, Filmmaker
55	Dr. Roberto O. Young	Biochemist, Scientist, author
56	Miss Karen Kingston	Former Pfizer employee
57	Mr. Javier Milei	President of Argentina, Economist
58	Dr. Luc Montagnier	French virologist, Noble Prize laureate
59	Dr. Michale Yeadon	Scientist
60	Dr. Geert Vanden Bossche	Scientist
61	Dr. Thomas Cowan	Author, Doctor
62	Dr. Larraine Day	Orthopedic Trauma Surgeon
63	Dr. Christ Shoemaker	Doctor
64	Dr. Richard M. Fleming	MD, JD, Cardiologist, researcher
65	Dr. Patrick Soon-Shiong	Transplant surgeon
66	Dr. Darrell Wolfe	Doctor and Author
67	Dr. Mike Yeadon	Scientist and former Pfizer VP
68	Dr. Carrie Madej	Osteopathic Physician

69	Dr. Kerryn Phelphs	Australia and former MP 2018 New South Wales, Councilor, Author, Writer and Health Care Advocate
70	Dr. Harvey Risch	Yale Professor

Table 23: List of Doctors and Professionals Opposed to Mainstream Covid-Narrative and Mandates: source *by student researcher Gerline Ferguson 2025.*

Countries with High Precautionary Measures within the Covid Domain (Emergency mandatory orders, edicts and the covax vaccine and program)			
No.	*Country*	*Region*	*Leader during pandemic covid-19*
1	*Madagascar*	*Africa*	*Dr. Andry Rajoelina*
2	*Tanzania*	*Africa*	*President Dr. John Magufuli*
3	*Burundi*	*Africa*	*Pierre Nkurunziza*
4	*Haiti*	*Caribbean*	*President Jovenel Moise*
5	*Ivory Cost*	*Africa*	*Hamed Bakayoko*
6	*Eritrea*	*Africa*	
7	*Angola*	*Africa*	

Table 24: List of Countries which Counteracted the Covid Pandemic: source *by Student researcher Gerline Ferguson 2025.*

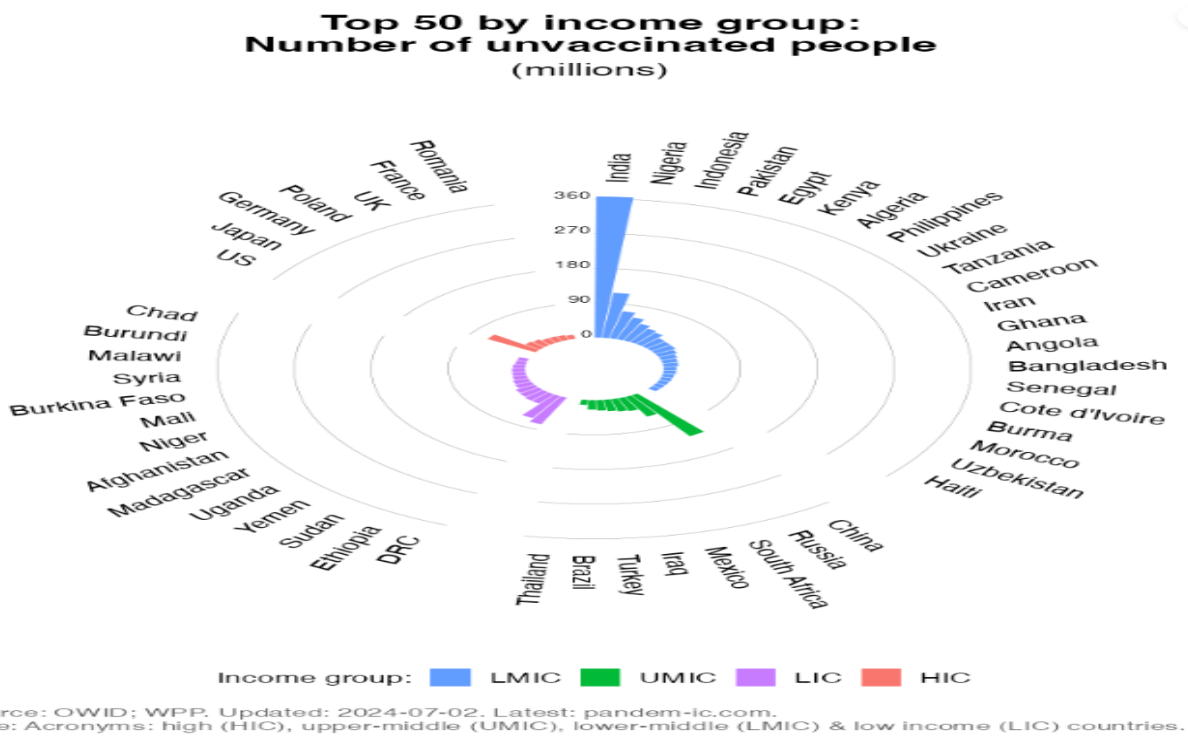


Figure 30: The 50 least vaccinate countries of the world update 2024 [*The 50 least vaccinated countries of the world*] accessed Feb., 25, 2025)

There are now new recent developments as the world transitions into a new phase post Covid-19 pandemic. The evolution of new headline and news emanating from the United States, White House. The recent "unconditional pardoning" of Dr. Athony Fauci, scientist, immunologist, director of National Institute of Allergy and Infection Disease NIAAID executive grant preemptive of clemency by former President Joseph R. Biden before demitting office in 2025. These aftermath developments also further give curiosity into new research areas and investigation on the topic pandemic and the PESTEL

5.6 Pandemic Formula Pandemic: Economic Theory and PESTEL

The notion of pandemic and long-term growth prospect touching all PESTEL element in the PESTEL framework.

A Proposed Pandemic Formula

Pandemic short-term chaos (plus) government intervention or expenditures (squared) plus a robust reset strategy equals stable long-term economic shift. A propulsion affecting on all levels of PESTEL framework both internal and external factors. These are the key ingredients for long term economic success (LTES). But if the reset is squared it accelerates the long-term impact of a pandemic outcome for greater positive momentum and acceleration, hence creating a new paradigm.

A pivot points (pivotal movement) requires robust strategies.

Pandemic short-term chaos plus aggressive government incentives to boost and prime the economy and the reset policies squared yield long term economic acceleration.

PSTC +AGI (squared) X R(squared) =LTEA

Short term chaos plus aggressive government intervention (injections, subsidies subventions) strategies and measure times a reset, equal a greater probability will lead to long term economic desired impact or shift (great leap into an economic paradigm or a paragon).

PSTC - AGI= Recession or even adverse effects economic depression if uncontrolled

What constitutes to a reset or a long-term economic recalibration? Using the Keynesians method and philosophies of government expenditure such as political intervention, methodologies fiscal and monetary spending stimulus and to boost and sure-up money supply, spending, consumption, investments, supply, demand influences.

Factoring the economic notions of the 'General Theory" as proposed by John Maynard Keynes, we can closely observe the Keynesian Multiplier Effect (Keynes 1975). This theory states that increase in private consumer spending along with robust gross government expenditures will ultimately raise gross domestic product (GDP) and the output and other key performance indicators or economic indicators (KPI or KPE).

Pandemics and disease outbreaks have fostered greater awareness, propelled good hygienic practices, sanitization concepts, environmental and ecological consciousness and garnered protocols and consensus.

- Major pandemic equals major sweeping long lasting changes and reforms;
- Intervention strategies;
- Subventions and incentives; and
- Injections -monetary fiscal policies and economic tools.

CHAPTER VI:

SUMMARY CONCLUSION

IMPLICATIONS AND RECOMMENDATIONS

6.0 Summary of Research Study and Findings

This section of the research study seeks to look at current and past academic case studies and other peer reviewed empirical data analysis conducted in connection to the thesis topic and philosophies presented as related to pandemics, crisis management and the application of the PESTEL framework both at the micro economic level and the greater macroeconomic global level. There are three (3) significant common denominators evident in a crisis environment. There is the element of unexpected surprise, that evokes short time immediate decisions and actions as the threat can be significant and detrimental. It evokes risk governance and the implementation of immediate strategies to mitigate and curtail the impacts and potential adverse impact.

Disaster and catastrophic anomalies have always fostered a curious investigative inquiry of what happened what is happening and how it happened and the need to immediately mitigate it from happening and recurring and even implementing interventions to curtail adverse effects and impacts. It is coined as the push and pull of societal expectation, where is it anticipated. This also influences such as code of ethics, liability, education, and professionalism (Knowles, 2014). Economic crisis as detailed in the case study in the International Journal of Economic and Financial Issues, Hertati et al., (2020) entitled, 'The Effects of Economic Crisis on Business Finances', make it clearly evident that with every great problem therein lies an even greater opportunity for potential development for growth (Hertati et al., 2020). Problems or crisis are opportunities in disguise hence the notion of "The Great Reset" which is another revolutionary moment in time, a monumental

paradigm shifts and thereafter a tremendous leap into new economics and financial territories of possibilities (Schwab and Malleret, 2020), (Swab and Zahibi, 2020), (Schwab, 2017).

6.1 Theoretical and Practical Implication

The practical implication and the potential value of the thesis as applied to real outcomes and real time situation is essential to humanity (Van Bergeijk, 2021). The information is practical and applicable to everyone from doctors, to politicians, lawmakers, social scientists, psychologist, environmentalist, academicians, statisticians and all those who assess pandemics such as epidemiologists, virologists, immunologist, technicians, clinicians, generalists and specialists. The 2020 pandemic (Covid-19) and the great plagues and pandemics prior have created uncertain, chaos, panic, fear, unrest (Huremovic, 2019), With knowledge, wisdom and thorough awareness and broad education and looking at pandemics through multiple lenses and assessing them at many levels, hence one can make better informed decisions, seek and develop alternative solutions and implement multiple tier results.

The theoretical implication is that this level of in-depth approach adds to perceptive, logical reasoning and to the body of knowledge. The insight of the topic and thesis gives a broader wholistic view and a deeper insight, and understanding of the topic of pandemics (Bramanti et al., 2016). Through deep constructive and judicious research and the application unbiased judgement with prudent perspective critical issues have to be analyzed. All those improbable or questionable perspectives are now looked at through merging thoughts, theories, concepts and by bridging the gap. New perspective gain is through gathering and analyzing the context and seeking to answers as to why, what when, and how (Boire et al., 2014).

6.2 Research Challenges

The major challenge encountered during in this research was accessing all avenues thoroughly within the broad the PESTEL framework. The topic is very board, elaborate and all-encompassing with many subsections and categories. Also, the current biases that exists proved to be a challenge. Being objective and neutral whilst overcoming the hurdles of not appearing conspiratorial. The PESTEL framework give a better understanding of pandemics from all key critical angles This was monumental in overcoming the narrow perspective and existing barriers that pandemics are isolated occurrences or only from the medical arena where there are even different segments such as virologists, immunologists, vaccinologist, scientist, biologists and so one (Sampath et al., 2021). Then there are doctors, who seeks or prefers holistic interventions and measures. But rather based on the thorough research presented it is possible that pandemics can derive from alternative sources. The myth that pandemics are only derived from nature and only occur through leaps from wild life into civilization (Antras et al., 2020). There are numerous published articles and scholarly studies that prove otherwise. This notion has to be been demystified with “gain of function research” and funding initiatives.

6.3 Recommendations for Future Research and Application of Future Research

One significant and pertinent area that would be suggested to future researchers is to inculcated other framework into and there are other Research Knowledge gaps withing this topic waiting to be explored. The questions are insurmountable to the curious inquisitive mind. The preference who be to use greater level and quantity of case study material. Leverage from the vast repository of existing knowledge bank. Also, the long-term data analysis of the effects of pandemics can be explored comprehensively. There are also vast opportunities to explore strengths and weaknesses of the study and other mitigation risks, Impacts and factors needs to be explored.

There are a multiple of factors and facets that have yet to be explored in this area of pandemics. One area that can be vastly improved upon is amalgamation of other framework into the mix of research such as the Porter Five forces, the PESTEL Analysis and Pandemics, or even looking at the subject matter with other measuring tools such as Balance Score Boards, GAP Analysis, Value Chain Analysis, BCG Growth Share Quadrant, Scenario Analysis Simulation Matrix. The are many meaningful yet unexplored avenues topics and unchartered ground that have not yet been fully analyzed or investigated. The inquisitive and highly curious researcher researchers can fully delve and explore various other facets of this topic in depth.

6.4 Summary Conclusion

The objective purpose and truest intent of this academic thesis research paper was to fill in the knowledge gap of current academic literature, to add to the existing body of scholastic knowledge, to advance public dialogue and active engagement on the topic presented on a multiple level, hence the PESTEL framework facilitates this seamlessly (Çitilci and Akbalık, 2020), At the core the objectives of this study have been realized, and fully achieved. The conclusive results of the various aspects of pandemics PESTEL, crisis management, disaster recovery management and their financial economic impacts is an ongoing quest into this subject. Pandemics has shift shake and shape humanity and reset civilization on all levels. This is a very elaborate and broad subject which has been meticulously honed using PESTEL framework but has more work to be done and compiled for even the next century.

This current environment post covid has been a critical one of resetting, the cooling off period, aftermath. This is when global economies start to recalibrate and the re-emergence of financial activities, reorganization, restructuring. The aftermath has its benefits and opportunities (Ma et al., 2022). Therefore, assessing the impact on all spectrum and angles in order to gain a

deeper better understanding of the entire inner networking and mechanisms can help humanity the world understand the dynamics of pandemics and usages in the PESTLE analysis framework. The obvious paralyzing evidence of concerns, and apprehensions of the "novel corona virus" and other outbreaks in the past affected societies and their impacts on overall systems and civilization in totality. The pandemic of 2020 was truly a worldwide event (Bacchus, 2022). There is a positive congruence of pandemics to the PESTEL and wealth transference strategies.

Pandemics may very well be a necessary evil a viable catalyst to catapult civilization into new dimensions and opportunities (Christopher et al., 1997). This calls for rethinking the dynamics and relationship between pandemics, nature, human, nature, society. It is said and emphatically expressed that "through every problem there is a greater solution and with every challenge there is an underlying equal or greater opportunity waiting to be unfolded". Therein lies for a possible wonderfully sculptured and meticulously crafted avenue to human advancement and civilization development (Schwab and Malleret, 2020). Whether the forces are natural or supernatural, artificial, hybrid or visible or invisible seen or seen, known or unknown are the driving for the wheel that spins and motion these series of events.

Charles Darwin's notion and his famous theory of natural selection such as. "survival of the fittest" concepts, "Not the strongest of the species that survives nor the most intelligent, rather it is the one most adapted to change". This notion not only applicable to human evolution but to the life cycle of each individual business, product, economy, sectors, industry and country all in the quest for survival, supremacy and dominance in this space, time a realm (Darwin, 1859).

The final analysis and results are all in tandem with the overall literature review and the data presented from previous academic research and prior data. The core objective has been established and finally all the references have been presented. Pandemics have been dissected and forensically asses in all aspects using PESTEL analysis framework (Çitilci and Akbalık, 2020).

The study of pandemics cannot be done in isolation but rather through various lenses, channels, and systems (Martinez-Contreras et al., 2022) The Political, the Economic, Social Technological Environmental and Legal aspects of it have been meticulously presented. The question now is 'How would the findings impact the way the world view and addresses pandemics in the future (Knowles, 2014).

REFERENCES

Açıkgöz, B., (2022), "Evaluation for COVID-19 Outbreak Public Policies in The World Within the Scope of Global Public Goods (GPGs) In *Pandemnomics: The Pandemic's Lasting Economic Effects",* (pp. 3-16), Singapore: Springer Nature Singapore.

Adam, S., (2016), "*The Wealth of Nations",* Aegitas.

Aguilar, F.J., (1967), "Scanning the Business Environment".

Al-Hashimy, H.N.H., (2022), "The Impact of Corona virus Pandemic on the International and Domestic Economy: Analysis the Strengths and Weaknesses Based on SWOT Analysis", *International Journal of Business and Management Invention*, *11*(10), pp.90-96.

Alibek, K. and Handelman, S. (1999), "Biohazard: The Chilling True Story of the Largest. Covert Biological Weapons Program in the World - Told from Inside by the Man Who Ran It." New York, NY: Random House; 1999

Andersen, B. and Fagerhaug, T., (2006), "*Root Cause Analysis",* Quality Press.

Allen, F., Babus, A. and Carletti, E., (2009), "Financial Crises: Theory and Evidence.", *Annu. Rev. Finance Econ.*, *1*(1), pp.97-116

Anderson, R.M., Heesterbeek, H., Klinkenberg, D. and Hollingsworth, T.D., (2020), "How will Country-based Mitigation Measures Influence the Course of the COVID-19 Epidemic? "The *Lancet*, *395*(10228), pp.931-934.

Ansari, I., Grier, G. and Byers, M., (2020), "Deliberate Release: Plague –A Review", Journal *of Biosafety and Biosecurity*, *2*(1), pp.10-22.

Antràs, P., Redding, S.J. and Rossi-Hansberg, E., (2020), "*Globalization and Pandemics",* (No. w27840). National Bureau of Economic Research.

Ask Dr. Drew Show Producer Youtude Video - Dr. Kelly Victory, MD Responds to "Why Didn't mRNA Vaccines Harm Me?" accessed Jan 06, 2023 @Kalebnationhttps://www.youtube.com/watch?v=W0RdOtQu7wA

Atlas, R.M. (1998), "Biological Weapons Pose Challenge for Microbiological community", ASM News 64: 383-388.

Avery, D. (1999), "Biological and Toxin Weapons: Research, Development and Use from the Middle Ages to 1945", (eds Geissler, E. and Moon, J.E.v.C.), 190–214. Stockholm International Peace Research Institute, Oxford University Press, Oxford, UK.

Av-Gay, Y. (1999)," Uncontrolled Release of Harmful Micro-organisms", Science 284:1621.

Azungah, T., (2018), "Qualitative Research: Deductive and Inductive Approaches to Data analysis", *Qualitative research journal*, *18*(4), pp.383-400.

Bacchus, J., (2022), "*Trade Links: New Rules for a New World*", Cambridge Univ. Press

Baker, N., (2021), "The Lab-Leak Hypothesis", New *York Magazine*, *4*.

Barras, V. and Greub, G., (2014), "History of Biological Warfare and Bioterrorism", Clinical, *Microbiology and infection*, *20*(6), pp.497-502.

Barrera, S.M., (2022), "PESTEL Analysis and the Porter's Five Forces: An Integrated Model of Strategic Sectors", In *Handbook of Research on Organizational Sustainability in Turbulent Economies* (pp. 292-314). IGI Global.

Batraville, Laurie-Anne, (2020), "Covid-19 and Race the Modern-Day Genocide or Medical Apartheid: From 1619 to Covid 19": the Multilayer Demolition of Black People (Book)

Beck, U., (2005), "*Power in the Global Age: A new global political economy",* Polity (book).

Bennett, S., (2021), "How Politics Shapes Pandemics. In *Sensemaking for Security"* (pp. 201-227). Springer, Cham.

Blaylock, R.L., (2021), "Covid-19 Pandemic: What is the Truth?", Surgical *Neurology International*, *12*, p.591.

Bloem, J., Van Doorn, M., Duivestein, S., Excoffier, D., Maas, R. and Van Ommeren, E., (2014), "The Fourth Industrial Revolution. *Things Tighten", 8*(1), pp.11-15.

Boire, N.A., Riedel, V.A.A., Parrish, N.M. and Riedel, S., (2014), "Lessons Learned from Historic Plague Epidemics: the relevance of an ancient disease in modern times", Journal *of Ancient Diseases & Preventive Remedies*, *2*(2), pp.1-17.

Bonadio, B., Huo, Z., Levchenko, A.A., and Pandalai-Nayar, N., (2020), "Global *Supply Chains in the Pandemic" (No. w27224),* National Bureau of Economic Research.

Bostrom, N. and Cirkovic, M.M. eds., (2011), "*Global Catastrophic Risks*. Oxford University Press, USA.

Bowart, W.H., and Sutton, R., (1990), "The Invisible Third World War". *Unfinished Manuscript*.

Bowen, G.A., (2009), "Document Analysis as a Qualitative Research Method",

Bowler, P.J., (1996), "*Charles Darwin"* (pp. 40 - 1), Cambridge: Cambridge University Press.

Bramanti B., Stenseth, N.C., Wallow. L., and Lei, X., (2016), "Plague: A Disease which

Changed the Path of Human Civilization" Adv. Exp. Med., Biol. 918, 1-29, doi:10.1007/978-94-024-0890-4_1

Bristow, W.F., (2007), "Hegel *and the Transformation of Philosophical Critique",* Oxford Univ., Press.

Brophy, L.P., Miles, W.D. and Cochrane, R.C., (1959), "*The Chemical Warfare Service: from laboratory to field"* (Vol. 2). Office of the Chief of Military History, Department of the Army (book)

Callegari, B. and Feder, C., (2022), "A Literature Review of Pandemics and Development: the Long-Term Perspective", *Economics of Disasters and Climate Change*, *6*(1), pp.183-212.

Carruthers, H., (2009), "Using PEST Analysis to Improve Business Performance", In *practice*, *31*(1), pp.37-39.

Carus, W.S., (2017) "A Short History of Biological Warfare: from pre-history to the 21st century" (Vol. 12). Government Printing Office – book

Carus, W.S., (2015), "The History of Biological weapons use: what we know and what we don't', Health *Security, 13*(4), pp.219-255.

Cenciarelli, O., Rea, S., Carestia, M.C., D'Amico, F., Malizia, A., Bellecci, C., Gaudio, P., Gucciardino, A. and Fiorito, R., (2013), "Biological Weapons and Bio-Terrorism: a review of History and Biological Agents", *International Journal of Intelligent Defense Support Systems*, *6*(2), pp.111-129.

Center for Disease Control A.W., (2020), "Centers for Disease Control and Prevention" USA CDC.

Céspedes, L.F., Chang, R. and Velasco, A., (2020), "The Macroeconomics of a Pandemic: A Minimalist Model*" (No. W27228).* National Bureau of Economic Research.

Chace, C., (2016), "*The Economic Singularity"',* New York: Three Cs

Chisholm, R.M., Chisholm, R.M., Chisholm, R.M. and Chisholm, R.M., (1989), "*Theory of Knowledge"* (Vol. 3). Englewood Cliffs, NJ: Prentice-Hall.

Christopher, G.W., Cieslak, J.T., Davlin, J.A. and Eitzen Jr, E.M., (1997), "Biological Warfare: A Historical Perspective",

Çitilci, T. and Akbalık, M., (2020), "The Importance of PESTEL Analysis for Environmental Scanning Process", In *Handbook of research on decision-making techniques in financial marketing* (pp. 336-357). IGI Global.

Claeys, G., (200), "*The Survival of the Fittest" and the Origins of Social Darwinism",* Journal *of the History of Ideas*, *61*(2), pp.223-240.

Cleveland, H., (1982), "*Information as a Resource*", *Futurist, 16*(6), pp.34-39.

Cochrane, R.C., (1947), "*Biological Warfare Research in the United States",* Office of Chief, Chemical Corps. (Book)

Cohen, A., Robenshtok, E., Rotman, E. and Sagi, R., (2002), "The History of Biological Warfare". *Harefuah, 141*, pp.7-12.

Cole, C.A., (1996), "The Spectre of Biological Weapons", *Scientific American*.
Cole, L.A., (1998), "The Eleventh Plague: Politics of Biological and Chemical Warfare".

Cole, L.A., and Cole, W.H., (1997), "The Politics of Biological and Chemical Warfare", ed. Freeman and Company, New York, pgs 289

Cui, J., Li, F. and Shi, Z.L., (2019), "Origin and Evolution of Pathogenic Coronaviruses", Nature *reviews microbiology*, *17*(3), pp.181-192.

Darwin, C., (2016), "*On the Origin of Species", 1859* [online]

DaSilva, E. and Iaccarino, M., (1999), "Emerging Diseases: A Global Threat", *Biotechnology Advances", 17*(4-5), pp.363-384.

DaSilva, E.J., (1999), "*Biological Warfare, Bioterrorism, Biodefence and the Biological and Toxin Weapons Convention',* Electronic *Journal of Biotechnology*, *2*(3), pp.0-0.

DaSilva, E.J., Ratledge, C. and Sasson, A., (1992), "*Biotechnology: Economic and Social Aspects: Issues for developing countries*", Cambridge University Press.

Daszak, P, Olival, K.J., Li, H., (2020)," A Strategy to Prevent Future Pandemics, Similar to the 2019-nCoV Outbreak", Biosafety and Health, 2, 6-8.

Denemark, D., Harper, T. and Attwell, K., (2022), "*Vaccine Hesitancy and Trust in Government: a cross-national analysis", Australian Journal, Political Science*, p.1-19.

Dennis, D.T., (2009), "Plague as a Biological Weapon. Bioterrorism and infectious agents: a new dilemma for the 21st century", pp.37-70.

Detzer, D. and Herr, H., (2014), "Theories of Financial Crises: An overview."

Dresch, A., Lacerda, D.P. and Cauchick-Miguel, P.A., (2019), "Design science in operations management: conceptual foundations and literature analysis". *Brazilian Journal of Operations & Production Management, 16*(2), pp.333-346.

Di Vaio, A., Palladino, R., Hassan, R. and Escobar, O., (2020), "Artificial Intelligence and

Business Models in the Sustainable Development Goals Perspective: A systematic literature review", *Journal of Business Research, 121*, pp.283-314.

Donnelly, J.P., (2017), "A Systematic Review of Concept Mapping, Dissertations", Evaluation *and program planning", 60*, pp.186-193.

Drake, J.M., Chew, S.K. and Ma, S., (2006), "Societal Learning in Epidemics: intervention effectiveness during the 2003 SARS outbreak in Singapore", *PloS one*, *1*(1), p.e20.

Dry, S. and Leach, M., (2010), "*Epidemics: Science, Governance and Social Justice".* Routledge eds (Book)

Duprex, W.P., Fouchier, R.A., Imperiale, M.J., Lipsitch, M. and Relman, D.A., (2015), "Gain-of-Function Experiments: time for a real *debate", Nature Reviews Microbiology*, *13*(1), pp.58-64.

Easterby-Smith, M., Thorpe, R. and Jackson, P.R., (2012), "*Management Research",* Sage.

Eltarabily, S. and Elghezanwy, D., (2020), "Post-Pandemic Cities, the impact of COVID-19 on cities and urban design", *Architecture Research*, *10*(3), pp.75-84

Erikson, S., (2020), "Pandemics Show us What Government is for", *Nature Human Behaviour*, *4*(5), pp.441-442.

Fakhruddin, B.S., Blanchard, K. and Ragupathy, D., (2020), *"Are We There Yet? The Transition from Response to Recovery for the COVID-19 Pandemic", Progress in Disaster Science*, *7*, p.100102.

Fener, T. and Cevik, T., (2015), "Leadership in Crisis Management: Separation of leadership and executive concepts", *Procedia Economics and Finance*, *26*, pp.695-701

Ferguson, N.M., Laydon, D., Nedjati-Gilani, G., Imai, N., Ainslie, K., Baguelin, M., Bhatia, S., Boonyasiri, A., Cucunubá, Z., Cuomo-Dannenburg, G. and Dighe, A., (2020), "*Impact of Non-pharmaceutical Interventions (NPIs) to reduce COVID-19 mortality and healthcare demand*".

Franks, A., (2014), "*Margaret Sanger's Eugenic Legacy: The Control of Female Fertility",* McFarland".

Frischknecht, F., (2003), "The History of Biological Warfare: Human experimentation, modern nightmares and lone madmen in the twentieth century". *EMBO reports*, *4*(S1), pp. S47-S52.

Fukuyama, F., (2020), "The Pandemic and Political Order", *Foreign Aff.*, *99*, p.26.

Geissler, E. and Moon, J.E.V.C. (1999), "Biological and Toxin Weapons: Research, bi Development and Use from the Middle Ages to 1945", Stockholm International Peace Research Institute, Oxford Univ. Press, Oxford, UK. Harris, S. (1992) Japanese

Gibson, L.P., Magnan, R.E., Kramer, E.B. and Bryan, A.D., (2021), "Theory of Planned

Behavior Analysis of Social Distancing During the COVID-19 Pandemic: Focusing on the Intention–Behavior Gap". *Annals of Behavioral Medicine*, *55*(8), pp.805-812.

Giordano, J.J., 2010. *Scientific and Philosophical Perspectives in Neuroethics*. Cambridge University Press. Book

Giordano, J. and DiEuliis, D., (2021), "A Strategic Multilayer Assessment. Invited Perspective Paper", *NSI, Inc.*

Glatter, K.A. and Finkelman, P., (2021) "History of the Plague: An Ancient Pandemic for the age of COVID-19".

Gramm, J.D. and Branagan, B.A., (2021), "*Neuro War Is Here"!* (Doctoral dissertation, Monterey, CA; Naval Postgraduate School).

Greub, G. and Grobusch, M.P., (2014), "Bioterrorism: Myth or Reality? *Clinical Microbiology and Infection"*, *20*(6), pp.485-487.

Guillén, A., (2020), "Coronavirus Crisis or a New Stage of the Global Crisis of Capitalism?", Agrarian *South: Journal of Political Economy*, *9*(3), pp.356-367.

Gunkel, D., (2020), "Deconstructing the Panic of Pandemic, A Critical Review of Slavoj Žižek's Pandemic! COVID-19 Shakes the World", *International Journal of Žižek Studies*, *14*(2).

Gurevitch, L., (2021), "The Spectacle of Competence: global pandemic and the redesign of leadership in a post neo-liberal world", *Cultural Studies*, *35*(2-3), pp.489-504.

Gurría, A., (2020), "Coronavirus (COVID-19): Joint actions to win the war", *OCDE. Disponible*

Elyassi, H., (2021), "Economics of the Financial Crisis: Any Lessons for the pandemic Downturn and Beyond? *Contemporary Economics*, *15*(1), pp.100-121.

Hartley, K., (2020), "*NATO at 70: A Political Economy Perspective",* Springer Nature.

Hayden, B., (1972), "Population Control Among Hunters, Gatherers". *World Archaeology*, *4*(2), pp.205-221.

Heit, E. and Rotello, C.M., (2010), 'Relations *Between Inductive Reasoning and Deductive Reasoning*." *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *36*(3), p.805.

Hevner, A.R., (2007), "A Three-cycle View of Design Science Research", Scandinavian *Journal of Information Systems*, *19*(2), p.4.

Hofer, C.W., (1990), "*Toward a Contingency Theory of Business Strategy",* Physica-Verlag HD. (pp. 151-175).

Huremović, D., (2019), "Brief History of Pandemics (Pandemics Throughout

History)", *Psychiatry of pandemics: a mental health response to infection outbreak*, pp.7-35.

Husseini, S., "2020", "Peter Daszak's EcoHealth Alliance Has Hidden Almost $40 Million In Pentagon Funding and Militarized Pandemic Science", Independent *Science News, 16.*

Hyman, M., Mark, C., Imteaj, A., Ghiaie, H., Rezapour, S., Sadri, A.M. and Amini, M.H., (2021), "Data Analytics to Evaluate the Impact of Infectious Disease on Economy: Case study of COVID-19 pandemic". *Patterns, 2*(8).

Hyun, J., Kim, D. and Shin, S.R., (2020), "The Role of Global Connectedness and Market Power in Crises: Firm-level evidence from the COVID-19 pandemic", *Covid Economics: Vetted and Real-Time Papers, 49.*

Jameson, F., (2009), "*Ideologies of theory",* Verso Books.

Jordà, Ò., Singh, S.R. and Taylor, A.M., (2022), 'Longer-run Economic Consequences of Pandemics". *The Review of Economics and Statistics*; 104 (1): 166–175. doi: https://doi.org/10.1162/rest_a_01042

Kadlec, R. P. (1995), "Biological Weapons for Waging Economic Warfare. In: Battlefield of the future: 21stcentury warfare issues", eds, Schneider, B.R. and Grintner, L.E., Department of Defense, Air University, U.S. Department of Defense, pgs.287

Krishnan, A., (2016), "*War as Business: Technological Change and Military Service Contracting',* Routledge.

Kaplan, A. and Haenlein, M., (2020), "Rulers of the World, Unite! The challenges and opportunities of artificial intelligence", *Business Horizons, 63*(1), pp.37-50.

Kelaidis, K., (2020), "What the Great Plague of Athens can teach us now". *The Atlantic, 23.*

Kilbourne, E.D., (2008), "Plagues and Pandemics: Past, Present, and Future." *Global catastrophic risks*, pp.287-307.

Keynes, M, (1975), "*Essays on John Maynard Keynes"*. 1975 ed., Cambridge Univ., Press.

Knight D. (2021), "COVID-19 Pandemic Origins: Bioweapons and the History of Laboratory Leaks". South Med J. Aug;114(8):465-467. doi: 10.14423/SMJ.0000000000001283. PMID: 34345925; PMCID: PMC8300139

Knowles, S., (2014), "Engineering Risk and Disaster: Disaster-STS and the American history of technology". *Engineering Studies, 6*(3), pp.227-248.

Krishnan, A., (2022), "Fifth Generation Warfare, Hybrid Warfare, and Gray Zone Conflict". *Journal of Strategic Security, 15*(4), pp.14-31.

Kurzweil, R., (2005), "The Singularity is Near", In *Ethics and Emerging Technologies* (pp.

393-406)". London: Palgrave Macmillan UK.

Laffont, J.J. and Martimort, D., (2009), "The Theory of Incentives: The Principal-agent Model". In *The theory of incentives*. Princeton university press.

Lehrer, K., (2018), "*Theory of Knowledge"*. Routledge.
Lesthaeghe, R., (1980), "On the Social Control of Human Reproduction". *Population and Development Review*, pp.527-548.

Littman, R.J. and Littman, M.L., (1969), "The Athenian Plague: smallpox". In *Transactions and proceedings of the American Philological Association* (Vol. 100, pp. 261-275). Johns Hopkins University Press, American Philological Association.

Ma, C., Rogers, J.H. and Zhou, S., (2020), "Modern Pandemics: Recession and recovery". *Available at SSRN 3565646*.

Pal, M., Tsegaye, M., Girzaw, F., Bedada, H., Godishala, V. and Kandi, V., (2017), "An Overview on Biological Weapons and Bioterrorism." *American Journal of Biomedical Research*, *5*(2), pp.24-34.

Mahoney, J.G., (2023) "China's Rise as an Advanced Technological Society and the Rise of Digital Orientalism". *Journal of Chinese Political Science*, *28*(1), pp.1-24.

Malone, Robert, W, Dec., (2022), "Lies My Gov't Told me: and the Better Future coming",

Mandel, E., (1989), "Theories of Crisis: An Explanation of the 1974–82 Cycle. In *Capitalist Development and Crisis Theory: Accumulation, Regulation and Spatial Restructuring"* (pp. 30-58), London: Palgrave Macmillan UK.

Marshall E., (1999), "Bioterror Defense Initiatives Inject Shots of Cash", Science 283:1234-1235.

Martinez-Contreras, R.M., Hernandez-Mora, N.C., Vargas-Leguizamon, Y.R. and Borja-Barrera, S.M., (2022), "*PESTEL Analysis and the Porter's Five Forces*: An Integrated Model of Strategic Sectors". In *Handbook of Research on Organizational Sustainability in Turbulent Economies* (pp. 292-314). IGI Global Scientific Publishing.

Mayor, A., (2022), "*Greek Fire, Poison Arrows, and Scorpion Bombs: Unconventional Warfare in the Ancient World"*. Princeton University Press.

McGaghie, W.C., Bordage, G. and Shea, J.A., (2001), "Problem statement, conceptual framework, and research question". *Academic medicine*, *76*(9), pp.923-924.

Mercola, J. and Cummins, R., (2021), 'The Truth About COVID-19: Exposing the Great Reset, Lockdowns, Vaccine Passports, and the New Normal." Chelsea Green Publishing.

Metcalfe N. A (2002), "Short History of Biological Warfare', Med Confl Surviv. 2002 Jul- -

Sep;18(3):27182. doi: 10.1080/13623690208409635. PMID: 12201085

Mihalis K., (2020), "Ten Technologies to Fight Corona Virus" European Parliament Report an In-Depth analysis by the EPRS European Parliamentary Services April 2020 Scientific Foresight Unit (STOA) PE 641.543 https://www.europarl.europa.eu/RegData/etudes/IDAN/2020/641543/EPRS_IDA(2020)641543_EN.pdf accessed 18 Nov., 2022

Miles, D.A., (2017), "A Taxonomy of Research Gaps: Identifying and Defining the Seven Research Gaps". In *Doctoral student workshop: finding research gaps-research methods and strategies, Dallas, Texas* (pp. 1-15).

Migacheva, K., (2018), "Modern Political Warfare: *Current Practices, Possible responses"*.

Mitroff, I.I., (2020), "Corona Virus: A Prime Example of a Wicked Mess". *Technological Forecasting and Social Change, 157*, p.120071.

Monath, T.P, and Gordon L.K, (1998), "Strengthening the Biological Weapons Conventions 'Science 282:1423

Moosa, I.A., (2021), "*The Economics of COVID-19: Implications of the Pandemic for Economic Thought and Public Policy"*. Edward Elgar Publishing.

Moreno, J., (2004), "DARPA on your mind".

Moreno, J.D., (2012), "*Mind wars: Brain Science and the Military in the 21st century"*. Bellevue Literary Press. Book

Morse S., (1998), "Defending Against Biological Warfare Programs of Defense Advance Research Project Agency (DARPA) In Technology and Arms Controls for Weapons of Mass Destruction", published New York Academy of Science USA ed Raymond S.U. pgs 23-28

Nishant R., (2021), "Corona Virus Impact on Online Traffic" adopted from Nishant Renu (DBA) Westcliff University Doctor of Business Administration, Westcliff University, 17877 Von Karman Ave #400, Irvine, CA 92614, USA

Nkirote, G.B. and Murtuzalieva, S., (2021). "*Economics Of Pandemics: A Case for Social*

Innovation and Digital Democracy". Горизонты экономики, (4), pp.104-111.

Oliveira, M., Mason-Buck, G., Ballard, D., Branicki, W. and Amorim, A., (2020) "Biowarfare, Bioterrorism and Biocrime: A Historical Overview on Microbial Harmful Applications". *Forensic science international, 314*, p.110366.

Office of Technology Assessment, (1993), "Proliferation of Weapons of Mass Destruction:

Assessing the Risks", Washington, D.C., U.S. Government Printing Office, pg. 50. Pearson, G.S. (1998). The threat of deliberate diseases in the 21st Century (http://www.brad.ac.uk/acad/sbtwc/other/disease.htm) accessed 18 Nov., 2023

Pareto, V., (1935), "*The Mind and Society",* (Vol. 1). Рипол Классик.

Patton, M. Q. (2002) "Qualitative Research and Evaluation Methods", (3rd ed.), Thousand Oaks, CA: Sage

Pearson, C.M. and Mitroff, I.I., (2019), "From Crisis Prone to Crisis Prepared: A Framework for Crisis Management". In *Risk management* (pp. 185-196). Routledge.

Peffers, K., Rothenberger, M., Tuunanen, T. and Vaezi, R., (2012), "Design Science Research Evaluation.", In *Design Science Research in Information Systems. Advances in Theory and Practice: 7th International Conference, DESRIST 2012, Las Vegas, NV, USA, May 14-15, 2012. Proceedings 7* (pp. 398-410). Springer Berlin Heidelberg.

Perlman, S., (2020), "Another Decade, Another Coronavirus". *New England Journal of Medicine*, *382*(8), pp.760-762. Accessed December 20, 2024 https://www.nejm.org/doi/full/10.1056/NEJMe2001126

Persons, S., (1954), "The Cyclical Theory of History in Eighteenth Century America", *6*(2), pp.147-163 American *Quarterly*.

Petersen, E., Hui, D. S., Perlman, S., and Zumlo, A., (2015) "Middle East Respiratory Syndrome – advancing the public health and research agenda on MERS – lesson from the South Korea outbreak", Int, J. Infect., Dis 36, 54-55., doi 10.1016/j.ijid.2015.06.004

Petrunenko, I., Kozlovskyi, S.E.R.H.I.I., Bolhov, V., Akhnovska, I., Lavrov, R. and Bolgarova, N., (2022), "Civilizational Cycles and Economic Development in the Context of Technological Transitions and Global Pandemics". *Montenegrin Journal of Economics*, *18*(4), pp.191-202.

Preston, R., (1998), "Statement before the Senate Judiciary Subcommittee on technology, terrorism and government information, and the select committee on intelligence on chemical and biological weapons threats to America: are we prepared?" Accessed December 20, 2023 (http://www.senate.gov/~judiciary/preston.htm)

Pintor, I., (2020), "Iconographies of the Pandemic".

Poongodi, M., Malviya, M., Hamdi, M., Rauf, H.T., Kadry, S. and Thinnukool, O., (2021), "The Recent Technologies to Curb the Second-Wave of COVID-19 Pandemic", *Ieee Access*, *9*, pp.97906-97928.

Primrose, D., Chang, R. and Loeppky, R., (2020) "Pandemic Unplugged: COVID-19, Public Health and the Persistence of Neoliberalism". *Journal of Australian Political Economy, The*, (85), pp.17-28.

Puyt, R.W., Lie, F.B. and Wilderom, C.P., (2023), "The Origins of SWOT analysis. *Long range planning", 56*(3), p.102304.

Qureshi, W.A., (2019), "Fourth and Fifth-Generation Warfare: Technology and perceptions". *San Diego Int'l LJ*, *21*, p.187

Redfield Dr. Robert R. *Written Statement of Before the House Select Subcommittee on the Coronavirus Crisis March 8, 2023, data* accessed May, 3, 2023 https://oversight.house.gov/wp-content/uploads/2023/03/2023.03.08-Statement-of-Dr.-Robert-R-Redfield88.pdf

Reed, D.J., (2008), "Beyond the War on Terror: Into the Fifth Generation of War and Conflict". *Studies in Conflict & Terrorism*, *31*(8), pp.684-722.

Riedel, S., (2004), "Biological Warfare and Bioterrorism: A Historical Review". In Baylor University Medical Center Proceedings (Vol. 17, No. 4, pp. 400-406). Taylor & Francis.

Robinson, L., Helmus, T.C., Cohen, R.S., Nader, A., Radin, A., Magnuson, M. and Migacheva, K., (2018), "*Modern Political Warfare'. Current practices and possible responses*.

Roman, D., Hryhorii, K., Vera, D. and Maryna, K., (2017), "Polemological Paradigm of Hybrid War Research". *Философия и космология*, *19*, pp.97-109.

Rosecrance, R., (1987), "Long Cycle Theory and International Relations". *International organization*, *41*(2), pp.283-301.

Rubinić, I., (2020), "Pandemic Paradigm Shift". *Journal of Labor and Society*, *23*(3), pp.383-397.

Sampath, S., Khedr, A., Qamar, S., Tekin, A., Singh, R., Green, R. and Kashyap, R., (2021) "Pandemics Throughout the History". *Cureus*, *13*(9).

Sanger, A., (2007), "Eugenics, Race, and Margaret Sanger Revisited: Reproductive Freedom for all", *Hypatia*, *22*(2), pp.210-217.

Sanger, M., (2022), "*The Pivot of Civilization*." Rowman and Littlefield.

Sarfraz, Z., Sarfraz, A., Iftikar, H.M. and Akhund, R., (2021), "Is COVID-19 Pushing us to the Fifth Industrial Revolution (Society 5.0)?", *Pakistan journal of medical sciences*, *37*(2), p.591.

Schellekens, P., (2024), "*The 50 least vaccinated countries of the world"* Updated April 6, 2024 online article The 50 least vaccinated countries of the world accessed Mar, 3, 2025

Scheitle, C.P. and Corcoran, K.E., (2021), "COVID-19 Skepticism in Relation to Other Forms of Science Skepticism". *Socius*, *7*, p.23780231211049841.

Schneider, B.R. and Grinter, L.E., (1995), "*Battlefield of the Future: 21st century warfare*

issues" (No. 3). eds., Air University Press. Washington, DC:

Schilirò, D., (2021), "Digital transformation, COVID-19, and the future of work".

Schwab, K., and Zahidi, S., (2020), "The Global Competitiveness Report. How countries are performing on the road to recovery". World Economic Forum. (Eds.) 2020

Schwab, K and Mallaret, T., (2020), "The Great Reset"., In World Economic Forum Geneva (Vol.,22).

Schwab, K., (2017), "The Fourth Industrial Revolution". Crown Currency.

Selgelid, M.J., (2016), "Gain-of-Function Research: ethical analysis. *Science and Engineering Ethics*," *22*, pp.923-964.

Sebők, M.,. (2019), "The Politics of Manufactured Crisis". Intersections. 5. 10.17356/ ieejsp. v5i3.522.

Sikkema, R.S., Farag, E.A.B.A., Islam, M., Atta, M., Reusken, C.B.E.M., Al-Hajri, M.M. and Koopmans, M.P.G., (2019), "Global status of Middle East respiratory syndrome coronavirus in dromedary camels: a systematic review". *Epidemiology & Infection*, *147*, p.e84.

Shang, Y., Li, H. and Zhang, R., (2021), "Effects of Pandemic Outbreak on Economies: evidence from business history context". *Frontiers in public health*, *9*, p.632043

Simon, J.L., (1994), "Demographic causes and consequences of the Industrial Revolution". *Journal of European Economic History*, *23*(1), p.141.

Skopec, R. (2020), "Coronavirus Is a Biological Warfare Weapon'. *Clinical Studies & Medical Case Reports*.

Smart, J.K., (1997) "History of Chemical and Biological Warfare: An American perspective". *Medical Aspects of Chemical and Biological Warfare. Washington, DC: Office of the Surgeon General*, pp.9-86.

Smith, A., (1937), "*The Wealth of Nations" Adam Smith [1776]*. Vol. 11937. na,

Smith, S.B., (1987), "Hegel's idea of a Critical Theory". *Political theory*, *15*(1), pp.99-126.

Sookermany, A.M., (2024), "Philosophy of Military Sciences". In *Handbook of military sciences* (pp. 1-23). Cham: Springer International Publishing.

Stadler C., (2023), "Pandemic Winners: The 10 Best Performing US Companies" Forbes.com online (May 4, 2023) accessed November 12, 2024 https://www.forbes.com/sites/christianstadler/2022/01/18/pandemic-winners-the-10-best-performing-us-companies/

Spyrou, M.A., Tukhbatova, R.I., Feldman, M., Drath, J., Kacki, S., de Heredia, J.B., Arnold, S., Sitdikov, A.G., Castex, D., Wahl, J. and Gazimzyanov, I.R., (2016). Historical Y. pestis genomes reveal the European Black Death as the source of ancient and modern plague pandemics. *Cell host & microbe*, *19*(6), pp.874-881.

Stenseth, N.C., Atshabar, B.B., Begon, M., Belmain, S.R., Bertherat, E., Carniel, E., Gage, K.L., Leirs, H. and Rahalison, L., (2008), "Plague: past, present, and future". *PLoS medicine*, *5*(1), p.e3.

Stocker, V., Lehr, W. and Smaragdakis, G., (2023), "COVID-19 and the Internet: Lessons learned. In *Beyond the Pandemic? Exploring the Impact of COVID-19 on Telecommunications and the Internet* (pp. 17-69)". Emerald Publishing Limited.

Surico, P. and Galeotti, A., (2020), "The Economics of a Pandemic: the case of Covid-19", Wheeler *institute for business and development, LBS. London: London business school*, pp.1-93.

Szinicz L. (2005), "History of Chemical and Biological Warfare Agents". Toxicology. Oct 30;214(3):167-81. doi: 10.1016/j.tox.2005.06.011. PMID: 16111798.

Thakur, V., (2021), "Framework for PESTEL Dimensions of Sustainable Healthcare Waste Management: Learnings from COVID-19 outbreak". *Journal of cleaner production*, *287*, p.125562.

The 50 least vaccinate countries of the world, update 2024
The 50 least vaccinated countries of the world (accessed Feb., 25, 2025)

The Chris Cuomo Project & Ex-CDC Chief Dr. Robert Redfield: "Reveals COVID-19 Truths" July 2024 video edition https://www.youtube.com/watch?v=oMlhvnMpRU0&lc=Ugzl-tuJTDZ9y5Sd1Ip4AaABAg accessed March 25, 2025

Toffler, A., (1980), "The Third Wave", Alvin Toffler. *New York: Morrow*, *544*.Book

Toscano, A., (2020), "The State of the Pandemic". *Historical Materialism*, *28*(4), pp.3-23.

Van Bergeijk, P. A. (2021), "*Pandemic Economics"*. Edward Elgar Publishing.

Trochim, W.M. and Donnelly, J.P., (2001), "*Research methods knowledge base"* Atomic

VAERS Vaccines Adverse Event Reporting Systems, accessed 16 May., 2022: (https://vaers.hhs.gov/reportevent.html) dog publishing. (Vol. 2). Cincinnati, OH

Velasco, A., Chang, R. and Céspedes, L.F., (2020), "*The Macroeconomics of a Pandemic: A Minimalist Model* "CEPR Discussion Papers (No. 14777).

Vom Brocke, J., Hevner, A. and Maedche, A., (2020), "Introduction to Design Science Research". *Design science research. Cases*, pp.1-13.

War, Encyclopaedia Britannica https://www.britannica.com/topic/war/Nationalism (accessed Mar.,15, 2025)

Weichselgartner, J. and Pigeon, P., (2015), "The Role of Knowledge in Disaster Risk Reduction". *International Journal of Disaster Risk Science*, *6*, pp.107-116.

Wieland, W. W., (2017), "Responsibility for Strategic Ignorance", Synthese (2017) 194:4477–4497.

Windholz, E.L., (2020), "Governing in a Pandemic: from parliamentary sovereignty to autocratic technocracy". *The Theory and Practice of Legislation*, *8*(1-2), pp.93-113.
Worden, K., Bullough, W.A. and Haywood, J., 2003. *Smart technologies*. World Scientific.

Wohlforth, W.C., (2009), "Unipolarity, status competition, and great power war". *World politics*, *61*(1), pp.28-57.

Worden, K., Bullough, W.A. and Haywood, J., (2003), "*Smart technologies"*. World Scientific.

World Bank, (2021), "Global Outlook", World Health Organization [WHO] (2017a).

Plague. Available online at: https://www.who.int/news-room/fact-sheets/detail/plague (accessed December 18, 2020). Google Scholar - accessed 15 Nov., 2022

World Health Organization [WHO] (2018a). *WHO Target Product Profile for Plague Vaccines.* Available online at: https://www.who.int/blueprint/what/norms-standards/Plague_Vaccine_TPP_Online_Consultation.docx?ua=1 (accessed December 18, 2020). Google Scholar - accessed 15 Nov., 2022

Yin Robert K. (2014), "Case Study Research Design and Methods" , (5th ed.), Sage. 282 pages. Thousand Oaks, CA: The Canadian Journal of Program Evaluation. 30. 10.3138/cjpe.30.1.108.

Zeuthen, F., (2018), "*Problems of Monopoly and Economic Warfare*", Routledge.

Zietz, B.P. and Dunkelberg, H., (2004), "The history of the plague and the research on the causative agent Yersinia pestis", *International journal of hygiene and environmental health*, *207*(2), pp.165-178.

Zhou, P., Yang, X.L., Wang, X.G., Hu, B., Zhang, L., Zhang, W., Si, H.R., Zhu, Y., Li, B., Huang, C.L. and Chen, H.D., (2020). A Pneumonia Outbreak Associated with a New Coronavirus of Probable Bat Origin. *nature*, *579*(7798), pp.270-273

Bristow, W.F., (2007), " *Hegel and the transformation of philosophical critique*:. Oxford University Press.