

Veliyath, Rajaram

## Article

# Does a feedforward orientation provide competitive advantages under disruptive conditions? A review of control literature with an illustrative case

Administrative Sciences

## Provided in Cooperation with:

MDPI – Multidisciplinary Digital Publishing Institute, Basel

*Suggested Citation:* Veliyath, Rajaram (2025) : Does a feedforward orientation provide competitive advantages under disruptive conditions? A review of control literature with an illustrative case, Administrative Sciences, ISSN 2076-3387, MDPI, Basel, Vol. 15, Iss. 1, pp. 1-19, <https://doi.org/10.3390/admsci15010013>

This Version is available at:

<https://hdl.handle.net/10419/321158>

## Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

## Terms of use:

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



<https://creativecommons.org/licenses/by/4.0/>

## Article

# Does a Feedforward Orientation Provide Competitive Advantages Under Disruptive Conditions? A Review of Control Literature with an Illustrative Case

Rajaram Veliyath 

Leven School of Management, Coles College of Business, Kennesaw State University, Kennesaw, GA 30144, USA; rveliyat@kennesaw.edu

**Abstract:** This paper identifies the salient features of feedforward control and the advantages that it provides vis-à-vis feedback control. These advantages are especially salient in strategic control situations and also during periods of environmental turbulence and extreme strategic discontinuity. Consciously adopting a feedforward orientation in organizational strategic management processes could enhance an organization's competitive advantages and potentially lead to sustainable, superior performance. Additionally, broadening the conceptual definition of feedforward (from its cybernetic origins) to also include strategic foresight might also enable organizations to develop dynamic capabilities. The example of Zara, a leader in 'fast-fashion' retailing, is presented as an example of how feedforward attributes can be identified, inculcated, and ingrained/retained as organizational attributes that become a part of an organization's DNA. Moreover, when severe external environmental disruptions inevitably erode an organization's resource bases and pose an existential threat to the organization's survival, such a feedforward orientation could be the catalyst for coping, adapting, and developing new dynamic capabilities. These new capabilities can not only help organizations to counter newly emergent threats and survive, but also help them to dynamically cultivate and develop newer sources of competitive advantages.

**Keywords:** feedforward orientation; strategic control; competitive advantages; dynamic capabilities



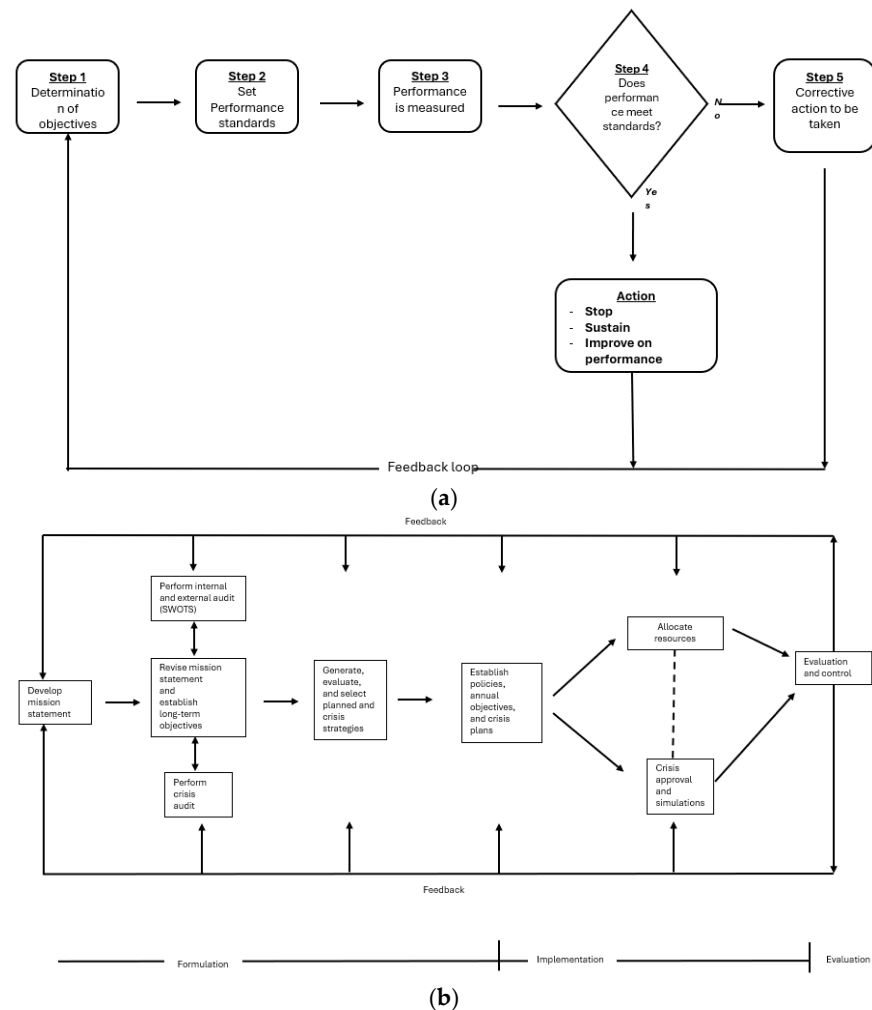
Received: 11 September 2024  
Revised: 12 December 2024  
Accepted: 25 December 2024  
Published: 30 December 2024

**Citation:** Veliyath, R. (2025). Does a Feedforward Orientation Provide Competitive Advantages Under Disruptive Conditions? A Review of Control Literature with an Illustrative Case. *Administrative Sciences*, 15(1), 13. <https://doi.org/10.3390/admsci15010013>

**Copyright:** © 2024 by the author. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

## 1. Introduction

Classical feedforward control incorporates a set of ex-ante actions that are undertaken before the completion of the feedback control process. These feedforward actions are better able to help an organization to deal with uncertainty (Faanes & Skogestad, 2004; Glassey-Previdoli et al., 2018). This becomes especially critical when control failures arising from delays in taking corrective actions and time lags in control processes are costly and debilitating. In contrast, feedback enables learning from mistakes, the taking of corrective actions, and the remediation and improvement of performance. These sequential steps are integral to ensuring organizational stability and for improving operational efficiency. This baseline control activity conducted at multiple levels and spread across functions is critical for all organizations, especially for those that are operating in stable industry conditions where they encounter little uncertainty and turbulence. Schematic representations of the model(s) for feedback control are shown in Figure 1a,b below.



**Figure 1.** (a) Feedback model of control; (b) feedback control-oriented strategic management process (adapted from Preble, 1997).

As is evident from Figure 1a, the steps involved in the feedback control process are the determination of objectives, the setting of standards, the measurement of performance (once the process is complete), the determination of whether the performance has met the standards (a decision node), and the taking of corrective action. If the performance has met standards, no further action is required. Conversely, if the performance outcome has not met standards, corrective action is initiated in terms of either reevaluating the objectives or through fine-tuning and adjusting the process.

Figure 1b, which applies this feedback model to a typical organization's strategic management process, illustrates that the setting and/or modification of the organizational mission and goals/objectives is the initial step. These organizational 'ends' are determined based on inputs received from a variety of identifiable sources, including the feedback obtained in the prior strategic planning cycle, as well as fresh inputs received when changes are detected from outside monitoring and scanning. The long-term mission and objectives are crystallized into shorter term operational goals. Overarching objectives are broken down into sub-goals for different parts of the organization, the statements of future intent were given more substantive content and became more concrete at the operating level.

Once these objectives (i.e., 'ends') are determined, strategies (i.e., 'means') are formulated that enable these objectives to be accomplished. These strategies are disaggregated and enunciated at both the operational (viz., action plans for different businesses/sub-units) and tactical (as applied to functions) organizational levels. The action and tactical plans

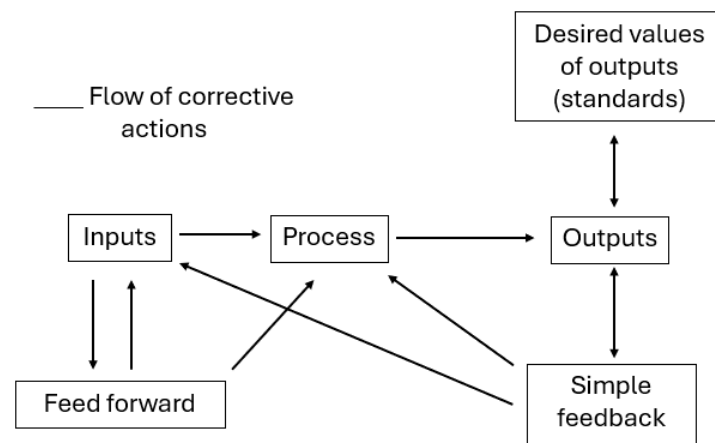
also identify the resources required for strategy implementation. Strategy implementation results in outcomes (i.e., organizational performance) that might meet, exceed, or fall below expectations. The deviations in performance provide feedback and trigger corrective actions which are undertaken to reduce the observed variations. Corrective steps might also involve modifying the process parameters (i.e., ends and means).

The limitations of the feedback control process, which is built on cybernetic closed-loop assumptions (shown in Figure 1a,b), are readily apparent when applied to strategic management. Firstly, a certain time lag (i.e., the projected duration of the planning business cycle) elapses before the feedback is obtained. In the meantime, radical changes could occur in the external (as well as internal) organizational environment(s) that might necessitate more urgent (immediate) corrective action. However, the design limitations underlying feedback control locks-in the process. Therefore, corrective action lags and is not undertaken immediately. This delay presents an organization with more uncertainty and escalating threats. Slack resources that are accumulated and conserved to serve other organizational needs might then be diverted to provide (temporary) solutions to these urgent emergent problems. Because of the time lag in its responses, an organization's competitive advantages (especially those that are ephemeral, such as goodwill and brand identity) erode or are neutralized. Finally, corrective action, when it is eventually undertaken, might occur too late to ward off organizational failure. This vicious cycle of events is especially detrimental under conditions of rapid change, industry volatility, enhanced environmental uncertainty, greater unpredictability in the behaviors of competitors, and strategic discontinuities (Camillus, 2016; Camillus et al., 2021). Because of its limitations, feedback control by itself is insufficient to enable timely adaptation and responses. Persistently lagged responses to external contingencies render an organization unable to cope with the demands placed on it, unable to satisfy the claims of its critical external stakeholders, and unable to combat the threats arising from other disruptive forces. All these externalities could result in a loss of competitive advantages, thereby creating dissatisfaction among key stakeholders, diminishing the organization's standing in the market and causing reputational loss and, inevitably, organizational decline. A singular reliance on feedback control approaches reduces organizational effectiveness. Therefore, what techniques of strategic planning and management control need to be developed and employed for addressing 'wicked problems' (Camillus, 2016) that arise in times of strategic disruptions?

One potential alternative that has been suggested to deal with 'wicked problems' is to create a feedforward framework for strategic management (Camillus, 2016, p. 15). This change can be initiated by introducing an overlay of feedforward control on top of feedback control. In comparison to feedback, feedforward control processes in their essence incorporate the following additional features (Faanes & Skogestad, 2004, p. 32):

- They use process inputs to reduce the effect of disturbances and improve set point tracking.
- Feedforward control is based on an open-loop assumption. The measurement of the disturbance and response triggers are independent of the control process. Thus, it is better equipped to deal with novel wicked problems in industries that are being disrupted and with competition that is arising from unexpected sources (Camillus, 2016, p. 8)
- The introduction of feedforward control does not affect the stability of the basic control system.
- The effect of the disturbance is identified and measured earlier in the process. This introduces an element of early detection that is critical for dealing with wicked problems.

A simple model of the feedforward control process (superimposed on feedback) is shown in Figure 2.



Comparison of Simple Feedback and Feed Forward systems

Figure 2. Feedforward control (overlayed on feedback).

In terms of salient differences from feedback control, feedforward (i.e., ex-ante control) relies on undertaking anticipatory action based on a continuous tracking of future trends and emergent strategic issues, the sensing of weak or unclear stimuli, and taking immediate corrective action to reduce uncertainty. However, we conceptually extend the scope of feedforward control (from its original cybernetic origins) to include both *strategic foresight* (Adegbile et al., 2017; Iden et al., 2017; Paliokaite et al., 2014) and *strategic issue management* (Ansoff, 1975, 1980). Strategic foresight is an embedded organizational capability that enables organizations to cope with the future (Paliokaite et al., 2014). Further, it enables the observance of and capture of factors that might induce future strategic changes in an organization (Iden et al., 2017). Therefore, strategic foresight also includes topics like strategic issue management (Ansoff, 1975, 1980) that have previously been discussed in the strategic management literature. Adopting this expanded definition of feedforward control enables us to more appropriately suggest it as a panacea for dealing with the wicked problems that organizations face during times of strategic disruption. Therefore, in addition to improving organizations' abilities to envision and shape the future, such feedforward approaches also help organizations to respond in real time to potential threats or disruptions that might negatively impact them. Additionally, this anticipatory orientation also enables organizations to provide greater value to and increase the satisfaction of key stakeholder groups (especially end customers). This enhances their competitive advantages, fortifies their industry positions, and ensures their survival. Feedforward control cannot entirely replace the traditional feedback control processes, which are imperative for improving efficiency and for ensuring operational stability. Nevertheless, it can supplement feedback control and enable organizations to become more anticipatory, adaptive, and responsive, thereby providing greater satisfaction to key stakeholder groups and ultimately becoming a source of competitive advantage (as we will demonstrate later).

Feedforward models modify inputs (viz., ends, objectives, goals), modify processes (viz., tweak cause–effect relationships), and can occur during or even before the basic feedback control cycle is completed. These anticipatory interventions are initiated by sensing and reacting to weak and fuzzy signals (Ansoff, 1975, 1980; Ruefli & Sarrazin, 1981) or strategic issues that provide advance warning of potential threats through monitoring for variations in external conditions, such as when exercising strategic foresight (Adegbile et al., 2017; Iden et al., 2017; Paliokaite et al., 2014). Strategic foresight enables real-time responses to the abrupt, unexpected actions of key stakeholders and sensing the emergence of major unanticipated environmental discontinuities and strategic disruptions in advance.

In this paper we first summarize the salient differences between these two primary modes of control, feedforward and feedback. Early management scholars examined whether and how the limitations of cybernetic models could be overcome, or alternatively, whether alternative control models (and processes) that are more suited to organizational contexts could be identified and adopted.<sup>1</sup> We then discuss strategic control, where feedforward control processes are more imperative and essential. This is because control failures are more widespread (sometimes with disastrous organizational consequences) when strategic control is based exclusively on feedback control models.

We then present the example of a global leader in ‘fast-fashion’ retailing, Zara, that incorporated feedforward characteristics into its strategic processes, beginning from its inception. Because this feedforward orientation was embedded across the whole Zara organization, it was able to continuously exercise strategic foresight in its operating domains. The scope of this strategic foresight spanned functions, countries, and regions across the globe in which Zara operated. The resulting competitive advantages enabled Zara to be successful consistently and resulted in industry-leading performance outcomes that lasted over several decades after the company was founded. Subsequently, it also enabled Zara to absorb and overcome extremely disruptive societal disruptions (viz., COVID-19) that debilitated and sometimes resulted in the demise of less adaptable retailers. In addition to successfully overcoming this disruptive wicked problem (caused by COVID-19), Zara moved into and prevailed in newer market domains like online retailing, where they faced newer, better-equipped, and tougher competitors. We illustrate how Zara’s consistent feedforward orientation combined with its strategic foresight enabled it to develop new dynamic capabilities (Grant, 1991; Teece et al., 1997), which later became the basis for extending their traditional competitive advantages to the online retailing domain.

## 2. Literature Review

We employed elements of the PRISM approach (see McCreight et al., 2019; Rabin et al., 2022) to conduct our literature review. The process involved initial searches for articles on Google Scholar using the keywords *control*, *feedforward control*, *feedback control*, *management control*, and *strategic control*. Once we identified the important authors and articles referenced in these topic areas, we used Research Rabbit (an AI research tool) to track all the other authors whose work was linked to and clustered around a content area, as proposed initially by a seminal author (identified from the above Google Scholar search), and by their work’s thematic link to the subject. These identified themes also needed to fit into a broader *context* involving the different domains of control (viz., *control*, *feedforward control*, *feedback control*, *management control*, *strategic control*) that we determined earlier. We submit that this method of identifying themes and contexts is broadly in accordance with the PRISM principles described in earlier work (McCreight et al., 2019; Rabin et al., 2022). Based on the results of the literature search conducted above, the important dimensions along which feedforward and feedback processes differed were identified by the current author. These differences are along the following dimensions (which are also itemized in Table 1 below):

- The underlying temporal orientation of the process (viz., a focus on future versus past events).
- When the corrective action is initiated (i.e., ex-ante versus ex-post).
- The information based upon which corrective action is undertaken (i.e., anticipatory versus historical information).
- The goal-orientation of the control process (i.e., adaptiveness versus stability).
- Triggers for the process (i.e., unexpected external events or changes in assumptions versus deviations from expected outcomes or the ending of predetermined time periods).



- Criteria for assessing the efficacy of the control process (i.e., enhancing effectiveness versus enhancing efficiency).
- The assumptions underlying cause-and-effect relationships (viz., adaptable and flexible versus fixed).
- Tightness of linkages between plans and budgets (i.e., loose versus tightly integrated).
- The dominant theme of the control process (viz., uncertainty reduction versus performance appraisal).

**Table 1.** Salient differences between feedforward and feedback control.

Characteristic Dimension	Feedforward Control	Feedback Control
(a) Temporal orientation	<i>Future</i>	<i>Past</i>
(b) Action occurrence	<i>Ex-ante (before outcomes)</i>	<i>Ex-post (after outcomes)</i>
(c) Information base	<i>Anticipatory information</i>	<i>Historical information</i>
(d) Goal-orientation	<i>Adaptiveness</i>	<i>Stability</i>
(e) Triggers for process	<i>Unexpected external events; changes in assumptions</i>	<i>Deviations from expected outcomes; end of pre-determined control period</i>
(f) Evaluation criteria	<i>Enhancing effectiveness</i>	<i>Enhancing efficiency</i>
(g) Cause-and-effect relationship assumptions	<i>Adaptable and evolutionary</i>	<i>Fixed</i>
(h) Tightness of linkages between plans and budgets	<i>Looser</i>	<i>Tightly integrated</i>
(i) Dominant theme	<i>Uncertainty reduction</i>	<i>Performance appraisal</i>

As noted, several of these differences between the feedforward and feedback control processes have been enunciated in the extant literature (see [Camillus, 2016](#), p. 84; [Morgan, 1992](#); [Ishikawa & Smith, 1972](#); [Koontz & Bradspies, 1972](#)).

In summary, feedforward control reduces delays by incorporating the monitoring of inputs, obtaining early warning of environmental threats, and through facilitating the prediction of their effects on outcomes. The early detection and measurement of system disturbances enables corrective actions to be undertaken in real time, a critical requirement for organizational planning and control systems to address wicked problems that arise during periods of societal disruption. We now discuss the need for a feedforward orientation in strategic control specifically.

### 2.1. Strategic Control and the Imperative Need for a Feedforward Orientation

The organizational literature has long advocated for a longer-term, strategic approach to strategic control on account of the shortcomings of and failures observed in strategic control processes ([Bungay & Goold, 1991](#); [Cantley, 1981](#); [Goold & Quinn, 1990](#); [Horovitz, 1979](#); [Lorange, 1984](#); [Roush & Ball, 1980](#); [Simons, 1990](#); [Veliyath, 1992](#)). Strategic goals target long-term success several years in the future. This exceeds the time-frame limitations of traditional cybernetic control models ([Goold & Quinn, 1990](#)). Moreover, to be effective, strategic control systems also need to identify the key assumptions based upon which a firm's strategy is premised and then track changes to those assumptions while assessing their performance implications ([Goold & Quinn, 1990](#)). The advocacy for more feedforward control was also primarily driven by strategic control failures that became more frequent and more pronounced as organizations increasingly operated in more uncertain and discontinuous environments created by industry dynamism and the globalization of markets ([Doz & Prahalad, 1981, 1984](#)), which are important themes in this special issue. Organizations began to face greater adversity and headwinds, both in terms of limited reaction times and reduced flexibility in the scope of their response options ([Lorange, 1984](#); [Simons, 1994](#)).

Additionally, strategic decision-makers were also required to deal with greater ambiguity in strategic circumstances and to anticipatorily respond to weak signals (Ansoff, 1975, 1980; Ruefli & Sarrazin, 1981). Uncertainty and ambiguity in their task and global environments, along with fuzzy signals, caused their existing control systems to misinterpret or ignore signals. This often led to the outputs of the control system becoming untimely and invalid (or irrelevant) for the purposes of undertaking strategic managerial actions (Chakravarthy & Lorange, 1991; Lorange, 1984; Lorange & Murphy, 2007). A clear understanding of cause-and-effect relationships (that cybernetic feedback control models were predicated on) was often not available, thus necessitating greater strategic foresight on the part of organizations (Adegbile et al., 2017; Iden et al., 2017; Paliokaite et al., 2014). When confronted with wicked problems, especially under conditions of environmental discontinuity, several other limitations in strategic control processes surfaced (Schreyogg & Steinmann, 1987). The complex process of gathering, interpreting, and transforming information in a typical control process ensured that only a limited amount of the potentially available information was considered, filtered, and used. Much of the available information was discarded as being redundant, primarily in the interest of reducing complexity and also to accommodate managerial cognitive limitations (Schreyogg & Steinmann, 1987). However, some of this discarded information could be highly pertinent and potentially could, if it was overlooked, create greater strategic uncertainty for the organization. Looming disruptive and threatening changes would then be removed from the ambit of management's control, since these changes were not sensed or recognized. Increasingly, strategic control processes were also required to incorporate qualities of 'double-loop' learning (Argyris, 1976), whereby the control process oversaw and modified itself, when necessary. Reflecting these concerns, several authors advocated for the use of more anticipatory and/or steering control models in strategic control (Ansoff, 1980; Camillus, 2016; Camillus & Veliyath, 1984; Goold & Quinn, 1990; Lorange, 1984; Lorange & Murphy, 2007; Roush & Ball, 1980; Simons, 1994; Veliyath, 1992).

Some authors (Raman, 1997; Schreyogg & Steinmann, 1987) advocated for three additional sets of activities to be overlayed on top of feedback control models, to enhance the effectiveness of strategic control processes. These three additions included (Schreyogg & Steinmann, 1987): (1) strategic surveillance control, (2) premise control, and (3) implementation control. Of these, strategic surveillance control ensured that external events, such as strategic issues that might possibly affect the strategy of the organization, were being continuously monitored and tracked. Alternatively, premise control tracked (on an ongoing basis) whether key assumptions that were considered at the outset continued to be valid (Horovitz, 1979). These two suggested changes enabled the incorporation of a more feedforward (i.e., anticipatory) orientation in the control process. Finally, strategic implementation control checked and ensured that the whole strategic process itself needed to be changed in the light of ongoing events. For example, one additional modification that could be incorporated is questioning whether assumed cause-and-effect relationships need to be tweaked or modified. The introduction of this feature incorporated 'double-loop' learning into the control process (Argyris, 1976, 1977). Additionally, double-loop learning questioned "not only the assumptions underlying the plan, but also the model of the system itself" (Argyris, 1977). All these three sets of strategic control activities were proposed to complement and add to the effectiveness of strategic control processes (Schreyogg & Steinmann, 1987).

Along with the discussion of feedforward (and feedback) orientations in strategic control, the parallel literature also examined multiple alternative models of control that have been proposed to help overcome some of the limitations of cybernetic control models and improve the effectiveness of strategic control processes. These include bureaucratic



control (Merchant, 1982; Otley & Berry, 1980; Otley et al., 1995; Ouchi, 1979; Simons, 1990, 1995), behavior control (Otley & Berry, 1980; Otley et al., 1995), clan control (Ouchi, 1979, 1980; Moores & Mula, 2000), top-down versus bottom-up control (Bower, 2017; Burgelman, 1983; Chakravarthy & Lorange, 1991; Goold & Quinn, 1990; Kim et al., 2014; Simons, 1990), real-time or concurrent control, and interactive control (Chakravarthy & Lorange, 1991; Simons, 1990, 1994, 1995). Each of these above alternative control models undoubtedly and to a limited extent helped in coping with complexity and in dealing with the strategic uncertainty that was rampant in strategic control. However, they each had assumptions and limitations that restricted their widespread applicability and appropriateness in strategic control contexts. Therefore, we will not discuss any of these other alternative control types in detail and will singularly focus our discussion on feedforward (versus feedback control).

## 2.2. Feedforward Orientation Linkages to Strategic Management Theory

Feedforward orientations in the strategic management process, while providing current competitive advantages, can also be linked to building dynamic capabilities (Eisenhardt & Martin, 2000; Teece et al., 1997; Winter, 2003). Firm resources and capabilities erode, are neutralized, their imitability increases, and their rarity decreases over time. Therefore, a firm's existing (and static) set of resources ceases to be a source of sustainable competitive advantages for the firm in perpetuity. These declines in competitive advantages are wrought by a combination of changes in market conditions, shifts in consumer preferences and the nature of rivalry, strategic discontinuities, and price/performance hypercompetition. In such instances, it becomes incumbent on firms to ensure their survival through dynamically reconfiguring their resource bases and developing new sources of competitive advantages (Teece et al., 1997). However, many firms fail to recognize this need to dynamically reconfigure their capabilities to accommodate changes, while some other firms are also unable to make the difficult transitions needed to develop dynamic capabilities. This is because the development of dynamic capabilities is predicated on firms' innate abilities to sense, seize, and reconfigure their resources (Helfat & Peteraf, 2015). The existing literature that has discussed how deploying a feedforward orientation can help to develop dynamic capabilities is very limited (Grafton et al., 2010; Grant, 1991).

However, there are representative real-life examples. For example, the 'fast fashion' retailer Zara exemplifies a company that accomplished this transition. The shock caused by COVID-19 undercut Zara's 'fast fashion' business model and negatively affected Zara's operations in 2020, leading to a precipitous decline in sales and operations. In the ensuing discussions, we provide insights into how Zara's feedforward orientation enabled it to dynamically sense, seize, and reconfigure its resource base (Helfat & Peteraf, 2015) in order to develop new sources of competitive advantages and secure its position of industry leadership. We begin by first illustrating how Zara displayed a feedforward orientation in its strategic management processes.

### A Real-Life Example: The Case of Zara<sup>2</sup>

The specific example of Zara<sup>3</sup> illustrates how it developed, incorporated, and exemplified a feedforward orientation across its strategic management activities. In doing so, Zara successfully tailored its organization (i.e., structure), strategic processes, and systems to integrate its key functional areas such as its supply chain, manufacturing, merchandising, and manufacturing to bring their activities into alignment and to achieve its chosen strategic positioning as a leader in 'fast fashion' retailing. This strategic positioning benefited Zara through providing sustainable competitive advantages that enabled the company to outperform its industry peers for several years, beyond its initial founding. When COVID-19 (which represented a societal disruption) disrupted the global economy in 2020,

Zara succeeded in capitalizing on its feedforward orientation to develop new dynamic capabilities (Teece et al., 1997). These changes enabled Zara to both survive the pandemic and to extend their competitive advantages into new domains in retailing, even as some of their other retail industry competitors stumbled and fell by the wayside.

The ‘fast-fashion’ business model is premised around providing ‘catwalk’-inspired fashion clothing items that are manufactured quickly and sold at affordable prices (Varma, 2017). This is a uniquely different niche segment in retailing that aims to provide fashionable, uniquely styled novelty clothing to fashion-conscious relatively affluent consumers at affordable prices. The main identifiable competitors in this retail industry segment (besides Zara) are H&M (Swedish), Uniqlo (Japanese), and Forever 21 (American). However, Zara was the pioneer and trend-setter that initially developed the innovative business model that was suited for this segment. In doing so, Zara displayed a rare and inimitable ability to anticipate, understand, shape, and satisfy the needs of its core group of customers. These customers were mostly younger, fashion-conscious, relatively affluent, urban women who wanted uniqueness, style, and freshness in their clothing at affordable prices.

Based on surveying articles on Zara in the business press and other available public sources, we identified specific attributes displayed by Zara that corresponded to (and represented) our conceptions of feedforward orientation dimensions (as listed and itemized earlier in Table 1). We describe below how Zara incorporated those feedforward attributes (from Table 1) into its strategic orientation, organizational processes, and the activities of their key personnel spread across the globe.

- (a) Future orientation: Zara’s designers (they employed nearly 300 in-house designers) instinctively intuited customer desires, spotted fashion trends in advance, provided advanced feedback, and supplied new ideas to members of their production and merchandising teams early in the merchandising cycle. They accomplished this through their designers physically attending fashion shows in known centers of couture such as Milan, Paris, and New York. Zara designers did not wait until the planning (or operational) cycle was completed to obtain and act on feedback. Instead, they tracked signals early to sense the directions that the market was moving towards in terms of fashion and tastes (Ansoff, 1980). This is an attribute representing a feedforward orientation (as shown in Table 1). However, beyond merely sensing these trends early, Zara’s designers also concurrently sketched designs and sourced fabrics based on their observations. On average, Zara annually created over 50,000 unique designs that were experimented with (Varma, 2017). These designers also worked with Zara store managers, sales managers, and design and commercial teams (many of whom were co-located in a sprawling hangar-like space near the company HQ in La Coruna in northwest Spain) to facilitate early introduction of these fashion items, especially during the peak selling seasons (Roll, 2021). Therefore, the designers were acting in advance of concrete outcomes such as the availability of actual sales data. Instead, they pulled customers as co-creators for their designs (Varma, 2017). This represented a feedforward orientation, since it was primarily occurring in the inbound logistics segment of the value chain. In addition, store managers also continuously tracked sales data, identified bestselling items, kept track of pieces returned by customers, and shared this information with the design teams (Roll, 2021). These activities represented a feedforward type of strategic implementation control, as described by Schreyogg and Steinmann (1987). This is because advance action was being undertaken even as the process was occurring. Moreover, consumption information and the progress of product life cycles were also being continuously tracked on an ongoing basis, further exemplifying their anticipatory orientation towards taking advance action.

- (b) **Ex-ante actioning:** Ex-ante actioning entails undertaking action long before the process has been completed and the output is available for measurement and for checking on outcome deviations. Zara spotted fashion trends early, acted on them without delay, and quickly reproduced items in small quantities at relatively low cost. It used its superior design and manufacturing skills to bring these fashions to market in as little as two to three weeks (Roll, 2021). On average, several dozen design prototypes were being regularly experimented with on an ongoing basis. This advance action compared favorably with the more than the six-month average time-lags taken for the same process by their other rivals (viz., H&M, Uniqlo, Forever 21) in fast-fashion. This was also partly made possible because these other competitors typically outsourced their production to globally dispersed suppliers in geographically distant places like China, India, and other locations, unlike Zara, who produced most items in-house in factories located close to their HQ in northwest Spain (Roll, 2021).
- (c) **Using anticipatory information:** Zara's designers and store managers observed the fashion preferences of their targeted customer segment (younger, fashion-conscious, relatively affluent urban women) in their stores and spotted trends early. Through observing them, these designers intuited the desires and tastes of their target customers. In addition, their designers also attended trade shows, scanned publications, trawled the web, and visited college campuses and other locations frequented by their target customer segment. Zara designers also kept track of ongoing sales data to more quickly transmit the information necessary for reordering quantities (Varma, 2017). They also employed technology that focused on big-data analysis templates to identify trends (Varma, 2017). This technology enabled them to undertake data mining of the daily sales updates. Along with actual consumption information, the duration/stages of product life cycles were also tracked in advance.
- (d) **Adaptiveness:** Zara's creative teams worked constantly on current and prospective products to create variations in styles, fabrics, and product mixes. There was constant innovation undertaken regarding chosen styles, fabrics, and fashion offerings. For example, during the pandemic-induced lockdown, when the buying habits and preferences of their customers changed drastically, Zara switched their product line to include pajamas and tracksuit bottoms that were then preferred by their quarantined, home-based customers (Harbott, 2021). Zara also employed learning-by-doing techniques through constantly experimenting with and improving on design prototypes, thereby exhibiting strategic foresight in the process.
- (e) **Actions triggered by changes in external events and/or changes in assumptions:** Zara's business model, based on 'fast fashion', was severely disrupted during COVID-19 when all of Europe went into a lock-down mode as mandated by the EU's response to the worldwide health pandemic emergency. This unanticipated external environmental shock severely disrupted Zara's operations. Their factories, the majority of which were located around their headquarters in northwestern Spain, were closed to comply with regulatory edicts issued by the EU. In addition, many of their stores, spread across the globe on every continent, were also shut down because of the pandemic and the regulatory edicts issued by different country governments in response to the pandemic. Compounding these operational exigencies, their core customers, who were younger, more affluent women who visited Zara stores, on average, about 17 times a year (viz., 1.5 times every month) in anticipation of being able to snag the latest fashion merchandise, were also forced to quarantine at home. The combination of these factors resulted in a 44% decline in sales for Zara in the first quarter of 2020 (Roll, 2021). This was an immense blow for this company that had experienced steady sales growth ever since its founding. As was in their nature, Zara responded quickly.

They cut inventory by 10% to cope with the lower demand (Harbott, 2021). They were also able to quickly reduce manufacturing capacity due to their manufacturing agility and flexibility (Harbott, 2021). They were also able to cut operating expenses by 21% in the calendar period ending June 2020 (Harbott, 2021). This occurred primarily during the period of the pandemic. Taking advantage of their short lead times, Zara quickly adjusted their clothing line by offering more comfortable items such as pajamas, tracksuit bottoms, etc. These were the items that were then preferred by their home-based customers over the extended lockdown period. The company also undertook other unprecedented steps to cope with the worldwide disruption of its operations. In March 2020, Zara ramped up web discounts, a significant departure from its earlier practice of not discounting merchandise. They also deviated from their traditional policy of always holding online and in-store prices at par (Harbott, 2021). Zara also quickly optimized their physical store network by closing as many as 1200 (mostly older, smaller) stores around the world (Roll, 2021). Their physical retail outlet strategy also underwent a shift towards concentrating on fewer, larger stores in prime locations (Roll, 2021). Their stores were also increasingly required to act as their distribution hubs for online sales. During the pandemic, their fledgling online business, which had already been in existence but dormant (since about a decade earlier) because it had not been emphasized, enabled them to respond quickly. Both in Europe and across most of the world, regulators permitted e-commerce to continue operating even when brick-and-mortar stores were temporarily closed. Therefore, the COVID-19 crisis accelerated Zara's digital shift, with online sales growing 75% over nine months, ending in October 2020, compared with the same period in the previous year (Harbott, 2021). More recently, Zara has expanded into a GenZ-focused low-priced brand called 'Lefties' to counter the competitive threats posed by the offerings of newer third generation rivals like Shein (Reuters, 2024).

- (f) Enhancing effectiveness: Ideas for new designs bubbled up from the designers, store managers, and sales managers who were Zara's advanced sensors of fashion trends. Once the design ideas crystallized, production was immediately undertaken in their manufacturing facilities located near their headquarters in northwestern Spain. Manufacturing of these experimental design concepts was limited to small quantities (Roll, 2021). This small-batch manufacturing method minimized risks for the firm by reducing the need for discounting of unsold items. Undergirding this capability were the process characteristics of Zara's factories, which could manufacture items in small batches and could also operate on short lead-times. This enabled Zara to manufacture and supply items quickly based on emergent demand. Very low expenditure on advertising combined with high inventory turnover allowed them to keep their costs low. They were then able to pass on the cost savings to customers, thus consolidating their strategic value proposition of being able to supply unique fast fashion merchandise at affordable pocket/street prices. All these organizational process qualities were distributed across Zara's different organizational functions and geographic locations. These processes contributed towards enhancing Zara's effectiveness in fulfilling their mission and goals.
- (g) Flexible and evolutionary cause-and-effect assumptions: Zara designers coordinated with upstream production teams as well as with downstream merchandising. Zara experimented with several dozen design prototypes concurrently on a regular basis (Roll, 2021). Their designers created over 50,000 design prototypes annually, on average. Of these several design prototypes, only a fraction (less than half) eventually went into production. As previously discussed, Zara also incorporated learning-by-doing techniques in experimenting with and improving on experimental design

prototypes. Co-located adjacent to their headquarters were several full-fledged photo studios, where finalized designs were styled and shot in-house. In doing so, they were attempting to exercise strategic foresight. Their operating structure was very flat (non-hierarchical) and nimble, thus eliminating unnecessary delays in decision-making (Varma, 2017).

- (h) Looser linkages between plans and budgets: Zara's embedded quick response (QR) processes facilitated coordination between the design, production, and merchandising functions. This reduced cycle times, enabled faster speeds to market, and improved their flexibility. Their QR processes spanned functional, organizational, and geographic boundaries. Their learning-by-doing orientation increased flexibility and speed to market. Overall, their feedforward orientation across different organizational functions was predicated on a looser integration of planning targets with budgets. This is typically not the case in primarily feedback control approaches.
- (i) Uncertainty reduction: Zara identified the fashion desires of its core group of customers and spotted trends very early (Roll, 2021; Varma, 2017). They then used their superior design and manufacturing capabilities which were co-linked to bring these styles to market quickly, in as little as three weeks. This short cycle time compared very favorably with those of their 'fast fashion' competitors, who took as much as 6 months. This was primarily because their competitors outsourced and offshored their supply chains to geographically distant locations. Consequently, Zara's shortened cycle times helped them to reduce uncertainty over whether the tastes and preferences of their target customers could change unexpectedly. The small batch production that they relied on reduced the risks to the company in case their prognostications were wrong. The small batch production runs enabled them to dispense with the need for large batch production, in order to exploit economies of scale (Roll, 2021). In addition to being able to process smaller orders, this advantage also enabled Zara to reorder more frequently with updated fashion items.

The above discussion identified some of the advantages that accrued to Zara from its feedforward orientation. In summary, Zara benefitted through improved adaptability, more proactive decision-making, and enhanced strategic alignment between different parts of the organization. Through incorporating and displaying these attributes, Zara exhibited a feedforward orientation from its inception. This orientation was set in place through the vision of its founders and because of necessity arising from Zara's being an upstart company located in a poorer, underdeveloped area of northwestern Spain. However, some of the described attributes that enabled the feedforward orientation also (unarguably) came with increased costs for the company. Other accompanying challenges might have also included the need for identification and monitoring of important emerging trends, the costs involved in collecting accurate and timely data, as well as the added investments required for institutionalizing a feedforward orientation. This was especially important for Zara, who primarily relied on targeting a core group of 'fast fashion' customers. The tastes of this customer segment could change abruptly, or their differentiation from the broader population of retail customers could disappear or fade over time. All these were potential threats that Zara could be forced to confront, and which would be difficult and expensive to deal with.

### 2.3. Zara's Capitalizing on Their Feedforward Orientation to Develop Dynamic Capabilities

A firm's competitive advantages (like those of Zara) could erode over time. Changes in market conditions, the nature of rivalry, changes in technology, and price/performance hypercompetition can cause the inimitability and irreplaceability of a firm's resources as sources of competitive advantage to diminish (Eisenhardt & Martin, 2000; Teece et al.,



1997; Winter, 2003). Over time, Zara's capabilities and advantages in 'fast fashion' were gradually neutralized by new entrants in online retailing like Bohoo.Com, ASOS, and Shein (McKinsey, 2024). Most importantly, disruptions created by external shocks like the pandemic (COVID-19), along with the shifts in customer preferences towards making more online purchases, accelerated this erosion of Zara's traditional advantages in 'fast fashion' retailing. Firms need to recognize and respond to these transitions through developing their dynamic capabilities. The development of dynamic capabilities is predicated on firms' abilities to *sense, seize, and reconfigure* existing resources (Helfat & Peteraf, 2015). There is very limited literature that has discussed the linkages and pathways for firms to transition from having a feedforward orientation to the development of dynamic capabilities (Grafton et al., 2010). To Zara's credit, despite the disruption to its traditional business model caused by the pandemic, it succeeded in extending its competitive advantages in 'fast fashion' by investing in and developing new dynamic capabilities that enabled it to remain competitive in digital marketing, an arena towards which the retail industry was in the process of transitioning. Moreover, Zara's feedforward orientation (described earlier) appears to have been the catalyst in enabling this transition. Based on the creativity of its teams and its fully integrated, nimble business model, Zara's superior performance continued unabated long after the pandemic ended (in 2020). In the first quarter of 2024, Zara's sales grew by 7.1%, its gross profit increased by 7.3%, EBITDA increased by 8%, and net income increased by 10.8% when compared to the previous year (extracted from interim Q1FY '24 results reported on Zara company website). Their spring and summer 2024 collections were well received by their customers, with both instore and online sales increasing by 12%.

Some of the initiatives that Zara undertook to move towards the digital frontier in retailing are now described. Newly acquired 'location intelligence' allowed apps to switch to 'instore' mode whenever a customer entered a store (Dowsett, 2018). This enabled customers to more easily locate products and receive pricing and other information (Dowsett, 2018). Additionally, this ultrasound technology helped to track footfall in stores while also providing virtual assistants to help customers (Dowsett, 2018). Inditex also formed developmental partnerships with technology companies like Jetlore and big data start-up El Arte de Medir to use artificial intelligence to predict consumer behavior (Dowsett, 2018).

Inditex (Zara's parent) facilitated tight control of stock through tagging by adopting technologies such as radio frequency identification (RFID) and the Integrated Stock Control System (SINT). This enabled better inventory management across all their brands (Ryclair, 2021; Inditex, 2023 Annual Report). Inditex is the parent company of seven (7) other companies including Zara, Pull&Bear, Massimo Dutti, Bershka, Stradivarius, Oysho, and Zara Home. We selected Zara for our analysis because, among these, it was the most appropriate subsidiary for illustrating a 'feedforward orientation'. The RFID and SINT systems enabled Zara staff to more quickly locate any item regardless of where it was located and it allowed more clothing items to be sold at full price because the items in stock (at a store) could then also be offered online. Their physical stores and online platform have merged into a single sales environment. This new capability is an example of Zara's developing dynamic capabilities. Other brands looking to create more rarified experiences have sought to do live shopping differently. Zara's show on Douyin featured Chinese models wearing Zara dresses trying on shoes and jewelry. Zara's livestream approach enabled it to build significant brand awareness in China. This represents another example of dynamic capability development. Consequently, during the first three months of 2024, Zara sold out in more than 50% of the product sizes that it sells in China. Additionally, the approach to offering something that the consumer would not normally find in stores was a novelty that made these featured events special and created an incentive for customers to join.



Zara has expanded its live shopping broadcasts to other markets like the U.K., Europe, and the United States (in 2024). These ad-hoc livestreams hosted by ‘well-known’ fashion personalities have enabled Zara to highlight specific Zara Woman collections (Reid & Pons, 2024). Aiming for a ‘friendly, casual, and fun’ experience, the interactive shows last 45 minutes to an hour. However, viewers are still able to react in real time with questions, comments, and emojis (Reid & Pons, 2024). Inditex’s investment in live shopping is an example of its continued momentum and ability to be at the forefront of experimenting with new formats (Reid & Pons, 2024). Zara has 142.9 million followers on social media and its website has recorded 4613 million visits (Inditex, 2023 Annual Report).

In online shopping, newer entrants like Bohoo.Com, Misguided, and Shein were already undercutting Zara’s traditional competitive advantages in fast fashion retailing, even before the pandemic (McKinsey, 2024 Business of Fashion Report). They had done this by producing clothes at faster speeds with reduced cycle times, sometimes taking as little as one week from initial design to point of sale. These new competitors were able to refresh their websites daily, featuring hundreds of new items. Zara was compelled to develop dynamic capabilities and play catch-up to compete with these newer entrants (McKinsey, 2024), who were undermining its traditional advantages in fast fashion. Arguably, Zara’s feedforward orientation, which it incorporated into its strategic processes right from the outset (as described), played a significant role in enabling Zara to make this difficult transition into an even faster online retailing environment.

### 3. Conclusions

This paper traced the development of two primary modes of control enunciated in the literature, namely, feedback and feedforward control. Feedback control based on cybernetic closed loop systems was the dominant model of control employed from the outset. However, feedforward control was proposed and was soon widely adopted as an addendum to feedback control to overcome some of the disadvantages of the closed-loop, cybernetic feedback control models that were dedicated to achieving homeostasis. The shortcomings of cybernetic control models became especially evident when they were applied to strategic control situations, especially so as environmental conditions increasingly became more hostile, dynamic, discontinuous, and less-structured (Camillus, 2016; Camillus et al., 2021). Companies were being confronted with wicked problems more frequently. Under these emergent conditions, cause-and effect relationships were ill-defined, and the need for ‘real-time’ corrective actions became ‘mission critical’. Consequently, proactive, mid-course corrective actions began to be emphasized as responses for dealing with the existential threats that confronted organizations. Companies were also called upon to develop greater strategic foresight. In this paper, we initially flushed out the salient differences between feedforward and feedback control models. The paper then discussed how, because of existential threats, feedforward control models became more critical in strategic control situations. We then traced how the early literature on strategic control began propounding feedforward approaches. Next, we described an example of the retail company Zara, which from the outset practiced and was emblematic of a feedforward orientation in its strategic processes. We then discussed how this feedforward orientation enabled Zara to become a trend-setter and leader in the ‘fast fashion’ retail industry. It allowed Zara to benefit from sustainable competitive advantages that resulted in industry-leading performance for several years after its founding.

Later in Zara’s history, a major environmental discontinuity, the COVID-19 pandemic, changed the ‘rules of the game’ and posed an existential threat to Zara (as well as to all its other retail competitors) through invalidating their business models and the assumptions upon which they were built. When that occurred, Zara was uniquely able to reconfigure its

resource base and develop new dynamic capabilities to deal with this exigency. This was enabled through sensing, seizing, and reconfiguring its resource base. Zara's traditional resources were based primarily on selling through its physical stores. We showed how Zara's existing feedforward orientation facilitated and was instrumental in dynamically enabling their resource transformation to facilitate selling in an online marketplace. Very few organizations can sense, seize, and reconfigure resources (Helfat & Peteraf, 2015) as effectively as Zara has done in the face of the pandemic-induced emergency. In the process of doing so, Zara modified its business model through emphasizing online sales more and established additional sources of competitive advantage in this new online retail sector. That has helped to sustain their industry leading performance and has resulted in their performance outcomes in the first quarter of 2024 exceeding those in the same period of the previous year (as stated earlier).

### 3.1. Implications

Competitive advantages are short-lived and can never be guaranteed in perpetuity, nor are they indefinitely sustainable. They can be neutralized by the actions of competitors, by changes in customer tastes, through shifts in technology, and by unexpected environmental discontinuities. It is incumbent on company management to identify and support the capabilities and resources that sustain and extend competitive advantages that lead to above-average, industry-leading performance. However, when sudden shifts in environmental conditions occur, companies must also be agile and flexible to be able to transform their resource bases and business models to accommodate the competitive realities of the new environment. Not many organizations are prepared to or equipped with the ability to shift and/or change resource bases. Nevertheless, some unique companies (such as Zara in our example) that have maintained a feedforward orientation in their strategic processes have ingrained the requisite abilities that have enabled them to change and reconfigure their resource bases quickly through sensing, seizing, and reconfiguring their resources. These are the attributes necessary to build dynamic capabilities and to extend competitive advantages in newer and emerging global operating environments.

The nature of organizations and the environments in which they operate have changed dramatically since the initial advent of control theory. More companies have become global in their scope, with their ownership, their management teams, and their loci of operations being dispersed across national boundaries. Beyond older, mature companies that followed conventional stages of internationalization in their overseas expansions, new startups are currently being 'born global' at very early stages in their life cycle. Moreover, companies today have outsourced and/or offshored many of their critical functions, have widely adopted international strategic alliances, and have chosen cooperative international strategies to source resources and to gain competitive advantages. As a result, organizational boundaries have become porous and permeable. In effect, organizations have begun to more closely resemble adaptable, open systems. By contrast, traditional models of control have assumed closed-loop systems that emphasize homeostasis and stability. Consequently, there often are fundamental mismatches between control system design assumptions and the contexts in which they are applied. These mismatches have contributed greatly to organizational control missteps and failures. Nevertheless, all organizations have a continued need for direction-setting, regulation, and control across their different subunits and functions in dispersed locations at different times during their progression through the stages of development. It would therefore be short-sighted and inappropriate to completely discard traditional control models because they are viewed as being inapplicable, ineffective, or obsolete. It is incumbent on both practitioners as well as control theorists to collaborate and develop newer paradigms of control based on ideas

that borrow from alternative disciplines (Oliver, 1993), natural systems (Bogart, 1980), and other observable phenomena in the environment. This is necessary for organizations to maintain varying degrees of coherence, direction, integration, and effectiveness in their management control systems in the emergent dynamic, global, and resource-constrained environments of the 21st century.

### 3.2. Directions for Future Research

There are several alternative models of control that have been discussed in the control literature. This paper has briefly alluded to some of them, such as adaptive control, bureaucratic control, behavior control, clan control, top-down control, bottom-up control, interactive control, real-time control, and concurrent control. These alternatives could possibly provide partial solutions to the paradox posed in organizational control of maintaining the conflicting balance between stability and change and between exploitation and exploration. While each of these alternative control approaches may alleviate the control problem facing organizations to a limited extent, they cannot completely eliminate the control dilemma that persists and confronts organizations operating in today's turbulent environments. While we concentrated only on feedback and feedforward control models in our discussions, future research could examine how combinations of multiple different models of control posited in the literature (and alluded to earlier) can be applied in organizations based on context-specific, identifiable contingency factors. Among the important contingencies that could be considered (and examined) could be the level of the organization where control is being applied, the nature and extent of prevailing uncertainty, the degree of turbulence in the environment, the rapidity of technological changes facing the organization, and the magnitude of the potential threats facing the organization. This is especially critical as more companies face wicked problems in this age of strategic discontinuities.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** This study did not require IRB approval. Ethical review and approval. There were no human subjects involved.

**Informed Consent Statement:** Not applicable. No human subjects were involved.

**Data Availability Statement:** No new data were created or analyzed in this study. Data sharing is not applicable to this article.

**Conflicts of Interest:** The author declares no conflict of interest.

## Notes

- <sup>1</sup> We have discussed some of these alternative models of control later in the paper (inserted on p. 8 of this manuscript).
- <sup>2</sup> All of the information on Zara was obtained from publicly available sources in the media (as well as available sources in academia), the company's website, and reports and documents that the company has filed periodically with regulatory authorities in Europe and elsewhere.
- <sup>3</sup> Ours is an attempt to apply theory from the domain of control to a real-life company (viz., Zara). In adopting this approach, we were informed and guided by prior authors who have used and written on the case method (Christensen & Carlile, 2009; Eisenhardt, 1989; Mintzberg, 1979). In our study, we also relied on a single organization (viz., Zara) and conducted inductive research while exercising 'creative leaps' (Mintzberg, 1979, p. 584) in drawing some of our inferences. We have not attempted to prove (or disprove) any theories. Instead, we have merely suggested how some of our ideas on feedforward controls might be adopted and applied in other real-life organizations that might potentially face wicked problems in times of societal disruption.

## References

- Adegbile, A., Sarpong, D., & Meissner, D. (2017). Strategic Foresight for Innovation Management: A Review and Research Agenda. *International Journal of Innovation and Technology Management*, 14(4), 1750019. [CrossRef]
- Ansoff, H. I. (1975). Managing Strategic Surprise by Response to Weak Signals. *California Management Review*, XVIII(2), 21–33. [CrossRef]
- Ansoff, H. I. (1980). Strategic Issue Management. *Strategic Management Journal*, 1, 131–148. [CrossRef]
- Argyris, C. (1976). Single-Loop and Double-Loop Models in Research on Decision Making. *Administrative Science Quarterly*, 21(3), 363–375. [CrossRef]
- Argyris, C. (1977). Double Loop Learning in Organizations. *Harvard Business Review*, 55(5), 115–125.
- Bogart, D. H. (1980). Feedback, Feedforward and Feed Within: Strategic Information in Systems. *Behavioral Science*, 25, 237–249. [CrossRef]
- Bower, J. L. (2017). Managing Resource Allocation: Personal Reflections from a Managerial Perspective. *Journal of Management*, 43(8), 2421–2429. [CrossRef]
- Bungay, S., & Goold, M. (1991). Creating a Strategic Control System. *Long Range Planning*, 24(3), 32–39. [CrossRef]
- Burgelman, R. A. (1983). A Model of the Interaction of Strategic Behavior, Corporate Context, and the Concept of Strategy. *Academy of Management Review*, 8(1), 61–70. [CrossRef]
- Camillus, J. C. (2016). *Wicked Strategies: How Companies Conquer Complexity and Confound Competitors*. University of Toronto Press.
- Camillus, J. C., Ramanadhan, S., & Ganapathy, K. (2021). Strategy in the times of Pandemics, Climate change and the Kurzweil Singularity. *Journal of Strategy and Management*, 14(3), 300–314. [CrossRef]
- Camillus, J. C., & Veliyath, R. (1984, August 12–15). *Organizational control: A conceptual typology*. Annual Academy of Management Meetings, Boston, MA, USA.
- Cantley, M. F. (1981). Scale, Protectionism and European Integration: The Structural Dynamics of Strategic Control in a Turbulent Field. *European Journal of Operations Research*, 7, 148–160. [CrossRef]
- Chakravarthy, B., & Lorange, P. (1991). Adapting Strategic Planning to the Changing Needs of a Business. *Journal of Organizational Change Management*, 4(2), 6–18. [CrossRef]
- Christensen, C. M., & Carlile, P. R. (2009). Case Research: Using the Case Method to build and teach Management Theory. *Academy of Management Learning and Education*, 8(2), 240–251. [CrossRef]
- Dowsett, S. (2018). *Zara looks to technology to keep up with faster fashion*. Reuters Online. Available online: <https://www.reuters.com/article/markets/stocks/zara-looks-to-technology-to-keep-up-with-faster-fashion-idUSKBN1JB0HP/> (accessed on 15 June 2018).
- Doz, Y. L., & Prahalad, C. K. (1981). Headquarters Control and Strategic Control in MNCs. *Sloan Management Review*, 23(1), 15–29.
- Doz, Y. L., & Prahalad, C. K. (1984). Patterns of Strategic Control within Multinational Corporations. *Journal of International Business Studies*, 15, 55–72. [CrossRef]
- Eisenhardt, K. (1989). Building theories from Case Study research. *Academy of Management Review*, 14(4), 532–550. [CrossRef]
- Eisenhardt, K., & Martin, J. A. (2000). Dynamic Capabilities: What are They? *Strategic Management Journal*, 21, 1105–1121. [CrossRef]
- Faanes, A., & Skogestad, S. (2004). Feedforward Control in the presence of Uncertainty. *European Journal of Control*, 10(1), 30–46. [CrossRef]
- Glasse-Previdoli, D., Metz, J.-C., & Fragnieri, E. (2018, March 7–9). *An “à la Ansoff Weak Signal” Feedforward Control for Pharmaceutical Distribution*. Proceedings of the 7th ICITM, Oxford, UK. [CrossRef]
- Goold, M., & Quinn, J. J. (1990). The paradox of Strategic Controls. *Strategic Management Journal*, 11, 43–57. [CrossRef]
- Grafton, J., Lillis, A. M., & Widener, S. K. (2010). The Role of Performance Measurement and Evaluation in building Organizational Capabilities and Performance. *Accounting, Organizations and Society*, 35, 689–706. [CrossRef]
- Grant, R. M. (1991). The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation. *California Management Review*, 33, 114–135. [CrossRef]
- Harbott, A. (2021, March 9). How Zara adapted Fast-Fashion to Covid. *Management Today*.
- Helfat, C. E., & Peteraf, M. E. (2015). Managerial Cognitive Capabilities and the Microfoundations of Dynamic Capabilities. *Strategic Management Journal*, 36, 831–850. [CrossRef]
- Horovitz, J. H. (1979). Strategic Control: A New Task for Top Management. *Long Range Planning*, 12, 2–7. [CrossRef]
- Iden, J., Methlie, L. B., & Christensen, G. E. (2017). The Nature of Strategic Foresight Research: A Systematic Literature Review. *Technological Forecasting & Social Change*, 116, 87–97.
- Inditex. (2023). *Annual report*. Available online: [https://static.inditex.com/annual\\_report\\_2023/en/Inditex\\_Group\\_Annual\\_Accounts\\_2023.pdf](https://static.inditex.com/annual_report_2023/en/Inditex_Group_Annual_Accounts_2023.pdf) (accessed on 25 December 2023).
- Ishikawa, A., & Smith, C. H. (1972). A Feedforward Control System for Organizational Planning and Control. *ABACUS*, 8(2), 163–180. [CrossRef]



- Kim, Y. H., Sting, F. J., & Loch, C. H. (2014). Top-down, Bottom-up, or Both? Toward an Integrative Perspective on Operations Strategy Formation. *Journal of Operations Management*, 32, 462–474. [CrossRef]
- Koontz, H., & Bradspies, R. W. (1972). Managing through Feedforward Control: A Future Directed View. *Business Horizons*, 6, 25–36. [CrossRef]
- Lorange, P. (1984). Strategic Control: Some Issues in Making It Operationally More Useful. In R. Lamb (Ed.), *Competitive strategic management* (pp. 247–270). Prentice Hall.
- Lorange, P., & Murphy, D. (2007). Considerations in Implementing Strategic Control. *The Journal of Business Strategy*, 27–35.
- McCreight, M. C., Rabin, B. A., Glasgow, R. A., Ayele, C. A., Leonard, C. A., Gilmartin, H. M., Frank, J. W., Hess, P. L., Burke, R. E., & Battaglia, C. T. (2019). *Using the practical, robust implementation and sustainability model (prism) to qualitatively assess multilevel contextual factors to help plan, implement, evaluate, and disseminate health services programs* (pp. 1002–1011). Oxford University Press Publication.
- McKinsey. (2024). *The state of fashion 2024: Riding out the storm*. McKinsey.
- Merchant, K. A. (1982). The Control Function of Management. *Sloan Management Review*, 23(4), 43–55. [PubMed]
- Mintzberg, H. (1979). An Emerging Strategy of “Direct” Research. *Administrative Science Quarterly*, 24(2), 582–589. [CrossRef]
- Moores, K., & Mula, J. (2000). The Salience of Market, Bureaucratic, and Clan Controls in the Management of Family Firm Transitions: Some Tentative Australian Evidence. *Family Business Review*, XIII(2), 91–106. [CrossRef]
- Morgan, M. M. (1992). Feedforward Control for Competitive Advantage: The Japanese Approach. *Journal of General Management*, 17(4), 41–51. [CrossRef]
- Oliver, P. E. (1993). Formal Models of Collective Action. *American Review of Sociology*, 19, 271–300. [CrossRef]
- Otley, D., & Berry, A. (1980). Control, Organizations and Accounting. *Accounting, Organizations and Society*, 5(2), 231–244. [CrossRef]
- Otley, D., Broadbent, J., & Berry, A. (1995). Research in Management Control: An Overview of its Development. *British Journal of Management*, 6, S31–S44. [CrossRef]
- Ouchi, W. G. (1979). A Conceptual Framework for the Design of Organizational Control Systems. *Management Science*, 25(9), 833–848. [CrossRef]
- Ouchi, W. G. (1980). Markets, Bureaucracies, & Clans. *Administrative Science Quarterly*, 25, 129–141.
- Paliokaite, A., Pacesa, N., & Sarpong, D. (2014). Conceptualizing Strategic Foresight: An Integrated Framework. *Strategic Change*, 23(3–4), 161–169. [CrossRef]
- Preble, J. F. (1997). Integrating The Crisis Management Perspective Into The Strategic Management Process. *Journal of Management Studies*, 34(5), 769–791. [CrossRef]
- Rabin, B. A., Cakici, J., Golden, C. A., Estabrooks, P. A., Glasgow, R. E., & Gaglio, B. (2022). A Citation Analysis and Scoping Systematic Review of the Operationalization of the Practical, Robust Implementation and Sustainability Model (PRISM). *Implementation Science*, 17, 62. [CrossRef]
- Raman, M. (1997). Strategic Control for Fast Moving Markets: Updating the Strategy and Monitoring Performance. *Long Range Planning*, 30(1), 64–73.
- Reid, H., & Pons, C. (2024). *After China, Zara expands live shopping experiment to Europe and US*. Reuters (Online). Available online: <https://www.reuters.com/business/retail-consumer/after-china-zara-expands-live-shopping-experiment-europe-us-2024-06-03/> (accessed on 3 June 2024).
- Reuters. (2024). *Zara owner Inditex expands bargain brand to counter Shein*. Economic Times Retail.Com. Available online: <https://retail.economictimes.indiatimes.com/news/apparel-fashion/apparel/zara-owner-inditex-expands-bargain-brand-to-counter-shein/107915168> (accessed on 22 February 2024).
- Roll, M. (2021). *The secret of Zara’s success: A culture of customer co-creation*. Business and Brand Leadership. Available online: <https://martinroll.com/resources/articles/strategy/the-secret-of-zaras-success-a-culture-of-customer-co-creation/> (accessed on 22 February 2024).
- Roush, C. H., & Ball, B. C. (1980). Controlling the Implementation of Strategy. *Managerial Planning*, 29(4), 3–12.
- Ruefli, T., & Sarrazin, J. (1981). Strategic Control of Corporate Development under Ambiguous Circumstances. *Management Science*, 27(10), 1158–1170. [CrossRef]
- Ryclair, B. (2021, January 16). How Inditex is refashioning its business model. *The Economist*.
- Schreyogg, G., & Steinmann, H. (1987). Strategic Control: A New Perspective. *Academy of Management Review*, 12(1), 91–103. [CrossRef]
- Simons, R. (1990). The Role of Management Control Systems in creating Competitive Advantage: New Perspectives. *Accounting, Organizations and Society*, 15(1/2), 127–143. [CrossRef]
- Simons, R. (1994). How New Top Managers use Control Systems as Levers of Strategic Control. *Strategic Management Journal*, 15, 169–189. [CrossRef]
- Simons, R. (1995). *Levers of control: How managers use innovative control systems to drive strategic renewal*. Harvard Business School Press.
- Teece, D., Pisano, G., & Shuen, A. (1997). Dynamic Capabilities & Strategic Management. *Strategic Management Journal*, 18(7), 509–533.
- Varma, A. (2017, May 25). Zara’s Secret to Success lies in Big Data and an Agile Supply Chain. *The Straits Times*.

- Veliyath, R. (1992). Strategic Planning: Balancing Short-Run Performance and Longer-Term Prospects. *Long Range Planning*, 25(3), 86–97. [[CrossRef](#)]
- Winter, S. G. (2003). Understanding Dynamic Capabilities. *Strategic Management Journal*, 24, 991–995. [[CrossRef](#)]

**Disclaimer/Publisher’s Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.