Chapter

Organizational Identity, Corporate Strategy, and Habits of Attention: A Case Study of Toyota

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Abstract

This chapter links organizational identity as a cohesive attribute to corporate strategy and a competitive advantage, using Toyota as a case study. The evolution of Toyota from a domestic producer, and exporter, and now a global firm using a novel form of lean production follows innovative tools of human resources, supply chain collaboration, a network identity to link domestic operations to overseas investments, and unparalleled commercial investments in technologies that make the firm moving from a sustainable competitive position to one of unassailable advantage in the global auto sector. The chapter traces the strategic moves to strength Toyota's identity at all levels, including in its overseas operations, to build a global ecosystem model of collaboration.

Keywords: institutional identity, lean management, learning symmetries, docility, habits of attention, kaizen

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"There is no use trying" said Alice, "we cannot believe impossible things."—Lewis Carroll

1. Introduction

Few organizations combine the institutional benefits of longevity and tradition with the disruptive startup advantages of novelty and suspension of path dependent behavior. This chapter provides a case study of Toyota Corporation, an organization with an explicit philosophy that embodies "...standardized work and kaizen (that) are two sides of the same coin. Standardized work provides a consistent basis for maintaining productivity, quality and safety at high levels. Kaizen furnishes the dynamics of continuing improvement and the very human motivation of encouraging individuals to take part in designing and managing their own jobs" ([1], p. 38). Toyota's philosophy, combining a model that is "stable and paranoid, systematic experimental, formal and frank" [2], often called the Toyota Way, evolved from the founding of Toyoda Automatic Loom Works, founded in 1911, setting up an auto division in 1933, and Toyota Motor Company in 1937 [3].

What is unique about Toyota and its pioneering lean production, described colloquially as just-in-time (JIT), embraces a deliberative philosophy that establishes a corporate identity for safety, quality, and aspirational performance goals. Going forward, with plants and distribution centers around the world, Toyota cultivates a direct involvement of employees, suppliers, and other organizations, called the Toyota Group, as a network identity that extends boundary members of the firm's eco-system that also embodies detailed performance measures to strengthen and reinforce identity enhancement. These identity attributes creating novel and seemingly contradictory configurations, both at home and now in global markets. Toyota provides a framework to link identity as a cohesive attribute for problem-solving with explicit, data-driven benchmarks, a DNA that encompasses observation, analysis, hypothesis testing from the shop floor to the executive suite [3, 4].

The concept of *identity* has a long pedigree in the social sciences, dating from classical writers like Adam Smith, Karl Marx, Max Weber, and Emile Durkheim, focusing on individual identities separate and distinct from larger social systems arising from the division of labor. However, identity in organizations is a relatively new construct, based on claims that are "central, distinctive, and enduring" [5]. Despite the growing literature on organizational identity [6, 7], there is less consensus given the multiple disciplinary focus, the levels of analysis, well as minimum empirical work linking organizational identity to corporate strategy. In some cases, identity linkages touch on outcomes like brand equity, reputation, visual media like social networking and the gap between defining what the organization is today and what it wants to become, despite the high failure rate of firms [8]. Indeed, there is little reason to doubt that "the concept of organizational identity is suffering an identity crisis" ([9], p. 206).

Despite the growing literature on organization identity, encompassing diverse constructs and methodologies [6, 7], often at different organizational levels (individuals, groups and senior management), has limited empirical study linking individual and group identity both to corporate strategy and corporate performance. Various accounts of social experiences, concentrating on a sense of insider and outsider to frame a mutual identity mindset that shapes organizational identity, apply personal histories and narratives, but leave open the distinction between corporate identity and organizational identity [10]. Identity producing mechanisms flowing from purposeful actions vary by context, such as universities and faith-based organizations to technology and engineering organizations with complicated role activities grounded in socio-technical design [11]. Compelling cases of identity as a tool for organizational integration, or the impact of cleavage and conflict owing to human diversity policies, personality characteristics of key actors, and sub-unit identity images advance understanding of behavior within organizations, but often ignores how both strategic choice and external forces impact these internal mindsets. Many scholars associate internal identity issues to external stakeholders using sundry communication tools (e.g., [12]) but the literature has few studies that explain what organizational identity features are truly different and give a competitive advantage in contested markets over time. To advance hypothesis testing and to encourage conceptual development in both theory and practice, there must be a linkage to identity as a construct that provides insights to an organization's competitive advantage.

This chapter addresses the issues linking strategic choices and capabilities to Toyota's identity as a case study. Toyota's strategic positioning and high-performance outcomes amplify identity tools at three levels, its employees (both in Japan and its factories overseas), its suppliers, and its customers. Depicted as a best practice company [13], Toyota is seen as a model to emulate in sectors as diverse as hospitals and retailing. This chapter has three objectives: first, by examining Toyota's

transformation as a leading domestic producer to a top global company, the firm's core identity has changed little despite numerous internal and external changes; second, Toyota as a case study illustrates the capacity to have multiple images in different contexts, without sacrificing its core identity; and third, the chapter offers recommendations for empirical studies of organizational identity.

2. Organizational identification and identity

In their seminal article, Stuart and Whetten [5] put forward the concept of organizational identity constituting a set of "claims" and specified what was central, distinctive and enduring, but recognizing that organizations can have multiple identities and claims that can be contradictory, ambiguous, or even unrelated. While some authors have attempted to provide more clarity, Pratt addresses the construct of identity and its generality, stating it was "often overused and under specified" beyond general statements about "who are we?" and "who do we want to become?"

Historically, identity and identification are described in classical writings focusing on societies, social systems, and their constituent parts. Such examples as Adam Smith in economics on the division of labor, Babbage on the division of work tasks, Marx on division of social class, Max Weber on the division of status and occupation, and Durkheim on differentiated social structures, each contributed to current views of how individuals, groups, and teams become a cohesive collective in a complex organization. More specifically, Durkheim's [14] analysis of the division of labor and differentiated social structures with distinct socio-psychological values and impacts required variations in role homogeneity in sub-systems.[1] His views influenced subsequent writers as diverse as Freud in psychiatry and Harold Laswell in political theory, whose study of world politics includes a chapter entitled "Nations and Classes: The Symbols of Identification."

Simon [15] introduced identification to organization theory, describing it as follows: "the process of identification permits the broad organizational arrangements to govern the decisions of the persons who participate in the structure" (p. 102). More specifically, "a person identifies himself with a group when, in making a decision, he evaluates the several alternatives of choice in terms of their consequences for the specified group" in contrast to personal motivation, where "his evaluation is based upon an identification with himself or his family" ([16], p. 206). Both the fault lines of identity, based on status, perverse incentives, class or occupation, as well as group identification [17] impact organizational performance by variations in shared goals and preferences, as well as forms of interaction and feedback, often enhanced or lessoned by recruitment patterns and work rules and incentives.

Identity and identification as reference points in organizations also flow from the configuration of roles, role structures, and "clusters of activities" where "a person has an occupational self-identity and is motivated to behave in ways which affirm and enhance the value attributes of that identity" ([18], p. 179). Theories of social identity assume individual identity is partitioned into ingroups and outgroups is social situations and organizational life, often with an implicit cost–benefit calculation, but acts of altruistic behavior, where behavioral norms benefit the welfare of others, often seen in "collectivist societies," strengthens organizational identity [19]. Other approaches take a social constructionist approach,

[1] To quote Durkeim [14] directly, "…as we advance in the evolutionary scale, the ties which bind the individual to his family, to his native soil, to traditions which the past has given to him, to collective group images, become loose…' (p. 259).

emphasizing social and cultural perspectives [20], where sense-making comes from stories and narratives of everyday experience [21], thereby, "...in linking identity and narrative in an individual, we link an individual [career] story to a particular cultural and historical narrative of a group" [22]. Going further, Dutton et al. [23] speculate that organizational identification is a process of self-categorization cultivated by distinctive, central, and enduring attributes that get reflected in corporate image, reputation, or strategic vision. Alvesson [24] describes the need for identity alignment: "...by strengthening the organization's identity—its experienced distinctiveness, consistency, and stability—it can be assumed that individual identities and identification will be strengthen with what they are supposed to be doing at their work place."

While some studies [25] purport to focus on managerial strategies that project images as a tool to shape distinctive identities with stakeholders, the reality is that organizational identities without corresponding integration of individual, sub-unit, or group identification may lead to behavioral frictions, and detachment via lower compliance and cues of detachment. Conflict and cleavages affect group-binding identification, often persisting as conformity of opinion, forms of social interaction, and group loyalties, as well as enhancing internal legitimacy for desired outcomes. While both individuals and groups may have multiple and loosely connected identities, there remains lingering organizations dysfunctions that exacerbate cleavage and conflict, such as hypocrisy, selective amnesia, or disloyalty [18]. Psychological exit comes from unsatisfactory outcomes, a form of weakening organizational identity and strengthening group identity to give voice for remedial actions [26]. In the extreme, such sub-identities found in groups and sub-units compete with other forms of identification and may lead to organizational dysfunctions [17].

Akerlof and Kranton [27] view organizational identity, with emphasis on why firms must transform workers from outsiders to insiders, as a form of motivational capital. In short, a distinctive identity is a distinctive competence. To quote Likert [28]. "the favorable attitudes towards the organization and the work are not those of easy complacency but are the attitudes of identification with the organization and its objectives and a high sense of involvement in achieving them" (p. 98). Other theorists suggest variations in organizational identity impact sense-making and interpretative processes [29], internalization of learning [10] and processes linking shared values and modes of performance [30].

Identity and identification cues, viewed as the mental perceptions of individual self-awareness, social interactions and experiences, and self-esteem have many antecedents, such as social class [31], demographic factors like age, race, religion, or sex [32], and national culture and identity [33]. Studies emphasizing social construction perspectives stem from individual accounts, often defined in social narratives, histories, and biographies rooted in time and place [34]. As Hammack [22] emphasizes, "...in linking identity and narrative in an individual, we link an individual story to a particular cultural and historical narrative of a group" (p. 230). At a general level, organizational culture depicts the set of norms and values that are widely shared and strongly held throughout the organization [35], and refers to the "unspoken code of communication among members of an organization" [36] and aids and supplements task coordination and group identity. In this way, individual employees better understand the premises of decision choices in problem solving at the organizational level. In complex organizations, identity is linked to the strategic capacity of choice opportunities and implementation dynamics of priorities and preferences. As Thoenig and Paradieise [37] emphasize, "strategic capacity lies to a great extent in how much its internal subunits ... shape its identity, define its priorities approve its positions, prepare the way for general agreement to

be adopted on its roadmap and provide a framework for the decisions and acts of all its components" (p. 299).

Such diverse views leave open how organizational identity, or shared central vision, confers competitive advantage in contested spaces. As a starting hypothesis, a shared identity strengthens coordination across diverse groups applying common norms, codes and protocols, hence improving shared learning skills. In a similar vein, individual cleavages and loyalties are lessoned by shared interactions and information sharing that mobilize learning tools. Further, organizational identity strengthens individual identities via performance success that promotes a shared set of preferences, expectation, and habits of rule setting.

3. Organizational performance at Toyota

By any standards—shareholder value, product innovation, employee satisfaction measured by low turnover and lack of strike action, market capitalization—Toyota has been astonishingly successful, both against rival incumbents in the auto sector, but as a organizational pioneer in transportation with just-in-time thinking. Against existing rivals at home, or in an industry with firms pursuing growth by alliances and acquisition (Renault-Nissan-Mitsubishi, VW-Porsche), facing receivership and saved by public funding (GM and Chrysler), exiting as a going concern (British Leyland) or new startups (Tesla). Toyota's performance is unrivaled. Toyota remains a firm committed to organic development, steady and consistent market share in all key international markets, and cultivating a shared identity within its eco-system around measurable outcomes of product safety, quality, and consumer value.

As shown in **Figure 1**, despite many forms of competitive advantages, such as size, high domestic market share, being part of a larger group, or diversification, there are many times when the side expected to win actually is less profitable and may actually lose. Toyota's growth and expansion, despite the turbulent 2009 recall and temporary retreats [38, 39], comes with consistent profitability and market share growth. In this organizational transformation, Toyota has replicated its

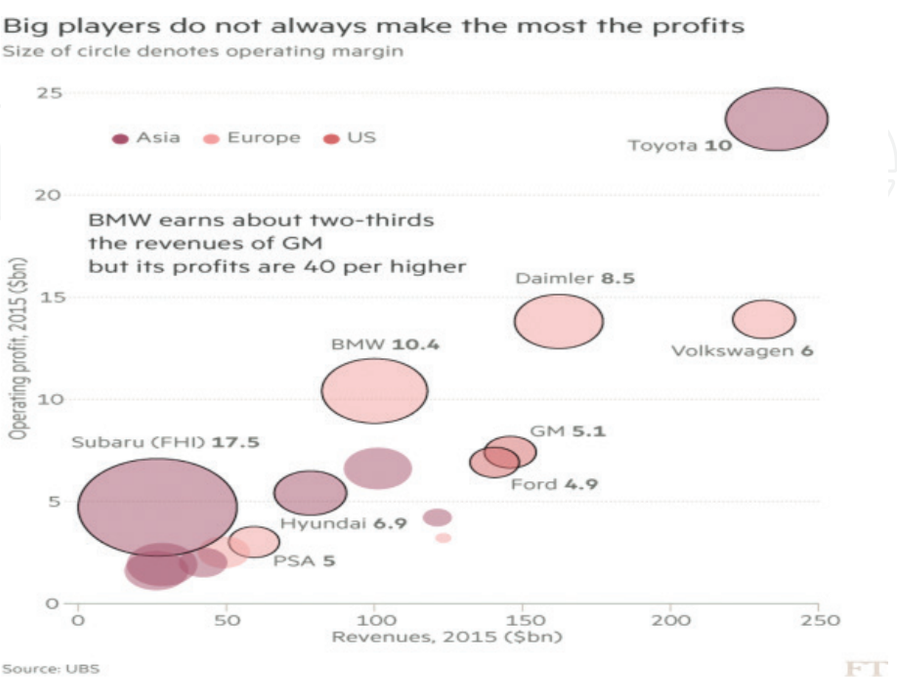

Figure 1.
Operating Profits versus Firm Revenues in the Auto Sector.

identity of "safety, quality, and value" outside its home market, often depicted by foreigners as "inscrutable," closed, and Japan Inc. [40]. Strategically, this organizational identity framework is multipurpose, allowing shared alignment of identities with domestic employees, suppliers and supervisors, but also incorporating these identity attributes first to foreign operations in North America and subsequently to Europe and Asia. Toyota management considers the firm as a learning organization, where learning symmetries take place at all levels, vertically and horizontally.

Unlike many corporate design models of multinationals, where foreign subsidiaries passively replicate the production systems of the home market (a miniature replica effect) or seek out decision-attention from head-quarters [41] Toyota is evolving as a global enterprise. In this model, Toyota's foreign subsidies and trade blocks (e.g., NAFTA and Europe), solve key problems and translate the protocols for headquarters and its global network of factories, distribution outlets, and service and maintenance dealerships. In this way, Toyota's training protocols, network learning systems, and using foreign subsidies to develop new technologies (e.g., Toyota Canada pioneering cold weather technologies for ignitions engineering), i.e., a learning chain that mobilizes employee identity to network identity, including its global supply chain collaboration [42–45].

To illustrate the complexity of contemporary auto production and the need to evolve both organizational design around supply chains, and the nature of complementarities in production, firms like Toyota must realign engineering and technological systems to novel role configurations for a diverse workforce. A car (or truck) has over 5000 parts, components, and sub-assemblies, where factories are linked to diverse supply chains with tightly-knit communications and transport linkages, often across national boundaries, to produce a factory production cycle of 1 minute per vehicle, or even less. Parts or components like steel, for instance, are not commodities, undifferentiated only by price, and Japanese steel producers produced the high carbon steel that was more resistant to water, hence rust. This production cycle demands very high quality and safety of each part and component, plus the precision engineering processes to assemble them. This alignment determines not only the standards of quality and safety of the finished vehicle but the image and reputation of the company, plus an indispensable need to retain price value of the brand in the aftermarket sales cycle.

To this contemporary production system, reshaped and refined since Toyota first introduced in 1956 what Womack et al. [46] termed "the machine that changed the world," auto production now faces a steady, relentless, and inexorable technology disruption. This shift in engines and fuel consumption technologies, away from diesel and gasoline-powered vehicles, to new dominant technologies, such as electric vehicles, fuel-cells, battery, hydrogen, or hybrid, each requiring massive changes to traditional parts and components suppliers, and the layout of factory assembly. Successful firms thus require forward-looking strategic intent and novel organizational configurations both to exploit existing systems based on gasoline vehicles, or novel organizational systems to explore new technologies and processes. Strategies differ widely. Tesla as a new startup has dedicated factories and labs using lithium battery technology. To gain equivalent scale of Toyota, GM, and Volkswagen, i.e., over 10 million vehicles per year, Nissan and Renault joined with Mitsubishi as a new alliances and equity investment partner.

By contrast, both Ford and GM are retreating from large markets like Europe, Japan, or India with direct-foreign investment strategies. Even more intrusive to existing production programs and protocols are new demands for data analytics, artificial intelligence, robotic and associated Internet and social media technologies. Both incumbent firms, new startups, and suppliers are developing futuristic technologies in drivers' facial recognition, driving habits, and consumer disabilities, from wheel chairs to hearing that impact cars of the future, and impose threats to existing distinctive

competences and corporate identity. Not all firms can manage simultaneously the processes of exploitation of existing organizational programs, and the exploration of product innovation and assembly [47]. Toyota is an exception.

The Toyota production system is transformational, an organizational philosophy around two core ideas, *kaizen* or principles of continuous improvement, and *nemawashi*, or consensus decision-making that allow network effects across its global factories, research labs, its supplier organizations, and related parts of the global eco-system, from universities to global shipping firms. In the firm's century-old evolution, starting as a leading textile firm that still exists but migrating to auto manufacturing as only the second largest by unit sales (behind Nissan), Toyota has emerged as the top producer both at home and globally, measured by market share, and a leading player in markets like North America, Europe, Latin America, India and China, where many rivals have a low market share presence (e.g., Europe firms in the US, American firms in Europe).

Strategies of corporate retreat in key markets (GM in Europe, GM and Ford in India, Ford in Japan), suggest home market advantages are the new testing ground for first-mover disadvantage [48] when firms face massive technology disruption. To cite an example, during the 1990s, four major automakers, Toyota, GM, Honda, and Ford, took the lead in the development of hybrid technologies, with GM the leader with 23 patents in hybrid vehicles (vs. 17 for Toyota, 16 for Ford, and 8 for Honda). By 2000, however, Honda and Toyota were the clear leaders, with Honda had filed 170 patents, and Toyota with 166 in hybrid drivetrain technology, far ahead pf Ford with 85 and GM at 56. Today, Fords' hybrid is a license from Toyota.

4. Toyota identity as a social construct

The auto sector symbolizes the development of post-war multinationals largely based on firm-specific capabilities and proprietary advantages. This organizational evolution includes changing work mechanisms characterized as machine theory by management [49], a catch-all phrase to describe scientific management techniques espoused by Frederick Taylor from his 1911 book with that title. He first learned time management at Philips Executer Academy and became an early practitioner of what became known as *kaizen,* continuous improvement, working with Henry Gantt [50], studying all aspects of work, tools, machine speeds, workflow design, the conversion of raw materials into finished products, and payment systems. The Taylor studies, later dubbed *Fordism* [51], was an approach to eliminate waste and unnecessary movements, or "soldiering"—a deliberate restriction of worker output.

Taylor's disciples in the engineering profession spread his message beyond America, to Europe, as well as to Japan and Russia, where even Lenin and Trotsky developed an interest after the Revolution of 1917. In appearances before Congressional committees, and in other forums, Taylor's theories faced withering criticisms and great resistance by American union movement a "dehumanizing of the worker" and a tool for profits at the expense of the worker. [50, 52]. In Japan, however, Taylorism and scientific management had wide acceptance, starting with Yukinori Hoshino's translation of *Principles of Scientific Management* with the title, *The Secret of Saving Lost Motion,* which sold 2 million copies. Several firms adopted scientific management practices, including standard motions, worker bonuses, and Japanese authors published best sellers on similar notions of work practices, including one entitled *Secrets for Eliminating Futile Work and Increasing Production* [3].

After 1945 in Japan, given the wartime devastation of Japan's industrial capacity, resource scarcity—food, building supplies, raw materials of all sorts, electric power—had a profound and lasting impact on Japanese society, even more so when

the American military supervised the Occupation and displayed abundance of everyday goods—big cars, no shortage of food, long leisure hours, and consumer spending using American dollars. As Japanese firms slowly rebuilt, the corporate ethos promoted efficient use of everything, and waste became a watchword for inefficiency. Japanese executives visited US factories, the Japanese media documented US success stories. American management practices were widely emulated, and US consultants—notably Peter Drucker, W. Juran, and W. Edwards Deming—had an immense following and their books, papers and personal appearances were publicized, translated and widely-read, even by high school students. While American firms emphasized a marketing philosophy where the customer is king, Japanese firms remained committed to production, helped in part by trading firms, led by the nine giant *Soga Sosha*, to distribute and sell both at home and abroad. US human resource practices also showed a stark contrast with Japanese practices. In the US, the rise of the trade union movement and national legislation from Roosevelt's New Deal, meant that management-worker relations for firms and factories were contractual, setting out legal norms, and negotiated commitments for pay, seniority, promotion, job rotation and skills differentials, so that worker identity was less towards the firm, more to the trade union, and what incentives and compensation union leadership could deliver [53].

Japan industrial firms, by contrast, cultivated three features of management-worker relations. The first was life time employment—once hired, the employee stayed in the firm until retirement. Second, wages and compensation were determined by seniority—young workers received lower wages and bonus compensation, just as older workers were paid more relative to their actual productivity. And third, firms had enterprise unions, as distinct from industry unions in the US and Europe (e.g., unions autoworkers, coal workers or shipbuilders). All three characteristics greatly extended the psychological linkages between employee identity and the firm's identity, and the employee's career success was directly tied to the firm's success. In Japan, with very low turnover, but high screening processes, firms hired the best graduates, and training was on-going and formed part of the job description, with little layoffs, firing, or absenteeism. Additionally, there was little employee fear of adopting new technologies. Abegglen and Stalk [54] describe the implication of technological diffusion as follows: "...it is the relatively close identification of the interests of *kaisha* and their employees that have made this rate of technological change possible and the patterns of union relations implicit in that degree of identification" (p. 133). Indeed, some writers go further, citing how the human resource system was imposed on a Confucian society, with an ethos to govern individual and group interactions for reciprocal benefits, in a market system of winners and losers. As Morishima [55] puts it, Korea and China chose Confucianism with the market, Japan chose the market with Confucianism, while North America and Europe were characterized by Protestant-driven market behavior of winners and losers. For Toyota, a family enterprise with links to many sectors like steel, textiles, aviation and machinery, the post-war environment brought inevitable contracts with American automotive practices.

Okika [56] describes the implications of the evolving Japanese model of labor-management relations in the firm:

> *Japanese enterprises made their decisions by gaining an overall consensus through repeated discussions starting from the bottom and working up ... making it easier for workers to accept technical innovation flexibly. For a start, that sense of identity with the firm is strong and they are aware that the firm's development is to their own advantage, so they tend to improve the efficiency of its production system and strengthens its competitiveness (p. 22).*

Across Japan, industrial firms, from Sony to Canon, recruited workers from rural areas, executives read US textbooks, and many visited US factories to study management practices. The production focus of Japanese firms, in a competitive environment of limited slack, hence the need for managerial improvisation and what the French call *bricolage*, i.e., making do with what is available [57]. In operational terms, this meant long production runs, division of labor taken to the extreme is monotonous assembly work tasks, product output determined by managerial estimates of demand, and wide use of buffer stocks to absorb varying time cycles of different sub-assembly needs. Buffer stocks also allowed conflicting management department goals to get sorted out with little time constraints, and less need to focus on quality issues based on bad product design, resource waste (e.g., steel), or timing processes that lead to product defects. Organizational reforms widely adopted across US industry, such as product divisions for large enterprises, largely left the product system intact, allowing middle management to focus on coordination between operational benchmarks at the factory level and financial benchmarks imposed by top management [58]. GM was seen in Japan as the prototype models to emulate.

5. Challenges to orthodox industrial production

The advance of industrialization involved new methods of energy, raw materials, dominant technologies, and organizational configurations [58] but relatively little to consideration actual production systems, especially after Henry Ford introduced mass production using interchangeable parts. As foreign executives visited Ford's assembly lines, there were dissenting opinions, such as Czech entrepreneur Thomas Bata and S. Toyoda who worked a year in Detroit. How could three core concepts be integrated—craft skills of custom-made products like a *kimono* or a house, the volume-cost advantages of mass production, and the nigh utilization capacity of process production in beer or chemicals?

Toyota's introduction of the lean production system has been widely studied,[2] including its the origins in the 1950s by Ohno [62], when visiting America and adopting ideas from super market chains, and had strong views on scientific management's focus on the total production system, and Japanese concepts of *jishu kanri* (voluntary work groups). Japanese managers had both knowledge and experience with traditional crafts sectors like woodblock prints and silk designs in textiles or the long training needed for Japan's culinary arts. How could three core concepts be integrated—craft skills of custom-made products like a *kimono* or a house, the volume-cost advantages of mass production, and the nigh utilization capacity of process production in beer or chemicals?

Core concepts of lean production is the desire to maximize capacity utilization, by reducing production variability and minimize excess inventories with a view to eradicating waste [54]. But other factors are critical, such as supplying high quality workmanship of craft production, reducing per unit costs via mass production using interchangeable parts, and high capacity utilization of continuous flow production, typically seen as three distinct systems. The ingrained ethos of resource scarcity in Japanese society, demonstrating that low slack in organizations encourage search behavior [63], and these requirements required pooling of efforts as an organizational philosophy (**Figure 2**).

[2] For more detailed background on Toyota's production system, see Cusumano [59], Dyer and Nobeoka [43], Fujimoto [60], Likert [61], McMillan [3], and Ohno [62].

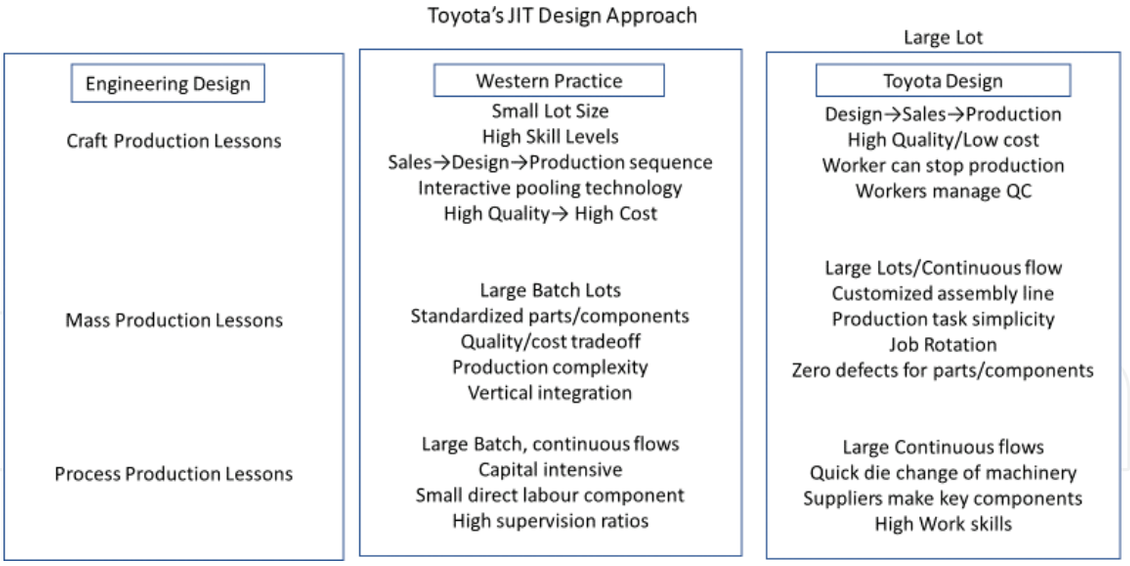

Figure 2.
Contrasts Between Traditional Technical Design and Toyota's Model.

To perfect the system over time, starting in the 1960s, Toyota accelerated the adoption of high work commitment by organizing workers in teams, reducing the number of job classifications, seeking suggestions from employees, and investing in training of new workers, 47–48 days per worker, compared to less than 5–6 days for US plants, 21–22 days for European plants [3]. The focus on production as an integrated system, using hardware ideas like quick die change equipment, robots, and advanced computer-aided design, also meant removing traditional tasks that are noisy, hard on the eyes, or dangerous to allow employees to concentrate on tasks like quality assessment, and allowing a worker to stop the entire production line, known as *andon,* in the case of equipment problems, shortage of parts, and discovery of defects, i.e., transferring certain responsibilities from managers and supervisors to workers [60]. Paradoxically, Toyota and other Japanese auto plants were far less automated than their foreign-owned rivals, not just for assembly line work but other tasks like welding and painting.

Einstein once said, "Make everything as simple as possible, but no simpler." Simplicity became a watchword in the evolution of Toyota's lean production system, a contrast to the complicated vertical integration model adopted in Detroit. Toyota adopted a highly focused structural design, becoming a systems assembler and sourcing from dedicated suppliers, each with core competences in specialized domains and technologies. Production engineering—e.g., craft, mass assembly or process systems—became central features as organizational configuration, choosing from the strengths of each but discarding the perceived weaknesses. Stress was place on the worker, avoiding the monotonous routines of a moving assembly line, by including job rotation and special training to apply quality management circles within a group structure. The advantages of process manufacturing as high capacity utilization came from high initial overhead of equipment and overhead, including IT investments, but allowing flexibility in machine set up, such as quick die change that reduced the need to stop the line for product variability from 3 months, to 3 weeks, to 3 minutes, to less than 3 seconds. The internal factory layout, an S shape configuration, changed the sequencing of tasks, the forms of supervisor-employee interactions, and the speed and timing of interdependencies between the production operations and external suppliers of parts, delivering "just in time."

In some cases, the interactions involve the core production system and independent suppliers serving as complementarities[3] where the competitive advantage of one is augmented by the presence of the other [45]. Early examples included Ford's cooperation with Firestone to produce tires, or Renault's links to Michelin to produce radial tires. Complementarities allow synergistic advantages, a contrast to additive, discrete features [64], and allow two immediate effects: knowledge spillovers at differing stages of production, including process learning impacts, and complimentary and coordinated changes in activities and programs across the value chain, such as process benchmarks for product design, scheduling, inspection, and time cycles of production. Toyota cultivates complementarity attributes but instituted a revised activity sequence, discarding production based on estimated demand forecasts, and turning finished production of cars and trucks to car lots for ultimate sale. The pull system starts with customer demands, allowing novel design using the advantages of the need for high capacity utilization of smaller actual output demands, to manufacture outputs with shorter time for product delivery.

6. JIT and Toyota's deep supplier collaboration systems

Toyota's lean production both reconfigures the boundaries of the firm by incorporating the supply chain as an integrated, cooperative network with collective competences and capabilities across the network value chain and incorporates decision processes for learning and knowledge sharing that shifts subunit identities to a collective identity. Lean production requires these system-wide processes to address inoperability issues like buffer stocks, time delays, peak demand, or product defects. Deep collaboration across sub-units needs robust methods to design, evaluate, and verify data gathering and data feedback. Unlike economic models of transaction costs, or contractual relations, lean production emphasizes symmetrical collaboration to optimize outcome effectiveness for the total eco-system organization, not sub-optimize for only certain members, sub-units, or component firms. Toyota's collective identity is a notable corporate example that combines both superb operational performance but also long-term, forward looking innovation through its complex ecosystem of Tier I and Tier II supplier system. As depicted in **Figure 3**, Toyota aligns its supply system both domestically and overseas with knowledge systems, including standards of precision and quality, including using internal staffing and consultants to assure optimum outcomes against agreed benchmarks.

By replacing asymmetric contractual relations based on cost, Toyota shifts the locus of corporate risk to the total eco-system, involving Toyota at the center, the Tier I and Tier II suppliers, and their Tier I and Tier II suppliers. The lean "pull" of production control is a connectivity to calibrate inventory at each stage, starting with the final assembly and preceding to each preceding stage without delay. Unlike the push model, where the early steps of sub-assembly is sequential to subsequent stages and require buffer inventory to lesson delays, Toyota's lean system of 'pulling' requires training and upgrading skills employed at different work stations, and close

[3] In mass assembly industries like autos, shipbuilding, and heavy construction equipment, where steel is a complementary component, scale, technology, and technical systems, including plant location, largely define cost advantages. By the early 1980s, the competitive gap between Japan and the US was increasing, just as Japanese firms were shifting from export strategies to direct foreign investment, i.e. establishing new plants in North America with the newest equipment, sourcing, and lean production. One analysis showed the contrast: "… the American steel industry had fallen from the largest and most technologically advanced in the world to the condition of a lagging competitor … companies retrofitted new technology unto often antiquated facilities" ([49], p. 91).

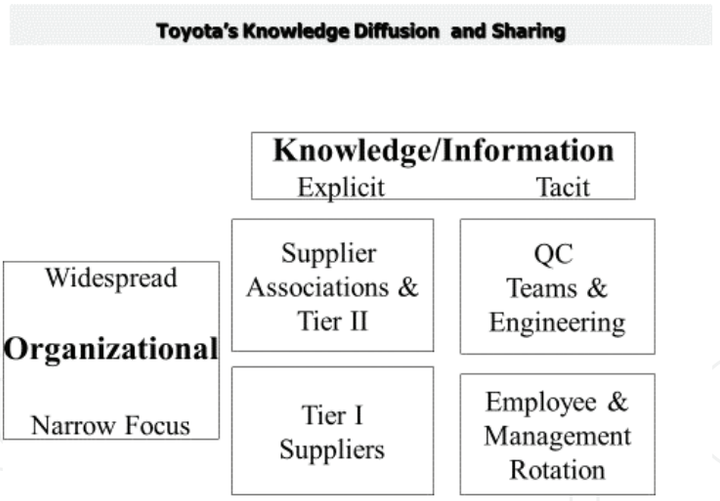

Figure 3.
Toyota's Knowledge Diffusion and Sharing Approaches.

communications across the total supply chain system. To make this system work, economic transaction costs are discarded, and replaced by a currency of cooperation using preventive tools and benchmarks to meet high standards of reliability where Tier II firms meet rigorous standards of price, quality, and delivery. Suppliers are battle-tested, i.e., they must conform to agreed specifications and their products are accepted only after years of testing. Tier I suppliers, on the other hand, meet the exacting standards of Tier II suppliers but they form part of the design, research, and testing of new products, markets, and technological innovations. Tier II suppliers can "graduate" to being Tier I suppliers if they meet benchmark performance over time, thus demanding intense deep collaboration at Level 4 (**Figure 4**).

Less coordinated systems of structure, processes, and executive decision-making inhibit eco-system operability. Three integrating systems are vital: (1) technical systems, including IT, software, and data; (2) organizational tools of coordination, like dedication teams supported by specialists and intense data sharing; and (3) collaborative executive decision processes that champion novelty, innovation, and feedback [65, 66]. Inoperability can come from seemingly mundane tasks, like loading supplies on a truck with different invoices, manifest requirements, and

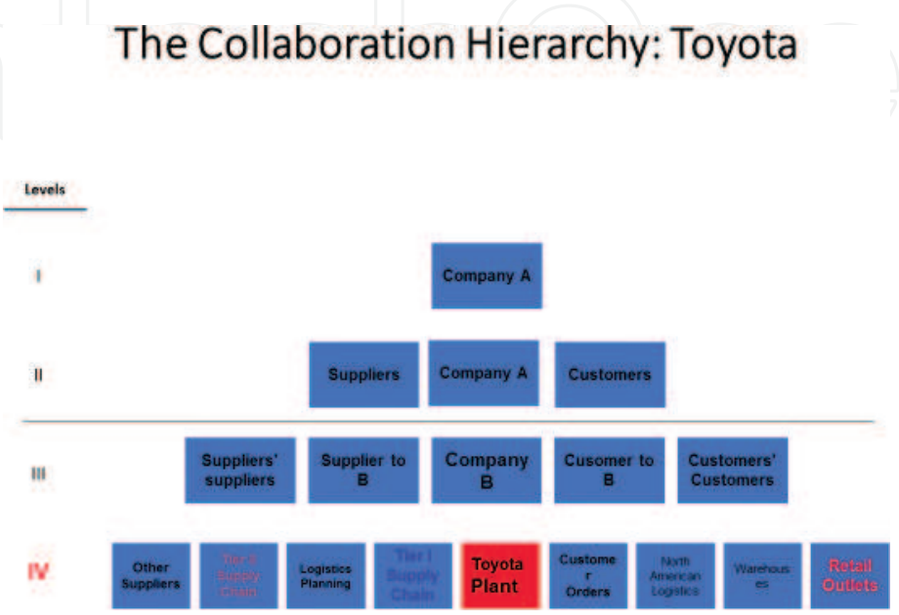

Figure 4.
Levels of Value Chain Collaboration: Toyota as Level 4.

delivery times. Separate and differing organizational processes inhibit deep collaboration. Inoperability arises from silo information flows and compartmentalization. Even with aspirational targets of decision-making, organizations acting alone fail to develop and improve competencies and capabilities to manage this integrated system via experiential learning, feedback, and criticism [67–69].

Deep collaboration needs robust methods to design, evaluate, and verify data gathering and data feedback to optimize effectiveness for the total eco-system organization, not sub-optimize for only certain members, sub-parts, or component firms [70]. Toyota's lean production now has both a language and a vocabulary to remove task ambiguities and increase identity among workers, sub-units, and factories in the global network, but requiring a learning process to perfect clear meanings and defined protocols. Words like *kanban, andon, jioda, yo-i-dan,* and *kijosei* have precise meanings and routines, and such terms as reverse engineering, early detection, and *ringi seido* or consensus decision-making, simplify and codify precise protocols for shared communication. Benchmark techniques are widely used but less to evaluate past performance against competitors, but more to evaluate current performance against higher targets and aspirational stretch goals [71]. Indeed, deep collaboration at each stage requires a judicious combination of sharing ideas, new targets, real time feedback, and potential revisions. Where ambiguous signals, informal targets and past measures become explicit, and shared across the system.

Training programs—internships, formal courses, apprenticeships—build organizational capabilities and mitigates risks from operating with incomplete knowledge, inexperience, understanding operating rules and procedures. Deep collaboration illustrates the need for similar training approaches to know, understand, and apply knowledge across the entire system. Toyota gains three network advantages: positional, where individual managers and subsidiaries access tools and protocols for high performance processes and benchmarks that create learning; structural, where communication connections strengthen the effectiveness and acuity of information flows to attend to emerging problems; agility, by strengthening interactions between individuals and teams, and embedding the new benchmarks across the entire network of factories, sales offices, and supplier organizations.

7. Split identities at Toyota

By the early 1980s, Toyota, like many leading Japanese corporations such as Sony, Komatsu, Canon, Matsushita, and Hitachi, were making deep inroads in the American market via exports. The auto sector was singled out, as 500,000 American autoworkers were laid off, a new President, Ronald Reagan faced pressure from Congress to take legislative action, and firms like Ford applied to the American International Trade Commission for temporary relief, following similar action by the powerful auto union, the UAW. Further, Japan's emphasis on direct export sales stood in contrast to American strategies of direct investment in foreign markets, often by acquisition of local companies [8, 45, 72] .[4] For firms like Toyota,

[4] In one of the great ironies of business history, in the 1930s, when Ford and General Motors provided two-thirds of the Japanese car market, mostly by assembling kits from their home market, the Japanese government, despite their desire to focus on auto production, wanted Ford to establish a joint-venture with Toyota. Various agreements were planned, including land purchase, but Ford, denied permission to expand local production on its own, retreated from Japan in 1939, followed by GM [73]. In 1980, China invited Toyota to establish a joint venture, but when Toyota decided not to accept, China turned to Volkswagen, not by far the most successful foreign carmaker, producing 4 million units, in a market of 2 million a month. Toyota produces only 1 million per year.

growing high dependence on exports meant that larger total volumes (domestic + exports) strengthened their product capacity and cost position at home, including that of their supplier base. Japan's auto exports to the US reached 6.6 million vehicles in 1981, up from a million units 10 years earlier, 566,042, accounted for almost 20% of total Japanese auto exports.

The imposition of Japan's export restraints, formalized in June 1981, coincided a $1.5b loan guarantee to Chrysler, indefinite layoffs of over 30,000 auto workers, and sectors like steel facing declining market share. Pressed by firms like Ford for Congressional actions, MITI imposed export quotas on each Japanese company, a form of "administrative guidance" designed to accommodate political goals in each country but was in fact a "cartel" solution aimed to appease the US government [3, 74]. The percentage breakdown for each of the five biggest exporters, calculated mainly by US exports in the previous 2 years, was as follows: Toyota (30.75), Nissan (27.15), Honda (20.75), Mazda (9.48), and Mitsubishi (6.7). The impact for each company in the brutally competitive Japanese market varied: Honda was the first to begin direct investment, opening its first plant in Ohio and then Ontario; while Toyota kept to its quota by exports but strengthened domestic operations to build up a commanding market share lead, over 50%. For the Japanese auto sector, as Summerville notes [74], "investment in local production was also a crucial way to insulate oneself from further export cutbacks, and of course to get away from the thumb of the Japanese state" (p. 395). Toyota illustrates the complexity to manage very fast growth in foreign markets, while transferring its corporate identity to a network identity of safety, quality, and value [43], even though the knowledge sharing processes that are now taken for granted at home, including quality standards of suppliers, may not exist in foreign countries [75–78].

The massive recall in 1999, where Toyota accepted responsibility to service over 8.5 million vehicles, the President appearing before Congress, and sundry lawsuits launched in a litigious environment against a foreign-owned firm, have been analyzed and studied[5] in the media, the automotive press, and by academic studies, with mixed conclusions. The reality, despite paying fines, accepting responsibility, apologizing to the American public, and accepting the huge financial costs of the recall, Toyota refused to play the blame game, or take easy solutions, like importing more parts from Canada or Japan, or shifting American production to Canada or Mexico. Toyota took the difficult decision, true to its identity, of fixing the core problem, raising the quality standards of its American-own parts supplier, devoting more resources to training, and accepting short-term risks to financial performance, particularly when leading automakers from Europe, Korea, and Japan were investing in the US market. The Detroit Big 3 received temporary relief, a massive bailout after bankruptcy from the US and Canadian government, and a 25% tariff on imported trucks, one of the most profitable segments for American producers. Toyota quietly responded about building a truck factory in Texas.

8. Discussion and conclusions

In a world of disruptive corporate strategy and identity offer a refined tool for alignment of stakeholders to create competitive advantage. Corporate culture focuses on the behavioral assumptions to perceive, think, and feel in

[5] For background, see Andrews et al. [79], Camuffo and Wilhelm [39], and Cole [80].

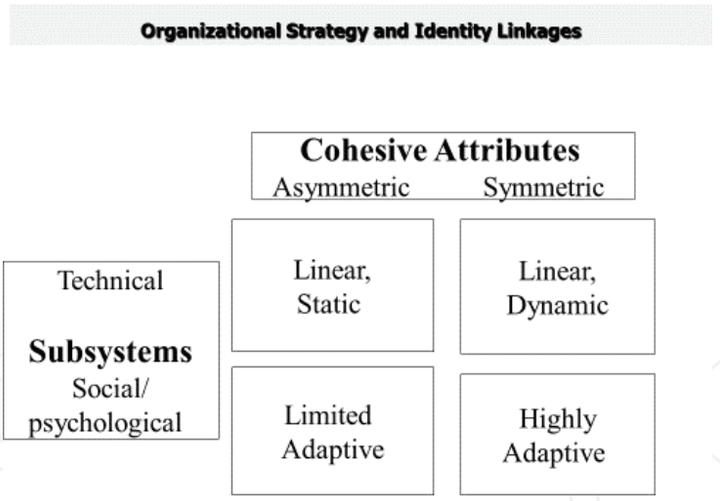

Figure 5.
Organizational Strategy and Identity Linkages.

problem-solving [81] within the organization, while organizational identity is a projection of that culture to external stakeholders to align both cognitive and behavioral tools for growth and innovation. Individual and sub-unit identities can lead to cleavage and discord, especially where environmental forces make knowledge and information asymmetric, so special attention and sense-making requires an adaptive alignment to improve performance (**Figure 5**).

Increasing, all organizations face four separate but related challenges that impact overall performance but also survival as independent entities. Clearly, technological change imposes new challenges for internal organizational competences and capabilities, as firms scramble for mergers, takeovers, and new alliances to meet the test of size and foreign market penetration, or a retreat approach or even drift. Decision uncertainty influences the nature of internal competencies, learning barriers, and the sustainable position of existing firms. The third challenge with disruption is the growing complexity of the firm's ecosystem, and what is the optimal scale of a firm's future business case, based on potential changes to customer markets across multiple countries?

The fourth challenge relates to the first three but is subtler. That challenge concerns what might be called the Galapagos trap, namely designing an ecosystem that is suitable for one market that is unsuitable for global markets and allows little transfer of knowledge or engineering knowhow to other markets with a separate eco-system, including the supplier system. Recent examples include Japan's unique wireless standards that did not apply in foreign markets systems, or American big car gas guzzlers with limited fuel mileage that did not meet foreign market regulations. Toyota's development of hydrogen fuel powered vehicles, based on new chemical technologies, is a case in point, where existing infrastructure lacks the necessary technical requirements for even limited mass appeal. In all four of these development challenges, the competitive race is to avoid the lessons of the computer industry, where new smart phone technologies displaced existing incumbents, lowered entry barriers for new startups, and shifted the main suppliers and their location.

Such fundamental changes pose difficult questions for firms' missions, corporate identity, and framing long term employee loyalty. As Simon [76] warned decades ago, "organizational identification…implies absorption of strategic plans into the minds of organizational members where they can have direct effect upon the entire decision-process, starting with the identification of problems…" (p. 141).

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