



THE EVOLUTION OF ENTERPRISE ORGANIZATION DESIGNS

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Abstract: This article extends Alfred Chandler’s seminal ideas about organizational strategy and structure, and it predicts the next stage of organizational evolution. Chandler described the evolution of vertical integration and diversification strategies for which the functional and multidivisional structures are appropriate. He also explained how the dominant structure at any point in time is a *concatenation*, or accumulation, of all previous strategies and structures. I extend Chandler’s ideas by describing how early “structures” became “organizations” (people, rewards, management processes, etc.) and by discussing the more recent strategies of international expansion and customer focus. International expansion leads to organizations of three dimensions: functions, business units, and countries. Customer-focused strategies lead to four-dimensional organizations currently found in global firms such as IBM, Nike, and Procter & Gamble. I argue that the next major dimension along which organizations will evolve is emerging in firms which are experimenting with the use of “Big Data.”

Keywords: Organization design; organization structure; strategy and structure

A major stream of thought in organization design is the evolution of the structure of the total enterprise. The origin of this idea is the historical study *Strategy and Structure* by Alfred Chandler (1962). This work, by a business historian, was picked up by organization theorists, strategic management theorists, economists, and sociologists. It led to a virtual explosion of conceptual and empirical studies of American, British, German, French, Italian, and Japanese enterprises (Franko, 1976; Stopford & Wells, 1972). Then, like many thought streams in organization and management theory, interest in it declined. In this article, I return to Chandler’s concept of structural evolution and extend it to include today’s global enterprise designs. This extension is based largely on my work as a practitioner, helping global companies as they develop the next phase of their growth strategies and enterprise structures.

STRATEGY, STRUCTURE, AND CONCATENATION

Chandler’s idea that “structure follows strategy” is one of the best-known organizational concepts in business. His concept of concatenation, or accumulation, is virtually unknown. “The thesis... is then that structure follows strategy and that the most complex type of structure is the result of the concatenation of several basic strategies” (Chandler, 1962: 14). Concatenation drives the complexity of today’s organizations but is also a management contradiction. Almost every leader is a champion of simplicity. But while leaders are saying “Keep it simple,” they are acting to implement ever more complex strategies and structures. What is driving this contradiction?

Concatenation

Concatenation, the accumulation of simple strategies into increasingly complex structures, is at the core of Chandler’s argument about structural evolution. Chandler explains the concept

with the example of a start-up firm in a single location and with a single business function – such as a distributor. The first simple strategy emphasized by the distributor is volume expansion, which leads to a simple structure where an administrative office is created to manage the business. The next simple strategy is geographic dispersion. This new strategic emphasis results in adding a distribution department headquarters to administer the several distribution field units. The resulting, more complex structure is shown in Figure 1.

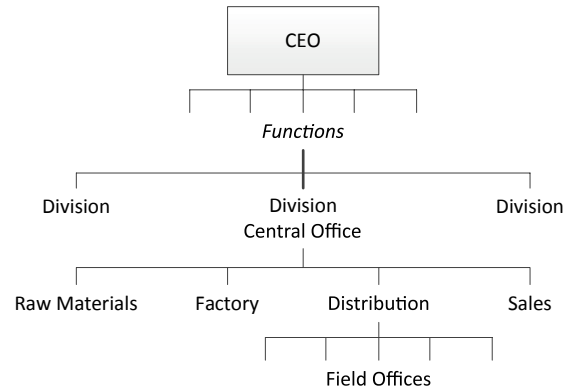


Fig. 1. Multidivisional Structure of Two Dimensions: Divisions and Functions

The next strategy is vertical integration, which adds additional functions to create a single, end-to-end business. The matching structure is a central office to coordinate the flow of work and material through the functions. This structure is also called a unitary form (U-form) or a multifunctional, single business structure (Williamson, 1975). The single business forms the basis of the next structure – the multidivisional or M-form. The multidivisional structure is created when the firm executes a strategy of diversification. The structure in Figure 1 shows the concatenation, or accumulation, of all the strategies in the more complex structure. In this case, each level represents a “simple” strategy, but the emphasis placed on a new simple strategy requires the development of a more complex structure. Table 1 shows the four strategies that Chandler discussed in *Strategy and Structure* (volume expansion, geographic dispersion, vertical integration, and diversification). The last two strategies, international growth and customer focus, were developed after Chandler’s study and will be described below.

Table 1. Matching Strategy With Structure

Strategy	Structure
Volume expansion	Administrative office
Geographic dispersion	Departmental headquarters
Vertical integration	Division central office
Diversification	Multidivisional general office
International growth	Three-dimensional structure
Customer focus	Front/back and four-dimensional structures

Growth Drivers

As posed in the question above, why do leaders who prefer simplicity develop complex strategies and structures? There appear to be two main drivers of this behavior. The first is the pursuit of growth. Every publicly traded company wants to grow and drive its stock to trade at a premium. A high stock price makes it easier to attract capital and reward executives and to serve as a currency to make acquisitions. Also, talented people want to join a growth company that has a bright future. But while growth is desirable, it is also limiting. A firm can only grow so much in its home country and core business. Therefore, it must venture into new country markets and adjacent businesses to attain growth. In so doing, the firm increases the complexity of its strategy and structure.

The other growth driver is the Law of Requisite Variety (Ashby, 1956). Taken from control theory or cybernetics, the law states that as entities in the stakeholder environment proliferate, units inside the enterprise must also proliferate to respond to those entities. For example, the marketing function has evolved from dealing with the mass market to focusing on market segments and now micro-segments. Large food companies (and their marketing consultants) may focus on more than 650 micro consumer segments. Some of these segments, such as Hispanic mothers, senior foodies, or the freezer segment, exhibit faster growth than the food market as a whole. Therefore, the food companies develop new products and promotions for those growing micro segments. Inside the marketing function, people and new departments are assigned and created to manage these chosen new micro segments. In this way, proliferating entities in the stakeholder environment lead to proliferating organizational units in response.

As long as companies pursue growth and stakeholder environments increase in complexity, enterprise organizational structure will evolve into more complex forms. Before describing the next strategies that have led to more complex organizations, let's trace the changes to the multidivisional form since Chandler's study.

EVOLUTION OF THE MULTIDIVISIONAL STRUCTURE

Chandler originally described and studied three types of structures: functional, multidivisional, and holding company. For each structure, there was a unique strategy. A functional organization was the means for implementing a single business strategy. A multidivisional structure was used for diversification into multiple related businesses. The holding company was appropriate when diversifying into multiple unrelated businesses. Researchers called these structures the unitary or U-form, multidivisional or M-form, and holding company or H-form (Williamson, 1975). Since Chandler's book was published in 1962, these forms have evolved from "structures" to complete "organizations" and from pure to mixed forms.

From Structure to Organization

The first additions to Chandler's basic strategy-structure relationship were the processes, policies, and practices used for managerial control and coordination. These additional features enlarged the organizational structure into a complete organizational form. Organization designers then wanted a model that would help them design and build organizations. In my case, I began to use the Star Model, shown in Figure 2, to guide my design thinking and practice (Galbraith, 1977, 2002). The Star Model has five key components for building an organization. McKinsey, a management consulting firm, created the 7S Model, which has seven organizational building blocks (Peters & Waterman, 1982). Today, every management consulting firm has a version of the Star Model or the 7S Model to guide its own design practice.

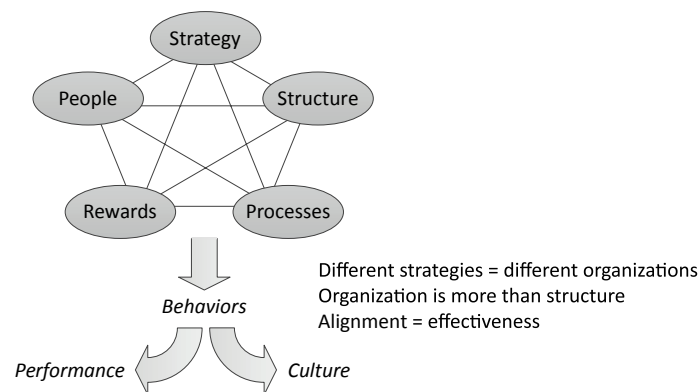


Fig. 2. The Star Model™

From Pure to Mixed Organizational Forms

When organization designers tried to design structures for diversified companies, they found

it difficult to distinguish between related and unrelated portfolios. The M-form and H-form and their strategies were pure types, but many actual organizations were mixtures of both. Designers' thinking evolved from drawing the line between related and unrelated strategies to conceiving of portfolio strategy as a continuum from a single business to multi-business unrelated portfolios. The related multi-business portfolio was somewhere in between. Some attempts were made to measure the continuum. One measure was the two-digit level of Standard Industrial Classification (SIC) codes. However, SIC codes proved to be not very useful. A company like Proctor & Gamble measured high in diversification based on SIC codes because it operates in many product categories such as soap, paper, pharmaceuticals, and so on. Yet P&G was a classic M-form organization because every profit and loss (P&L) center was a B2C business in the packaged consumer goods sector. All the P&Ls at P&G followed the same business model. So today, researchers and designers make judgments about where a portfolio is located along the low-to-high portfolio diversity scale. These judgments are based on the number of similar businesses.

A new type of organization emerged because the gap between related and unrelated business portfolios was still very large. Thus, a mixed model was created from among the three pure types. For example, originally Hewlett-Packard had a classic related portfolio of P&Ls (which it called divisions). The company provided electrical instruments for technically trained professionals in the electronics, telecom, chemical, and medical industries. Then HP diversified into computers. At first it followed the same business model of selling minicomputers (boxes) to end users in factories and laboratories. However, the computer business eventually evolved into a "product" and "systems" business. Customers would buy an entire supply chain system made up of many computers, storage devices, software, and services, while computer products like PCs, printers, and hand-held devices were sold as stand-alone products through resellers. As a result, HP wound up with three different business models for (1) computer systems, (2) computer products sold through resellers to businesses and consumers, and (3) instrument businesses selling boxes directly to end users. Such business model diversity made HP look like some unrelated corporate portfolios. The "HP Way," on the other hand, made the company look like some related-portfolio companies. Thus, HP fell into a mixed category.

Today, nearly every consulting firm uses a four-category continuum to analyze and evaluate corporate portfolio strategies. For each of the four types of strategies, there is a complete Star Model including the appropriate structures, processes, and HR practices. The entire model is usually shown in a grid with the strategy types on one axis and the organizational elements, which match that strategy, shown on the other axis. The grid that I use is shown in Table 2 (Galbraith, 1993).

From Divisions to Strategic Business Units

As multidivisional corporations grew, they initially used a cell-division model to adjust their organizations. That is, when a division reached a size of about \$150 million in revenues, it was divided into two divisions of about \$75 million each. When these two divisions grew to be \$150 million, each of them was divided, thereby creating four divisions of \$75 million each. General Electric followed this process of cell division as it grew. In 1969, the result was that it had a three-level structure reporting to the CEO's office. The first level consisted of eight business groups. Reporting to the groups were 49 divisions, and reporting to the divisions were about 250 departments. The departments were the basic building blocks and P&L centers of the structure. When they attained revenue of approximately \$150 million, they were split into two departments. At that time, the CEO called in McKinsey consultants to help reduce the complexity of the organization. There was simply no way that the CEO and the leadership team at GE could understand the operations of 250 departments and allocate resources to them during the strategic planning and budgeting process.

Table 2. Portfolio Strategy and Organization

Strategy	Single Business	Related Diversification	Mixed	Unrelated Diversification
Structure	Functional	Divisional	Cluster	Holding Company
Centralization	High	Moderate	Low to the cluster Moderate within cluster	Low
Corporate Staff	Small	Large	Low in corporate Moderate in cluster	Small
Control Type	Operational Strategic Financial	Strategic Financial	Strategic Financial	Financial
Business Processes	Common	Common	Common within cluster	Different
Compensation System	Company	Company	Cluster	Subsidiary
Bonuses	Company	Company	Cluster	Subsidiary
Careers	Company	Company	Mix	Subsidiary
Subsidiary Culture	Company-wide	Company-wide	Mix	Unique to subsidiary
Division Name or Brand	Company-wide	Company-wide	Mix	Subsidiary
Example	BMW	Agilent	Hewlett-Packard	Berkshire Hathaway

The result was the GE-McKinsey SBU reorganization of 1969–1970. In this reorganization, the divisions and departments were collapsed into 49 strategic business units (SBUs), which reported to eight group executives who reported to the CEO's Office. An SBU was now the basic building block of the organization. The major change in thinking here was that size was no longer the determinant of the organizational building blocks. Those blocks were now determined by a business rather than size logic. An SBU was to be a complete, fully functional business with its own unique set of products, customers, and markets. SBUs varied in size from \$100 million to about \$1 billion in revenue. The SBU logic and language subsequently spread from GE to many of today's large corporate enterprises.

Another important outcome of the 1969–1970 reorganization was the dividing of the Personnel or Employee Relations Group into two parts, one for blue-collar workers and their unions and one for senior executives (the top 250 people). The new Executive Resources unit would focus on the development and compensation of these 250 senior executives. A talent review process was also added and implemented. The top 250 executives were seen as talent belonging to GE the corporation, not just to the SBUs where they worked. The talent pool contained executives who could be moved around the enterprise to where they were needed. Such resource flexibility is a major advantage when responding to changing market opportunities.

In summary, since the publication of Chandler's (1962) book, organization designers have evolved in their thinking along the following lines:

- (a) from strategy and structure to strategy and organization
- (b) from three pure types of strategy and structure – U-form, M-form, and H-form – to a continuum of strategies and organizations where the pure U-form is the simplest and the pure H-form is the most diverse

- (c) from divisions, where size determines the basic building blocks of the organization, to SBUs, where business logic determines the basic building blocks of enterprise structure.

In the next section, we build on Chandler's work to see how international expansion led to the next concatenation of enterprise organization.

INTERNATIONAL EXPANSION AND THE DEVELOPMENT OF THE MULTIDIMENSIONAL MATRIX STRUCTURE

As noted above, firms driven by growth inevitably reach the limits of their core business in their home country. Chandler (1962) reported that American firms in the mid-1900s chose to grow by diversifying within the U.S. It was at this time that managers created and adopted the M-form and H-form organizations. But as U.S. domestic growth declined in the 1960s and the European Common Market opened up, American firms expanded into Canada and Europe and then into other regions of the world. Our knowledge of this phase of strategy and structure development comes largely from Raymond Vernon's Harvard International Project at the Harvard Business School. The research was reported by Stopford & Wells (1972), Franko (1976), Prahalad & Doz (1987), and Bartlett & Ghoshal (1989). At first, the growth strategy of international expansion caused few changes in the M-form companies that were the first to expand. Those companies simply added another division, the International

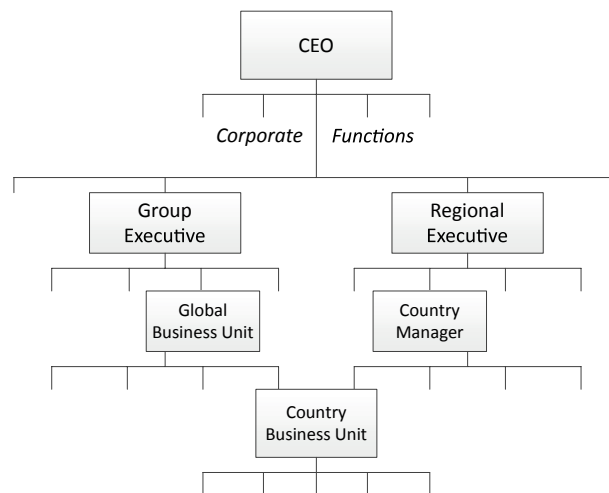


Fig. 3. Multi-Business, Multinational, Functional Matrix

Division, to their existing organization. But when the international division's sales reached 25-35% of total sales, it was disbanded and a new form of structure emerged (see Figure 3). This structure was a three-dimensional structure wherein the business units, countries, and functions all reported to the CEO. The M-form and H-forms were two-dimensional structures wherein the businesses were the P&Ls and reported to the CEO along with functions.

The variations in the three-dimensional structure concern the placement of the P&L responsibility as well as power and authority relationships. For companies with SBUs in B2B businesses and which spend more than four percent of sales on R&D, the P&Ls are in the business dimension, as in Royal Dutch Shell. For companies in B2C businesses and which spend much less on R&D, the P&Ls are in the geographic dimension, as in Nestlé. Still other firms, such as ABB, introduced a balanced matrix organization with the P&Ls in both the businesses and the countries. ABB was a B2B company that spent seven percent of sales on R&D. These features favored a business dominant structure. But 70% of ABB's sales went to government-owned or -influenced customers. Such customers required a strong local presence in their countries and a strong country manager. ABB had to be both globally integrated and locally responsive. A dual profit center matrix was its chosen structure.

The functions are the third dimension of a matrix structure. The functions of finance and R&D were the most global units and were matrixed across the P&Ls. As supply chains

became more integrated across borders, the supply chain function gained more power and authority. Similarly, global brands increased the power of marketing. Balancing the power and authority of functions, countries, and businesses is the challenge for leaders and management teams in the three-dimensional matrix (Bartlett & Ghoshal, 1989; Galbraith, 2000).

In summary, a new strategy of international expansion led to a new three-dimensional organization. As in the past, the resulting organization was a concatenation of past strategies and structures. Initially, an international division was simply added on to the existing multidivisional structure, but increased growth led to embedding the geographical activities into the functions and businesses. The result was a complex three-dimensional organization, which is often some form of matrix structure. Getting these complex structures to work effectively is still an organizational design challenge for companies today.

THE CUSTOMER DIMENSION

In the 1990s, a new customer-focused strategy began to emerge, and it continued to be refined during the early years of the 21st century. There are a number of drivers behind this new strategy, but two are particularly salient. One is the shift of more buying power into the hands of customers. Big customers are demanding and getting a single interface with their vendors and are receiving customized product and service offerings to meet their particular needs. The other driver is the move to provide systems or solutions to customers instead of stand-alone products. The digital revolution now allows every object to talk with every other object. So, for example, IBM provides smart solutions to customers like a smart electrical grid for the island of Malta. The issue with providing unique offerings to customers is that vendors lose economies of scale. Their response has been mass customization. Now top companies design products and/or solutions platforms that can be replicated around the world (Gawer & Cusumano, 2002). These platforms have been designed from the very beginning to be easily and quickly modified to meet the unique needs of customers. The organization for

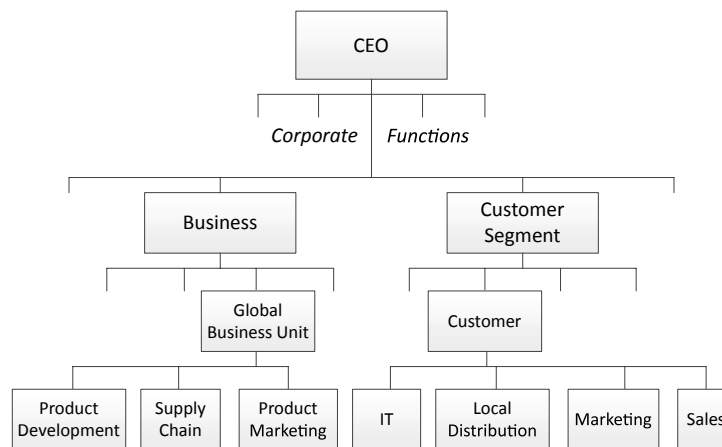


Fig. 4. Front/Back Organization

implementing a mass-customized product design strategy is the front-back model (Galbraith, 1993, 2002: Ch. 8).

The front-back organization is shown in Figure 4. It is a modification of the matrix design shown in Figure 3. The front end of the business is organized around customers, countries, and/or customer segments, while the back end is organized around products. The back end is to achieve global scale, while the front end achieves local adaptation. The supply chain, product marketing, and product development functions are more globally and regionally oriented in the front-back model. There is no country-business matrix. The customer-centric front end focuses on developing in-depth customer knowledge, cross-selling, and custom solutions. Marketing is local and focused on segmentation, local distribution, and customer insights. Either or both ends of the organization can be the P&L centers. At some companies, such as Unilever, the organization is three-dimensional like the one shown in Figure 4. In

other firms, such as P&G, Nike, and IBM, the customer or customer segment is a fourth dimension.

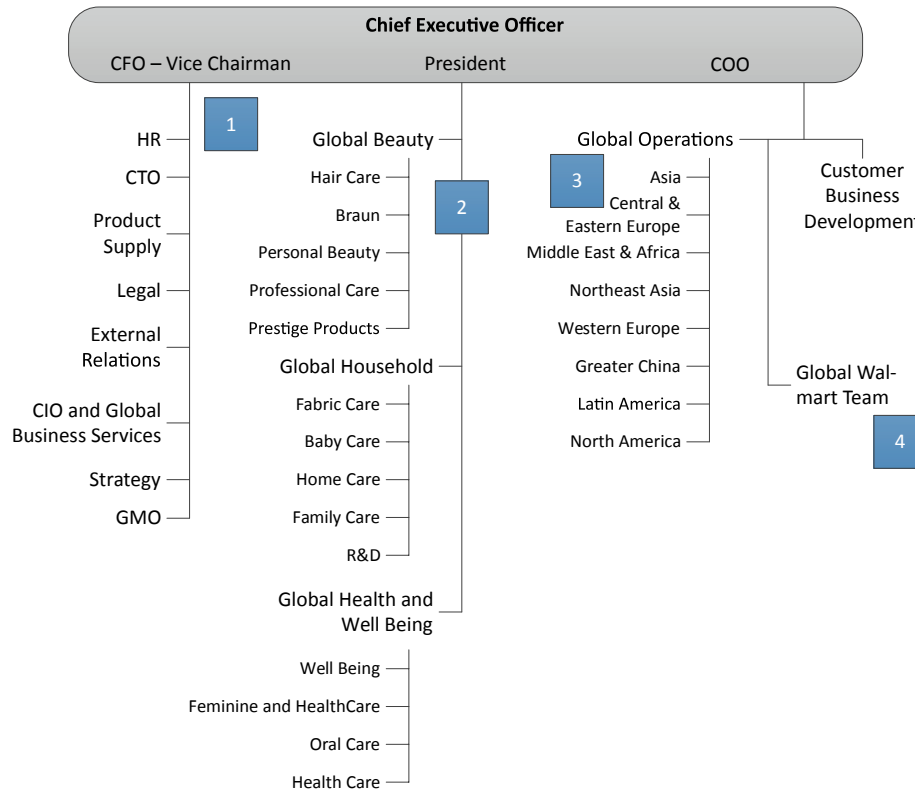


Fig. 5. P&G's Four-Pillar Organization

The Four Pillar organization of P&G is shown in Figure 5. Reporting to the Office of the Chief Executive are (1) business functions, (2) global business units, (3) market development organizations (regions), and (4) the Wal-Mart customer team (Wal-Mart is one of P&G's many large customers). Wal-Mart accounts for about 35% of P&G's worldwide sales, and the customer team consists of about 250 people located at various Wal-Mart sites around the world. In this organization, the Global Business Units (GBUs) design the global platforms, and the regions and customer teams adapt them for their customers. For example, the Hair Care GBU creates the platform for Pantene Shampoo. In Japan, part of Northeast Asia, the local product manager ensures that less perfume is added (Japanese women prefer more subtle scents) and more conditioner is added (Asians have thicker hair). Similar customizations are made for global customers such as Tesco and Carrefour. The GBU handles the mass aspects of a product, and the regions and customer teams are responsible for the custom portion.

Many companies have responded to the increase in customer power by creating global account units. Under pressure from Daimler-Benz, ABB created a global account team consisting of seven core members, those with the largest sales volume, and 30 extended team members. The team provided a single interface for Daimler to jointly create a global sales plan for the two companies to work together. Such global account teams are usually limited to the sales function.

The customer teams at P&G, Nike, and IBM are multifunctional units, which are often P&L-responsible as well. The customer dimension in these companies has become a fully embedded fourth dimension in their organizations. A partial example of embedding through the matrix relations at P&G is shown in Figure 6. The usual matrix of corporate functions across business units is shown only for the Chief Technical Officer (CTO) and one business group. The Wal-Mart team's matrix reporting is more elaborate. It shows how the customer dimension is embedded into the other three dimensions of the organization. The regional team reports to the North America region as well as the global Wal-Mart team. The business team in North America (NA) reports to the NA Fabric Care unit as well as the regional Wal-

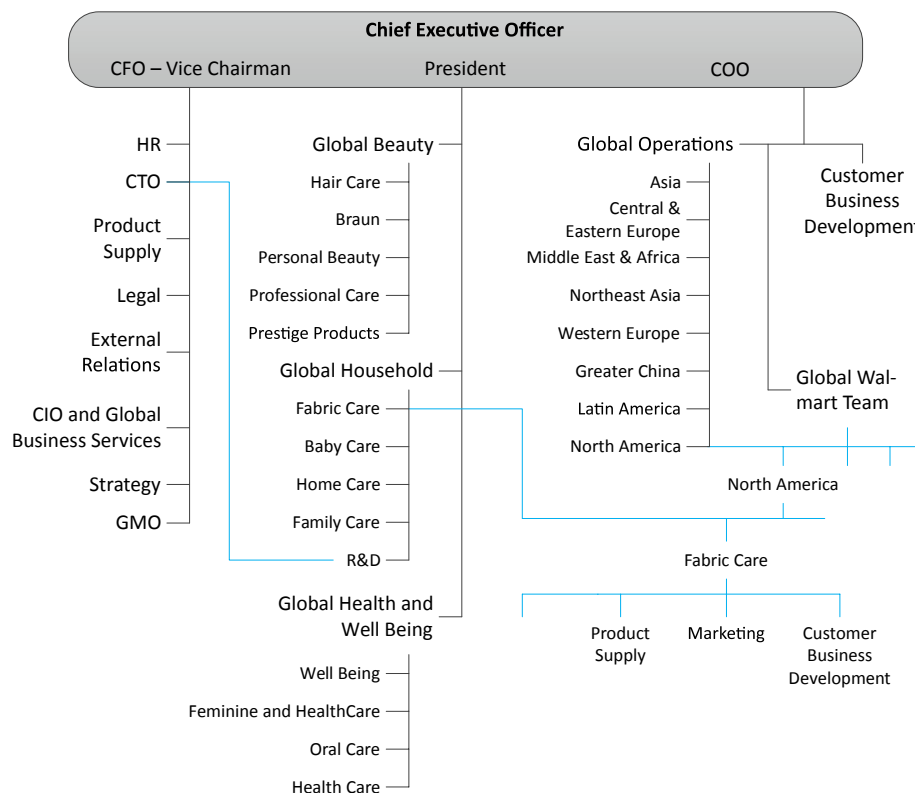


Fig. 6. Matrix Relationships at P&G

Mart team. Also, the functions report to the Wal-Mart NA Fabric Care unit. Even with this simplified diagram, the complexity of the four-dimensional organization is obvious. Thus, it is clear why organization designers began to see that organization is more than structure. How does P&G make this complex organization work? One major means is through aligning goals in the planning process. The regional Wal-Mart teams align their revenue, margin, and growth goals with the regions; the Wal-Mart regional business team aligns its goal with the GBUs; and so on. P&G also uses rotational assignments extensively. People join P&G in a function and then rotate through GBUs, regions, customer teams, and corporate headquarters. They build personal networks and get an understanding of the total company and how it works. They can then participate in the processes to align the company across the four dimensions. So as organizations get more complex, the more important are the management processes and HR practices. They provide the means for holding global enterprises together.

SUMMARY: EVOLUTION OF ENTERPRISE ORGANIZATION

I have tried to extend Chandler's original concept of strategy and structure to encompass current thinking and practice regarding enterprise-level organization. Chandler (1962) described how the strategies of vertical integration and diversification led to the single-business functional structure and the multi-business divisional structure. Following Chandlerian logic, I described how the multidivisional structure was expanded to *organization* by including management processes and HR practices. Following this, I described the GE reorganization of 1969–1970 (which was heavily influenced by the thinking of McKinsey consultants). This reorganization shifted thinking away from size as being the shaper of divisions to business logic being the shaper. The next strategy that affected enterprise organization was international expansion. The Harvard International Project provided the bulk of the research that led to our understanding of the resulting three-dimensional organization (functions, businesses, and countries). Finally, I described the most recent strategy of customer focus. This strategy has led to the four-dimensional organization where businesses, functions, countries, and customer units all report to the company's top leadership.

Throughout the discussion, I have tried to illustrate Chandler's little-known concept of

concatenation. This concept suggests that at any point in time, a company's organization is the accumulation of all previous strategies and structures the company has adopted. Concatenation leads to organizational complexity because each new strategy is added to prior strategies, which have become institutionalized. To be sure, companies can shrink and divest and otherwise move in the opposite direction. For example, circa 1990, Westinghouse was a three-dimensional global company. Today it is a service provider to nuclear power plants under Japanese ownership. But for the IBMs and P&Gs of the world, where growth is paramount, concatenation is a reality that must be addressed by organization design theory and practice.

The P&G organization shown in Figure 6 is a result of concatenation. Up until World War II, P&G was in a single business (soap). That business is now the Family Care Global Business Unit. P&G then diversified into detergents (Fabric Care), paper (Home Care, Baby Care), shampoos (Hair Care), and so on. The GBUs are collected into three groups, as shown in Figure 6. In the 1960s, P&G expanded into Europe and subsequently the rest of the world. It added regions as it grew and linked them to the GBUs. In the late 1980s, P&G formed an alliance with Wal-Mart. It also built alliances during that period with other fast-growing customers in North America. As Wal-Mart grew internationally, so did P&G. Around 2000, P&G implemented its Organization 2005 initiative. This organization was the four-dimensional, front-back model shown in Figures 5 and 6, also referred to as the Four Pillar organization. Over time, P&G has embedded the customer teams into its GBUs and regions. Currently, P&G obtains well over half of its total sales from ten global retailers who are its customers.

FUTURE CONCATENATION

Given the complexity of global enterprise organizations, one must ask, Is there any end to this process? Will companies continue to add new strategic dimensions and embed them in their organizations? Using Chandlerian logic, there are actually two parts to this question. First, will the growth drivers continue to create additional organizational dimensions as markets, channels, and media become more fragmented and specialized? And, second, can organizations continue to create the integrating mechanisms needed to handle more complex interdependence?

The addition of strategic dimensions is a slow process. During the nineteenth century, Chandler (1962) identified three business growth strategies: volume expansion, geographic dispersion, and vertical integration. During the twentieth century, three more growth strategies were developed: diversification, international expansion, and customer focus. So, only six major growth strategies have been driving organizational evolution over the past one hundred fifty years. Assuming that the limit of strategic dimensions has not yet been reached, what is the next one likely to be? One candidate that is rapidly emerging is "Big Data."

Big Data

Big Data is a combination of multiple large databases within a firm, the continuing advance of cost-effective storage and computing hardware, and the use of analytics to make sense of all the data. Initially, data management was seen as an IT responsibility. The analytical expertise, however, usually resides in the businesses and functions. So today, the capability to effectively use Big Data is becoming an enterprise-wide responsibility. SAS, a software vendor that sells business intelligence software packages, is promoting the establishment of BICCs, business intelligence competency centers. BICCs are permanent structures that are staffed from across the company and make the data and analytics universally available. Some companies are now emerging as leading Big Data competitors. For example, Capital One has always been an information-based company. The firm started with a credit card business and has diversified into financial services of all types. Its data and analytics competence is used in all of the firm's business units. American Express talks about moving from a "payments" company to a full-fledged information company, with possibly many new businesses emerging if it succeeds in being able to capture and analyze huge amounts of information.

There are a number of signs indicating that Big Data may be the next strategic dimension

and a new source of growth. McKinsey Global Institute (2011) published an important report entitled “Big Data: The Next Frontier for Innovation, Competition, and Productivity.” McKinsey has a practice area in Big Data, and several articles have appeared in the McKinsey Quarterly. The World Economic Forum held a session on Big Data at its 2012 Davos meeting and issued a report entitled “Big Data, Big Impact: New Possibilities for International Development.”¹ IBM, like SAS, has focused its Smart Planet initiative on helping companies become better competitors by using Big Data strategically.

The evolution of Big Data as a strategic dimension has important organization design implications. In their book, *Competing on Analytics*, Davenport and Harris (2007) identify five stages through which an ordinary company must pass in order to become an analytical competitor or master of Big Data. In the earliest phase, there is the creation of the enterprise-wide database. Initially, different units all have their own databases. Finance has credit and risk data, manufacturing and procurement have vendor data, and marketing and sales have customer and channel data. All of these databases need to be combined into one enterprise data network with access for all. Then there is the maneuvering of various units to become the central data and analytics unit. At a bank, for example, there are several candidates for this role: the Chief Risk Officer who has the credit data and risk analytics, the Chief Marketing Officer who has the customer data and customer insight analytics, and the credit card division that has credit, marketing, and merchant data. While they are all competing to be the central unit, they are all united around opposing a central unit reporting to the CEO. All such companies will need organization design and change expertise to develop acceptable solutions.

One real (anonymous) company shows how a firm can adapt organizationally to the potential opportunities afforded by Big Data. It started as a credit bureau with access to all bank credit transactions and developed the analytical capabilities to calculate credit scores. It grew by acquisition, acquiring both other credit bureaus and marketing database companies. Today, the company can combine these business databases and sell to retailers lists of consumers who have both the financial ability and the willingness to buy. Early on, this company created a Data Council to merge or network all of the various databases of its acquired companies. It also bought or acquired outside data. For example, all automobile transactions are recorded by state Departments of Motor Vehicles, and these data are publicly available. The company has grown to consist of multiple credit and marketing businesses in over 25 countries. It provides data services through multiple customer channels to banks, credit card companies, insurance companies, telecom operators, and retailers. Anyone who grants credit to consumers is a potential customer. It is the type of four-dimensional organization (functions, businesses, countries, and customers) described earlier as in an advanced stage of structural evolution. Now there is a fifth dimension, represented in an organizational unit called Decision Analytics which provides services for all of the firm's businesses and countries. Decision Analytics develops fraud analytics to distinguish late payers who are down on their luck from those who want to commit theft. It has predictive analytics that can tell when a consumer is likely to switch to a new credit card company. This same product is now valuable to a telecom operator. Wireless telecoms are plagued with “churn.” Since telephone numbers were made portable, consumers continually move from one telecom operator to another. The company's software can inform operators in advance of churn so that they might offer customers something that will retain them. This company is becoming a user, and ultimately perhaps a master, of Big Data. It has integrated all of its data in a company-wide network and is developing real skills in combining databases and analyzing them to create unique customer insights. Big Data has allowed it to grow during the downturn.

In summary, it seems to me that the concatenation process will continue. My leading candidate for the next growth driver and strategic dimension is Big Data, the use of massive databases and analytics on an enterprise-wide basis. The Big Data phenomenon has been emerging over the past 10-15 years and appears to be gathering momentum.

¹ The report can be downloaded at: <http://www.weforum.org/reports/big-data-big-impact-new-possibilities-international-development>

Integrating Big Data into the Organization

A consequence of the concatenation of strategic dimensions is the ever-increasing need for more integration. Can organization designers create the integrating mechanisms that can coordinate the increasing interdependence of today's complex organizations? With the era of Big Data upon us, it may be that Big Data itself will create the tools necessary to manage interdependence.

Many of the mechanisms to manage interdependence have been both formal processes and automated processes. For example, Cisco Systems customers can go to Cisco's website and design their own order for routers. At a click of the mouse, the order is sent into Cisco's supply chain system. The customer's credit is checked, and orders are sent to contract vendors who manufacture parts and send them to the contract assembler. When completed, the order is shipped and an invoice is sent to the customer. Upon receipt and validation of the order, the customer wires the money to Cisco's bank account. The vendors, shippers, and taxes are paid by the same process. In such a system, people only manufacture and assemble the product. In earlier days, sales people would have entered the order, and finance and accounting people would have checked the credit, recorded the order, and sent it to production scheduling. People would have scheduled the orders, talked with vendors, and then sent the necessary paperwork. Today, there are very few people involved in this process. Fewer people mean fewer managers, fewer departments, and no face-to-face coordination. Interdependence is managed through automated processes. Coordination and integration processes are now so extensive that they have been called the Second Economy (Arthur, 2011).

Second, there have been advances on the management front. For example, resource allocations are being made using spreadsheets that show businesses as the rows and countries as the columns. The budgeting process is designed to arrive at shared goals for both a business and a country. These spreadsheets then become the "dashboards" to manage changes throughout the year. There are times when a large meeting is employed to create and update the spreadsheets. Using the concept of "get the system in a room," groups of 27, 43, or 71 people are gathered into "decision accelerators" and facilitated to reach a decision. Interdependence is managed through such emerging integrating mechanisms called horizontal processes (Galbraith, 2010).

Another management area where integration has advanced is HR systems. Increasing integration requires more people who are able to work together collaboratively. These kinds of people are recruited and promoted to key decision-making positions. The use of 360-degree evaluations and coaching has helped people develop their collaborative skills. Rotational assignments have increased in importance. Many HR practices today emphasize enterprise-wide collaboration. When people have rotated through various parts of the company, they develop a comprehension of the entire company and how it works. At P&G, one enters the firm through a function. People stay in that function but work periodically at the functional headquarters, in a business unit, in a country, and on a customer team. Leaders who complete this process identify with the company and know its culture and systems.

Finally, shared values guide people to choose behaviors that result in desired outcomes without having to converse and coordinate with others. Think how much more effective the mortgage origination firms would have been if they had a value of "Never sell a mortgage to a person who cannot afford one." With reinforcement from management, values serve as self-monitoring mechanisms to guide people's behavior in desirable ways.

In summary, the automation of processes will coordinate a lot of interdependent work. The development and selection of collaborative leaders who can participate in large-scale meetings will manage the interdependence in the resource allocation processes. And the continued use of rotational assignments will develop leaders with a good network and a "one company" mindset. Combined, these practices will enable companies to manage their increasing interdependence and complexity. Companies that cannot develop these capabilities and practices will miss out on the next source of growth.

CONCLUSION

The evolution of complex enterprise organization continues. From the single-business

functional structure, we have evolved to the four-dimensional organization adopted by many leading firms. The natural question is “Will there be a fifth dimension?” From early indications, the answer appears to be “Yes.” A number of organizations are integrating previously isolated databases into an enterprise-wide database. Then, using new analytical tools, they are discovering useful insights that have value to customers. The move to Big Data appears to be the next dimension in the concatenation process that Chandler identified. Big Data will then become the next big challenge for organization design.

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