ORGANIZATION DESIGN

ADVANCES IN STRATEGIC MANAGEMENT

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ADVANCES IN STRATEGIC MANAGEMENT VOLUME 40

ORGANIZATION DESIGN

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REVIEWING, REVISITING, AND RENEWING THE FOUNDATIONS OF ORGANIZATION DESIGN

John Joseph, Oliver Baumann, Richard Burton and Kannan Srikanth

INTRODUCTION

A long tradition of research has examined the determinants and consequences of organization design. Scholars in this field have mainly been concerned with the extent of empirical variation in organizational structures and the factors driving such variation (Chandler, 1962; Child, 1972; Donaldson, 2001). This stream of research has also charted the role that organization design plays in orchestrating a firm's overall decision making and in the organizational behavior that follows (Burton & Obel, 1984; Galbraith, 1977; Mintzberg, 1979; Puranam, 2018; Simon, 1947).

This extensive body of work draws its explanatory power from a variety of theories: behavioral theory of the firm, structural contingency theory, resource dependence, information processing, social networks, the knowledge-based view, and team theory. At the same time, organization design research is united as regards two key observations – namely, that the central problems of design are: (1) how best to divide the organization into subunits and (2) how best to integrate or coordinate those subunits in support of the firm's overall goals (Lawrence & Lorsch, 1967). This work accordingly acknowledges that there is no single template for "good organization," much of which depends on the external environment and the firm's own interdependencies (Thompson, 1967).

Although the essence of design's fundamental problems is still a touchstone in contemporary research, much is changing. Research on organization design has grown in the last decade as academics and managers have become increasingly preoccupied with the relevance of design for organizational strategy,

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innovation, and performance. Underlying this growth – and, perhaps, motivating it – are advancements in both theory and empirics as well as changes in technology (e.g., big data, machine learning, and artificial intelligence) and a proliferation of alternative organizational forms (e.g., ecosystems, communities).

So even as fundamental problems retain their importance, we are seeing a shift in focus. The retrenchment of contingency theory has been offset by the increased attention given to microstructures (Puranam, 2018), which is concerned with more microlevel mechanisms and their aggregation, rather than more macro-level organizational forms. Also on the rise is a greater focus on the behavioral implications of structural arrangements (Keil et al., this volume; Keum & See, 2017; Reitzig & Maciejovsky, 2015) and to approaches that account for the multidimensional nature of design choices and their interactions (Burton, Obel, & Håkonsson, 2015). Supporting this shift in theoretical focus is a greater use of agent-based models (e.g., Baumann & Siggelkow, 2011; Christensen & Knudsen, 2010; Csaszar, 2012; Levinthal & Workiewicz, 2018), experiments (Raveendran, Puranam, & Warglien, 2015), and case-based studies of organizations (Dobrajska, Billinger, & Karim, 2015; Jacobides, 2007; Srikanth & Puranam, 2014) in addition to the more creative use of archival data to document important design phenomenon (Joseph, Klingebiel, & Wilson, 2016; Obloj & Sengul, 2012; Srikanth & Puranam, 2011).

Our goal in this volume of *Advances in Strategic Management* is to reflect these emerging trends and complement contemporary research in the field of organization design. Our call for papers sought to attract scholars interested in bringing together perspectives or mechanisms and in examining topics that might otherwise be considered too exploratory, risky, or unusual for mainstream journals. We emphasized our openness with regard to disciplines, methods, levels and units of analysis, and the examination of organization design as both an LHS and RHS variable. In short, we seek to move the science of organization design in new directions that can inform and also inspire new research in this field.

We were fortunate to have received many excellent manuscripts, of which the best are included here. From our perspective as editors, it has been a joy to work with such researchers in crafting this volume. These chapters reflect current thinking on the subject of organization design and the great diversity in scholarship exploring this important topic worldwide. While the foundational concerns remain central, we are now starting to see a change that offers a deeper understanding of the foundational problems of organization design. In particular, the research in this volume, and in the field, is now far more nuanced and sophisticated than in earlier research.

More specifically, the chapters in this volume reflect a renewed focus on the subject of *integration* and, by extension, *differentiation*. Unlike earlier work, which focused primarily on integration via hierarchical supervision, this new stream of research considers integration from a variety of theoretical perspectives; it addresses multiple integration mechanisms simultaneously (e.g., both formal and informal, both top-down and bottom-up) as well as their overall fit. These chapters also give greater attention to certain types of integration – such as culture and process – that have previously been less studied and to the implications of

those mechanisms for coordination, innovation, and performance. The studies published here employ a wide variety of theories and research designs.

In what follows, we briefly *review* the evolution of organization design research. We then *revisit* the key themes in organization design and use text analysis to uncover changes in the design-related themes that typify management research over the last half century. Next, we consider what might have driven these changes. We posit that research has shifted because of changing near decomposability of organizations, rising importance of alternative units of analysis, and a corresponding greater interest in dynamics as embodied by adaptation and learning. Finally, we discuss the chapters and show how they contribute to this volume's theme and the *renewal* of organization design research.

REVIEWING THE FOUNDATIONS

Motivated by an interest in the phenomenon, efficiency, and effectiveness of organizations, more than a century of research has been dedicated to understanding the foundations of organization design. Early work by Taylor (1911), Weber (1978), and Barnard (1938) helped to establish task design and formal organizational structure as important domains of inquiry and to articulate, for the scholars who followed, the fundamental problems that their research agendas should address. These pioneers, through their rich documentation and detailed understanding of organizations, identified the domain's central concerns.

Many of these researchers were especially interested in formal hierarchy. For instance, Weber's (1978) classic study charts the characteristics of a bureaucratic enterprise and thereby highlights the features of specialization and coordination through hierarchical authority and formal rules. Barnard's (1938) concern was that of a practitioner – in other words, the *management* of organizations – and so he devoted considerable effort to examining formal hierarchies and ways to motivate cooperation. For Simon (1947), the role of hierarchy was to enable vertical specialization and to establish decision premises for decision-making units at lower levels in the organization. Chandler (1962) detailed the division between line and staff functions and, in particular, between managers of operating units and executives in the corporate office. For Chandler, the corporate hierarchy's role was to increase the decision-making capacity of executives in a multibusiness firm.

During this same period, sociologists began contrasting the formal hierarchy with the informal organization and mechanisms of coordination. Blau (1955), Gouldner (1954), Selznick (1949), and Burns and Stalker (1961), among others, recognized organizations as cooperative, social, and political systems that adapted as they interacted with their environment. These authors depicted organizations not only as formal hierarchical structures but also as being characterized by organic structures, informal interactions, and horizontal (in addition to vertical) coordination activities.

Laying the foundations for a contingency theory of organizations, Lawrence and Lorsch (1967) and Thompson (1967) brought attention to the idea that the most effective structure would vary with the organization's circumstances. These

authors were the first to conceive of the structure as reflecting two key design features: differentiation and integration. Lawrence and Lorsch (1967) defined *differentiation* as the "state of segmentation of the organizational system into subsystems, each of which tends to develop particular attributes in relation to the requirements posed by its relevant external environment" (p. 4), and *integration* was defined as the "quality of the state of collaboration that exists among departments that are required to achieve unity of effort by the demands of the environment" (1967, p. 11). Lawrence and Lorsch concluded that firms operating in complex environments were more likely to have a more differentiated structure and to devote more resources to coordination; those operating in simpler environments were apt to be less differentiated and, in general, more integrated.

Contingency theory provided the conceptual scaffolding for an influential stream of strategy research. Thus, the emphasis pivoted away from formal hierarchies (and from hierarchical authority) as the central feature of organization design. Instead, scholars focused on design configurations that supported information processing (Galbraith, 1974; Tushman & Nadler, 1978) and achieving fit through both mutually reinforcing internal activities and also by the matching of an organization's structural characteristics to its environment, technology, and size (Drazin & Van de Ven, 1985; Mintzberg, 1979).

Despite the reduced prominence of contingency theory during the 1980s and 1990s, interest in an organization's *fit* became more prominent and sophisticated (Burton & Obel, 2004; Siggelkow, 2001). Organizational and strategy scholars sought to model more complex organizations, and new agent-based computer modeling techniques led to a new field of research that could account for multiple design choices simultaneously (Siggelkow, 2011). With these new tools, it was possible to undertake systematic explorations of the trade-offs and performance implications of a greater number and variety of designs. Organizational scholars enthusiastically adopted these methods, which led to a resurgence in work on the design aspects of strategy and organization theory.

Among the most notable of these efforts were those using simulations to articulate sets of high-performing design choices as well as their underlying mechanisms and boundary conditions (Burton & Obel, 1980a,1980b; Levinthal & Workiewicz, 2018; Siggelkow & Levinthal, 2003, 2005; Siggelkow & Rivkin, 2006). Several of these studies adopted an information-processing perspective (Christensen & Knudsen, 2010; Csaszar, 2012), and dealt explicitly with cognitive limitations and the imperfect representations embedded in various structures (Csaszar & Levinthal, 2016; Ethiraj & Levinthal, 2009; Fang, Lee, & Schilling, 2010; Siggelkow, 2002). Some research dealt directly with differentiation and integration (Carroll & Burton, 2000; Menz, Kunisch & Collis (2015)) and their interrelationship (Kretschmer & Puranam, 2008), whereas other authors focused on how design choices affect the processes of organizational adaptation (Baumann & Siggelkow, 2011).

Concurrently with these developments, a group of empirical researchers began using advanced archival methods to break new ground in the study of integration. Examples include work on the integrative features of common goals, plans, or expectations (Gulati, Puranam, & Tushman, 2012;

Ketokivi & Castaner, 2004) and of resources (Karim, 2012) in addition to research aimed at revisiting well-established integration mechanisms such as hierarchy (Jacobides, 2007). Other scholars focused on such bottom-up mechanisms as communication channels (Joseph & Ocasio, 2012), executive mobility (Karim & Williams, 2012), and social networks (Kleinbaum & Tushman, 2007; McEvily, Soda, & Tortoriello, 2014).

The field of design, then, is experiencing a renaissance. New work at the intersection of strategy, organization theory, and organization design has been especially remarkable. The combination of theoretical advances and sophisticated modeling techniques has yielded breakthrough findings on complex adaptive systems (see e.g., Baumann, 2015). Notwithstanding the continued centrality of organization design's foundational problems, researchers are striving to uncover the microfoundations (Puranam, 2018) and behavioral roots of structure's effect on organizational decision making (Joseph & Gaba, 2018).

REVISITING THE FOUNDATIONS

To complement our historical overview and provide a more systematic analysis of the foundations of organization design, we used text analysis to examine the themes instantiated by organization design research published in leading management journals. Given the large number of abstracts – which were our data source – and the need to identify the themes addressed by each one, our analysis relied on probabilistic topic modeling (Blei, 2012). *Topic models* are algorithms that analyze the words in a set of documents toward the end of identifying the topics or themes that run through them. Such models analyze the co-occurrences of words in a document (and so rely on more than word counts). Each topic is represented as a combination of words that co-occur across a collection of documents, so the source of variation in topics or themes is these different combinations; thus, the meaning of a given word may differ depending on the other words with which it occurs.

To conduct the analysis, we first developed a vocabulary list of 96 words related to organization design – including hierarchy, interdependence, differentiation, and integration – as culled from key texts in the field (e.g., Burton et al., 2015; Galbraith, 1974; Puranam, 2018). We then collected all abstracts from *Academy of Management Journal*, *Academy of Management Review*, *Administrative Science Quarterly*, *Journal of Organization Design*, *Organization Science*, and *Strategic Management Journal* (for this purpose we used Python to "scrape" the journals' respective websites). Abstracts were collected beginning with the first issue of each journal, starting with the 1958 edition of the *Academy of Management Journal*. This process yielded 2,273 abstracts published from 1958 through 2018. After cleaning and then eliminating unrelated chapters, we were left with a sample of 1,495 abstracts.

We followed standard text analysis procedures when preparing our raw corpus for analysis (see cf. Croidieu & Kim, 2018; Grün & Hornik, 2011). Across abstracts, we grouped all common words by truncating them to their respective roots. We omitted non-meaningful words and also words that would probably

not be assigned to topics; examples include the so-called stop words (e.g., "the") and low-frequency words (i.e., those appearing fewer than three times in our corpus).

We adopted a topic modeling approach based on the Bayesian technique of latent Dirichlet allocation (LDA). In LDA, the goal is to calculate the conditional distribution of the topic structure given the observed documents (here, journal abstracts). Formally, that distribution is written as $P(\beta_{1:K}, \theta_{1:D}, z_{1:D} \mid w_{1:D})$; here β is a distribution over the vocabulary words, θ is the topic proportion over documents, z is the topic assignment over the words, and w represents words observed in the document. The terms K, α, and β are parameters of the topic model; K is the number of topics, α is a *topic*-smoothing parameter (which affects the shape of the Dirichlet distribution), and β is a *term*-smoothing parameter. A smaller value of α indicates that the documents are more likely to consist of only a few topics, and a smaller value of β indicates that the topics are more likely to consist of only a few words. Following prior work and based on the size of our corpus, we generate results using parameter estimates of 10, 0.01, and 0.01 for (respectively) K, α, and β.

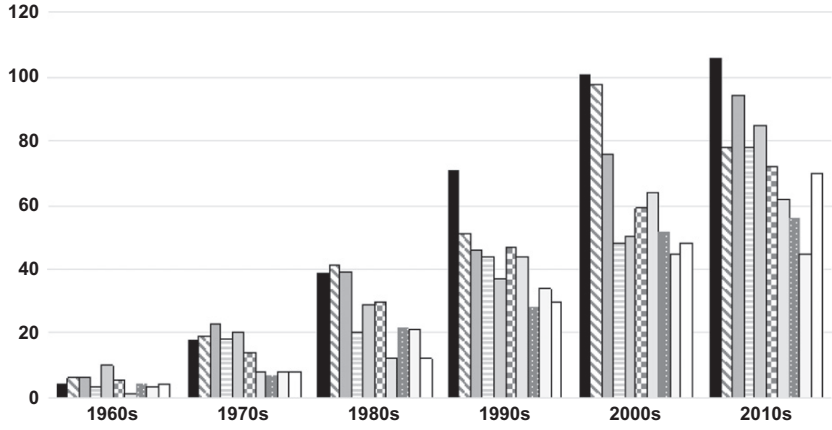
Results of the Topic Modeling

The topic frequencies and distribution of topics over the period of study are plotted in Fig. 1. This figure reveals that, across periods, *contingency* (topic 1) was the most frequent, followed by *resource dependence/stakeholders* (topic 2) and *fit* (topic 3). There was a fairly even balance of topics in the early years. Though all the numbers are small in the 1960s, *job/task design* (topic 5) received the most attention. Thereafter, *contingency* predominated and remained the most popular topic across all periods. *Resource dependence/stakeholders* was the second most frequent topic for many years, although its frequency declined after 2010. The topic of *fit* was the third most popular, and it has received even greater attention since 2010.

We then compared the frequency of topics in the period before 2001 with their frequency after 2000 to gain a clearer understanding of the focus of more recent research; see Fig. 2 for an illustration of the percentage change in topic frequency. With respect to the two periods considered, topics experiencing the greatest growth were *alliances* (topic 7), *interdependence/communication* (topic 8), and *integration* (topic 10). The greatest increase (86.7% since 2000) was for the topic of *integration*.

Sources of Change in Organization Design

There are a variety of environmental factors driving the resurgent interest in the concept of integration, but three of these factors may be (at least partially) endogenous: (1) decreasing decomposability of formal organizations, (2) increasing relevance of alternative units of analysis, and (3) increasing difficulty of organizational adaptation and learning. It follows that the coordination requirements have increased for organizations, which require that we broaden our



Topic #	Topic
1	Contingency/technology/ diversification
2	Resource dependence/ stakeholders
3	Fit
4	Methods
5	Job/task design
6	Innovation
7	Alliances/collaboration
8	Interdependence/ communication
9	Executives
10	Integration

Fig. 1. Frequencies of Organization Design Topics in Management Journals, 1960–2018.

understanding of integration, consider multiple forms of integration, and examine the causal relationship between differentiation/integration and a greater variety of outcomes. In this endeavor, we must also elaborate a theory to account for the various integration mechanisms that inform the development and application of novel theories, methods, and approaches.

Decreasing Decomposability of Organizations

According to Simon (1962), complex systems consist of many parts that interact in a non-simple way. These hierarchical systems are nearly decomposable in the sense that there are more interactions within than between subsystems. Simon recognized that the primary benefit of such systems is their capacity to adapt. That is, decomposability prevents perturbations in one part of the organization

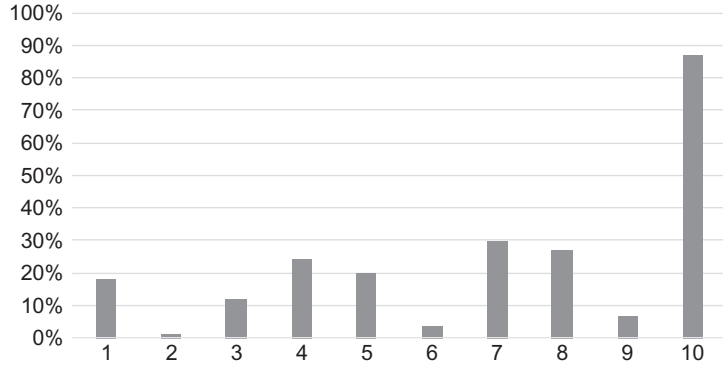


Fig. 2. Percentage Growth in Articles, by Topic, Since 2000. *Note*: See the Key to Fig. 1 for topic names.

from affecting the rest of the organization. Themes related to decomposability appear in studies of modularity and innovation (Baldwin & Clark, 2000; Sanchez & Mahoney, 1996), strategy making (Brusoni, Marengo, Principe, & Valente, 2007; Gavetti, Levinthal, & Rivkin, 2005), and the performance of multidivisional firms (Burton & Obel, 1980a,1980b).

However, the phenomenon of near decomposability may be waning. The "empty world hypothesis," whereby most entities are only weakly connected with most other entities, may be less true today than during the period when many theories of design were proposed. A rise in the use of functional, matrix, and flat organizational structures reflects greater interdependencies inside the firm and has accordingly increased the necessity of coordination. An illustrative example is that scholars chronicling nonhierarchical formal organizations, or *holocracies* – firms that have no formal hierarchy, no job titles, and no job descriptions (Puranam & Håkonsson, 2015) – have noted that "alternative modes of coordination, based on mutual adjustment, are emerging in place of the traditional top-down mode" (Birkinshaw, 2015, p. 8). At the same time, we are witnessing multidivisional bellwethers (e.g., General Electric) being challenged by activist shareholders for failures related to, inter alia, their organizational structure.[1]

As reflected in greater interdependencies within organizations, decreasing decomposability leads to increased reliance on ways of integrating agents and activities within the firm. Organization designs intended to accommodate this trend are themselves composed of multiple elements that interact with one another in complex ways (Siggelkow, 2001). These developments require changes in how we understand information processing, firm capabilities, and resource-based advantages. Compounding this complexity is the multidimensionality of individual design elements. For instance, a hierarchy serves as a structure not only for authority but also for tasks. Interdependence may involve tasks, agents, or both (Puranam, Raveendran, & Knudsen, 2012). The mechanisms of information processing involve screening (Csaszar, 2012),