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The Emergence and Evolution of the Multidimensional Organization

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"In terms of its impact, not just on economic activity, but also on human life as a whole, the multidivisional organizational design must rank as one of the major innovations of the last century."—John Roberts[1]

The multidivisional, multi-unit, or M-form, is widely acknowledged as the most successful organization form of the twentieth century.[2] Firms that employ the M-form organize their activities in separate business units and delegate control over the resources needed to create economic value to the managers of these units. This organization form is widespread, is central to the "theory in use" of managers, and serves as the basis of most accounting systems. However, the organization of productive activities in many contemporary firms violates the principle that is central to the M-form: that business units are self-contained. The quest for synergies that has been high on the corporate agenda since the late 1980s has resulted in the widespread adoption of corporate account management, shared service centers, and matrix organizations. As a result, most business units now depend at least in part on resources that are controlled by other units. This raises fundamental questions about the status of the M-form in contemporary firms.

Questioning the status of the M-form is not merely a theoretical fancy, but is high on the agenda of managers as well. In this article, we report on research that was commissioned by the Foundation for Management Studies, a Dutch organization of management executives. These practical men and women shared a fundamental uneasiness about structuring their organizations. On the one hand, many of them experienced problems with the M-form: high employee costs, internal battles over resources, lack of standardization, lack of cooperation, and loss of market opportunities. On the other hand, they did not see any viable alternatives to the multi-unit organization form. The need to exploit synergies across business units was widespread, but it was unclear which organizational designs are most appropriate to achieve this. This led to a research project to explore the ways in which leading Dutch organizations, including subsidiaries of foreign multinationals, have adapted the M-form to better exploit synergies across business units.

As we expected, the results of the study vividly illustrate the fundamental tension between the need for contemporary firms to exploit synergies and their need for clear accountability. However, an additional and unexpected finding was that a number of firms in the study have evolved an organizational form that signals a new way of resolving this tension. These firms are organized around multiple dimensions (e.g., region, product, and account) and simultaneously hold different managers accountable for performance on these dimensions. This multidimensional organization form is based on different principles than the M-form, the most notable of which is that resources and market opportunities are organized separately, so that unit managers are deliberately made dependent on each other to achieve their objectives. The multidimensional organization also differs from the matrix organization. In particular, it avoids the situation where employees have two bosses. This is made possible by a different way of organizing information and by a planning and control process in which the customer—rather than any one of the dimensions for which managers are held accountable (e.g., country or product line)—is seen as the main profit center.

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First, however, a discussion of the M-form and its inherent limitations is in order. This will clarify why changes in the economic context in the second half of the twentieth century have put a strain on the way large businesses are typically organized. The significance of the multidimensional organization is best understood against the backdrop of the evolution from a resource-centric industrial economy that was focused on exploiting tangible physical resources, to a customer-centric service economy that is focused on exploiting intangible knowledge resources. Multidimensional organizations can be interpreted as attempts to implement a team-based approach to economic value creation that seems particularly well adapted to exploiting the distributed nature of knowledge that is arguably the defining characteristic of modern economies.

The Rise and Fall of the M-Form

Economic historian Alfred Chandler famously documented the emergence of multidivisional organizations in the first half of the twentieth century.[3] Economist Oliver Williamson labeled this type of organization the M-form to distinguish it from the U-form that it replaced.[4] In the U-form, or unitary form, the firm is a single profit center that is organized along functional lines. The large industrial firms that Chandler described realized that a unitary organization stood in the way of their growth strategies. Instead of using functional departments such as production and sales as the main dimension along which to organize, these firms broke up into separate divisions, each of which was itself a U-form. A "corporate parent" acting as headquarters coordinated the divisions. This organization design is based on the following four principles:

- *The firm is organized in separate business units*—Each division targets a specific market. The specific scope of the divisions can be defined on the basis of such criteria as geography, product, customer, or distribution channel. The divisions operate as strategic business units, meaning that they can pursue a competitive strategy that is geared to the specific market on which they focus. Each business unit is a profit center, so that, in contrast to the U-form, the firm now consists of multiple profit centers.
- *Business unit managers are accountable for creating economic value*—The corporate parent holds business unit managers accountable for creating economic value. This accountability goes hand in hand with the delegation of authority. Within the business scope defined for each unit, and apart from financing its operations, the authority to make the necessary strategic, tactical, and operational trade-offs to achieve business objectives is delegated to the business unit managers.
- *Resources are allocated unequivocally to business units*—To be able to create economic value, business units control all the resources they need to pursue a focused competitive strategy, with possible exceptions such as research and development funds. This control allows business units to respond to market requirements with a minimum of coordination with other business units or corporate headquarters.
- *The task of the corporate parent is to add value to the activities of the business units*—Headquarters defines the scope of the business units, allocates resources, and coordinates activities where necessary. Each business unit is an investment project in itself and the task of the corporate parent is to support the business units in creating economic value. The turnover of the firm is the sum of turnovers of the business units, corrected for internal deliveries. The income of the firm is the sum of the incomes of the business units, minus the costs of the corporate parent.

These organizing principles have been applied widely in the United States and Europe, and successfully so.[5] There are two reasons for the M-form's popularity and success:

- *By creating an internal capital market the M-form stimulates entrepreneurship*—For the corporate parent to coordinate the activities of the different business units, it is in principle sufficient to define the business scope of each unit by specifying its target market.[6] After the scope of the business units is defined, corporate headquarters essentially manages an internal capital market to allocate financial resources to the business units. In addition, corporate headquarters may exercise control by providing overall strategic direction: approving financial and non-financial objectives; controlling performance against objectives; appointing, assessing, remunerating, and dismissing managers; and imposing corporate policies. However, despite these possible additional roles for headquarters, the main principle of the M-form is that business unit managers are responsible for creating economic value and control the resources that allow them to do so. By organizing resources on the basis of markets served and delegating control of these resources to business unit managers, firms that use the M-form can better respond to market opportunities. The M-form stimulates entrepreneurship and creates opportunities for individuals to develop into general managers without the need to provide capital.

- *The M-form offers a simple way to exploit synergies*—In terms of management accounting, the M-form is a simple organization that is nevertheless able to exploit some synergies across business units. The M-form is simple in the sense that accounting and control follow one dimension: the performance of the business units. The efficiency of the firm as a whole can be assessed through its break-up value: the value of the firm must be higher than the sum of the values of the business units. This is achieved by exploiting synergies, provided these synergies do not breach the quasi-autonomy of the business unit managers. Such synergies can take the form of financial synergies and economies of scope. Williamson made a further distinction between the H-form, or financial holding, in which the corporate parent only pursues financial synergies, and the M-form, in which the corporate parent pursues both financial synergies and economies of scope.[7] Financial synergies may result from spreading the risks of investment across business units or reducing the costs of capital of the firm. The sources of economies of scope include corporate R&D and management development programs that benefit multiple business units.

Despite its success during much of the twentieth century, by the late 1980s the M-form was under attack. The critique of the M-form focused on the added value of the corporate parent to its business units.[8] From the perspective of outside investors, corporate headquarters adds costs that an investor could avoid by directly investing in the business units. On this view, it is clear that the overhead costs of a corporate layer of management should be offset by the value that the corporate parent adds to the activities of its business units. If the parent is able to increase the ability of its business units to create economic value, the value of the firm as a whole will be higher than the sum of the values of its business units. However, in many cases it could be demonstrated that the overall value of the firm was in fact lower than its break-up value. In other words, rather than creating shareholder value, many parents were destroying it.

The limited success of many corporate parents in adding value to their business units raised some fundamental questions about the M-form that both managers and theorists have been struggling with ever since the issue was raised some twenty years ago. It may be clear that the only source of added value is the ability of the parent to exploit synergies of some sort. For much of the twentieth century, the relative efficiency of the internal capital markets of the H-form and M-form allowed firms to reap financial synergies. One of the main causes of capital market inefficiencies is information asymmetry between shareholders and managers. Outside investors may not have access to all the inside information that is needed to assess the true value of investment opportunities. In an internal capital market, this problem is reduced because headquarters has the power to conduct financial and strategic audits of the business units. However, by the 1980s, external capital markets had become much more efficient and there was little room left to add value through financial portfolio management alone.

With the potential for financial synergies much reduced, the H-form became much less popular and M-form firms increasingly focused on exploiting economies of scale or scope. However, in doing so, they also ran into the limitations of the multi-unit design. The need to exploit synergies across business units has led to a variety of responses. On the market side, key account management systems are a common solution to exploit customer synergies. On the resource side, shared service centers are a common solution to exploit synergies in production, delivery, and a variety of (support) functions. Over the years, many firms have experimented with different types of matrix organizations. What all these responses have in common is that they reduce the independence of business units. This, in turn, goes against the very idea of the M-form.

At its heart, the M-form assumes that each of the firm's customers only needs to deal with one business unit, and that each of the firm's business units can control all resources needed to serve its market. It is only on these two assumptions that business units can truly operate independently. These assumptions are violated as soon as there are opportunities for cross-selling or system integration across the products of the different business units, complementarities among the resources of the different business units, or economies of scale in the use of resources across business units. In other words, there is a crucial trade-off involved in choosing between the unequivocal resource allocation and lines of authority that have led to the success of the M-form, on the one hand, and the creation and the exploitation of the kind of synergies that product and financial markets increasingly require, on the other.

In Search of Alternatives for the M-Form

The tension between the need to create synergies and the organizing principles of the M-form explains why the Dutch Foundation for Management Studies commissioned a study into the status of the M-form among large firms in the Netherlands (see the Appendix, "About the Research"). Interviews at 36 large Dutch organizations, including a number of subsidiaries of non-Dutch multinationals and a number of non-profit organizations, led to five main conclusions about the status of the M-form.

The M-form Still Dominates the Corporate Landscape

In 29 of the 36 firms interviewed, the internal organization was based on one dimension. These firms were organized around units that were defined in terms of either regions, products, markets, product-market combinations, or in some cases distribution channels (e.g., intermediaries in the insurance industry). An interesting case among these 29 firms was the "split business chain" employed by Philips Medical Systems, in which development and manufacturing are organized globally in divisions based on products, while marketing, sales, and services are organized on the basis of regions. However, with the exception of Philips Medical Systems and the seven multidimensional firms identified below, the dominant way of organizing firms in the sample was on the basis of the principle underlying the M-form: around units that are defined in terms of one specific dimension.

The M-form Is Central to the "Theory in Use" of Executives

A second conclusion is that the traditional multi-unit organization is central to the "theory in use" of executives.[9] Executives' comments on organization were typically framed in terms of the organizing principles that underlie the M-form. Clearly defined accountabilities and performance targets at the level of business units are seen as the norm against which organizational solutions are to be judged. As one respondent remarked, "When I was appointed CEO of this firm, the organization was a complete mess. There was only one way to clear this up: to organize it strictly in business units and divisions, without compromise." Another illustrative comment by a CEO was: "My first philosophy is to decentralize until the bitter end, which should result in clearly identifiable entities for entrepreneurship. My second philosophy is that entrepreneurship is by far more important than achieving synergies. My third philosophy is that if the market changes, the organization needs to be adapted." That the M-form dominates the thinking of executives about organization is reinforced by the fact that the multi-unit form is also the basis of the accounting systems of most companies.

The Matrix Organization Is a Negative Mental Anchor

In contrast to their frequent recourse to the principles of the M-form when discussing their firm's organization, executives had nothing positive to say about the organizing principles of the matrix organization. The interviews made it very clear that the concept of a matrix organization has very negative connotations. This is despite the fact that all respondents acknowledged that a firm typically cannot be managed on only one dimension. A remark that was made, in slightly different terms, in multiple interviews, was the following: "You cannot run a company like this along a single dimension, you need to manage along multiple dimensions—but one thing is for sure, I never again want to work with a matrix organization." Executives associate the matrix organization with unclear responsibilities, a lack of accountability, and political battles over resources, resulting in risk-averse behavior and loss of market share.

On the basis of the interviews, it seems that negative experiences with matrix organizations even prevent top executives from asking the crucial question that is central to recent scholarship on designing complex organizations "are there ways to make the matrix organization work?"[10]

Virtually No Business Unit Is Self-Contained

Although the M-form still dominates both organization charts and executives' mental maps, at the same time, the interviews showed that virtually no business unit is self-contained. In contrast to the ideas underlying the M-form, all firms are organized on the basis of business units that depend on resources outside the unit to achieve their objectives, albeit in varying degrees. This is in large part the result of the use of synergy mechanisms. Both shared service centers (26 out of 36 organizations) and corporate account management (15 out of 36 organizations) are widespread. In other words, while the M-form may still dominate the thinking about organization, the actual practice of organizing has taken firms away from the underlying logic of the M-form.

Mental Anchoring to the M-form Creates Problems When Implementing Synergy Mechanisms

A number of firms—such as ARCADIS, an engineering firm with worldwide operations—were wrestling with the organization of corporate account management. While ARCADIS has historically operated very successfully on the basis of independently operating business units, its corporate account management program is one of its most successful growth platforms. A corporate account is typically a customer who is served by multiple business units, so that corporate account management cuts across business units. The question that firms like ARCADIS face is whether or not to grant corporate account managers profit-and-loss responsibility. Project driven firms such as construction companies face a similar dilemma with respect to project management. In a firm such as Van Hattum & Blankenvoort (a division of one of the largest construction companies in the Netherlands, the VolkerWessels group), large projects are typically the profit drivers of the firm, yet there is also a need to monitor the profitability of the business units that not only deliver goods and services to the projects, but also to their own external customers. One of the problems with respect to giving corporate account managers or project managers profit-and-loss responsibility is opposition by business unit managers. They typically perceive such responsibilities as reducing their own status, power, and autonomy. In fact, in five of the firms interviewed, the mental anchoring to the M-form resulted in a failure to successfully implement account management or project management.

Together, these five conclusions confirm the reality of the tension that executives face when organizing their firms. Most firms seem to be "stuck in the middle" between the principle of self-contained units that is central to the M-form, on the one hand, and the need to create synergies across business units, on the other. However, our research also unexpectedly turned up a number of

TABLE 1. The Multidimensional Firms from the Sample

Firm	Number of Dimensions	Dimensions
ABN AMRO	4 (+1)	Regions, Global Clients, Market Segments, Products, (Support Functions)
Ahold (Albert Heijn Company)	8	Time, Place, Formula, Category, Customer's Loyalty Card, Receipt, Regions, Branch/Store
ASML	2 (+1)	Products, Accounts, (Support Functions)
IBM	4 (+1)	Product/Solution, Regions, Accounts, Distribution Channels, (Support Functions)
Microsoft	4	Products, Regions, Applications, Market Segments
PricewaterhouseCoopers	2 (+1)	Industries, Professional Services, (Support Functions)
Van Hattum & Blankevoort	2	Business Units, Projects

firms that seem to have found a new way to balance the demands for synergies with clear accountability and control mechanisms.

Multidimensional Organizations

Seven of the firms that were interviewed create and exploit synergies across their business units by organizing along multiple dimensions, and five of these firms were studied in more detail (see Table 1). One of these firms is PricewaterhouseCoopers Netherlands (PwC), the professional service firm for accounting, tax, and management consulting. This firm is organized on the basis of three dimensions: industries (including key accounts), professional services, and support functions such as HR, IT, and facility management. This means that, in addition to operating shared service centers for the support functions, PwC has made different managers responsible for pursuing market opportunities and for managing resources. The "market managers" of industries and key accounts have top-line responsibility. They are accountable for turnover, market position, and customer retention. However, these managers control very few resources. To reach their targets, they depend on the "resource managers" of the professional service units. In addition to controlling most of the resources, these resource managers also have bottom-line responsibility.

The crux of PWC's organization is that pursuing market opportunities is organized separately from managing resources. In doing so, the firm knowingly violates the organizing principle that is at the heart of the traditional M-form: that resources are unequivocally assigned to unit managers so that they can use these resources to pursue market opportunities. What is interesting is that PwC's violation of this principle does not result in wheeling and dealing among the market managers and resources managers. Instead, the inherent conflict between developing new market opportunities and an efficient utilization of resources is deliberately brought to the table of PwC's executive board. To fruitfully exploit the tension between innovation and efficiency, the task of the board is twofold. On the one hand, it must reduce risk-averse satisficing behavior among the resource managers by confronting them with the market opportunities identified by the market managers. On the other hand, it must confront any overly optimistic judgments about market opportunities among the market managers.

The example of PwC highlights three of the six main characteristics of multidimensional organizations that we identified. Multidimensional organizations: simultaneously report their performance on two or more dimensions at multiple levels in the organization; simultaneously hold different managers accountable for the contribution of their dimension to the firm's overall performance; and organize resources in such a way that the managers who are responsible for the different dimensions are dependent on each other for the resources they need to achieve their performance objectives. What is essential is that in multidimensional organizations, the reconciliation of grasping market opportunities and using resource efficiently is a corporate issue that is visible to all. Trade-offs are made in light of their effect on overall firm performance.

A possibly paradigmatic example that illustrates in more detail how multidimensional organizations operate is IBM. When Gerstner took over as CEO in the early nineties, IBM was a product-centric firm with a focus on hardware products such as mainframes. Its internal organization was based on a geographical model: the key positions outside the United States were the country managers. Today, IBM offers products, services, and solutions and is organized around four dimensions: regions, products and solutions, industries and accounts, and distribution channels. Contrary to his predecessor Akers, who intended to split IBM up into a number of autonomous companies, Gerstner implemented a strategy aimed at offering integrated services, including servicing a number of global key accounts. Palmisano, the current CEO, has extended this strategy with his concept of the "Globally Integrated Enterprise."[11]

To operate as an integrated enterprise, IBM simultaneously holds different managers accountable for the results of products, accounts, regions, and distribution channels. Product managers are accountable for turnover, margin, market share, and market penetration of specific products or solutions. Account managers are accountable for client satisfaction (which is measured twice a year by an independent agency), turnover, and margin for specific accounts. Account managers have staff for industry expertise and architecture design, but are otherwise dependent on staff and expertise from the product groups. Region managers are accountable for turnover, margin, and market penetration for specific products, but which products will be offered in a region is beyond the decision authority of the region manager. Distribution channel managers are accountable for turnover, return on sales, and customer satisfaction for their channel. Product, account, region, and distribution channel managers all depend on shared services organized in "Globally Integrated Support Functions," including finance, HR, legal, communications, and sales support.

A crucial building block of IBM's ability to operate as an integrated enterprise is its management information system. Before 1994, in keeping with IBM's geographical organization, IBM Finance was decentralized. Management information systems were geared to the needs of the local business units, cost allocations were subject to gaming among business units, and consolidation of the necessary information for financial reports was tedious. Today, all IBM's transactions are recorded according to one set of common data definitions and processes and they are consolidated in one global general ledger. This has created a trusted central source of accounting information that can be simultaneously reported in terms of the multiple dimensions along which IBM is organized. In addition, IBM operates a CRM system that enables all managers to consult the database for orders and leads and specifies their contribution to customer profitability. For instance, a distribution channel manager has access to information about the percentage of total sales to individual customers through her specific channel, and thus about her contribution to IBM's overall profit with this customer. IBM's management information systems are the basis of a management process that is designed to facilitate cooperation between the managers who are accountable for results on each of the different dimensions.

Interestingly, the main profit centers in IBM's organization are not the units that bear responsibility for one of the four dimensions for which individual managers are held accountable. The main profit center is the customer and the primary task of all of the unit managers is to optimize IBM's position with its customers. To balance customer demands and the efficient use of resources and to be able to respond to tactical buying behavior of customers that attempt to increase their bargaining position vis-à-vis different IBM units, product and account managers confer each month. This is done on the basis of management information provided by IBM Finance from its accounting and CRM systems. All managers within IBM receive the same information so that horizontal information asymmetries (across dimensions) and vertical information asymmetries (across layers in the hierarchy) are eliminated. For new leads, product managers and industry consultants jointly write a business case. Depending on the situation, more weight may be given to account management or product management, but the criterion to decide on the right balance is always the contribution to the overall performance of IBM. If product and account managers cannot agree, the matter is escalated to region managers, or in exceptional cases to corporate headquarters.

In addition to the three characteristics of the multidimensional form specified above, the IBM case illustrates three more features that are common to the seven firms in our sample that we identified as multidimensional organizations.

Multidimensional Firms Have Multidimensional Market Positions

The primary reason for organizing firms along multiple dimensions is that multidimensional firms have identified multiple dimensions that are critical to their market position. Decision rights are allocated in line with the importance of these dimensions in the market. IBM's multidimensional organization is the result of its philosophy that it should be able to conduct business with its customers in the way that these customers prefer. Some customers prefer to do business through product-based sellers, while others prefer industry-based sales teams, solutions-based sales teams, intermediaries, or direct channels such as call centers and the Internet. As a result, IBM has defined its market in terms of no less than six segments that have significant overlap (global accounts, regional accounts, midsized customers, industry-specific solutions, discrete products, and distribution channels). While various commentators initially criticized IBM for the complexity of its market definition and suggested that it would need to concentrate on only one dimension, this criticism was silenced by IBM's success in serving the market along these different dimensions.[12]

Multidimensional Firms Focus on the Customer as the Profit Center

The customer-centric nature of multidimensional firms is further enhanced by the practice of treating customers as profit centers. In fact, although all the managers that carry responsibility for a particular performance dimension typically have profit responsibility, multidimensional firms see customers as the primary profit center. Multidimensional firms create economic value creation by pursuing market strategies on the basis of integrated product-and-service offerings that maximize customer profitability.

An example of this approach is how ABN-AMRO allocates individual customers to specific unit managers. ABN-AMRO is organized along four dimensions: regions, market segments, products, and global clients. Profit is reported for each of these dimensions, but also for each customer. This is made possible by a worldwide CRM system, in which all customers (corporate accounts, SME, or retail) are recorded down to the level of daily business and profitability. On the basis of the specific profile of the customer, quarterly decisions are made to allocate each customer to the unit manager that is best placed to optimize the profitability of the customer. For instance, an SME firm would typically be allocated to the SME manager in the firm's country of residence. However, if the owner of such a firm decides to sell his business, the market manager for private equity clients will typically be much better placed to profitably serve this customer. In the past, it was left to the initiative of the customer to become a private equity client with ABN AMRO. Now, on the basis of the information collected by the account manager of the client (in this case the SME manager) and recorded in the CRM system, the quarterly meeting on customer reviews decides to move the customer into the custody of the private equity manager. The SME manager is rewarded by a referral fee, and the private equity manager takes on the responsibility for cross-selling products and services other than his own private equity service.

Multidimensional Firms Eliminate Information Asymmetries and Transfer Pricing

In multidimensional firms, corporate headquarters owns the transaction data and customer data. External and internal transaction data are recorded on multiple characteristics in one general ledger and are shared across the firm. The general ledger allows for consolidation along multiple dimensions as well as for reports at the level of individual customers. By operating one general ledger, multidimensional firms create a single trusted source for performance data, and by making these data available to all, multidimensional firms eliminate information asymmetries. Also, because the general ledger records all external and internal transactions, transfer prices between units and the attendant negative effect of double marginalization on the performance of the firm are eliminated.

The crucial importance of information systems in allowing firms to operate as multidimensional organizations is illustrated by one of the firms in our sample that is moving towards the multidimensional form. This multinational company, which operates four divisions that are active in around sixty countries, has been running a global data system for some twenty years. The system reports along the product-driven divisional organization as well as the legal dimension of its organization (the operating companies within the divisions, as well as the national subsidiaries that act as holdings for the local sales organizations). When the firm changed its strategy to include global key account management, it discovered that the global data system could not report the necessary information. Sales to key accounts were locked up in local databases that could only report consolidated financial figures per product division, which was, after all, the main dimension along which planning and control had historically proceeded. When the firm also decided to establish a project dimension that cuts across its four divisions to offer integrated services to the hotel market, it ran into further difficulties, as the product divisions were hesitant to make the necessary investments and transfer prices undermined the profitability of the projects. The challenge that the firm is currently facing is threefold: to allow the global data system to report profitability on key accounts and projects, to give the key account managers and project managers profit-and-loss responsibility, and to use the global general ledger to eliminate transfer prices.

The Evolution of the Multidimensional Form

The ways in which multi-business firms can be organized to reap the benefits of synergies across their business units has long been a central topic in the management and strategy literature. As a theoretical concept, the idea of a multidimensional organization is not entirely new. In fact, the idea that the M-form should exploit economies of scale and scope through financial synergies, corporate management development, or R&D programs led to a line-and-staff organization that can already be seen as multidimensional, albeit in a very limited way. In the line-and-staff organization, functional managers not only report to the general managers of their business unit, but also to corporate functional managers, so that management information needs to be made available along both the line and the staff dimensions. However, the planning and control processes in the M-form are strictly one dimensional, with the business units as the only profit centers.

In the late 1970s, there was some theoretical interest in the potential of more explicitly organizing multi-business firms along several dimensions in a number of publications that were concerned with the changing nature of multinational corporations (MNCs).[13] These publications are from a period in which European multinationals were transforming their country-based international operations, and U.S. multinationals their international sales divisions, into transnational organizations. The typical result of these transformations was a matrix organization, rather than a full-fledged multidimensional design. As an empirical phenomenon, the multidimensional organization as we describe it is new. While it certainly has its precursors in well-designed matrix organizations, such as the much celebrated global matrix that ABB operated in the 1990s, or in so-called "network organizations," it has a number of crucial features that signal a new phase in the evolution of multidimensional organization designs.[14]

In Table 2 we use the dimensions of Galbraith's "star model" for organization design to summarize the main differences between the traditional M-form, the typical two-dimensional matrix organization, and the multidimensional form.[15] The table highlights the differences between the M-form and the multidimensional form and also shows that the matrix organization is in many ways an intermediate form that may share more features with either the M-form or the multidimensional form, depending on how well it is designed. In fact, one could easily conceive of a matrix organization as a two-dimensional organization, and a multidimensional organization such as IBM could conversely be seen as a very complex matrix organization. However, there are also three important differences between the typical matrix organization and the organization of the multidimensional firms in our sample.

Strategy

In keeping with Chandler's dictum "structure follows strategy," the emergence of the multidimensional organization is best understood against the backdrop of the shift from the physical production model (that was central to the industrial revolution) to the knowledge exploitation model (that is central to a post-industrial service and experience economy). Multidimensional firms have fully acknowledged the age-old marketing wisdom that their profitability ultimately depends on their ability to create value for customers. They have also acknowledged that the sources of their ability to create this value are shifting from tangible physical assets and codified knowledge to the tacit personal knowledge of creative knowledge workers. The result is strategies that are customer-centric instead of resource-centric and aimed at knowledge exploitation rather than physical production.

TABLE 2. A Comparison of Different Organization Forms

	M-form	Matrix Form	Multidimensional Form
Strategy	Physical Production Model	(Intermediate)	Knowledge Exploitation Model
	Resource Centric	(Intermediate)	Customer Centric
Organization	Portfolio of Units	(Intermediate)	Integrated Firm
	Single Dimension	Multiple Dimensions	Multiple Dimensions
	One Boss	Two Bosses	One Boss
	Autonomy	(Intermediate)	Teamwork
Planning and Control Process	Focus on Tangible Resources	(Intermediate)	Focus on Intangible Resources
	Resource Allocation	(Intermediate)	Resource Mobilization
	Single Dimension	Multiple Dimensions at Unit Level	Multiple Dimensions at All Levels
	Transaction Data Owned by Units	Transaction Data Owned by Regions	Transaction Data in Trusted General Ledger
	Unit Primary Profit Center	Product or Region Primary Profit Center	Customer Primary Profit Center
Rewards	Individual Performance Targets	(Intermediate)	Team and Individual Performance Targets
People	Unit Oriented	(Intermediate)	Firm Oriented
	Hierarchical	(Intermediate)	Cooperative
	Motivated by Control of Resources	(Intermediate)	Motivated by Contribution to the Success of the Firm

Organization

Customer-centric strategies based on knowledge resources demand teamwork. Perhaps the main difference between the M-form and the multidimensional organization is that the executive board no longer sees its task in terms of portfolio management, but in terms of running an integrated firm. This is why the efficient use of resources and the pursuit of market opportunities are organized separately, so that managers become dependent on each other. The firm is no longer seen in terms of one dominant dimension along which resources are allocated to quasi-autonomous managers, but in terms of multiple dimensions that cooperate toward the common goal of creating value for customers. This unlocks scarce knowledge resources from self-contained business units, so that they can be used across the firm.

Planning and Control Process

The multidimensional organizations in the research sample have all defined the customer as the primary profit center in their accounting systems, and have translated this choice into their management control processes.[16] This stands in contrast to most firms, where the logic of the M-form is hardwired into the accounting systems, and performance measurement and control typically proceed along one dimension, taking the business unit or division as profit center. More often than not, this one dimension is a poor proxy for the firm's position with customers. A necessary condition for operating a multidimensional organization is that performance data is recorded and reported over multiple dimensions and at all levels of the organization. Only a central accounting system that is seen as a trusted source of financial data can eliminate information asymmetry and the need for transfer prices between units, both of which are essential for running an integrated customer-centric firm. Trade-offs between dimensions are visible to all involved and a clear planning and control process makes sure that these trade-offs are made with an eye to improving the development and exploitation of knowledge resources across the firm and optimizing the firm's position with customers.

Rewards

The essence of the multidimensional organization is that it turns on the principles of "team play." This means that all players know the game and their roles in this game, share information, cooperate towards a common goal, and are rewarded on the basis of their contribution towards realizing this common goal. To be able to reward the collective effort of team play, remuneration is primarily based on people's contribution to the common goal. This stands in contrast to the remuneration systems that dominated in the traditional M-form and that reward managers in proportion to their position in the vertical hierarchy.

People

Multidimensional firms select managers for their motivation to make a visible contribution to the overall performance of the firm. Organizing a firm on the principle of teamwork calls for another type of manager than the one that typically thrives in the M-form. Whereas the traditional business unit manager is likely to be extrinsically motivated by strong financial incentives and the status conferred by controlling resources, the emphasis on teamwork in the multidimensional organization calls for managers that are intrinsically motivated by their contribution toward a common goal. Multidimensional firms put information systems in place that disrupt the monopoly on information that managers could use to control their subordinates in the traditional Weberian bureaucracy. Interestingly, as a female manager at IBM remarked, this development may well benefit women because they are known to be more likely to share information and to solve problems collectively than men. The hiring and promotion practices of a firm thus have an important role to play in making a multidimensional organization work.

While the differences between the M-form and the multidimensional organization may be clear, the differences between the matrix organization and the multidimensional form are subtler. While a poorly designed matrix organization resembles the M-form without the attendant advantages of clear accountability, a well-designed matrix organization may in many ways resemble a multidimensional organization. However, there are nevertheless three important differences between a multidimensional design and the matrix.

The first difference is in terms of organization. In a matrix organization, the "node" on the organization chart where the dimensions meet is the employee, who reports to two bosses that each have their own objectives. In a multidimensional organization, the "node" in the organization is no longer the employee, but the customer. In multidimensional organizations, most employees are in fact employed in specific units and report to a single manager. Rather than sharing employees, the managers who are responsible for specific dimensions (say, product and region) share customers.

The second difference is in terms of the planning and control process. Rather than defining one of the dimensions as the main profit center, multidimensional organizations are primarily oriented on the profitability of customers. The profitability on the different dimensions is seen as a derivative of customer profitability, and although each of the managers of the different dimensions typically has some form of profit responsibility, the profit on his dimension is made subservient to overall profitability with customers.

The third difference is that to be able to avoid the two bosses of the traditional matrix, the multidimensional organization employs information systems that can simultaneously report performance on the different dimensions at all levels in the organization, down to individual customers. These systems allow the multidimensional organization to eliminate information asymmetries and transfer pricing and to truly operate as an integrated customer-centric firm.

In hindsight, the multidimensional firms in the research suggest that the root of the problems that many firms encountered with the matrix organization was its focus on authority and power, whereas the solution to making an organizational design along multiple dimensions work lies in a focus on the firm's joint goals with customers and information systems that allow firms to operate along multiple dimensions without the ambiguities that are inherent in the two-boss system.

Conclusion

> "In the knowledge society, managers must prepare to abandon everything they know."—Peter F. Drucker[17]

For most of the twentieth century, the organizing principles of the M-form served firms well. However, contemporary economic conditions increasingly call for the creation and exploitation of synergies; and this is not something for which the M-form was conceived, or can be adapted easily. In their search for alternatives to the M-form, many firms in our sample have experimented with and subsequently discarded the matrix organization. Instead, the most common organization design is the M-form combined with synergy mechanisms such as corporate account management and shared service centers. This particular combination creates tensions because these synergy mechanisms go against the basic design principles of the M-form. However, a limited but substantial number of firms have evolved towards multidimensional designs that allow them to better exploit the intangible resources that are increasingly becoming the main source of competitive advantage in contemporary economies. The multidimensional organization is an alternative to the M-form and the matrix organization, and it is explicitly based on design principles that facilitate the creation of synergies across units to serve increasingly fragmented markets.

An important question is if the multidimensional organization is efficient. Ultimately, this question can only be answered by observing the future financial performance of multidimensional organizations.[18] However, the multidimensional form does seem to be particularly well adapted to the economic logic of a knowledge society. Knowledge-driven production calls for firms that are able to integrate distributed and tacit knowledge. Because no single individual holds all the knowledge that is required to produce the complex products and services of most contemporary firms, both the exploration and exploitation of productive knowledge requires teamwork. Seen in this light, the emergence of the multidimensional organization can be understood as a way to facilitate the teamwork that is needed to successfully create and exploit productive knowledge.

Our findings show that firms have evolved towards a multidimensional design as a result of the need to simultaneously optimize the proactive exploitation of market opportunities and the efficient exploitation of resources. On the market side, the main rationale for adopting a multidimensional organization is that many markets are no longer one-dimensional. Customer preferences have become much more fragmented and as a result products and services are increasingly sold through multiple distribution channels. The retail market that Ahold faces may be seen as an extreme case. Individual customers are likely to shop in different Albert Heijn stores (Ahold' s main brand in the Netherlands): a traditional medium-sized neighborhood Albert Heijn supermarket for utility shopping, a small "Albert Heijn ToGo" shop at a railway station for convenience products, or an "Albert Heijn XL" for leisurely shopping at the weekend. This means that the traditional organization design in which individual stores were the main profit centers can no longer serve as an accurate proxy for the company's position with customers. In fact, Ahold has realized that individual customers may have different sets of preferences depending on the time of day, the day of the week, or the location where they shop, so that in some sense even individual customers further fragment into distinct consumer behavior profiles that may be triggered at different moments. On this view, Ahold's ultimate challenge is to increase the company's profitability for different "clouds of consumer behavior." The eight dimensions along which Ahold's planning and control processes proceed are an attempt to do just that.

Another reason for the multidimensional nature of markets is that industries are increasingly networked. As a consequence, the locus of innovation has shifted from the individual company to the network in which it operates. In the case of IBM, the integration of components into a system may be a task that the customer wants to perform in-house, it may be a task that the customer wants to outsource to an independent third party, or it may be a task that the customer wants IBM to fulfill. That IBM is organized along four dimensions reflects the fact that it wants to serve all three types of customers and illustrates Ashby's "Law of Requisite Variety": to control a market, a firm's internal organization should at least match the complexity of the external environment.

On the resource side, the central reason for adopting a multidimensional organization is that it allows firms to make better use of personal knowledge resources. This both increases the firm's ability to increase economies of scope and makes the firm more attractive for knowledge workers. The individual expertise of knowledge workers is increasingly becoming the most valuable resource of firms, and by organizing market opportunities and resources separately, individual expertise is no longer locked-up in specific business units.[19] Instead, it can be applied in the products and services for the customers who most value the expertise. This is not just an advantage for the firm, but also for the knowledge worker, whose personal market is increased. This, in turn, should give multidimensional organizations a competitive advantage in the market for knowledge workers compared to the M-form. As Drucker already emphasized, in the knowledge economy, "organizations have to market membership as much as they market products—and perhaps more."[20] Knowledge workers, especially the more creative kind, are known to pursue as large a personal market for their knowledge as possible, and on this aspect the multidimensional organization clearly outperforms the M-form.[21]

It is, of course, one thing to conclude that the multidimensional organization has advantages for knowledge-driven firms that operate in complex, interrelated markets, but quite another to make a multidimensional organization work. This is where the main source of corporate added value lies. In a multidimensional organization, the role of headquarters is not merely to manage a portfolio of investments, but to create the conditions that make it possible for the firm to operate as an integrated team. The first step towards creating these conditions is to overcome the mental barriers that are the legacy of the M-form. Both the firm's top executives and, equally importantly, its business unit managers will have to give up on some deeply engrained notions about organization design. Instead of unequivocally allocating resources, the interdependence of units is explicitly designed into the firm. The second step is to reorganize the firm's information systems, planning processes, and reward schemes. The crucial enablers for a successful multidimensional organization are systems and processes that eliminate information asymmetries and allow employees to jointly focus on creating economic value for customers.

APPENDIX
About the Research

Interviews were conducted at 36 organizations. They are listed below, with the seven multidimensional firms highlighted in bold. Half of the interviews were with the CEO of the firm, while the other half were with the CFO or the controller. In addition to assessing the status of the multi-unit organization as well as the use of account management and shared service centers, the interview protocol focused on questions such as: "Which alternatives to the multi-unit organization are used?" and "Which trade-offs are made in deciding between familiar and new organization forms?" The question that led to the unexpected discovery of the multidimensional organization form was "Along which axis is accountability for turnover and profit organized in your organization?" After the interviews, a number of multidimensional firms were selected for detailed case studies (ABN-AMRO, Ahold—Albert Heijn, IBM, PwC, and Van Hattum & Blankevoort). These case studies were co-authored with representatives of the firms and reported back to the firms before being authorized for publication.

Firm	Industry	Corporate Account Management	Shared Service Centers	Profit / Non-Profit
1. **ABN-AMRO**	Financial Services	X	X	P
2. Eureko - Achmea	Insurance		X	P
3. **Ahold—Albert Heijn**	Food Retail		X	P
4. Akzo-Nobel	Chemicals		X	P
5. ARCADIS	Engineering	(X)	X	P
6. **ASML**	Hi Tech Equipment	X	X	P
7. Ballast Nedam	Construction			P
8. Bollegraaf Recycling	Equipment Engineering			P
9. Carante Groep	Care		X	NP
10. Cordaris	Financial Services		X	NP
11. Royal Cosun	Food			P
12. DSM	Chemicals	X	X	P
13. Essent	Energy			P[a]
14. Evean Groep	Care		X	NP
15. **IBM—Netherlands**	IT Equipment and Services	X	X	P
16. ING	Financial Services		X	P
17. KLM Cargo	Air Transport	X	X	P
18. KPN	Telecommunication	X	X	P

	Firm	Industry	Corporate Account Management	Shared Service Centers	Profit / Non-Profit
19.	**Microsoft—Netherlands**	Software and IT Services	X	X	P
20.	Ministry of Interior	Government		X	NP
21.	Ministry of Defense	Government		X	NP
22.	Nationale Nederlanden	Insurance[c]			P
23.	PGGM	Financial Services			NP
24.	Philips Electronics	Electronics	X	X	P
25.	**PricewaterhouseCoopers**	Professional Services	X	X	P
26.	Rabobank	Financial Services	X	X	P[b]
27.	Rodamco Europe	Real Estate	X		P
28.	Sabic Europe	Chemicals	X	X	P
29.	Sanoma	Publishing	X	X	P
30.	Shell	Oil and Energy		X	P
31.	SNS Reaal	Financial Services		X	P
32.	TNT-Post	Postal Services		X	P
33.	Unilever	Food	X	X	P
34.	UWV	Social Security			NP
35.	Van Hattem & Blankevoort	Construction[d]			P
36.	Vitens	Public Water Supply			P[a]

a. Shareholders are public bodies
b. Cooperative with a statutory injunction on distributing profit to its members
c. Division of ING
d. Division of VolkerWessels

Notes

1. John Roberts, *The Modern Firm: Organizational Design for Performance and Growth* (Oxford: Oxford University Press, 2004), p. 2.
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3. Alfred D. Chandler, *Strategy and Structure: Chapters in the History of American Enterprise* (Cambridge, MA; MIT Press, 1962).
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6. Alfred P. Sloan, *My Years with General Motors* (Hammondsworth, UK: Penguin Books, [1962] 1986).

7. Williamson (1975), op. cit.
8. Michael Goold and Andrew Campbell, *Strategies and Styles: The Role of the Centre in Managing Diversified Corporations* (Oxford: Basil Blackwell, 1987); Michael E. Porter, "From Competitive Advantage to Corporate Strategy," *Harvard Business Review*, 65/3 (May/June 1987): 43-59.
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10. Jay R. Galbraith, *Designing Matrix Organizations That Actually Work* (San Francisco, CA: Jossey-Bass, 2009).
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14. For well-designed matrix organizations, see Galbraith (2009), op. cit. For ABB, see Christopher A. Bartlett and Sumantra Ghoshal, "Beyond the M-Form: Toward a Managerial Theory of the Firm," *Strategic Management Journal*, 14 (Special Winter Issue 1993): 23-46. For more in-depth and critical discussions, see Christian Berggren, "Building a Truly Global Organization? ABB and the Problems of Integrating a Multi-Domestic Enterprise," *Scandinavian Journal of Management*, 12/2 (1996): 123-137; Winfried Ruigrok, Leona Achtenhagen, Mathias Wagner, and Johannes Ruegg-Sturm, "ABB: Beyond the Global Matrix Towards the Network Multidivisional Organization," in Andrew Pettigrew and Evelyn Fenton, eds., *Processes and Practices of New Forms of Organizing* (London and Thousand Oaks, CA: Sage, 2000). For network organizations, see Michael Goold and Andrew Campbell, "Structured Networks: Towards the Well-Designed Matrix," *Long Range Planning*, 36/5 (October 2003): 427-439.
15. Jay R. Galbraith, *Organization Design* (Reading, MA: Addison Wesley, 1977). See also Galbraith (2009), op. cit. Note that we focus on the planning and control process, which is essential to the operation of the multidimensional organizations we studied. We do not discuss operational processes, which differ widely across the firms.
16. See also Galbraith (2005), op. cit.
17. Peter F. Drucker, "The New Society of Organizations," *Harvard Business Review*, 70/5 (September/October 1992): 95-104.
18. Among the seven multidimensional firms in the sample, six firms are performing well. ABN AMRO is the exception. Under pressure from activist shareholders that were dissatisfied by the performance of its shares, it has recently been taken over by a consortium of three competitors and broken up. This illustrates that the multidimensional organization, like any form of organization, is certainly no panacea.
19. C.K. Prahalad and Gary Hamel, "The Core Competence of the Corporation," *Harvard Business Review*, 68/3 (May/June 1990): 79-91; Bartlett and Ghoshal, op. cit.
20. Drucker (1992), op. cit., p. 100.
21. Richard Florida, *The Rise of the Creative Class* (New York, NY: Basic Books, 2004); Sherwin Rosen, *Markets and Diversity* (Cambridge, MA: Harvard University Press, 2004).