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Chapter 8: Organizational agility through data-driven strategic and operational planning

8.1. Introduction

The hyper-complexity of the new post-COVID-19 Era and its consequences call for a revolution in the way organizations operate, making it vital that they be “agile” and “data-driven” in their strategic and operational planning in order to respond to new scenarios and act instantly according to unpredictable changes in their environment. The new imperatives and the lack of preparation that leaders seem to display in the post-COVID-19 era, questioning the quality and relevance of society's complex systems for value creation that organizations represent, make it essential that they assume the commitment to operationalize organizational agility - establishing it as a need for survival and flourishing in an uncertain, volatile, and fast-changing environment. For this reason, they need to transpose organizational agility from the realm of rhetoric to the practical operations of the organization, making it tangible from a structural-infrastructural, methodological, cultural-behavioral, and technical perspective (McAfee et al., 2012; Chen et al., 2015; Mikalef et al., 2019). This chapter focuses on the process of conducting re-framing through design thinking and how to link the opportunities generated and captured through design thinking to the organizational data universe. Based on that input, the goal is to implement in an integrated manner the data-driven constructs through which the organization transforms its strategy and operations at a dual level, to generate and capture value. The resulting snapshot is the basis for developing strategic-type documents within the framework of data strategy and aligning operational business plans with data-driven projects. These documents and plans have the dual purpose of defining the organization’s vertical and horizontal levels, and its ability to operate at the desired level with predictable results, in an alignment process between strategic and operational planning (Tallon & Short, 2014; Teece et al., 2016).

8.1.1. Overview of the Study

The ongoing Fourth Industrial Revolution has compelled humanity to adapt to incessant rapid shifts in technology, social structures, and global economies. These changes demand individuals and organizations to restlessly recalibrate their ways of thinking, being, and doing. The organizations that thrive are those that do not shy away from experimenting with their processes, products or services, strategies, business models, corporate purpose, or even cultures. Agility has become the prerogative for organizations to survive and thrive in this landscape. Emerging research proposes adopting a heuristic approach to strategy, based on experimentation, learning, and transformational change, as a panacea for developing organizational agility. However, these research streams afford little granular detail to these recommendations. Data-driven strategic and operational planning can fulfill this knowledge gap.

This paper explores the concept and explains the principles, significance, aspects, and processes of data-driven strategic and operational planning, thereby establishing it as a practicable solution for organizations to invoke to develop the organizational agility required to survive and thrive in an evolving landscape of discontinuous change. Explaining data-driven strategic and operational planning and accentuating its significance to organizations necessitates establishing the significance of the parent themes: data-driven planning, organizational agility, and strategic and operational planning; hence, the first three sections of this paper. Inductively presenting the details of data-driven strategic and operational planning facilitates the organization of its contents. The penultimate section presents an evaluation scheme to assess the quality of current practices to encourage experimentation on, and transformational change of, the process-based knowledge-based capabilities on the improvement of which depends on the effectiveness and efficiency of data-driven strategic and operational planning. The closure summarizes the presented content and proposes an agenda for future research.

8.2. Understanding Organizational Agility

Agility has become a pervasive concept within organizations, yet, with the presence of many disciplines that use the term, it can take different definitions and meanings. The term organizational agility came out for the first time in the early 1990s, and since then, the concept has become widely recognized in the area of changing marketplaces driven by globalization and the implementation of new technologies. In short, organizations considered as agile can quickly adapt to the market demands, while also responding to the changes either from the environment or from within the company. Distinguishing from flexibility, which is associated with a gradual change – usually, an increase in something and is often the result of a lengthy planning process and many forecasting

efforts, the change introduced by agility is fast and radically modifies the current state of the company.

In that sense, agility can be understood as the organization's capacity to continually identify new opportunities or to take advantage of the changes in the competitive landscape and respond to them promptly and cost-effectively. The capability to make timely and fast decisions involves speed mechanisms. These mechanisms are generally inter-organizational and need to operate as a seamless system that promotes the effectiveness of the whole. Thus, the development of organizational agility should foster not only speed but also the capability of operating more effectively and efficiently as a whole through its collaborative relationships, which can be dynamic and project-based with partners, suppliers, or customers.

More explicitly, agility can be defined as the process capability of an organization to rapidly adjust its overall configuration, as well as its resource deployment, by effectively integrating its key internal functions – particularly, product development and supply chain – as well as linking them to the key functions of its business network members, to improvements in the offering and the delivery of that offering to strategic customers. In this view, the effort of developing agility should aim at maximizing both speed and effectiveness through the creation of a systemically agile context.

Fig 8 . 1 : Organizational Agility

8.2.1. Definition and Importance

In pursuit of a concise yet coherent discussion of the topic "Organizational Agility through Data-Driven Strategic and Operational Planning", we first present a framework for understanding organizational agility—its definition and importance, as well as its key characteristics. We then explore the conditions needed for organizations to build and increase their agility, connecting it with two crucial dimensions of organizational design: strategy and operations. Following this discussion, we present the building blocks needed for organizations to programmatically undertake data-driven strategic and operational planning that helps them leverage the power of their unique data. We present a framework and discuss related implications.

Organizational agility is increasingly becoming a buzzword in business strategy and is often used to describe the management of organizations in turbulent environments. Organizational agility is the ability to sense, seize, and respond to opportunities and threats in a timely way. Agile organizations can adjust faster and more effectively than their competitors can. An agile organization constantly aligns and realigns its strategic direction, resource configuration, and capabilities with the current business environment and anticipated future environment. Decisions about strategy, operations, structure, processes, culture, and relationships with stakeholders are then implemented quickly, accurately, efficiently, and, where necessary, quickly reversed or adjusted.

8.2.2. Key Characteristics of Agile Organizations

The burgeoning literature and popular rhetoric on the topic of "organizational agility" feature many definitions of agile organizations populated with various organizational attributes. Writers have enumerated many characteristics of agile organizations, ranging from what may be merely the implementation of practices or technologies that have shown some correlation with organizational agility to truly fundamental features. Characteristic lists vary greatly in length and detail, with some writers suggesting merely three or four characteristics, and others suggesting distinct clusters of attributes in a map or model of agile features themselves.

Despite this variation and superficiality among most characteristic schemes, it would still be unwise to allow agility discussions to devolve back into the mere identification of practices. Research has long shown that most organizational characteristics are interdependent. Some act as moderators of other artifacts. More importantly, generic artifacts do not reflect the deeper concerns and hidden challenges of organizations struggling with organizational change and transformation or truly systems-focused efforts in reshaping organizations. Thus, a more complete articulation of the themes associated with specific attributes of agile organizations should assist our understanding

of these ingrained deep assumptions and values. Such a refined understanding should, in turn, assist both practitioners and researchers alike in their struggles with agility. This focus on a multimodel approach to the attributes of agile organizations does not imply.

8.3. The Role of Data in Strategic Planning

In organizational management and strategic planning, a multitude of participants, actors, agents, groups, stakeholders, and power centers are implicated: owners, managers and employees, unions, customers, suppliers, alliance partners, the local community, shareholders, and investors. They all have an interest in the company's success and performance, and some of these groups may even engage in corporate activities. However, because participants vary in size, focus, viewpoint, and power, they generate a broad spectrum of different interests for managers regarding the development and execution of an organization's strategic plan. The necessary input and information for the steps of formulating a company's mission, internal and external analysis, decision-making, and implementation are affected by these varied stakeholders, especially customers, employees, and shareholders. Furthermore, larger organizations are complex and change over time; they comprise multiple business units, functional departments, and geographic locations with associated interests, making information gathering and analysis increasingly difficult.

Strategic plans involve what the company intends to do and how aiming for a set of organizational goals in a resource-efficient way and alignment with internal and external considerations. Therefore, a quality interface must exist between the developed plan and its input, for it to remain realistic. This includes the consideration of opportunities, threats, trends, and uncertainties, and their associated probabilities. Particularly in a dynamic, competitive, and shifting environment, being able to integrate appropriate real-time data is crucial; current trends may otherwise go unnoticed and alternative options overlooked. Notably, increased digitization and the emergence of the Behavior Revolution for data collection and analysis through customer and employee engagement allow for new opportunities for managers; they can work with near-real-time data monitoring to create informed proactive responses. Also, advances in artificial intelligence allow for a new level of data mining, deep learning, and information processing and analysis, even to the extent of automating the decision-making process.

8.3.1. Data Collection Methods

Various methods can be employed to collect data for strategic and operational planning. These data collection methods, ranging from qualitative to quantitative, can be grouped into four main categories: survey and observation; interview; archival research; and

experiment. Different combinations of these methods can further enhance data collection. When using these data collection methods, however, ethical issues may arise, particularly with respect to privacy and confidentiality.

The most common and frequently used data collection methods are survey and observational methods. Surveys offer a relatively convenient way to ask research participants several relevant questions about their beliefs, attitudes, preferences, and opinions. The survey may be administered in paper-and-pencil or electronic format, and either in-person, by telephone, by mail or e-mail, or through the internet. Questions may be either close-ended or open-ended.

Observations can also be used to collect data for research. This specific method allows the researchers to use their powers of observation to answer questions of interest. For many variables of interest, such as customer preferences, whether in a retail store, factory, or office, observers are quite capable of collecting data with considerable accuracy. Before implementing observational surveys, however, researchers should consider the advantages and disadvantages of this technique. Observers are limited by the focus of their observations. If they are focused on product characteristics, they cannot also conduct the research from a service-oriented perspective. Observational surveys are also impractical for data collection efforts requiring lengthy exposition, and they can only measure behaviors that lend themselves to being observed.

8.3.2. Data Analysis Techniques

Combinations of quantitative and qualitative data provide a rich basis for data analysis. Quantitative research often informs the analysis. It is especially useful in comparing potentially long lists of priorities, needs, or concerns. Such lists could include the target areas defined by stakeholders for either investment or, conversely, performance improvement or limit adversely affecting effects; trends for populations or demographic groups for either good or ill; existing systems, services, or products with thresholds for either cost or some measure of effectiveness; the nature or distribution of impacts for legislative or policy issues; or the factors considered important by customers or citizens justifying costs. Qualitative research often provides the context that enables effective action to be taken from the quantitative data.

Integrating importance and performance data, for instance, helps to provide focus in deciding what areas to challenge. Additional qualitative data allows finer-tuned actions to be developed. Importance-performance analysis is an easy-to-understand, intuitive technique. It is useful for both services and business structures. The basic concept is that the data are matrixed. On one axis, one lists the "importance" of a dimension, product, service, or other variable as defined in qualitative research. On the other axis is the

"satisfaction" or performance for that variable from a survey. The two matrices are related, traditionally using demographic information and/or customer segment information.

Quality also has an essential role in determining the costs of services. Avoiding decline will have its cost, as will any action intended to be proactive. If denial is recognized, with the bottom line as a priority, trying to moderate the detrimental effects is a valid strategy, but may not represent a path to excellence.

8.3.3. Integrating Data into Strategic Frameworks

The importance of data goes beyond assisting in the development of the strategic framework. It can also be integrated into key strategic framework models or complemented by data tools that integrate data more directly or unwrap strategic framework layers allowing for deeper investigation and dynamic update of frameworks over time. In integrated models, the strategic framework becomes not only a guideline that utilizes data on occasion but also an integrated whole, where the framework is responsive to the data and the data flow from the framework. Data tools serving as layers or guidelines complement the framework model by formulating hypotheses that experts can analyze and assess using the stepwise process of validation.

The model of strategy as practice relates how strategy is grounded in social practices that ultimately determine performance and may serve as an example of this relationship in terms of adaptation but is not data-driven. Some strategic frameworks provide predictive analytics techniques that can be applied to historical financial data to facilitate the determination of financial objectives. These are of more help in strategic planning showing when expected changes are predicted rather than how predictions of data would be utilized to manage the business. A method provides a way that can be used to validate the occurrence and impact of a set of factors during the analysis phase of financial and non-financial data but it does not use data to assist pinpointing of the actual forces involved. Statistical tools can also be utilized to assess, over time, the relevance of the factors and relationships of contextual models.

8.4. Operational Planning in Agile Organizations

Operational Planning is the translation of goals into specific actions that will direct the formulation and execution of decisions. It focuses on the day-to-day work, developing plans, budgets, and schedules, predicting revenues and costs, and determining what is needed for the operation such as resources, communication, and support systems. For the agile organization, it is not only about resources, but also about ‘capabilities’,

including sufficient variability in resources to adapt to changing demand and, importantly, learning capabilities that allow the organization to innovate and adapt quickly as needed. Operational planning is so clear, so structured, so predictable, and so well understood, that it is second nature to every employee. The greatest danger is when it is also so focused on efficiency and consistency that, when faced with uncertainty and non-routine events, operational decision-makers are paralyzed or conditioned to ignore the event to their peril and to the peril of the organization.

Operational planning is focused on the short term, which means that, more often than not, those who are responsible for executing the plans are separated from the identification monitoring, and course correction of the strategic direction. It is imperative that operational plans affirm rather than contradict the strategic focus. The way that operations are structured and planned, including the considerations of balancing efficiency and effectiveness, also influences the eventual implementation of strategic decisions. Developing flexibility and the ability to anticipate change is not only an issue for corporate strategy; it is also an operations strategy issue. The capability to respond quickly and efficiently to changing market conditions and competing demands is a key source of competitive advantage. The question of sufficient capability in the day-to-day operation to anticipate and support future product and service demands must be addressed at the operational level.

8.4.1. Aligning Operations with Strategic Goals

Operational planning is the second level of organizational planning, coming after strategic planning. Organizational strategy, in turn, is the establishment of key goals that will significantly influence the organization's objectives and future. In business organizations, the main goal is typically profit maximization, where achieving cost leadership or differentiation of products can be a means to that end. Decision-making about strategic goals generally rests with higher-level management. However, it is interesting to note that many successful organizations hire high-level experts and managers at considerable cost. The expected value of their knowledge and expertise is maximized when they are allowed to influence not only the operational but also the strategic goals of the organization, consisting of the sector segmentation strategy and the set of operational goals that need to be achieved in the short to medium term to successfully implement the planned strategic goals. As such, directors and executive officers should remain flexible in allowing those managers to suggest modifications to the original goals and/or level of ambition continuingly.

Operational goals can be divided into organizational performance targets and organizational process targets. Decision-making about set operational targets typically rests with middle-level management in conjunction with higher management. However,

target-setting influence flows in both directions, and lower levels can influence top-level target-setters in both setting specific target levels and levels of ambition continuingly. The main interest of middle management is that the performing functions of the processes considered are subject to realistic and practical limitations on the capabilities of organizations to grow and that the performance targets established are consistent, related, and coherent so that they do not create internal tension.

8.4.2. Flexible Operational Models

To support the dynamic nature of an organization's strategy, we propose and employ operational models that evolve at the tactical design and planning levels depending on the final strategic objective and level of data accuracy available in a timely fashion to support decision-making. Consequently, these operational models will take concrete forms - operational plans, schedules, and budgets, among others - defined and implemented within the organization and its business units at the operational level. Our flexible operational models are grounded on the principles of data-driven cyclic operational planning, supported with appropriate simulation methods, enabling shorter planning cycles and more frequent adjustments for day-to-day operations, mostly at the tactical level. These short-term operational models, associated with a mile-, quarterly-, or semester-based operational cycle, help operational managers to set short-term tactical objectives for the operational functions specified within the broad strategic functional goals for the organization, working through the tactical and operational levels of the organization.

Support for a structured and periodic tactical management control function is also provided through the use of monthly operational activity reports, based as much as possible on data generated directly from the organization's internal systems, to be reviewed and discussed at the operational level. The short planning cycles then make it necessary for the organization to be flexible in operations and activities to be aligned with fluid organizational and strategic directions. It is, therefore, crucial for organizations nowadays to design and implement appropriate operational procedures, provide support to organizations and systems, and set the appropriate direction and value to encourage the necessary degree of flexibility to be achieved and exercised.

8.4.3. Monitoring and Adjusting Operations

Despite the challenges involved in accurately anticipating every operational step for the months or quarters to come, a better understanding of the second level in the dual-layer operational view can transform execution into an extremely flexible process capable of overcoming obstacles and taking advantage of opportunities. Even limited agility at this

level is helpful; if basic expectations are exceeded, teams would be motivated to redirect their efforts toward places where additional value is needed, even if added activities have not been included in the operational plans. This flexibility transforms operational plans into a live-world plan, allowing operations to be monitored and managed in a way that takes strategy into account. The operational plan and the strategic plan become integrated and reinforce each other over time. The re-evaluation of operations to maintain organizational responsiveness requires awareness of and, ideally, an early warning system for all operational areas, enabling constant feedback from the operational level to strategic planning and re-planning. This calls for simple, clear, and focused objectives, a wide delegation of decision-making, and ongoing channels of communication – monitoring routines but also rewards for those staffers who contribute to alerting decision-makers to situations needing reassessment. Investing in executive information systems or efforts to include operational staffers in constant planning and feedback functions becomes beneficial. Getting and keeping operational activities in phase with strategic goals essentially depends on the motivation and the capacity of teams to assess changing internal and external situations and adjust their specific operational deliverables. Therefore, all planning must aim at the teams' strengths: providing additional value with their products and services. The considerations applying to strategic patterns are equally important at this operational level.

8.5. Data-Driven Decision Making

"We should be too big to take ourselves but too small to hold on."

Data-Driven Decision Making (CDM) is key to successful strategic and operational initiatives for an organization. While many organizations claim to be data-driven in their decisions it is difficult to effectively and efficiently implement DDDM. This chapter discusses concepts, frameworks, and tools that organizations can use to facilitate more data-driven decision making thereby increasing organizational agility.

The speed and success of business decisions of an organization are greatly influenced by how data is analyzed, interpreted, and translated into meaningful information supporting the decision. Data science and analytics lead to significant return on investments as the data-driven insights inform and drive decision making, by increasing revenues, reducing costs, enhancing customer experiences, optimizing business processes, and creating new products, services, and business models. For a growing number of organizations, machine learning, and artificial intelligence are further driving automation of analyses and decision support, on an ongoing basis.

For these reasons, the analytics function of an organization is no longer merely a support function; it plays a core strategic role and a mission-critical capability delivering results

across the entire enterprise. Further, the group of analytics users is no longer confined to data scientists but now includes a much broader coalition of empowered and enabled citizen data scientists in business units throughout the organization. In general, organizations going data-driven can expect a 5-10% improvement across their major KPIs with well-executed analytics initiatives.

8.5.1. The Importance of Analytics

Data-driven decision-making is about making decisions based on facts, data, and analytics, rather than intuition or personal experience alone. Using data to aid decision-making has numerous benefits, but few people know how data can aid or replace completely "old-fashioned" decision-making processes. How have some organizations been able to achieve these remarkable results? In today's competition-driven economy, organizations cannot afford to continue relying on heuristic methods of decision-making – no matter how strongly organizational leaders believe in them. Organizations need to move to an analytical approach to decision-making.

The majority of organizations – from the largest multinational corporations to the smallest startups – collect immense amounts of data every day. Until very recently, most groups were unable to make smart use of their data. Without a formalized process to collect and analyze the data for implications, organizations could only look at the information in a historical context. It was only useful as a means to examine what happened previously, not to shed light on what was likely to happen in the future. Now, technology is at long last catching up with the promise of the Internet – particularly in terms of cloud computing – allowing companies to take advantage of their data like never before. Today, data from customer interactions, operations, and market dynamics can guide almost every aspect of business strategy and execution, from initiating and planning to steering monitoring, and controlling. Organizations are able to conduct predictive analysis based on data-driven models, resulting in forecasts that are vastly improved over the forecasts developed with previous methods. As a result, companies are achieving impressive results by replacing old-fashioned forecasting methods with more inquiry-based analytics.

8.5.2. Tools for Data-Driven Decision Making

To navigate the varied areas of specialization and unique challenges present in every organization, professionals have been developing and applying tools to help with data-driven decision-making. Data visualizations, dashboards, and key performance indicators are frequently employed to give busy leaders a way to monitor the enterprise from many different perspectives in an efficient manner. Predictive modeling, scenario

analysis, and optimization can reveal the choices that will deliver the best-expected outcome or with the least risk. Artificial intelligence and machine learning can automatically adjust the models to reinforce learning from recent events as patterns of behavior change. However, selecting the right mixture of these tools and ensuring they are effectively utilized by decision-makers varies with the nature of the task at hand and the level of the organization involved. In addition, while rules of thumb are useful, they can only go so far when it comes to these dynamic and diverse data environments.

In addition to knowledge of analytical capabilities, decision-makers require context that goes beyond the historical performance of particular metrics or measures. Key stakeholders intimately aware of the tasks, responsibilities, and potential pitfalls associated with the decisions at hand are the true experts when it comes to clarifying expectations. Armed with this knowledge, the analysts can engage with the data in a more diverse manner using a variety of methods. This will help the analyst separate noise from noteworthy indicators and potential drivers of the organization's performance. For informed forecasts or projections to be effective, both qualitative and quantitative inputs need to be actively considered and reconciled.

8.5.3. Case Studies of Successful Implementation

While data-driven decision-making may be talked about by most organizations, implementing an agile data-driven decision-making framework is not in the collective development agenda. Instead, select firms have made data-driven decision-making implementations successfully. The data-driven decision-making initiatives at one company are cases in point. These initiatives are presented from this viewpoint.

One of the pioneers in utilizing services technology to deliver client solutions, this company sets out to redesign its processes to address the growing set of investor expectations in the investment industry without the corresponding raising of costs. To maximize stakeholder financial value, the new processes are devised to minimize costs, maximize revenues, and mitigate risks. These desired outcomes are possible only by increasing the utilization of available data. Yet the company completes the annuity process just once per year, supporting it with physical and paper-intensive processes and systems, all with multiple data stores. All of these processes are non-data-driven. Out of the teams that represent the operating departments servicing the annuity process, one says it only sees or uses an investor's data once a year.

Data-driven decision-making is part of the model redesign. Now initiatives are identified to gather data toward predictive models that would change how the firm would have viewed an investor's data daily. Deploying a solution supporting a sophisticated data warehouse and a set of predictive models, the company now detects early signs of

investor behavior that might have required action so that it can either take action or let its clients take action. Automated daily alerts trigger appropriate operational actions. As a result, at a much lower cost, the design of the firm's investment operations is able to increase revenues from increased sales through improved asset flows as well as reduce costs by lessening bad asset flows and mitigating risks through smarter investments—a classic triple bottom line.

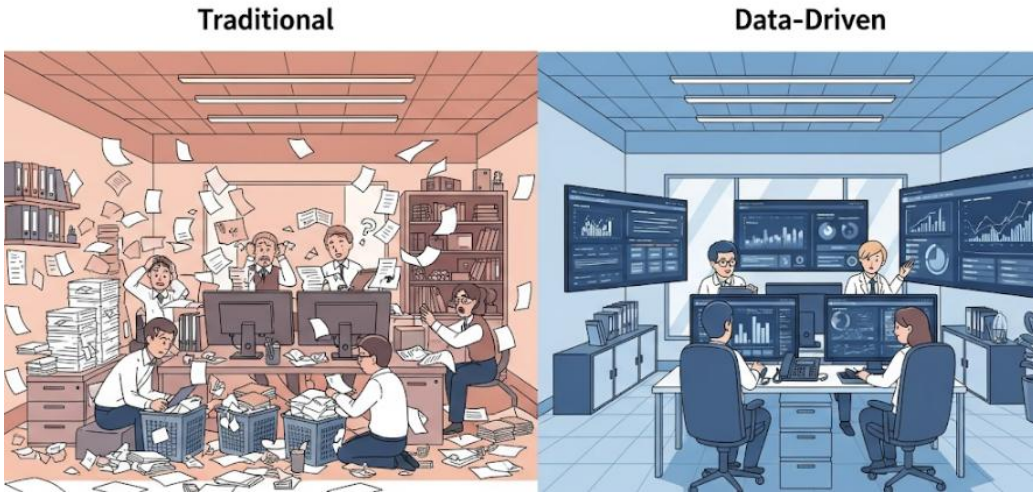

Fig 8 . 2 : Building a Smarter Business

8.6. Challenges in Implementing Data-Driven Approaches

While the potential benefits of data-driven approaches for organizational agility are substantial, the actual implementation of these approaches is often fraught with challenges. Central to these challenges are issues related to the quality and integrity of the data that organizations collect, store, and analyze, the cultural resistance to change and skepticism that many organizations have toward the use of data in their daily operations, and the technological barriers that organizations face in terms of the infrastructural changes required to reap the potential benefits of data-driven agility. Therefore, organizations seeking to create data-driven approaches for strategy and operations need to take these challenges into consideration and develop strategies for each. The following sections examine each of these challenges in greater detail.

Data Quality and Integrity

One of the main challenges associated with using data to drive decisions, forge strategies, and direct operations is the question of data quality and integrity. Organizations are often faced with issues related to how accurate, complete, and timely their data are. Poor data

quality can lead organizations to make biased predictions and incorrect conclusions from their analysis of data, ultimately leading to ineffective strategies and actions. Poor data quality has been deemed the single biggest obstacle to fully realizing data-driven agility. Some of the more prevalent measures of data quality include accuracy, completeness, consistency, timeliness, believability, and accessibility. Organizations seeking to build data-driven approaches for strategy and operations, therefore, need to develop strategies to ensure that their data are of high quality and integrity, able to cultivate the trust of their leaders and employees in data, and use data sensibly to enhance performance.

8.6.1. Data Quality and Integrity

The quality and integrity of the data are the foundation of data-driven decision-making. However, organizations often struggle with making the right data available, at the right time, in a usable form, and of sufficient quality. Ensuring the representativeness, completeness, consistency, timeliness, accuracy, and usability of the data to support the decisions made in strategic and operational planning is a costly and complex challenge for organizations. The full potential of AI-assisted decision-making cannot be utilized unless the quality of the underlying data is ensured.

Several requirements that the data needs to fulfill in order to ensure its quality are identified. Data representativeness ensures that the data provides a reliable estimate of the criteria used within. Data integrity assesses all forms of data restrictions and corrections. Consistency helps ensure that data from different sources are consistent with each other. Timeliness ensures that the data is up to date to fulfill real-time criteria required by the scenarios of certain manufacturing systems. Accuracy calculation ensures that the data is correct and precise. Finally, the usability of the data allows the development of data sets that could be utilized by the majority of AI and machine learning algorithms. In a traditional data-driven setup, the monitoring of data quality is a manual process carried out on an ad hoc basis and limited to a few selected subsets of the data. Typically, no user-friendly GUI is provided. As a result, verifying the quality of large-scale data sets is time-consuming and tedious work, often leading to decreased productivity.

8.6.2. Cultural Resistance to Change

Organizational change is often resisted by people even in the best of circumstances. Top management must recognize the likelihood of resistance when attempting to implement a significant change in the way the organization functions. Before 1999, all products were made from scratch. During a time of declining sales, the top management decided to implement a formula for success that would allow the organization not to compromise

its quality while attempting to improve customer service. The new formula involved making certain food items ahead of time and then passing them through a warming oven when ordered by the customer, but still was a labor-intensive process with branding attached to quality and flavor.

Resistance occurred both from employees at all levels as well as franchisees. Employees were unsure whether the pass-through method would affect the quality of the food or were worried about the effect that the process would have on sales volume, and the amount of work would be involved in passing the food through the warming oven over and over. The franchisees were concerned that customers would feel that the food was only warm and not freshly prepared. The corporate structure had to spend an enormous amount of time and energy overcoming resistance to the formula from the employees at all levels, including corporate employees as well as the franchisees. Employees had to be re-oriented to believe that the pass-through method would enhance food quality without sacrificing the "secret recipe."

8.6.3. Technological Barriers

Numerous technologies are available today to help embed analytics into enterprise processes. There are no longer significant technological obstacles to gathering and processing relevant data or building advanced analytics functions. Enterprises can simply add digital capability to business processes, embedding analytics into workflows to provide insight into what is happening at any moment. In the past decade, access to huge datasets, increasing amounts of enterprise data, big data processing frameworks, and customizable cloud-enabling applications, together with declining costs of using these technologies, have accelerated innovation. Companies have effectively invested in a team of outside developers to create the next digital must-have, from on-demand taxis to e-commerce, social networking, and mobile platforms. These digital newcomers have little need for internal IT functions. They use technology in a radically different way, transforming not only personal habits but corporate expectations as well.

These specialized organizations have pioneered new models for how data powers decision-making. They rely on a highly analytical, fact-driven business strategy focused on creating competitive advantage through better, more timely decisions. Most mature companies cannot rely on a handful of expert data scientists unlocked from mainstream activities to gain widespread analytics adoption. A data-driven decision-making culture has to be developed, and training and organizational accord are critical. In order to innovate and win in these volatile markets, enterprises of all sizes need to review their strategic goals and the decisions that drive them to take advantage of emerging advanced data science techniques. In other words, the enterprise must, by design, root itself in a

strategy of data-driven continuous innovation that has the goal of meeting the needs of changing customer bases at speed and scale better than competitors.

8.7. Best Practices for Enhancing Agility

Organizations across industries are striving to become more agile to navigate the complexities and uncertainties of today's operating environments. At the intersection of high-level strategy and corresponding organizational design lie two factors driving agility: the engaged people who make it happen and the overarching mindset influencing how things are done. Data is essential to translating high-level strategy into clarity on responsibilities, enablers, and accountabilities. Robust metrics, dashboards, and linked rewards make everything more tangible and integrated. This section describes some of the best practices for enhancing agility through the use of data.

Developing a Data-Driven Culture

Building a data-driven culture starts with people empowered to make decisions based on real-time data and insights rather than intuition. Decision-making should be decentralized, but also anchored to budget, strategy, and company purpose. Cultural change takes time, but the digital tools developed in the age of big data allow for continuous tracking of performance on metrics that matter. Metrics are defined at the company, business unit, function, and level of individuals and are linked to accountabilities and rewards. Management's ability to track progress in real-time, sending cues to the deploying party of who is excelling and who is lagging, creates a rhythm that reinforces the culture. Over time, the internalization of what great looks like, and aspirations are developed by linking metrics and historical performance to strategy. What is not measured is not pursued. Scores created by employees and published internally allow the encouragement of healthy internal competition.

Continuous Learning and Adaptation

A simpler, more flexible strategy development process enables speedier adaptation of the strategy based on changing conditions. Semi-annual or quarterly strategy refreshes help the organization review results and reallocate investments as strategic assumptions change. Creating cross-functional teams that tackle themed insight projects drives the testing and refinement of specific theories. This combination of semi-annual refreshes and themed projects along with quarterly financial and performance reviews ensures continued internal alignment on strategy while allowing the movement of resources across segments, businesses, product lines, and geography when needed. It fosters accountability through timely reviews, yet flexibility by testing themes with fast teams.

8.7.1. Developing a Data-Driven Culture

Creating a data-driven planning process requires a change in mindset — both for management and employees. Risk-aware decision-making can be transformed into data-driven routine practice. A clear plan, yet flexible enough to absorb changes, will return greater results throughout the plan's life. Stronger collaboration sustained with comprehensive and vetted feedback across all hierarchical levels enables a constantly evolving overview of progress toward the strategic intents. The choices for pivoting rely on the evaluation of real-time data and subsequent insights, incurring a minimal drop in productivity.

Management should recognize that the data-driven culture requires time to settle, becoming a daily routine. Continuous, if not daily, focus on the employee and the processes fulfill the purpose of the new strategy. Building a momentum based on trust leads to a protective environment where adequate guidance can be expected, and brings sustained evaluation of the strategy performance. The performance of top leaders in creating a climate of high psychological safety encourages open discussion of failures, shared acknowledgment, and collective learning. Middle managers participate in developing a data-driven office culture by performing the obvious in their teams with an adjustment period until the data-enhanced working practice is established and reliable enough to use in decision-making.

8.7.2. Continuous Learning and Adaptation

Various best practices that have been adopted may ultimately lead to achieving an agile organization. These practices are by no means conclusive. They can be further refined, augmented, or customized to the organizational context. Continuous learning helps organizations to evolve by introducing or assimilating new practices to work smarter, better, and ultimately, together. Organizations should therefore develop mechanisms that promote, capture, quantify, and manage lessons learned, experiences gained, and knowledge acquired. Engaging and involving employees in a collaborative process of continuous improvement helps develop teamwork and team cohesion, which is fundamental for agility. Moreover, while vertical coordination in organizations is crucial to ensure alignment with customer needs, external environmental factors, and strategic objectives, informal types of coordination through personal communication and social networks may facilitate more coordination for speed. Facilitating networks or communities of practice, across and along organizational boundaries, that provide social and intellectual support, and foster creative and innovative ways of doing work. The constant evolution of customer needs, business environments, and company personnel will necessitate the need for organizations to adapt or improve their ways of working from time to time at different levels. Business challenges today cannot be solved in the

vacuum of functional teams. While a primary goal should be to develop expertise, specialization, and efficiency in key functional roles and disciplines, business challenges today require breaking down functional silos with cross-functional teams working towards common objectives. In conclusion, promoting a dynamic interplay between explorative and exploitative learning is central to achieving organizational ambidexterity and agility.

8.7.3. Engaging Stakeholders in the Process

The essence of ensuring agility is ensuring collaboration among stakeholders of the organization. From a data perspective, this means having a 360-degree view of your customer, internally through the various functions as well as externally with partners in the supply ecosystem. Goals, objectives, plans, and policies should ideally be developed with the participation of individuals up and down the organizational hierarchy. Organizations with flexible environments often derive great benefits from involving their employees more directly and less formally in the process of creating plans and budgets. These managers will play a vital role in supporting those plans, budgets, and stakeholder buy-in processes. The methods used to conduct the time frame become especially important in participative planning. The latter is more effective when it is a two-way communication in both directions, from the top down and bottom up, rather than just a downward discussion directed by senior management. Firmly established and regularly used participative planning methods improve cohesion and communication between different hierarchical levels.

Also important in the planning process is the involvement of other stakeholders who help ensure achieving organizational strategic objectives: suppliers, brokers, and dealers should be incorporated into the planning process. Stakeholders can make an important contribution to a company's product and market knowledge, especially in the area of seasonal and long-term cycles, and may even have their plans. Contacting and discussing relevant matters with major external stakeholders assists with the achievement of both external and internal cohesion. Group meetings are popular discussion forums for suppliers to express their opinions, especially about technical documentation and whether necessary raw materials will be available at critical times.

8.8. Future Trends in Organizational Agility

The emergent phenomenon of digital transformation raises questions about the degree of relevance of the concept of organizational agility at the dawn of the second quarter of the 21st century. This is notably marked by an all-encompassing mutation of the business environment. Also taking place is a diffusion of tools and production processes

conditioned by the speed of technological progress. Thus, together with the expected evolution of digital ecosystems, emerges enterprise automation, digitization, and algorithmization of decision-making, deploying even more rapidly, via cloud computing and the Internet of Things, adaptive and collaborative corporative networks. This is creating a new circular model of value creation, from a business point of view, moving away from the linear scenario that historically prevailed from the time of the Industrial Revolution and that accelerated impetus from the second half of the last century onwards.

In summary, these phenomena raise three major issues. First, what is the role played by emerging technologies in facilitating enterprise adaptation to discontinuities in the conducts and needs of the stakeholders and, in particular, of the customers? Second, what is the role of Artificial Intelligence, and, in particular, of its various branches, such as machine learning, in the quest for new predictive models that allow corporations to develop anticipatory, rather than not only reactive, capabilities concerning the returns of their stakeholders? Is, thirdly, the impossibility of accessing predictive models of major structural and/or cyclical disturbances derived from the increasingly chaotic business environment not only a limiting factor for the development of organizational agility? From these issues arise the questions that we now unravel.

8.8.1. Emerging Technologies and Their Impact

The rapid growth of emerging technologies is having a huge impact on the nature of organizations and their overall success. We could classify the rising importance and influence of emerging technologies into a few key groups: The first group is culture and management inhibiting factors that many organizations still cite as the largest roadblocks to gaining the benefits they crave from digitization; the cultural mismatch with technology, a technology ill temperament of management, resource allocation mismatches, ideation and product road mapping inadequacies, and portfolio management oversight failures are all part of corporate life. The second group is the help that can be provided in the area of the digital group creation using emerging technologies to smooth the transition. Organizations have explored the creation of digital groups to ease the transition to the new world and shield the transition process from the inertia of the existing corporate structure. These groups can explore the use of new technologies and show the way for the rest of the organization. The third group is the set of technological platforms that have been created or rapidly evolved as part of the transition to the new world. New infrastructures are allowing faster and cheaper experimentation and exploration into the use of emerging technologies; cloud computing and application ecosystems, all form the underpinnings of newer leaner infrastructures with higher utilization levels and better cost structures.

Emerging technologies lower the bar for the exploration of new concepts and for turning ideas into rapid prototypes. The reduction in costs to build and deploy digital capabilities, thanks to cloud computing, combined with the sheer number of companies producing point solutions via the SaaS framework, is allowing organizations of all sizes to rapidly experiment with these sets of enabling technologies. Various aspects of AI and advanced analytics, automation processes, the Internet of things, augmented and virtual reality, artificial and natural intelligent agents, digital ecosystems and marketplaces, and new devices and interfaces, are just some of the enabling technologies that are easier and quicker to experiment with, but also to adopt and integrate.

8.8.2. The Role of Artificial Intelligence

Organizations are facing difficulties in formulating and implementing appropriate plans and are, therefore, looking for new technologies that can help them make insightful decisions at every stage of the realization of their strategic and operational plans. These organizations would like to redesign their present systems with a proper infusion of technology in order to make them more insightful and productive. Such redesigning would also serve an important purpose for these organizations. It would help them provide their stakeholders in becoming knowledgeable. The stage of strategic and operational planning is of utmost importance for any organization. The model provides phases, which are essential for any strategic and operational planning; demand forecast, enjoy, assess, create, build, deliver, and improve, and emphasizes that for getting the desired results on a long-term basis at a specified time frame functional heads should join hands and convert their part plans into consolidated plan by being supportive to each other. Hence, stakeholders at all phases need relevant data, which is needed to be planned, to enable analysis using relevant data tools and provide insights.

We believe that Artificial Intelligence Technology together with Data warehousing and Data mining tools enables the corporate data-knowledge system, which is required by executives of organizations faced with important decisions. It has enabled these organizations to be analytical, insightful, and productive by applying Data Warehouse-Data Mining Technology throughout the phases of making long-term strategic and operational plans. This technology in fact serves the stakeholders well at the phase stage of organizational planning by which the stakeholders become by and large knowledge-based stakeholders, which would help the top management subsequently in the evaluation and implementation of the plans.

8.8.3. Predictive Analytics in Strategic Planning

Predictive analytics focuses on identifying patterns in historical data and using them to make predictions about future events. As this area advances, it will contribute to creating a data-driven culture within the organization. In strategic planning, predictive analytics is incorporated into decision-making through a feedback loop process, which identifies existing problems and poses targeted questions that relate to the vision and goals of the organization. In so doing, the decision cycle is shortened and the assessment of alternatives is data-driven and includes changes in key indicators. This assessment will be closer to "what will happen" than "what would have happened". With a shorter decision-making cycle, the more accurate the predicted behavior, the more dynamic and effective the change of organizational strategy and tactical objectives in achieving this strategy.

Strategic planning should be constantly revised, validated, and adjusted. Predictive analytics will help the organization move towards a continuous adjustment of its planning priorities, dynamics, and needs. With predictive models being run more frequently and updated with new data, it becomes more likely that decision-makers will be comfortable relying on the results of the models. Although the models will not be perfectly accurate, they may provide incremental improvement over a decision-maker's judgment or ad hoc analysis and thereby offer value via recency, speed, and efficiency. Companies may continuously run models for burning issues or opportunities and present the insights via dashboards, alerts, and forecasts. Improved predictive accuracy may also allow companies to perform scenarios in support of this strategic planning. For example, by integrating predictive models with optimization and simulation tools and checking these results against company rules and policies.

8.9. Conclusion

This essay argues that all organizations face the challenge of directing their available resources toward achieving the most important priorities or objectives for the organization and that three effective work systems fulfill this need: an annual operating planning and budgeting system, a management system for continually improving strategic objective achievement during the current year, and a strategy development, consolidation, and prioritization system. The vast majority of organizations rely heavily upon only the first system, which is essentially focused on resource allocation. This singular reliance typically results in slow reactions to unanticipated environmental changes during the year, plus or minus actual achievement of annual financial budgeted targets as a result of these year-long resource allocation decisions. The difficulty of integrating the support from human and financial resources to achieve long-term

strategic objectives is the greatest barrier to achieving strategic alignment, strategic fitness, or the ability to execute effectively and adapt to change.

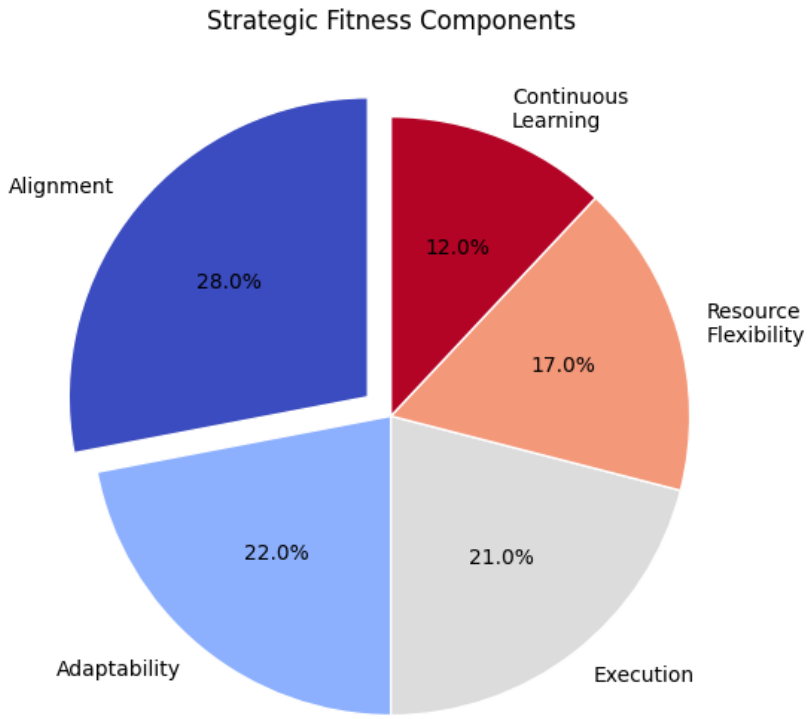

Fig 8 . 3 : Strategic Fitness Components

It has also been shown that reliance upon only a single-performing "balance" strategic map, a single-performing set of strategic objectives, or even a single-performing year-long financial forecast inhibits agility, the "agile" capability to respond quickly and effectively to unanticipated environmental changes with strategic and operational actions, utilizing available resources. This essay describes a data-driven set of dynamic year-long forecasts of measures across the four perspectives of the Balanced Scorecard that can be utilized in an organization's operational and strategic planning and budgeting systems to readily reveal the needed focus pivot areas that any organization can utilize to direct and align its available resources. This capability enables the delivery of planning activities that can be updated with whatever regularity is necessary, cascading a robust plan that is alive and continually being worked at all levels of the organization.

8.9.1. Summary of Key Insights and Implications

This book supports organizations in enhancing their strategic and operational planning processes by embracing a data-driven decision-making approach underpinned by data

science and its core technologies and tools. Conclusively, this book argues that by adopting such an organizational agility-driven approach, organizations can emerge from the dark shadow of strategic planning that has so often, and inaccurately, been equated with the process of organizational stagnation. Rather, strategy can become the basis for dynamic decision-making – through organizational agility – that stimulates better exploration of products, both existing and new, services, both existing and new, markets, both existing and new, and working models, both existing and new. Consequently, organizations become better positioned to balance taking advantage of existing business capabilities with the need to be able to learn and adapt continuously in an increasingly unpredictable world. As a result, better business outcomes are generated that result in the realization of both business objectives and shareholder interests.

Decades have been devoted to the study of strategy and strategizing. Yet increasing complexities, uncertainties, and rapid changes in business environments are amplifying pressure on organizations to not only formulate strategic plans for the future but also dynamically modify and adapt these plans as circumstantial factors change. Unfortunately, traditional strategic planning approaches typically associated with the work of strategy tend to lead organizations in the opposite direction by implementing processes that both tacitly and explicitly require adherence to a set plan.

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