



HAL
open science

Lean is a strategy

Florian Magnani, Michael Ballé, Godefroy Beauvallet

► **To cite this version:**

Florian Magnani, Michael Ballé, Godefroy Beauvallet. Lean is a strategy. A Research Agenda for Lean Management, Edward Elgar Publishing, pp.15-34, 2024, 9781035302901. 10.4337/9781035302918.00011 . hal-04508349

HAL Id: hal-04508349

<https://hal.science/hal-04508349v1>

Submitted on 17 Mar 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Lean is a strategy

Florian Magnani, Michael Ballé, Godefroy Beauvallet

Lean has been variously described as a coherent set of manufacturing techniques (Shah and Ward, 2003), guiding principles (Liker, 2004), a set of operational practices (Karlsson and Åhlström, 1996), or an integrated socio-technical system (Shah and Ward, 2007). The term “lean” was originally coined to capture the difference in operating theory between Toyota and its competitors in the 1980s. It was clear to the original research team that they were witnessing a new industrial paradigm, which has proved harder to capture than originally thought. Looking at lean experiences and experiments outside of Toyota has led to a richer understanding of what it encompasses (Ballé *et al.*, 2017). Previous research pointed out that lean encompasses different levels of abstraction: from the philosophy (conceptual level) to its translation in terms of operational practices (empirical level) (Marodin and Saurin, 2013).

The intention to capture the “essence” of lean gave rise to multiple theoretical interpretations, leading to heterogeneous and wide-ranging models of lean adoption (Anand and Kodali, 2010). Often derived from quantitative research, such models can lack the contextual elements needed to help practitioners adapt how they will adopt lean. Most models focus on the creation of a technical system of continuous improvement, without a clear idea of the potential gains from a human perspective (Netland, 2013). Progress in research has shown that lean has evolved from a set of production methods to a complex and comprehensive organizational system, considering all stakeholders in the organization, and changing fundamentally how to apprehend company strategy (Ballé *et al.*, 2017; Marodin and Saurin, 2013).

Lean frameworks can be classified into two main categories, namely "conceptual" and "empirical" frameworks. The more conceptual frameworks discuss the content of lean, i.e., what the elements of a lean system are (Karlsson and Åhlström, 1996; Shah and Ward, 2003), while the empirical frameworks discuss how to implement lean, including what should be the adoption steps and what feedback loops are in play to reinforce (or slow) adoption. About 30 frameworks were detailed and reviewed by Anand and Kodali (2010) based on their comprehensiveness, level of abstraction, and the degree of fit they present for adoption in an organization. The results showed that most of the frameworks examined were not constructed holistically, while many had rather high levels of abstraction. Recognizing lean as a strategy is a first attempt to connect these frameworks.

The central debate we want to discuss in this chapter is whether lean is a strategy or a set of operational principles to execute strategy determined elsewhere. Our contention is that lean is a strategy, and one based on learning that does not separate “strategic” thinking from execution (Ballé, Chaize, *et al.*, 2019). Our second contention is that this is the point of view of leaders known to be successful with lean (Ballé, Chartier, *et al.*, 2019; Byrne, 2012). This contention underlines the failure of any other interpretation of lean and its adoption (Secchi and Camuffo, 2019; Soliman, 2013).

In the first section of this chapter, the four levels of understanding identified in the lean literature will be presented. The second section is about the interpretation of lean as a strategy. And the third section shows how this strategy is implemented, primarily through the adoption process. Avenues for research will conclude this chapter.

Levels of understanding in the lean literature

Lean has been approached, both from philosophical or pragmatic levels and then from strategic or operational levels (Pettersen, 2009). This and other researchers' findings (Bhamu and

Sangwan, 2014) highlight that lean is polymorphic, making its theoretical capture complex and applicable until research leads us to a new understanding. The concept becomes richer and more refined as we study it at different levels of abstraction.

Philosophical vs pragmatical levels

At a philosophical level, Shah and Ward (2007) conceptualized lean as an integrated socio-technical system, with the ambition of eliminating sources of waste by reducing or minimizing internal, customer, and supplier variability. The identification and elimination of waste are often reported in the lean literature (Liker, 2004; Ohno, 1988; Womack and Jones, 1996) but only serve one primary purpose: to show how to improve customer value by recognizing activities that add no value from the customer's perspective. Lean, however, is anchored on the human dimension of work: the alignment of managerial practices and the corporate value system, which are the legacy of the tacit knowledge of Toyota's leaders, managers, and employees (Hino, 2005).

At a pragmatic level, several works have shown that there are major differences between lean as it is practiced and what is described in the literature (Brännmark and Benn, 2012). Adler and Cole (1993) study lean, at an individual level around the role, played by employees who are responsible for the quality produced, as well as the suggestions and implementation of improvements. Ensuring that employees operate lean practices daily represents the most difficult part to achieve (Drew *et al.*, 2004). This would mean paying systematic and continuous attention to operations, the work environment, behaviors, and infrastructure to adapt the adoption process.

Operation versus Strategic levels

Moreover, lean exists at both an operational and strategic level (Hines *et al.*, 2004): on the operational side, lean practices help identify and reduce non-value-added activities to

encourage continuous improvement and help operationalize its strategic dimension. In this sense, lean is seen as a transformation of work, redefining the level of requirements to master and improve operational tasks (Losonci *et al.*, 2011). The majority of the studies are carried out at this operational level, and notable research has already explained this level in great detail (Belekoukias *et al.*, 2014; Negrão *et al.*, 2017). At the strategic level, lean provides the foundation for managers to understand value from the customer's perspective and to focus internal efforts on exploring and optimizing that value. In this sense, lean can be perceived as a set of strategic orientations that focus on understanding end customer value by achieving flow efficiency while ensuring quality levels, with resource efficiency as a byproduct (Modig and Åhlström, 2012).

Referring to lean as a strategy of course imports all the well-known complexities associated with the ambiguity of the term “strategy” (Mintzberg, 1987). Distinguishing within “lean” layers similar to the “five P’s” Mintzberg differentiates within “strategy” (strategy as plan, ploy, pattern, position or perspective) proves helpful:

- “Lean-as-system” encompasses all the tools and activities pioneered by Toyota and present in lean companies (from pull systems to kaizen-style continuous improvement activities) (Marodin and Saurin, 2013; Netland, 2013; Soliman *et al.*, 2018);
- “Lean-as-pattern” reflects the intent of fostering collective learning and generating knowledge which must be present in all activities for lean efforts to be successful. It gives consistency to the behavior of Lean-as-system practitioners and resilience to the systems they put to work. Maintaining Lean-as-pattern alive is the main task of a class of actors specific to lean, the *sensei* (Ballé *et alii*, 2019);

- “Lean-as-competitive-advantage” is the often-vaunted situation of Toyota and of other companies whose lean mastery helps on the market. It is the “silver bullet” of many lean consultants, their selling point, even though few companies have achieved Lean-as-pattern at a scale comparable to Toyota’s (Lewis, 2000);
- “Lean-as-perspective” is the collective intuition of lean practitioners and *sensei* about how the world works. It is visible in shared quasi-aesthetic judgments, such as “no liking inventory”, and intra-daily routines and rituals, such as being willing to hear “problems first”. The “lean paradigm” contrasts with Taylorism and Financial management as the general theory of business. It informs the way lean practitioners create strategies at the firm level and “practice lean” in the field according to the three other definitions. The epitome of Lean-as-perspective is the name of the first workbook of the lean community: *Learning to see* (Rother and Shook, 1999) and is discussed in more depth by Åhlström *et al.* (2021).

The multifaceted aspects of lean make it hard to grasp in a linear discursive structure, and therefore most researchers focus only on the form they are familiar with, without fully grasping the interactivity between the different forms that exist. Many debates about lean articulate – and sometimes mix – these four layers, similarly, to debates about strategy. Future research is encouraged to express their point of view, the supported definition, the artifacts, or the framework chosen by the researcher and by the organizations studied, in order to better appreciate the results of the studies.

Highlights of the strategic interpretation of lean

Inviting researchers to illustrate the details of the organization being studied and the practices being observed will bring nuance to the results. This will also help identifying the reasons for the organization's adoption of lean and the implicit strategy to achieve the expected results.

Previous efforts to describe lean as a strategy

In its simplest form, strategy is a way to achieve your goal, a path to victory. But isn't choosing a goal also strategy? Strategy is a young discipline, and few people agree on how to define it, or even if there is a way to define it. In the very early days of “strategy”, Chandler (1962) wrote: "Strategy is the determination of the basic long-term goals of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals." Nevertheless, the overarching goal of business strategy seems to be a sustainable advantage to thrive under conditions of uncertainty. Uncertainty is relevant to the many moving parts: markets change, enabling technologies change, the company and its supplier networks change, and so strategy, which is meant to be a framework for medium- or long-term success, is by its nature always in flux. Businesses should both win the day to deliver promised value to customers and profits to shareholders, and evolve and adapt to changing, often difficult-to-see conditions. As discussed previously, Mintzberg (1987) provides five definitions of strategy: plan, ploy, pattern, position, and perspective. As Stacey (1996) states: ‘The dynamics of successful organizations are therefore those of irregular cycles and discontinuous trends, falling within qualitative patterns, fuzzy but recognizable categories taking the form of archetypes and templates’. This stream of decision successions appears to be consistent with sufficient time. This means that while some short-term control is possible through traditional techniques, long-term development avoids the kind of linear, analytical reasoning that underlies many of these

techniques. Getting out of the management control aspect of the strategy is a challenge that lean literature intended to discuss.

Looking at the lean literature, numerous studies visualized the long-term objectives of lean initiatives, but few studies talk about lean as a strategy. The one that discusses lean strategy from a corporate level identified at first lean as a strategic innovation, introducing fragility and flexibility in its system that provides dynamic competitive advantages (Helmold, 2020; Volberda, 2006). This strategic innovation reevaluates decisions related to capital allocation, mergers, acquisitions, partnerships, diversification scope, and coverage. Every choice is made taking care of stakeholders from the suppliers to the final customers to maximize the value and outcomes from an efficiency point of view and a human resource point of view (Smeds, 1994). Some studies found that lean strategy from a product level is driven by designing, producing, and selling the right product at the right time (Morgan and Liker, 2006). It has changed the way we have looked at innovation, with the introduction of incremental innovation that, over time, will be disruptive innovation. Regarding lean strategy from a functional level, it focuses on cross-functional cooperation between research & development, production, supply chain, marketing, HR, and finance to pursue shared and mutual objectives (Singh *et al.*, 2009). Finally, studies identifying the lean strategy from a business level depicted the planning, change initiatives, collaborative partnership, but most importantly the strong and robust alignment with the corporate level (Ahmadjian and Lincoln, 2000). This alignment is materialized by hoshin kanri, which strives to create strong links and alignment between management control of day-to-day activities (hoshin) and a compass for direction (kanri). Although studies have investigated lean strategy as one of the most successful management strategies for improving organizational performance (Chen and Taylor, 2009), researchers have found that lean strategy can positively contribute to organizational innovation moderated by human resource management, especially through knowledge management (Shin and Alam, 2022). The aim is to

create a more knowledge-based organization (Nonaka, 1994) that will lead to organizational learning (autonomy and collective learning) anchored in organizational memory (i.e culture). This knowledge-based organization is usually accomplished by reinforcing its dynamic capabilities.

There are multiple ways to achieve a lean strategy (Netland, 2013). What they all have in common is that they create dynamic capabilities to respond to internal and external uncertainties and organizational constraints (Pil and Fujimoto, 2007). These dynamic capabilities are defined as the ability of employees to integrate, construct and reconfigure the competencies they hold to inform the transformations that result from the adoption (Teece *et al.*, 1997). They are displayed throughout Improvement, which relies on a set of interrelated meta-routines to incrementally improve existing products/processes, and throughout Innovation, which relies on a set of interrelated meta-routines to develop new products/processes (Furlan and Vinelli, 2018). These dynamic capabilities emerge as organizational competencies that denote existing learning patterns, as they ultimately modify the learning mechanisms themselves. These organizational competencies will evolve and stabilize into a new collective learning pattern that systematically generates new operational practices (Zollo and Winter, 2002). It should be noted that these dynamic capabilities emerge in the organization through the processes of acclimatization, commitment, and development of employees (i.e the human dimension of lean).

Over time, a complex, intricate system will emerge from these dynamic capabilities. The system components and their connections were already explained in previous research through the lens of complex system theory (Saurin *et al.*, 2013). The lean system emerging from these dynamics capabilities : (1) give visibility to processes, practices, and outcomes, (2) encourage diversity of perspectives when making decisions, (3) anticipate and monitor the impact of small changes,

(4) design slack while anticipating its side-effects, (5) monitor and understand the gap between prescription and practice, (6) create an environment to support and develop organizational resilience. We argue that the lean system most researchers discuss is the outcome of a multi-layered lean strategy, encompassing generalized lean activities, lean behavior patterns, leveraging lean features (agility, quality, *e.g.*) as a competitive advantage, and communicating within the company as a worldview compatible with lean tenets. Adopting lean incorrectly, without considering its strategic aspects, increases the inefficiency of an organization's resources and reduced employee confidence in lean usefulness (Ballé *et al.*, 2017). The success and implementation of any particular management strategy normally depend upon organizational characteristics, which means that all organizations should not or cannot implement a similar set of strategies in their particular case (Shah and Ward, 2003). Therefore, applying the appropriate lean strategy at the appropriate time for the appropriate company for the right purposes seems crucial to leverage the benefits of its adoption. Consideration of organizational contexts such as organization size, and organization resource limitations have been noticeably lacking in research on the execution of lean strategies (Bortolotti *et al.*, 2015; Marodin and Saurin, 2015).

The Five Strategic Fits of lean : a framework

Marksberry (2012), Samuel, Found, and Williams (2015) insisted that organizations need to regard lean as a dynamic phenomenon and one which is constantly developing. This means that lean is viewed as a never-ending long-term commitment (Bhasin and Found 2020). A word of caution is offered by Mårtensson, Snyder, and Ingelsson (2018), who suggest that companies applying lean tend to possess the knowledge of tools and techniques but frequently fail in direction, planning, and adequate project sequencing, *i.e.* the strategical aspects of it.

Based on our previous research, we can argue that these dynamic capabilities are anchored into 5 fits (Ballé *et al.*, 2017):

1. Customer fit: This is the most common fit. It focuses on understanding and satisfying the needs of the customer. It involves the identification of the customer's requirements and expectations and the provision of products and services that meet those needs and maximize value (Womack and Jones, 1996).
2. Market fit: This fit is the understanding and timely response to market demand. It requires monitoring market trends, identifying opportunities for growth or improvement, and developing products and services that are in line with customer needs quickly and efficiently (Morgan and Liker, 2006).
3. People fit: This fit emphasizes the importance of employee satisfaction, involvement, and empowerment at all levels of the organization. It involves first considering the preferences and needs of employees. It then involves creating a culture of continuous improvement, providing training and development opportunities, and involving employees in decision-making processes and knowledge-sharing activities (Alagaraja and Egan, 2013).
4. Technology fit: The focus of this fit is on the use of technology to improve processes and deliver better value to customers or employees. It involves the identification, selection, and implementation of proven technology solutions that support lean principles such as quality detection, visual management, and real-time data analysis (Mothersell, 2009).
5. Capability Fit: This fit is the alignment of the organization's capabilities with its strategic goals and objectives. It requires an understanding of the organization's strengths and weaknesses, identification of areas for improvement, and making sure that strategic directions are consistent with the resources and capabilities needed to achieve them (Anand *et al.*, 2009)

In an in-depth study of dozens of lean transformation efforts (Ballé *et al.*, 2017; Medina and Charles-Lavauzelle, 2020), all veteran researchers and company leaders in the lean field, have shown that we can find at the root of lean thinking a radically different thinking process – leading to both different decision-making and operational realization. This different thinking is based on first *finding* problems at customers, workplace, and suppliers, then *facing* the challenges these problems represent to succeed in the market, to *frame* issues in a way that

everyone in the company can understand what is at stake and so *forming* solutions from sharing individual insights, initiatives, and experiments. This is contrasting to the traditional opposition of strategy and execution represented in leaders *defining* situations in the boardroom, *deciding* on options, *driving* them through the ranks, and then *dealing* with the unexpected consequences of their decisions.

The lean strategy systematically integrates all activities affecting the products and services provided to the firm's customers, from product conception through the product life cycle, whether these activities are performed by the firm itself, or by external suppliers or channel members (Ahmed, 2021). It confirms the importance of vertical linkages—linkages that exist between a firm's value chain and the value chains of its suppliers and channel members (Yusuf and Adeleye, 2002). It also calls for the spanning of boundaries not only within a firm; but between firms to engender a more competitive stance in the global marketplace. Then, the lean strategy consists of fine-tuning the way the organization will adapt to the changes in its environment. It combines transformational change where the organization is dramatically severed from its past ('framebreaking'), and adjustments to the structures, systems, or technology while retaining continuity with the past ('framebending') (Nadler and Tushman, 1989)

To foster all of these changes and adjustments, managerial and human resource management practices are also impacted (Shah and Ward, 2003) and consequently transformed. These modifications will then evolve thanks to cumulative dynamic capabilities (Hansen and Møller, 2016), the ones related to the work system, the ones related to the improvement system, and creating a new set related to the second-level improvement system leading to innovations. Developing a system of continuous collective learning through solving the right problem in the right way at the right time, every time is at the heart of lean strategy. Learning was built into

the purpose of Toyota's strategy, whereas most western companies that have tried to implement lean have failed to include learning as Toyota did.

To conclude this section, we wanted to examine lean as a strategy, specifically through its 5 fits. The 5 fits help us to capture what are the key components to specify to consider a company's lean strategy. We argue that the 5 fits are part of a framework that can be applied to different contexts and that will produce an adapted and specific strategy.

Pathways toward a lean strategy

Consequently, there can be multiple lean strategies, but they are all inspired by the framework we present. As a result, lean systems are specific to each company that adopts this framework (Netland, 2012). This uniqueness can be seen in the many ways to get started with lean.

Traditional adoption process

Looking at the operational declinations of the lean strategy, three models coexist: models constructed by academics; models resulting from consultants' interventions; and models resulting from organizations' adoptions. Most of the models built by academics are the result of quantitative research, thus mixing the specificities of each lean adoption in the considered organization's (Netland, 2013). Models resulting from organizational adoptions are generally empirical, technically biased, and, although influenced by contingency factors, these are rarely specified. Anand and Kodali (2010) while studying adoption models described their shared components: top management commitment, education and training of employees, management of social relations, and management tools (or manufacturing techniques). Whether such traits are specific to lean adoption remains uncertain.

Most strategic models describe Top-Down approaches, i.e., adoption is usually initiated by senior management and implemented by dedicated teams through projects, thus including a limited number of actors. In comparison, bottom-up approaches, based on the emerging initiatives of field employees (including their local managers), have been mostly relegated to the background. Womack and Jones (1996) showed that the Top-Down approach was inevitable in the initial phase of lean adoption. However, it is supposed to give rise to a Bottom-up approach, equipping employees with problem-solving skills that ultimately transform the current organization into a learning organization (Liker, 2004). The field employees, accompanied by the proximity managers, through these daily activities of continuous improvement, participate in the adoption of lean and continue to contribute to its adoption in the organization (Ohno, 1988; Shingo, 1981). Therefore, it seems essential to consider both Top-Down and Bottom-up approach together, to make explicit the strategic dimension of lean. Successful lean transformations use both approaches simultaneously: senior leadership adopts the orientation of lean (focusing on customer satisfaction, improvement of quality, lead times, and total cost reduction) while encouraging bottom-up kaizen from all workplace teams. Driving both top-down and bottom-up initiatives is unusual in Western management and hard to describe according to the traditional management paradigm, which leads researchers to choose one or the other perspective, thereby missing one of the unique components of lean: it's a top-down initiative that rests on bottom-up operational improvement (Ballé et al, 2017). Complementarity between top-down and bottom-up approaches can lead to better adoption sustainability and operational results: this can also add to the 5 fits an additional fit to monitor, the organizational fit (Galeazzo *et al.*, 2021).

The analysis of models resulting from adoption by organizations shows that each company or factory has developed its approach to designing its strategy and resulting management system. Although these empirical models appear difficult to generalize, Anand and Kodali (2010) and

Netland (2013) have shown that some commonalities can emerge. The general message that emerges is that a lean strategy, in its historical form, is adaptable to the circumstances, organizational factors, and contextual factors (Marodin and Saurin, 2015) of the organizations that adopt it. That reinforces the idea that each organization or company should appropriate their adoption process to their specificities and their environment.

Alternative adoption process

With a look back to the roots of lean, we discovered an alternative adoption process that possibly bypass the organizational fit we were discussing previously. Fujimoto (1999) highlights the emergence of a multi-channel lean strategy. This explains the difference between the logic of the initial stage of adoption of the elements of the TPS and their subsequent diffusion in the organization in the second stage. This initial logic has been extensively studied by researchers: Coriat (1991) describes it as a variety of small events and macroscopic conditions responsible for the emergence or, more generally, the self-activation of lean, i.e. a path-dependent logic (Cusumano, 1988). This strategy was not only the result of favorable initial conditions but was shaped through the evolution of the organization. Van Driel and Dolfsma (2009) propose to carefully analyze the timing and effects of the initial conditions that shaped the strategy.

Individual and collective learning meta-routines, interacting with organizational episodes, enabled a dynamic locking-in of the lean strategy: these metamorphoses form a process of adoption that is both voluntaristic and opportunistic. Among these, one meta-routine that has influenced the evolution over a long period is centered on transmission mechanisms: managerial policies on knowledge transfer through the circulation of personnel in the plants, and accumulation through the formal documentation of experiences, can explain the diffusion of the lean strategy at Toyota (Hino, 2005; Van Driel and Dolfsma, 2009). The company's

dedication to this meta-routine still differentiates it from its main competitors: what Toyota does best compared to its rivals is not the rational calculations before each experimentation, but rather the systemization and institutionalization done after each experimentation (Fujimoto, 1999). The sequence of specific events, coupled with the meta-routines, could reveal the emergence of organizational characteristics generated by initial conditions, eventually giving rise to dynamic locking.

This lock-in was possible according to Knuf (1995) and Fujimoto (2012) through continuous transformational learning supported by a processual dimension (preparation, implementation, maintenance, evaluation) and by an interactional dimension (constant reflexivity of employees' perspectives). The operationalization of the lean strategy was materialized using the knowledge and skills of each employee to improve the existing system daily. On this point, even if organizations have adopted lean all over the world, few have truly followed Toyota in that respect (Saito and Cho 2012). TPS capitalizes on the unique characteristic of Japanese culture with respect to employee commitment to organizational goals by incorporating other singular attributes of Western employees. Fujimoto et al. (2009) explain that the development of this dimension is done through education and skill building of each employee so that they can understand the state of the current system, and then improve it toward the future system. Saito and Cho (2012) prefer to use the term "Continuous Learning System" rather than TPS or lean since it makes explicit the dynamic nature of the system.

The processual dimension of the Continuous Learning System is revealed when the incremental adoption phase results in the creation or reinvention of certain organizational features that support the adoption process (Knuf, 1995). Once a solid learning base is in place, the organization is ready to broaden adoption by creating communities of learners, moving from a focus on content (single-loop learning) to systemic learning (double-loop learning) (Barber,

2006). After learning how to work, through a succession of short learning loops, employees learn by working (Argyris, 1993), thus institutionalizing the initial learning. The evaluation phase is based on ongoing evaluations of the learning that accompanies the implementation of the strategy. Since this evaluation is specific to the organization's pace of adoption, it is designed locally by its members. Learning occurs by itself, through a stable social process centered on a permanent questioning of actions to develop the capacity to act of the members of the organization (Knuf, 1995).

Evolutionary learning capability as the key to lean strategy development

The lean strategy incorporates emergent qualities not known in advance related to the creative element in the human dimension (Ohno, 1988). Fujimoto (1999) exposes these through the evolutionary learning capability, which is both intentional and opportunistic in that the organization uses established routines to generate potential improvements, and at the same time, it can capture unexpected emergent improvements while intelligently institutionalizing them. These improvements seem to be possible only because of the human dimension of the system, i.e., its evolutionary learning capability (Cho, 1995). Importantly, this evolutionary learning capability is one of the dynamic capabilities we discussed earlier.

The Toyota environment is strongly influenced by the concepts of Monozukuri and Hitozukuri (Sugimori *et al.*, 1977). It is often recalled that the focus on quality and continuous improvement is achieved through Hitozukuri. Hitozukuri symbolizes the education of employees, but also a social and continuous process that allows employees to develop their skills, and to achieve recognition of their know-how and ability to solve problems in an atmosphere of mutual trust (Ballé *et al.*, 2017). By empowering employees, they naturally deepen their practice and learn on their own to perform them more effectively. This concept is often named in Western literature as the principle of "Respect for People" (Sugimori *et al.*,

1977). This principle is found in the Toyota Way and is characterized by the promotion of the best possible human relationships between employees, centered around mutual trust, transparency, accountability, motivation, and sound personnel recruitment and promotion policies. Womack and Shook (2011) argue that for Toyota, "Respect for People" refers to the psychological process built through a series of meaningful dialogues between managers and their employees to help them identify dysfunction and empower them to act. It is about giving meaningful activities to perform, ensuring that the environment is conducive to their execution, and then generating learning situations for employees. This construct implicitly captures the human resource development often referenced in the Toyota literature (Jayamaha *et al.*, 2014), as an inherent part of the lean strategy.

Human resource skill development is grounded in a combination of individual learning through interactional deepening with managers in Toyota, or lean experts in adopting organizations (Cho, 1995). Learning does not come only from training or from an accumulation of information, but from interactions between employees. Hitozukuri aims to educate employees to continuously use their knowledge and wisdom to maintain stable process-related conditions and respond to anomalies in the organizational environment while capitalizing to improve its functioning. Finally, Hitozukuri is akin to the continuous process of human development around actions and interactions among actors (Saito *et al.* 2011).

As a result, there has been a shift from seeing lean as purely a process-oriented strategy to lean as a people-oriented strategy (Jayamaha *et al.*, 2014; Marodin and Saurin, 2013). Drawing on the work of Fujimoto (1999) and Saito (1995), the lean strategy is therefore based on a dynamic learning system that has evolved according to contextual constraints, but also according to random trials, successive capitalizations, and knowledge transfer mechanisms. This dynamic

learning system is animated through the existence and development of an evolutionary learning capability operated by all employees embodied by the Hitozukuri.

Conclusion and Future Research

In Western organizations, the key to prosperity lies in seeking to increase productivity. Previous research tells us that productivity can be the result of three factors: work (sought through organization and optimization), financial capital (sought through investment and innovation), and human capital (sought through education, development, and use of skills). Human capital, through lean, has a leverage effect on work (better organization, well-being, alignment) and financial capital (innovation acceptance and improvement idea generation). The lean strategy proposes and postulates that human capital is not acquired outside the company, but through educational activities daily, in the work environment, while working. This is exemplified by the Hitozukuri principle that create an evolutionary learning capability. Learning is, therefore, inseparable from production. Lean becomes a strategy for the acceptance and valuation of human capital to make better use of labor and financial capital, which consequently becomes a major competitive advantage. All employees accept that they can make mistakes. Above all, they are committed to identifying, understanding, and solving them. The lean system anchored in the strategy is designed to highlight these errors and give people the tools and skills to deal with them. At the same time, it develops their expertise, which ultimately delivers more value to the customer. This is achieved by specializing in one's field and by working in teams to improve coordinating expertise. This results in a more flexible organization, which can be used to implement a more adaptive and dynamic strategy.

The literature is consistent in its message that lean sustainability is characterized by four traits: scale (organization-wide), magnitude (influences the status quo), duration (can take years), and

strategic importance. History shows that Toyota has the most adaptive strategy regarding contextual, economic, and environmental aspects of the competitive market but also regarding crisis management. Lean is viewed as a dynamic strategy, in comparison to static strategies clarified by Porter (2008), that is supported by a specific evolutionary learning capability intertwining value chain control with dynamic capabilities development (Soliman *et al.*, 2018).

The first steps to understanding the lean strategy can be explained as follow:

- 1/ knowing what needs to be done better in the organization (learning to identify/see what is in one's interest to improve, starting with what will convince customers)
- 2/ developing problem-solving routines that will, with time, shape an improvement culture (learn to improve individually and collectively)
- 3/ investing the gains generated by problem-solving activities in what needs to be done better and in what needs to be started (learn to capitalize and innovate).

The lean strategy, through mostly its evolutionary learning capability, can also be viewed as a strategy-as-practice (Sage *et al.*, 2012), i.e. something that people do rather than something that a firm possesses. Looking at the practical aspects of lean helps connect the macro and micro-practices of strategizing (Jarzabkowski *et al.*, 2007). It also stretches the way strategies are not only disseminated but appropriated, translated, and transformed by specific people, artifacts, and events, often in an unintentional way. To open the discussion, looking deeper into lean as a survival strategy, especially during these difficult times (Singh *et al.*, 2009) can provide more details about its strategic features.

We would like to suggest avenues for future research. The first avenue is to keep studying lean through the prism of strategy. This was the main purpose of this chapter, and we specified future directions in this regard throughout the article. The second avenue would be to study in a more

qualitative and contextual way the organizations by making explicit their strategy and the researcher's point of view to mitigate the interpretations. Researchers often use different interpretations of lean, sometimes implicitly, and therefore it is difficult to generalize the research results. It is about turning the feeling of knowledge into the actual creation of knowledge. The third avenue is to continue to strengthen the knowledge acquired about lean, moving from accumulation to assimilation of knowledge. It is our belief that this will be the best way to emphasize that lean is a new paradigm, rather than a mix of functionalist paradigms (as described by Hoss and ten Caten (2013)). It is going to reveal new questions to explore.

By doing so, future research could then reevaluate the interdependency of the lean strategies, the lean organization or systems resulting from it, and the impact of the interdependency on the outcomes. Paradoxically, this was a question addressed by early studies of lean, from the most positive (Womack *et al.*, 1990) to the most pessimistic (Boyer and Freyssenet, 2000). The fact that this question endures – and not the issue of the “perimeter of validity” of lean, which was the other issue raised early by lean critics (Freyssenet *et al.*, 2012) – testifies to the success of lean on the ground.

References

- Adler, P.S. and Cole, R.E. (1993), “Designed for Learning: A Tale of Two Auto Plants”, *Sloan Management Review*, Vol. 34 No. 3, pp. 85–94.
- Åhlström, P., Danese, P., Hines, P., Netland, T.H., Powell, D., Shah, R., Thürer, M., *et al.* (2021), “Is lean a theory? Viewpoints and outlook”, *International Journal of Operations & Production Management*, Emerald Publishing Limited, Vol. 41 No. 12, pp. 1852–1878, doi: 10.1108/IJOPM-06-2021-0408.
- Ahmadjian, C.L. and Lincoln, J.R. (2000), “Keiretsu, Governance, and Learning: Case Studies in Change from the Japanese Automotive Industry”.
- Ahmed, W. (2021), “Understanding alignment between lean and agile strategies using Triple-

- A model”, *International Journal of Productivity and Performance Management*, Emerald Publishing Limited, Vol. 71 No. 5, pp. 1810–1828, doi: 10.1108/IJPPM-04-2020-0176.
- Alagaraja, M. and Egan, T. (2013), “The strategic value of HRD in lean strategy implementation.”, *Human Resource Development Quarterly*, Vol. 24 No. 1, pp. 1–27.
- Anand, G. and Kodali, R. (2010), “Analysis of lean manufacturing frameworks”, *Journal of Advanced Manufacturing Systems*, Vol. 09 No. 01, pp. 1–30, doi: 10.1142/S0219686710001776.
- Anand, G., Ward, P.T., Tatikonda, M.V. and Schilling, D.A. (2009), “Dynamic capabilities through continuous improvement infrastructure”, *Journal of Operations Management*, Vol. 27 No. 6, pp. 444–461, doi: 10.1016/j.jom.2009.02.002.
- Argyris, C. (1993), *Knowledge for Action: A Guide to Overcoming Barriers to Organizational Change*, 1 edition., Jossey-Bass, San Francisco.
- Ballé, M., Chaize, J. and Jones, D. (2019), “Lean as a learning system: What do organizations need to do to get the transformational benefits from Toyota’s method?”, *Development and Learning in Organizations: An International Journal*, Emerald Publishing Limited, Vol. 33 No. 3, pp. 1–4, doi: 10.1108/DLO-11-2018-0147.
- Ballé, M., Chartier, N., Coignet, P., Olivencia, S., Powell, D. and Reke, E. (2019), *The Lean Sensei: Go see and Challenge*, Lean Enterprise Institute, Incorporated, Boston, MA.
- Ballé, M., Jones, D., Chaize, J., Fiume, O. and Ehrenfeld, T. (2017), *The Lean Strategy: Using Lean to Create Competitive Advantage, Unleash Innovation, and Deliver Sustainable Growth*, McGraw Hill Higher Education, New York.
- Barber, J.C. (2006), “From the working class to the learning class”, *National Productivity Review*, Vol. 13 No. 4, pp. 461–466, doi: 10.1002/npr.4040130402.
- Belekoukias, I., Garza-Reyes, J.A. and Kumar, V. (2014), “The impact of lean methods and tools on the operational performance of manufacturing organisations”, *International Journal of Production Research*, Vol. 52 No. 18, pp. 5346–5366, doi: 10.1080/00207543.2014.903348.
- Bhamu, J. and Sangwan, K.S. (2014), “Lean manufacturing: literature review and research issues”, *International Journal of Operations & Production Management*, Vol. 34 No. 7, pp. 876–940, doi: 10.1108/IJOPM-08-2012-0315.
- Bortolotti, T., Boscari, S. and Danese, P. (2015), “Successful lean implementation: Organizational culture and soft lean practices”, *International Journal of Production Economics*, Vol. 160, pp. 182–201, doi: 10.1016/j.ijpe.2014.10.013.
- Boyer, R. and Freyssenet, M. (2000), *Les Modèles productifs*, La Découverte, Paris.
- Brännmark, M. and Benn, S. (2012), “A Proposed Model for Evaluating the Sustainability of

Continuous Change Programmes”, *Journal of Change Management*, Vol. 12 No. 2, pp. 231–245, doi: 10.1080/14697017.2012.672449.

Byrne, A. (2012), *The Lean Turnaround: How Business Leaders Use Lean Principles to Create Value and Transform Their Company*, McGraw-Hill Education, New York.

Chandler, J.A.D. (1962), *Strategy and Structure: Chapters in the History of the American Industrial Enterprise*, Beard Books, Washington, D.C.

Chen, H. and Taylor, R. (2009), “Exploring the impact of lean management on innovation capability”, *PICMET '09 - 2009 Portland International Conference on Management of Engineering & Technology*, presented at the PICMET '09 - 2009 Portland International Conference on Management of Engineering & Technology, pp. 826–834, doi: 10.1109/PICMET.2009.5262042.

Cho, F. (1995), “Toyota Production System”, in Saito, K. (Ed.), *Principles of Continuous Learning Systems*, Vol. 1, McGraw-Hill, New York.

Coriat, B. (1991), *Penser à l'envers : Travail et organisation dans l'entreprise japonaise*, Nouv. éd., Christian Bourgois Editeur, Paris.

Cusumano, M.A. (1988), “Manufacturing Innovation: Lessons from the Japanese Auto Industry.”, *Sloan Management Review*, Vol. 30 No. 1, pp. 29–39.

Drew, J., McCallum, B. and Roggenhofer, S. (2004), *Journey to Lean: Making Operational Change Stick*, 1st edition., Palgrave Macmillan, New York.

Freyssenet, M., Mair, A., Shimizu, K. and Volpato, G. (2012), *Quel modèle productif? Trajectoires et modèles industriels des constructeurs automobiles mondiaux*, La découverte, Paris, France.

Fujimoto, T. (1999), *Evolution of Manufacturing Systems at Toyota*, 1st edition., Productivity Press, New York.

Fujimoto, T. (2012), “The Evolution of Production Systems”, *Annals of Business Administrative Science*, Vol. 11, pp. 25–44, doi: 10.7880/abas.11.25.

Fujimoto, T., Shimokawa, K., Womack, J. and Miller, W. (2009), *The Birth of Lean*, Lean Enterprise Institute, Inc., Cambridge, Mass.

Furlan, A. and Vinelli, A. (2018), “Unpacking the coexistence between improvement and innovation in world-class manufacturing: A dynamic capability approach”, *Technological Forecasting and Social Change*, Vol. 133, pp. 168–178, doi: 10.1016/j.techfore.2018.03.022.

Galeazzo, A., Furlan, A. and Vinelli, A. (2021), “The role of employees’ participation and managers’ authority on continuous improvement and performance”, *International Journal of Operations & Production Management*, Emerald Publishing Limited, Vol. 41 No. 13, pp. 34–

64, doi: 10.1108/IJOPM-07-2020-0482.

Hansen, D. and Møller, N. (2016), “Conceptualizing Dynamic Capabilities in Lean Production: What are They and How Do They Develop?”, *Engineering Management Journal*, Taylor & Francis, Vol. 28 No. 4, pp. 194–208, doi: 10.1080/10429247.2016.1238727.

Helmold, M. (2020), “Lean Management as Part of the Corporate Strategy”, in Helmold, M. (Ed.), *Lean Management and Kaizen: Fundamentals from Cases and Examples in Operations and Supply Chain Management*, Springer International Publishing, Cham, pp. 45–55, doi: 10.1007/978-3-030-46981-8_5.

Hines, P., Holweg, M., and Nick Rich. (2004), “Learning to evolve”, *International Journal of Operations & Production Management*, Vol. 24 No. 10, pp. 994–1011, doi: 10.1108/01443570410558049.

Hino, S. (2005), *Inside the Mind of Toyota: Management Principles for Enduring Growth*, Productivity Press, New York.

Hoss, M. and ten Caten, C.S. (2013), “Lean schools of thought”, *International Journal of Production Research*, Vol. 51 No. 11, pp. 3270–3282, doi: 10.1080/00207543.2012.762130.

Jarzabkowski, P., Balogun, J. and Seidl, D. (2007), “Strategizing: The challenges of a practice perspective”, *Human Relations*, SAGE Publications Ltd, Vol. 60 No. 1, pp. 5–27, doi: 10.1177/0018726707075703.

Jayamaha, N.P., Wagner, J.P., Grigg, N.P., Campbell-Allen, N.M. and Harvie, W. (2014), “Testing a theoretical model underlying the ‘Toyota Way’ – an empirical study involving a large global sample of Toyota facilities”, *International Journal of Production Research*, Vol. 52 No. 14, pp. 4332–4350, doi: 10.1080/00207543.2014.883467.

Karlsson, C. and Åhlström, P. (1996), “Assessing changes towards lean production”, *International Journal of Operations & Production Management*, Vol. 16 No. 2, pp. 24–41.

Knuf, J. (1995), “Changing organizational cultures in the lean manufacturing environment”, *Principles of Continuous Learning Systems*, McGraw-Hill., Vol. 1, New York, pp. 57–82.

Lee, B.-H. and Jo, H.-J. (2007), “The mutation of the Toyota Production System: adapting the TPS at Hyundai Motor Company”, *International Journal of Production Research*, Vol. 45 No. 16, pp. 3665–3679, doi: 10.1080/00207540701223493.

Lewis, M.A. (2000), “Lean production and sustainable competitive advantage”, *International Journal of Operations & Production Management*, Vol. 20 No. 8, pp. 959–978, doi: 10.1108/01443570010332971.

Liker, J. (2004), *The Toyota Way: 14 Management Principles from the World’s Greatest Manufacturer*, 1st edition., McGraw-Hill, New York.

- Losonci, D., Demeter, K. and Jenei, I. (2011), “Factors influencing employee perceptions in lean transformations.”, *International Journal of Production Economics*, Vol. 131 No. 1, pp. 30–43.
- Marksberry, P. (2012), *The Modern Theory of the Toyota Production System: A Systems Inquiry of the World’s Most Emulated and Profitable Management System*, 1st ed., CRC Press.
- Marodin, G.A. and Saurin, T.A. (2013), “Implementing lean production systems: research areas and opportunities for future studies”, *International Journal of Production Research*, Vol. 51 No. 22, pp. 6663–6680, doi: 10.1080/00207543.2013.826831.
- Marodin, G.A. and Saurin, T.A. (2015), “Managing barriers to lean production implementation: context matters”, *International Journal of Production Research*, Vol. 53 No. 13, pp. 3947–3962, doi: 10.1080/00207543.2014.980454.
- Mårtensson, A., Snyder, K. and Ingelsson, P. (2018), “Interlinking Lean and sustainability: how ready are leaders?”, *The TQM Journal*, Emerald Publishing Limited, Vol. 31 No. 2, pp. 136–149, doi: 10.1108/TQM-04-2018-0046.
- Medina, R. and Charles-Lavauzelle, B. (2020), *Learning to Scale: The Secret to Growing a Fast and Resilient Company*, Régis Medina, Sèvres.
- Mintzberg, H. (1987), “The Strategy Concept I: Five Ps for Strategy”, *California Management Review*, SAGE Publications Inc, Vol. 30 No. 1, pp. 11–24, doi: 10.2307/41165263.
- Modig, N. and Åhlström, P. (2012), *This Is Lean: Resolving the Efficiency Paradox*, 1st Edition., Rheologica Publishing.
- Morgan, J.M. and Liker, J.K. (2006), *The Toyota Product Development System: Integrating People, Process And Technology*, 1st edition., Productivity Press, New York.
- Mothersell, W.M. (2009), “The role of technology and people in the diffusion of lean production in the automotive supplier industry.”, *International Journal of Automotive Technology & Management*, Vol. 9 No. 3, pp. 290–315.
- Nadler, D.A. and Tushman, M.L. (1989), “Organizational Frame Bending: Principles for Managing Reorientation”, *Academy of Management Perspectives*, Academy of Management, Vol. 3 No. 3, pp. 194–204, doi: 10.5465/ame.1989.4274738.
- Negrão, L.L.L., Filho, M.G. and Marodin, G. (2017), “Lean practices and their effect on performance: a literature review”, *Production Planning & Control*, Vol. 28 No. 1, pp. 33–56, doi: 10.1080/09537287.2016.1231853.
- Netland, T.H. (2012), “Managing strategic improvement programs: the XPS program management framework”, *Journal of Project, Program & Portfolio Management*, Vol. 3 No. 1, pp. 31–44.

- Netland, T.H. (2013), "Exploring the phenomenon of company-specific production systems: one-best-way or own-best-way?", *International Journal of Production Research*, Vol. 51 No. 4, pp. 1084–1097, doi: 10.1080/00207543.2012.676686.
- Nonaka, I. (1994), "A dynamic theory of organizational knowledge creation", *Organization Science*, Institute for Operations Research & the Management Sciences (INFORMS), US, Vol. 5, pp. 14–37, doi: 10.1287/orsc.5.1.14.
- Ohno, T. (1988), *Toyota Production System: Beyond Large-Scale Production*, Productivity Press, New York.
- Pettersen, J. (2009), "Defining lean production: some conceptual and practical issues", *TQM Journal*, Vol. 21 No. 2, pp. 127–142, doi: 10.1108/17542730910938137.
- Pil, F.K. and Fujimoto, T. (2007), "Lean and reflective production: the dynamic nature of production models", *International Journal of Production Research*, Vol. 45 No. 16, pp. 3741–3761, doi: 10.1080/00207540701223659.
- Porter, M.E. (2008), *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, Illustrated édition., Free Press.
- Rother, M. and Shook, J. (1999), *Learning to See: Value Stream Mapping to Add Value and Eliminate Muda*, Productivity Press, Boston.
- Sage, D., Dainty, A. and Brookes, N. (2012), "A 'Strategy-as-Practice' exploration of lean construction strategizing", *Building Research & Information*, Routledge, Vol. 40 No. 2, pp. 221–230, doi: 10.1080/09613218.2012.655925.
- Saito, A., Kozo, S. and Cho, F. (2012), *Seeds of Collaboration: Seeking the Essence of the Toyota Production System, an Appreciation of Mr. Fujio Cho, Master Teacher*, Larkspur Press, Monterey, Ky.
- Saito, K. (1995), *Principles of Continuous Learning Systems*, Vol. 1, McGraw-Hill, New York.
- Saito, K., Salazar, A.J., Kreafler, K.G. and Grulke, E.A. (2011), "Hitozukuri and Monozukuri: Centuries' Old Eastern Philosophy to Seek Harmony with Nature", *Interdisciplinary Information Sciences*, Vol. 17 No. 1, pp. 1–9, doi: 10.4036/iis.2011.1.
- Samuel, D., Found, P. and Williams, S. (2015), "How did the publication of the book *The Machine That Changed The World* change management thinking? Exploring 25 years of lean literature", *International Journal of Operations & Production Management*, Vol. 35, doi: 10.1108/IJOPM-12-2013-0555.
- Saurin, T.A., Rooke, J. and Koskela, L. (2013), "A complex systems theory perspective of lean production", *International Journal of Production Research*, Vol. 51 No. 19, pp. 5824–5838, doi: 10.1080/00207543.2013.796420.

- Secchi, R. and Camuffo, A. (2019), “Lean implementation failures: The role of organizational ambidexterity”, *International Journal of Production Economics*, Vol. 210, pp. 145–154, doi: 10.1016/j.ijpe.2019.01.007.
- Shah, R. and Ward, P.T. (2003), “Lean manufacturing: context, practice bundles, and performance”, *Journal of Operations Management*, Vol. 21 No. 2, pp. 129–149.
- Shah, R. and Ward, P.T. (2007), “Defining and developing measures of lean production”, *Journal of Operations Management*, Vol. 25 No. 4, pp. 785–805, doi: 10.1016/j.jom.2007.01.019.
- Shin, D. and Alam, M.S. (2022), “Lean management strategy and innovation: moderation effects of collective voluntary turnover and layoffs”, *Total Quality Management & Business Excellence*, Routledge, Vol. 33 No. 1–2, pp. 202–217, doi: 10.1080/14783363.2020.1826923.
- Shingo, S. (1981), *Study of “Toyota” Production System from the Industrial Engineering Viewpoint*, Japanese Management Association, Tokyo.
- Singh, B., Garg, S.K. and Sharma, S.K. (2009), “Lean can be a survival strategy during recessionary times”, *International Journal of Productivity and Performance Management*, Emerald Group Publishing Limited, Vol. 58 No. 8, pp. 803–808, doi: 10.1108/17410400911000426.
- Smeds, R. (1994), “Managing Change towards Lean Enterprises”, *International Journal of Operations & Production Management*, Vol. 14 No. 3, pp. 66–82.
- Soliman, M., Saurin, T.A. and Anzanello, M.J. (2018), “The impacts of lean production on the complexity of socio-technical systems”, *International Journal of Production Economics*, Vol. 197 No. C, pp. 342–357.
- Soliman, M.H.A. (2013), “Lean Transformation Guidance: Why Organizations Fail to Achieve and Sustain Excellence Through Lean Improvement”, *International Journal of Lean Thinking*, Vol. 4 No. 1, pp. 31–40.
- Stacey, R.D. (1996), *Complexity and Creativity in Organizations*, Berrett-Koehler.
- Sugimori, Y., Kusunoki, K., Cho, F. and Uchikawa, S. (1977), “Toyota production system and Kanban system Materialization of just-in-time and respect-for-human system.”, *International Journal of Production Research*, Vol. 15 No. 6, pp. 553–564.
- Teece, D.J., Pisano, G. and Shuen, A. (1997), “Dynamic capabilities and strategic management”, *Strategic Management Journal*, Vol. 18 No. 7, pp. 509–533, doi: 10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z.
- Van Driel, H. and Dolfsma, W. (2009), “Path dependence, initial conditions, and routines in organizations: The Toyota production system re-examined”, *Journal of Organizational Change*

Management, Vol. 22 No. 1, pp. 49–72, doi: 10.1108/09534810910933906.

Volberda, H.W. (2006), “Strategic Flexibility Creating Dynamic Competitive Advantages”, in Campbell, A. and Faulkner, D.O. (Eds.), *The Oxford Handbook of Strategy: A Strategy Overview and Competitive Strategy*, Oxford University Press, p. 0, doi: 10.1093/oxfordhb/9780199275212.003.0031.

Womack, J.P. and Jones, D.T. (1996), *Lean Thinking: Banish Waste And Create Wealth In Your Corporation*, Second revision (2003)., Simon & Schuster, New York.

Womack, J.P., Jones, D.T. and Roos, D. (1990), *The Machine That Changed the World: The Story of Lean Production*, Reprint edition (2000)., Free Press, New York.

Womack, J.P. and Shook, J. (2011), *Gemba Walks*, 1 edition., Lean Enterprises Inst Inc, Cambridge, MA.

Yusuf, Y.Y. and Adeleye, E.O. (2002), “A comparative study of lean and agile manufacturing with a related survey of current practices in the UK”, *International Journal of Production Research*, Taylor & Francis, Vol. 40 No. 17, pp. 4545–4562, doi: 10.1080/00207540210157141.

Zollo, M. and Winter, S.G. (2002), “Deliberate Learning and the Evolution of Dynamic Capabilities”, *Organization Science*, Vol. 13 No. 3, pp. 339–351.