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Disruption Dynamics Maturity Model: An empirical tool for Business Disruption Diagnosis and Intervention

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Abstract

Numerous models and frameworks addressing digital transformation and business disruption have emerged over the past two decades. Generally, these models and frameworks excel at describing business disruption and even aid in post-facto analysis, as they primarily examine prior popular examples and cases. The Disruption Dynamics Maturity Model (DDMM) proposed here, however, adopts a deeper and more action-oriented approach towards providing diagnosis and outlining possible interventions. The Disruption Dynamics Maturity Model can be empirically applied to business situations to capture emerging scenarios and analyze future possibilities. While a number of authors, researchers from around the world, and major consulting firms such as McKinsey, Deloitte, and Accenture have all attempted to gauge this phenomenon, the challenge lies in the increasingly granularity and widespread factors triggering business disruption. These factors arise from multiple directions, often remaining unidentified in time. This makes it difficult to establish a universal or widely accepted model for diagnosing business disruption. Thus, such a model must be dynamic and evolving, allowing practitioners or managers to track, group, pre-empt, and envision various scenarios, thereby facilitating the deduction of strategic and tactical decisions. Through an integrative literature review, this working paper explores and captures significant dimensions to conceptualize such a model, which can be used as an empirical tool for business disruption diagnosis and intervention. The outcome of this study is the conceptualization of the Disruption Dynamics Maturity Model and the demonstration of its dimensions.

Keywords: Digital Transformation, Digitalization, Disruption Dynamics, Business Disruption Diagnostic tool, Disruption Maturity Model

1. Introduction

Business disruption is progressing at an unprecedented rate, impacting organizations irrespective of their size. These disruptions, frequently significant yet unexpected, often catch organizations off guard. When executives do not address these forces with proactive and decisive action, their organizations might struggle to adapt and face potential failure. The current and future business climate necessitates a reconsideration of leadership strategies, mandating changes to many traditional organizational models and mindsets (Donald, 2018).

Innovative companies disrupt industries of all sizes, and this phenomenon continues to grow rapidly (Warner & Wäger, 2019; Kaplan & Haenlein, 2019).

This working paper proposes a model which can be used as an empirical tool for decision making by enabling Business Disruption Diagnosis and exploring possible Interventions.

2. Problem Identification

A systematic survey of literature reveals that while there are various articles around the theme of business disruption and while several approaches, and frameworks exist, there is clearly a dearth of suitable frameworks that can be used for managerial decision making with ease. Some of the frameworks proposed earlier, although detailed, lack a clear applicability when it comes to translating their analysis into real life business scenarios. This has resonated in the other integrative literature reviews done during the last ten years by other authors as well.

While the impact of digital disruption on companies' ability to survive in the market is growing, there is limited evidence on how technological and organizational factors influence digital disruption (Skog et al., 2018; Fitzgerald et al., 2014).

Although there is research on digital disruption, it predominantly concentrates on the tools inducing this disruption, such as artificial intelligence (Kaplan & Haenlein, 2019; Rothberg & Erickson, 2017), the Internet of Things (Saarikko et al., 2017), and social media (Swani et al., 2017; Kaplan & Haenlein, 2016, 2010).

3. Research Problem

It's not enough to know that a threat is coming. You need to know whether it is coming right for you. (Wessel & Christensen, 2012). While several earlier approaches and frameworks have attempted to capture and address business disruption, a diagnostic approach is rarely employed.

Few empirical studies on digital disruption are found in the business literature. Most research within business disciplines highlights the significance of technology in digital disruption. Moreover, these studies often overlook the interplay between technological and organizational factors in facilitating responses to digital disruption. Digital disruption encompasses not only outperforming competitors efficiently but also transforming entire markets or industries with novel business approaches (Thakur et al., 2023).

Cozzolino et al. (2018) assert that despite the increasing significance of digital transformation and disruptive innovation, the strategy literature still fails to provide a comprehensive understanding of how incumbent organizations adapt their business models post-disruptions. Their examination focuses on: (1) the enablers and barriers to business model adaptation; (2)

how incumbent firms modify their strategies to manage various elements of the disruption process; and (3) ways in which a closed business model can be transformed into an open, platform-based model to leverage external opportunities, reduce costs, and defend against disruptors.

There is a need to envision a model which could capture the possible dimensions of business disruptions allowing the management to pre-empt and track upcoming disruptions in time. This paves the way for the conceptualization of Disruption Dynamics Maturity Model (DDM Model). When applied empirically in the business context to capture emerging scenarios, DDM Model will be like a radar screen aiding the management in capturing the magnitude of the various disruption dynamics and further determining the future course of action.

4. Objective of the Study

The objective of this working paper is to formulate the very first version of Disruption Dynamics Maturity Model (DDMM) by identifying the key dimensions of Business Disruption and envisaging a mechanism to facilitate a visual projection of those dimensions which will eventually serve as a decision-making tool. This will also contribute to the future research in terms of guiding the further explorations in this field which is otherwise very ambiguous.

5. Survey of Literature

The prevailing interest in disruption conceals an unsettled issue: while disruption is assumed to be occurring, its reality remains uncertain. Disruption is infrequently defined and almost never quantified. Additionally, the impact of the hype surrounding disruption is difficult to assess, leaving the degree to which hype influences managerial decisions unclear. This is concerning, as the pervasive "noise level" associated with disruption can foster unhealthy collective thinking and poor business decisions. Thus, a more rigorous approach is needed. To create successful strategies, executives should adopt an evidence-based approach to managing disruption (Wade et al., 2020).

Managers must steer through the escalating complexities of their business environments caused by new technological advancements and digital disruption. It is essential to continually evaluate strategic threats and opportunities to their businesses; however, companies frequently lack the time and resources to create a structured approach for such evaluations (Diekmann et al., 2022).

The majority of research within business disciplines underscores the critical role of technology in digital disruption. Additionally, these studies often neglect to consider the joint influence of technological and organizational factors in facilitating responses to digital disruption. Many studies indicate that the digitization of products and services, along with globalization, are significant predictors of digital disruption (Rick, 2016).

Digital disruption transcends simply outperforming competitors in efficiency; it involves overhauling entire markets or industries with innovative business methods. In a rapidly changing environment where managers face an influx of information from various sources, it becomes crucial to establish decision-making routines to navigate this complex reality effectively (Rauch et al., 2016).

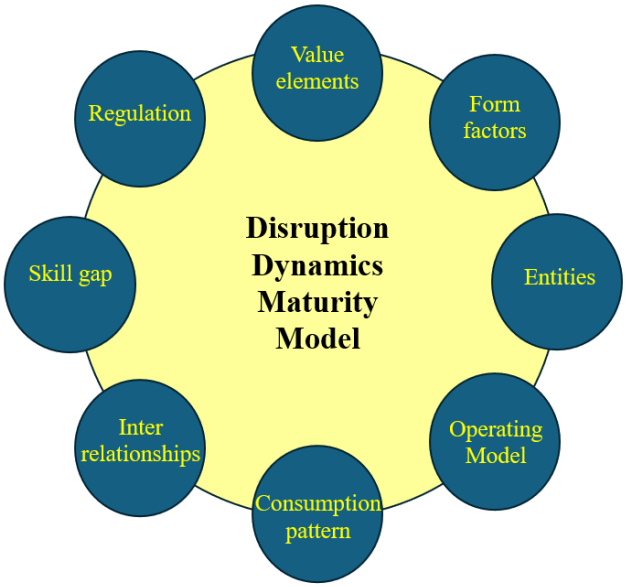
Although the adoption of digital technologies and innovations might occur "bottom-up" within an enterprise, achieving strategic goals such as digital transformation and digital engineering necessitates the coordinated application of multiple technologies and innovations. Consequently, there is a need for research that spans the gap between existing adoption studies, which usually concentrate on individual technologies or innovations, and adoption in the context of digital engineering and digital transformation, which relies on the strategic application of a variety of constantly evolving digital innovations. This form of adoption is termed strategic adoption (Campagna & Bhada, 2024).

Silva and Grützmann (2023) contributed to the research on disruptive innovation and ecosystems by enhancing the understanding of how disruption influences the emergence of new ecosystems. Their study highlights that business models form the value network surrounding disruption and its progression within an ecosystem. They also introduce the concept of evolution within the disruptive ecosystem, illustrating that participants must adapt to environmental changes. This evolutionary process is driven by the obsolescence of existing technologies and business models, while the disruptive ecosystem fosters growth through new technologies and business models, resulting in the formation of a new ecosystem. These insights open up new research directions on disruptive innovations and ecosystems (Silva & Grützmann, 2023).

6. Research Methodology

This study relies on an integrative literature review to organize similar ideas and provide new perspectives on emerging topics. Information for research to explore various dimensions of business disruption has been gathered from different secondary data sources. Various online papers were obtained through reputable and authentic sources such as ProQuest, EBSCO, and Google Scholar. Based on the inputs from this secondary data, the research framework for the Disruption Dynamics Maturity Model was developed, as shown in Figure 1.

Figure 1: Disruption Dynamics Maturity Model



7. Research Framework

Based on the survey of literature, industry illustrations and empirical observations across various verticals, the following dimensions have been identified as the key factors impacting the Dynamics of Business Disruption:

1. Value elements
2. Formfactors
3. Entities
4. Operating Model
5. Consumption pattern
6. Interrelationships
7. Skill gap
8. Regulation

8. Discussion, Analysis and Findings

The Dimensions of Business Disruption within the Disruption Dynamics Maturity Model have been demonstrated through suitable business examples and scenarios. Most of the business scenarios captured here are like phenomena that can very well occur and are seen in other industry contexts as well. Hence, these should not be seen as industry specific isolated instances but events with wider ramifications across the industry.

8.1 Value elements

Value elements: How are the basic aspects of value changing, migrating or getting dislodged? This is the first major aspect which needs to be examined very closely. Changes in the fundamental elements of value can terminate a business model instantly. While various prior studies and earlier researchers have touched upon the concept of business value many times, most of those studies they are looking at a gradual shift in the business value preposition. In reality the pace of this change is growing, causing disruption and needs to be addressed. The case of Garmin navigation provides a radical example of this phenomenon.

Samuel et al. (2020) observed that Garmin's navigation business was the company's cornerstone, contributing 73% to its total sales, amounting to $2.5 billion in 2008. However, the introduction of smartphones equipped with GPS and constant access to digital maps led to a significant decline in the car navigation market. This resulted in the vehicle navigation sector, once their key business segment, shrinking by half from $2.5 billion in 2008 to $1.3 billion in 2013 (Samuel et al., 2020).

Further, Garmin continued investing in the wearables and built upon its core strength to introduce a large number of advanced functions based on GPS technology, and also opened the users' community site "Garmin Connect", generating a good response. Ultimately, instead of suffering losses, Garmin diversified its business by dedicating resources to mission-critical aviation and maritime sectors that demand high-precision location sensing technology. Representative products include satellite navigation devices, fish finders, and marine navigation systems used in small private aircraft and ships, which now hold over 80 percent market share and generate stable profits.

Hence focusing on the elements of value to repackage, rejuvenate or renew lines of business is critical especially when the older value element gets suddenly dislodged, migrated or absorbed by altogether separate market spaces.

From the point of Disruption Dynamics Maturity Model (DDM Model), one must actively scan for such avenues or phenomena that can potentially cause this shift, dislodging the value elements.

8.2 Formfactors

Formfactors: Emergence of new technology formfactors, components or devices changing the way industry operates. A new profound wave of 'Tech resurgence' is impacting almost every industry vertical. Roads have become Smart-Roads, clothes have become Smart-Clothes and even classrooms are now Smart-Classrooms. Sensor based network on the roads provide real-time traffic information in a city and can be used to operate the traffic system autonomously. The patterns and external parameters power the analytics which can be used to take more impactful decision regarding the town planning, traffic, tolls etc.

For the perspective of Formfactors, one significant case is of Kinsa, a San Francisco based company. Maheshwari (2018) observed that Clorox entered into a licensing agreement with Kinsa, a tech start-up that sells advanced internet-connected thermometers, which stand in stark contrast to traditional mercury and glass models. These thermometers synchronize with a smartphone app, enabling consumers to monitor their fevers and symptoms, making them particularly appealing to parents of young children. The data provided by Kinsa identified ZIP codes across the country with rising fever rates. Clorox then targeted more advertisements to those specific areas, assuming that households there might be interested in products like its disinfecting wipes. According to Kinsa, its thermometers are present in over 500,000 American households, and it has promoted the benefits of its "illness data."

Chamberlain et al., (2020) demonstrated that Distributed networks of smart thermometers track COVID-19 transmission epicenters in real-time.

From generating commercial value from illness data to identifying long-term health patterns, and from providing early warning signals for chronic diseases to aiding medical research, thermometers as we knew them have changed forever.

Thakur et al. (2023) demonstrated that the convergence of technologies is a significant predictor of digital disruption. Their study indicates that businesses capable of integrating and digitalizing multiple technologies into a more sophisticated device are more likely to experience substantial changes to the value propositions of their existing goods and services due to emerging digital technologies. For instance, Amazon's Alexa, a voice-activated personal assistant, succeeds largely because it combines functionalities such as music playback, online shopping, and video streaming through Amazon's Fire TV. Other notable examples of companies leveraging technology convergence to disrupt the market include Google Home and Microsoft Cortana. The examples and evidence presented in the study underpin the proposed relationship between technology convergence and digital disruption.

The business leaders must continuously scan for such new formfactors and emerging technology concepts to preempt how their convergence might lead to creation of new products, solutions and offerings changing the industry completely. The entire range of emerging

technologies under the umbrella of Industry 4.0 (such as IoT, AR, VR, AI, Blockchain etc.) provide a huge vista of opportunities of digital transformation and at the same time fuel business disruptions as well.

8.3 Entities

Entities: This dimension is characterized by the entry of unrelated or even unrecognized entities on the periphery of the industry, who, in no time take the center stage. It involves newer or 'different looking' firms entering the industry changing the competition and stakeholder mix. While some new stakeholders might come onboard with heavy tech paraphernalia, and some might be completely virtual, such as mobile-apps and platforms, they all ultimately impact the balance of power on the industry. Also, the industry incumbents today have to watch out for various 'digital natives' emerging around their core offering or value preposition.

This dimension can be illustrated by considering the eclectic example of TopGolf. TopGolf began with a straightforward idea to reimagine the traditional "joyless mud fields" of golf by using microchip technology to introduce new dimensions to the game. The company's inaugural facility, Topgolf Watford, launched in 2000 northwest of central London. Topgolf set itself apart from conventional driving ranges by offering covered bays, multiple screens, patios, and cafés, alongside innovative golf accuracy challenges reliant on technology-based scoring, and a comprehensive entertainment model. By early 2020, Topgolf had grown to 56 facilities worldwide, including 52 in the United States, and had diversified into new media and entertainment ventures. What began as a departure from the standard golf course model had evolved into a global sports entertainment entity with a reach of 100 million and strategic alliances with the PGA and LPGA tours (Foster & van der Wal, 2020).

8.4 Operating model

Operating Model: This dimension includes unforeseen Business model changes at strategic or tactical levels. Sometimes this leads to novel efficiency gains and newer ways of squeezing out the inefficiencies which also precipitate noticeable changes in the revenue model and profit.

This dimension also modulates the value chain possibly by defragmentation where smaller portions of the established value elements are lifted out and taken over or absorbed by external or new entities. This can have major implications for the future of the industry. A suitable example here would be American Well, which has created an entirely new operating model in the healthcare sector. This model addresses a peculiar pain point of this industry by balancing the real-time excess demand and real-time excess supply of healthcare services.

Ofek (2014) showcased the innovative case of healthcare IT provider American Well, whose Online Care technology enables physicians to offer real-time care to patients via online platforms. With American Well's system, patients with non-urgent health issues can communicate with physicians online or by phone, obtaining advice or even a diagnosis without needing to visit a physician's office. This technology reduces the costs of care delivery, generates new revenue streams for healthcare providers, and enhances the overall efficiency and convenience of healthcare services. The platform offers advantages to insurers, providers, employers, and patients by addressing the economic challenges of time and location, effectively matching the excess supply of physician availability with the excess demand for patient care.

8.5 Consumption pattern

Consumption pattern: A gradual and unnoticeable, or sudden and unexplainable shift in the consumption pattern is also a leading dimension of business disruption.

While one can again consider the Garmin navigation example discussed above, some tangible products illustrate this phenomenon more conspicuously, such as fax machines or mobile pagers. These products were commercial successes at their peak, and then, suddenly, they were no longer needed. The consumption pattern simply shifted away.

More popular examples include the old saga of Blockbuster and Netflix, and the classic case of Encyclopedia Britannica and Kodak as well. These companies suffered big time due to the Consumption pattern dimension.

In recent years, the emergence of pure-play digital banking channels, peer-to-peer money landing platforms and FinTech is a good indicator of what the future beholds for the banking industry. Banks are increasingly reevaluating and consolidating their branch-based operations in wake of this shift in the consumption pattern.

Another prominent consumption pattern shift was seen in the rapid rise of mobile money platform M-Pesa and the rise of decentralized banking. Schachter (2019) identifies several key factors behind the success of M-Pesa: the erosion of public trust in traditional institutions, the collaboration between public, private, and nonprofit sectors, the initial regulatory vacuum that fostered innovation, and extensive consumer testing to achieve optimal product-market fit.

The key point here is that this shift can happen due to either technological, environmental or organizational factors. In essence, Customers are always looking for superior experience coupled with convenience and cost efficiency.

8.6 Interrelationships

Interrelationships: This dimension entails creation of new relationships with old stakeholders or realignment of relationships between various stakeholders. It could also impact the ownership patterns and possibly shift the balance of power, usually in the favor of the customer.

Consider the autonomous car, Tesla, as an example. It boasts several promising features like swarm intelligence, summoning, and an associated mobile app. Combined, these features transform the entire user relationship with the company. This innovation can potentially turn a conventional means of transportation into a new model of "driver-as-a-service," or a capable personal assistant, and can even enable the car to earn income for the owner during its free time.

The company has crafted an intriguing multipronged approach to fundamentally transform the industry. Its core strategy includes unique elements at each ecosystem level: redefining the core product architecture, placing itself strategically in crucial bottleneck components, and addressing system-level constraints that impede the technology's adoption (Rotman & Nersessian, 2020).

Such changes are impacting even the industrial or heavy engineering sectors alike where the emerging tech like IoT is creating new models and changing the interrelationships between the industrial giants, their vendors, OEMs, channel partners, subject experts, etc.

8.7 Skill gap

Skill gap: Another indicator of Business Disruption is sudden loss of skill set within an industry or conversely mounting pressure to upgrade from the usual skills. One such case is seen in the field of surgery where conventional surgeons who were always reliant on the dexterity of their hands are now asked to go for robotic remote surgeries. They are compelled to learn to operate robotic arms for performing surgeries. Apart from the skill upgradation, what is the impact on the business model? A surgeon who was to offer his services within a limited geography can now virtually enter and operate in any operation theater across the globe. This new skill can change the dynamics of this industry forever.

Gatlin (2024) noted that Intuitive Surgical, a leader in the robotic surgery market, is expected to maintain its dominance despite increasing competition, according to a report by UBS analyst Danielle Antalffy. A survey of surgeons in the US suggests that the number of Intuitive Surgical's da Vinci robotic surgery systems installed in hospitals will continue to grow in the long term. The company recently announced strong fourth-quarter sales, beating expectations. Intuitive Surgical expects procedure volume to grow this year, and its stock has performed well, with a high rating for its 12-month performance.

8.8 Regulation

Regulation: Surge of new regulations. Business Disruption today is also characterized by an indirect indicator – surge of regulations in the industry ecosystem. This could be because of the changes in the overarching legal and regulatory frameworks of a country or sometimes new industry specific regulations.

The ongoing battle of survival between the Television (TV) channels and OTT platforms highlights this point effectively. TV channels have historically operated under government oversight while the OTT platforms went scot-free. OTT platforms have eaten a considerable share of the TV Channels market in the last decade. The regulatory landscape is now changing, and it would be interesting to see how Television (TV) channels and OTT platforms continue to coexist into the next decade.

The advent of cryptocurrency also illustrates this point suitably. While cryptocurrencies came with a big promise, the response has been mixed. In some countries, governments are readily recognizing and regulating them, while others are quite restrictive. Regulatory regimes can both catalyze and impede disruption.

Governments are finding it difficult to create regulations around new emerging technologies and business models. For example, the emergence of drones has suddenly necessitated modifications to aviation industry regulations. Just imagine a school kid operating a hundred-dollar drone falling under the purview of the same aviation regulators who oversee a hundred-million-dollar aircraft.

Similarly, the field of surgery will be witnessing a range of new regulations just because the surgeons are able to operate remotely using the robotic-remote surgery. While a sudden surge of regulations can disrupt the existing industry environment, it can also create new opportunities.

9. Use of Disruption Dynamics Maturity Model (DDMM) for diagnosis

In order to use the DDM Model for diagnosis, it is recommended that all the eight dimensions of Disruption Dynamics Maturity Model are evaluated empirically by the management team and ranked across five levels: very low, low, medium, high and very high.

As with other empirical models, the best way to execute this is through a focused group discussion compiling observations and views from all participants (business managers). Once all the eight dimensions are marked and sufficient reasons are identified, this is the first step towards understanding the nature of disruption coming in. This requires discussion, due diligence with proper labels or items marked on the DDMM chart illustrated below.

Convergence of digital technology allows companies to do more with underused assets or to find opportunities that others do not notice (Moeller & Hodson, 2017). Hence, once this empirical analysis is done after scanning through various internal and external factors, the next step is to explore the possible strategic and tactical options in view of the high and low values assigned.

According to Zemsky (2019), executives should leverage digital technology in their leadership activities to become disruptors. It is important to note that each of those eight dimensions can possibly lead to several strategic choices ranging from augmenting the product portfolio to spinning out separate lines of businesses, collaborations or operating in new geographies etc.

The management team is required to identify what is causing each of the Disruption Dynamics dimensions to change and whether the pace is noticeable. This leads to a realization about the present state of the industry revels the maturity of each dimension. Then the next step is to identify the dimensions that are to be addressed. This prioritization is essential in the diagnosis. Once the team arrives at a commonly agreed view of the Disruption Dynamics Maturity Model populated through the consensus then they explore possibilities and evaluate various interventions required to tackle impact caused by the maturity of a specific dimension.

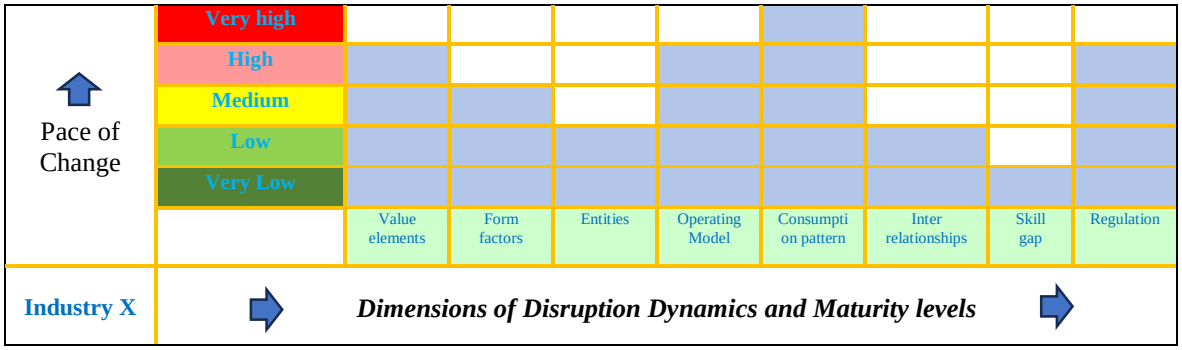
The maturity of any of those eight dimensions is not necessarily the highest attainable level on the grid but it is the point where that dimension stabilizes or is stable of a period of time making it addressable by the management.

However, it is important to understand that the recourse chosen, or the options evaluated need not arise from the same dimension. For example, it is possible to address a regulatory change through changes in the formfactors or it is possible to address a shift in the consumption patterns through realignment of interrelationships and so on.

Companies that adopt bold strategies in the face of industry digitization improve their odds of coming out winners. (Bughin & Zeebroeck, 2017)

A typical use of the DDM Model has been illustrated through a hypothetical scenario in Figure 2 below. Rightly mentioned by the Australian Institute of Company Directors (Mor, 2014), curiosity about customer behavior is essential to surviving digital disruption.

Figure 2: Disruption Dynamics Maturity Model Illustrated through a hypothetical scenario



Although some CEOs may acknowledge that companies like Uber and Airbnb are transforming the business landscape, many continue to adopt a wait-and-see approach, opting to respond only when a direct threat to their own business becomes evident. However, in the context of digital disruption, waiting until the threat is apparent is frequently too late. Such a delayed response does not provide enough time to mitigate the impact on their business (Hill, 2017).

Remember that DDM Model postulated here also enables the management to pre-empt the possible indicators under each of those dimensions, so one must start early and run business scenarios through the DDM model on a regular basis.

10. Conclusion

As illustrated above, the Disruption Dynamics Maturity Model (DDM) can be utilized with relative ease to diagnose the onset of business disruption and pave the way for possible interventions. This model assists organizations in gathering diverse views, observations, and insights in a structured manner, thus streamlining the decision-making process. It also promotes collaboration among various teams, fostering a deeper understanding of disruptive dimensions and enabling them to explore strategic paths forward. Given the ever-changing global business landscape, the DDM Model should be used periodically to create a visual representation of impending disruptions.

11. Limitations and Scope of Future Research

Business Disruption is a highly agile and dynamic phenomena. Our survey of literature has revealed that the broad, ambiguous and high-level nature of this field has prevented researchers from coming forward with any conclusive framework. While such plurality of approaches and frameworks has supported further exploration but at the same time it has stirred continuous ongoing discussions leaving the business managers wondering what it the best way forward. Hence the DDM Model is an attempt to serve as a stepping-stone towards addressing this significant challenge of Business Disruption.

The DDM Model itself is dynamic and more dimensions of Business Disruption might emerge in the future. As more and more scenarios would be evaluated using this model empirically, it is likely to reveal various pertinent triggers causing the dimensions of Disruption Dynamics to change and impacting their maturity levels. This revelation will further aid in understanding the interplay between various dimensions and in the diagnosis and interventions towards addressing the complexities of Business Disruption.

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