

Research Article

Norman Meisinger*

Orders of the Division of Labor: Self-reference in Organization Structures

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Abstract: As a consequence of a variety of dynamics that firms have to deal with, their structures are continually evolving. Some of the resulting patterns and structural properties, however, only become visible at a greater distance from the object of analysis. Thus, this paper analyzes organization structures – conceptualized as the way in which firms divide and institutionalize labor – in their long-term development and shapes the phenomenon of aggregating structural self-reference. This self-reference is decomposed into a taxonomy based on three orders of the division of labor (DoL), each with a corresponding division logic (*efficiency*, *effectivity*, and *viability*) and structural implementation method (*specialization*, *contextualization*, and *reflection*) that firms apply to cope with steadily-changing environmental conditions. Each of the three orders reflects a response to a distinct period of change conceptualized as different bundles of stimuli (the *Taylorian*, *Schumpeterian*, and *UCA* ‘zeitgeist’) through which new orders of the division of labor emerged.

Keywords: division of labor; organization design; organization structure; organization theory; management fashion; self-reference

1 Introduction

Firms can be viewed as ‘architectural’ vehicles which purposefully organize divided labor, since whenever labor is divided, the separated elements require structures that sustain their meaningful interrelations. Today, *in praxi*, diverse hierarchically coordinated, multidivisional (Chandler 1962), multidimensional (Worren 2017) and/or matrix-shaped (Galbraith 2012) organization designs are used to manage divided labor, for instance by product, application, technology, function, task, or by

*Corresponding author: Norman Meisinger, Faculty of Economics and Business Administration, Chemnitz University of Technology, Chemnitz, Germany; and Institute of Philosophy, University of Bern, Bern, Switzerland, E-mail: n.meisinger@zeppelin-university.net. <https://orcid.org/0000-0002-9070-6001>

individual workforces among the various highly specialized industries. Organization researchers have analyzed these structures—defined in this paper as how firms divide and institutionalize labor—according to several relations and properties, for instance, the degree of decentralization (Marengo and Dosi 2005), decomposability (Reinstaller 2007; Simon 2002), complexity (Ethiraj and Levinthal 2004; Zhou 2013), hierarchy (Harris and Raviv 2002), configuration (Burton, Obel, and DeSanctis 2011, 57 ff.), competitive advantage (Nadler and Tushman 1997), the type of information structure (Aoki 1986) or reversibility (Castillo 2023). In the last few decades, scholars have increasingly linked innovation and change to specific properties of organization designs, including modularity and vertical integration (Argyres and Bigelow 2010), the type and timing of reorganization (Raveendran 2020), or the balance between exploitation and exploration (Raisch 2008). More and more attention is currently being devoted to the impact of organizational structure on ecological responsiveness (Pérez-Valls et al. 2019) and the need for vertical integration to perform corporate social responsibility (Murcia, Panwar, and Tarzijan 2021).

However, knowledge about the *division* itself remains somewhat sparse. Thus, the present study runs over a more extended period to reveal causal interrelations and patterns in organization structures that (through a socio-ontological lens) came into being only because the division happened in this way. However, the study neither asks how business practices change as a result of individuals' decisions (*intra-firm* level) nor how management models are disseminated between firms (*inter-firm* level). Instead, the study focuses on emergent patterns at a superordinate level that have developed over time and do not directly result from conscious, rational decisions. By this way, the empirically substantiated conceptualization reveals the phenomenon of aggregating structural *self-reference* along three distinct orders that evolved in organizations to cope with steadily-changing modernization demands.

This paper is structured as follows. After introducing the conceptual framework and relevant terms, the taxonomy of the first-, second-, and third-order division of labor is portrayed based on a brief historical outline of the three crucial phases from which they emerged (the *Taylorian*, *Schumpeterian*, and *VUCA* zeitgeist), each accompanied by the corresponding division logic (*efficiency*, *effectivity*, and *viability*) and structural implementation method (*specialization*, *contextualization*, and *reflection*). The study concludes with some notes on its *rigor* and *relevance*.

2 Conceptual Frame and Relevant Terms

Organizational structures can be understood as orchestrated labor or, put differently: as a result of the *division of labor*. Labor is considered as all of a firm's expenditure of time and effort (Weber 1978 [1921/22], 114). Even the smallest new

venture is forced to divide labor once a certain quantity of workload or a specific kind of knowledge has been reached. However, those division templates refer to tasks, roles, and institutions but not humans, because one of the exceptional characteristics of organizations is to outlast their concrete human cast, which means keeping their individuals exchangeable (Hedberg 1981, 6).¹

The conceptual framework and its essential components (outlined in the next paragraphs) to explore the long-term development of the firms' structures based on the division of labor evolved from an abstract idea that underwent numerous changes in an iterative development process, and continuously matured based on various quantitative and qualitative empirical data. The *qualitative* approach is still part of the article (see the three tables below). The *quantitative* study (involving a structured analysis of literature from over 200 journals and thousands of articles dated 1900 to the present) was also initially part of the article but was not included in the final version. Although this quantitative approach strengthened the author's conviction in the concept developed, it lacked robustness because the actual meaning of the content and the corresponding taxonomical classification of each of these numerous articles could not be determined appropriately (compared to the qualitative approach). Put differently: The strength of the sociological/socio-economical and time-diagnostic propositions developed in the present paper should be seen more in the argumentatively sound and in-depth description than in quantitative figures. Despite the extensive work that went into the quantitative study, the author, thus, decided to present the theory exclusively based on the far more reliable qualitative analysis and its empirical findings.

Division Logic: How firms divide their labor is incorporated into organizational routines, understood as “both a set of inert and temporarily dormant repertoires and knowledge used and performed daily” (Lazaric and Raybaut 2005, 395). However, division routines are not reinvented in every single firm. Instead, managers use division templates encoded in management models (cf. the tables below). The present paper sheds light on the long-term transformation of the division logic implicitly disseminated by these management models, i.e. from *efficiency* to *effectivity*, to *viability*. In doing so, the study concentrates on the *result* of the dissemination between firms and argues in line with DiMaggio and Powell's (1983) neo-institutional concept of *organizational isomorphism*, according to which coercive, mimetic, and normative pressures (institutional mechanisms) cause a continuous assimilation of organizations within their fields.

Whereas studies analyzed “the rise and fall of uninstitutionalized or weakly institutionalized organizational forms and techniques” (Abrahamson and Fairchild 1999, 709) and emphasized diversity and divergence of beliefs in “management

1 At least for those theorists who rather tend to construct organizations as entities of their own.

fashions” (Guthey, Ferry, and Remke 2022, 406) and elaborated on the micro-foundations of the institutionalization of fashionable management practices (Perkmann and Spicer 2008), the present paper deals with the opposite: the progressively institutionalized and complementary principles of the DoL.

In doing so, the analysis of globalized popular management techniques—understood as building plans of interfirm-disseminated organizational routines with high reproduction success—suggest three characteristic patterns that can be distinguished by the division logic of labor: *efficiency*, *effectivity*, and *viability*.

Zeitgeist: This paper claims that the sequence of the emergence of each division logic corresponds to certain changing environmental conditions clustered around three grand upheavals of intertwined societal, economic, and technological evolution processes. Much as DiMaggio and Powell (1983, 148) extended their unit of analysis from the competitive environment of the population-ecology approach “to the totality of relevant actors” (which they introduced as the “organizational field”), the unit of analysis in the present investigation is extended to the entirety of Western market economies, generally characterized by competition, growth, and innovation. As a conceptual proxy, the somewhat obscure-sounding term *zeitgeist*² seems appropriate (neither established nor inflated) to chronologize specific dynamics, understood as distinct periods of change, each characterized by different bundles of stimuli through which new orders of the division of labor emerged.

Structural Implementation Method: If, as claimed, the changing *zeitgeist* stimulates the change of the main division logic inherent in management practices in firms, the question arises of how firms incorporate the changing division logic in their structures. This paper argues that firms apply implementation methods corresponding to each evolved division logic—i.e., *efficiency* through *specialization*, *effectivity* through *contextualization*, and *viability* through *reflection*. The three orders, however, do not substitute but complement each other.

Firms thereby follow a selection process by applying the heuristics of “imitate-the-successful” or “imitate-the-majority” (Schlaile 2021, 50); as Langton (1984, 336) put it, “[t]hose that seemed promising (...) were put into practice”—as a result, management fashions arise.

Organizational Paradigm: The impact of these new institutionalized division practices also corresponds to changing forms of the firm-like organization. Bodrožić and Adler (2018) reconstructed the coevolution and interdependency of management models and the waves of technological revolution from 1750 on. In correspondence to each of the five Kondratiev cycles, they identified the shift of the organizational paradigm, which they defined “as a set of ideas that characterize the essential features of the enterprise as an organization” (Bodrožić and Adler 2018, 87). The

² The ‘signature’ of thought at a certain period.

evolution of the organizational paradigm from the medieval craft guild (Kieser 1989), to the professionally managed firm, to the factory, to the corporation, and to the network (Bodrožić and Adler 2018) is commensurable to the three phases that are reconstructed in the present study.

Orders of the DoL: Each identified structure pattern is both uniquely created and “part of the ubiquitous (re)organization of the economy” (Witt 2000, 742). The three socio-economic upheavals (termed *zeitgeists*) yielded three orders of the DoL, which become visible only over a more extended analysis period. The identifying feature of higher orders compared to lower ones is not its degree of sophistication, as it is often associated with levels or classes. Instead, higher orders simply relate to one or more (usually lower) instances. Viewed in isolation, an order encompasses a logic of the division of labor and the corresponding structural implementation method, so to say, the *modus operandi*, that differs from others in its degree of self-reference. In other words, new tasks, roles, and responsibilities do not simply perpetuate the logic from which they arose but could only occur because they refer to already divided labor. This principle of an increasing self-reference also hides in Argyris and Schön’s (1978) theory of organizational learning when they conceptualized (second-order-like) double-loop learning as an instance “not only of detecting error but of questioning the underlying policies and goals” of (first-order-like) single-loop learning (Argyris 1977, 116) and even on a third instance as deutero-learning (Argyris and Schön 1978, 26 ff.), which refers to learning that critically relates to the development of the learning itself.

3 The Orders of the Division of Labor

Numerous researchers (e.g. Durkheim 1960 [1893]; Marx 1954 [1867]; Smith 1981 [1776]; Weber 1978 [1921/22]) from disciplines including economics, sociology, and anthropology have investigated various aspects of the phenomenon of the DoL (such as causes, functions, or consequences) on diverse levels of analysis (*within* firms, i.e. between employees, teams, and machines, or *between* firms, economies, nations, or societies). According to Smith (1981 [1776], 1.2.1, 25), the division of labor is the “consequence of a certain propensity in human nature (...); the propensity to truck, barter, and exchange one thing for another.” He was one of the first to elaborate on the enormous increase in production volume associated with DoL. Following Smith’s economic considerations on efficiency, Durkheim (1960 [1893], 257) analyzed DoL anthropologically. He explained DoL’s steady increase not with economic advantages but with the growing moral density of social interactions and relationships. Marx (1954 [1867], ch. 6), in contrast, drew attention to (critical) societal consequences, such as the alienation of labor power as a “commodity” and the stratification of society, by

considering property relations at the distinction between capital and labor. From such a critical point of view, the “division of labor [is] introduced not to increase coordination and efficiency but to intensify the performance of workers, while constricting their skills and thus dampening their wage demands” (Langton 1984, 346).

Weber (1978 [1921/22], 114) subdivided labor, understood as “human services for economic purposes,” into managerial and working labor from a rather structural perspective. Weber thus not only provided an initial classification of different labor types but was also the first to recognize the progressive “process of organizational rationalization” (Langton 1984, 333), known as bureaucratization. Although Weber’s typification is quite similar to the conventional distinction between *direct* and *indirect* labor, he focused on administration intensity as the most crucial property rather than the association with product outputs. But neither this classification nor Spencer’s (1898, 357 ff.) distinction of the sequential occurrence of labor (*simultaneous* or *serial*) would be adequate for today’s highly differentiated strategies and meshed interdependencies of divided labor in organizations. And this is exactly where the present article contributes to the theory of labor: how did organizations’ structure patterns change because of their division logic?³

In doing so, the paper distinguishes three orders of the DoL that have chronologically emerged, not substituting but complementing each previous order. The description of each order starts with a brief historical outline of its evoking zeitgeist – *Taylorian*, *Schumpeterian*, and *VUCA* (volatility, uncertainty, complexity, and ambiguity) – followed by its specific division logic (*efficiency*, *effectivity*, and *viability*) and the corresponding structural implementation method (*specialization*, *contextualization*, and *reflection*).

The argumentation starts before the time of Smith (1981 [1776]), when the complexity and volume of production, the diversity of products, and the market competition still allowed for the allocation of multifaceted labor to individual human workers. However, the division according to individual workers soon became rare since all the competencies required for the increasingly complex products could hardly be concentrated within a single human worker. The shift to the *division by specialization* grew because labor thus became more efficient.

³ The distance to the object of analysis in the present work is much broader and the period of analysis more extended compared to the theories of structural differentiation, inertia/change, or (new) organization forms contributed by Blau and Schoenherr (1971), Hannan and Freeman (1977), the Aston Group, and Puranam, Alexy, and Reitzig (2014), among many others. Such explorations of long-term developments may appear more schematic and lacking in depth. Thus, the paper is intended as a first introduction to the conceptual idea.

3.1 First-Order Division of Labor

The distinguishing feature for divided labor to belong to the first order is whether the divided labor elements can be derived solely from the product or service that the labor was necessary to create – so to say, “about the known knowns.”⁴ From an analytical point of view, first-order divided labor can be examined in almost infinite complexity by considering more staff, products, and fine-grained divided tasks and more relations among those; its core, however, remains efficiency-driven (Table 1). First-order DoL is defined as *a firm’s division of labor for optimal output in relation to expenditure*.

3.1.1 The Taylorian Zeitgeist: From Medieval Craft Guilds to Professionally Managed Firms

The question of why formal organizations (understood as the successor institution of the guild) emerged is tightly coupled with the adaptability of former societies (Kieser 1989, 543). Former guilds, which typically struggled with restrictive rituals and rules such as hereditary terms of hiring (causing human resource scarcity), kinship hierarchies (causing coordination problems), or multifunctionality (causing an inability to innovate), had to cope with the increasing output quantities caused by population growth (ibid.). The ability to coordinate production more efficiently and thus maximize profits increased the selective value within evolutionary processes (Kieser 1989, 557) and led to what Bodrožić and Adler (2018) call the “professionally managed firm.” At this point, *efficiency* became more and more crucial for industrial production and administration processes and even became a focal point when the “factory” was born (Bodrožić and Adler 2018).

The Taylorian zeitgeist – characterized by new machines (e.g. combustion engines and assembly lines) and production methods (e.g. time studies, stores and routing systems, inspection systems, and cost statistics) to maximize speed and volumes and to reduce costs – gradually established the division logic *efficiency*. Firms became more pressured to divide labor primarily by the highest degree of efficiency, lest the whole firm risk being selected out. Economies of scale typically led to decreasing costs per unit and quantity discounts, while the repetition of tasks led to more noticeable learning curve effects and increased repeatability. Scientific management methods, grounded in “standardization, exact knowledge, functionalization, incentive and selected personnel” (Keir 1918, 525), conquered primarily industrial plants in no time. The “popular conception of efficiency,” however, gradually lost its experimental character and became institutionalized into a threatening division logic. According to Thompson (1915, 307), “the conservation of personal effort is interpreted as an

⁴ The origin of this phrase has not yet been clearly reconstructed.

important phase of the broader movement for the conservation of all resources. It is considered economically advantageous, and, therefore, a personal and social duty.”

3.1.2 Division Logic: Efficiency

Goodin and Wilenski (1984, 513) note that efficiency “is usually regarded as the most basic goal of good administration.” Although efficiency and effectiveness are widely accepted as necessary for firms to survive, both are frequently treated synonymously. One might assume that the common understanding of efficiency is much sharper compared to effectiveness, as it is often treated as a synonym for productivity. But Rowlinson and Procter (1997, 40), for instance, who distinguish between a subjectivist and essentialist sense of efficiency, conclude that efficiency cannot be defined “without a whiff of relativism,” meaning efficiency can only be defined in relation to certain situational conditions such as values, preferences, or needs. Goodin and Wilenski (1984, 513) also saw the human nature behind pure economic treatment as an output in relation to expenditure: “What stands most immediately behind the goal of efficiency is the more fundamental goal of want-satisfaction (...) alternatively (...) if we can achieve a desired satisfaction of wants with fewer resources then there will be resources left over to satisfy other wants.” Modern advanced forms of the efficiency-based division are known from “management by objectives” as the goal-setting criteria found in “SMART” (specific, measurable, attainable, realistic, timed) or from “total quality management,” as in the “PDCA” (plan, do, check, act) framework.

3.1.3 Structural Implementation Method: Specialization

When a firm or an individual entrepreneur increases its output to the point where its work capacity is fully exhausted, the question arises as to how additional labor may be divided. Prior to Smith (1981 [1776]), firms would probably have hired another worker to simply duplicate the workforce and, if necessary, one more to triplicate, quadruplicate, and so on. But since Smith (1981 [1776], ch. 1, 2) and Babbage (1832, ch. 19), we know that the division of labor according to *specialization* causes more productivity than the sum of single reproduction units “because returns to the time spent on tasks are usually greater to workers who concentrate on a narrower range of skills” (Becker and Murphy 1992, 1157). Consequently, “[t]ask specialization refers to the narrowing down of a job to smaller routine component parts” (Keon and Carter 1985, 1146). Smith (1981 [1776], 1.1.5, 17) ascribed this higher productivity to the “increase of dexterity (...) to the saving of the time which is commonly lost in passing from one species of work to another (...) [, and to] machines which facilitate and abridge labour.” For Witt (2000, 736), “the very

essence of the notion of specialization is that the quality of at least one factor involved in production changes.”

Table 1: First-order DoL.

Definition	Division of labor for optimal output in relation to expenditure.
Zeitgeist	Taylorian – Industrialization Mass production Bureaucracy
Division logic	Efficiency Economies of scale “Doing things right”
Struct. impl. logic	Specialization “About the known knowns”
Org. paradigm	Factory “The unitary, centralized organization structure” (Bodrožić and Adler 2018, 91)
Narrative patterns	Quality, speed, and volume enhanced by reduction, measurement, and improvement associated with attributes such as continuous, running, and leanness.
• Exemplary streams and paradigms in organization and management science •	
Scientific management (Taylor 1911) “...the great loss (...) through inefficiency in almost all of our daily acts” “the remedy for this inefficiency lies in systematic management” “the best management is a true science, resting upon clearly defined laws, rules, and principles, as a foundation” (p. 7)	
Operations research (various contemporary research streams) Management of operations supply chain management transportation systems stochastic modeling optimization financial engineering business analytics enterprise modeling and integration	
• Exemplary management tools and fashions •	
REFA—Association for Work Design, Business Organization and Business Development [lit.] (est. in 1924) “The efficiency and the success of a company are decisively determined by the design of processes and work places” (refa.de/en, retrieved 06/2024)	
QC-Circle—Quality control circles (Juran 1967) “...a small group of departmental work leaders and line operators who have volunteered to spend time outside of their regular hours to help solve departmental quality problems.” (p. 329)	
MbO—Management by objectives (Drucker 1986 [1954]) “Each member of the enterprise contributes something different, but they must all contribute toward a common goal. Their efforts must all pull in the same direction, and their contributions must fit together to produce a whole ...” (p. 121)	
TIPS—Theory of the resolution of invention-related tasks [lit.] (Altshuller 1984) “...the idea of controlling the process of creativity as a rule ...” (p. IX) “...the process of thinking is not chaotic but organized and plainly subject to control.” (p. X)	
TPM—Total productive maintenance (Nakajima 1988) Eight pillars of preventive techniques for improving the reliability of the equipment: Autonomous Maintenance, Focused Improvement, Planned Maintenance, Quality Management, Early/Equipment Management, Education and Training, Administrative & Office TPM, Safety Health and Environmental conditions.	
QRM—Quick response manufacturing (Stalk 1988) “...as a strategic weapon, time is the equivalent of money, productivity, quality, even innovation.” “...time as a critical source of competitive advantage ...” “...managing time the way most companies manage costs, quality, or inventory.” (p. 41)	
Lean Management (Womack and Jones 2003 [1996]) “...lean thinking can be summarized in five principles: precisely specify value by specific product, identify the value stream for each product, make value flow without interruptions, let the customer pull value from the producer, and pursue perfection.” (p. 10)	
4DX—Four disciplines of execution (Covey, McChesney, and Huling 2016) “Achieving Your Wildly Important Goals” based on four disciplines: “focus on the wildly important” “act on the lead measures” “keep a compelling scoreboard” “create a cadence of accountability”	

Coase (1937) argued that the costs of transactions are the main reason for the existence of the firm-like organization. To a large extent, these costs are associated with the division of labor. In this view, “specialization increases until the higher productivity from a greater division of labor is just balanced by the greater costs of coordinating a larger number of more specialized workers” (Becker and Murphy 1992, 1157) and as well as by the negative consequences of demotivation and absenteeism caused by (subjectively) monotonous and/or (objectively) repetitive specialized tasks (Melamed et al. 1995). Because even though specialization leads to more efficient labor once employees are thoroughly trained in their tasks, specialization also leads to physiological degeneration (Simmel 1890, 128) and psychological distress (for an overview of negative implications, see Loukidou, Loan-Clarke, and Daniels 2009). From this transaction-cost perspective, the division of labor increases efficiency as long as the costs of another division do not exceed its marginal utility (Coase 1937, 394).

3.2 Second-Order Division of Labor

Second-order DoL differs from first-order DoL in that it cannot be derived from the results of the first-order division of labor, but in turn, refers to these as the source for its divisions. This division type is associated with “known unknowns” by enhancing the efficiency orientation (“things to be done right”) with the effectivity orientation (“right things to be done”). Second-order DoL aims to direct or redirect first-order divided labor by embedding it in contextual conditions (Table 2). Thus, second-order DoL is defined as *a firm’s division of labor for optimal output in relation to the goal(s)*.

3.2.1 The Schumpeterian Zeitgeist: From Regional Economies to Global Value Chains

Following the Second World War, when mass production became established in Western countries, the worldwide trade of industrial products increased tenfold between 1953 and 1973. The “modern manufacturing firms” replaced Ford’s factories with “flexible machine tools and programmable, multitask production equipment” (Milgrom and Roberts 1990, 511) in order to produce smaller batch sizes and to reduce goods inventories. The increasing diversity of products has benefited from innovative manufacturing processes and advances in engineering sciences such as industrial automation, robotics, and digitalization. The competitive requirements of that time were “manifested in shorter product-development times, quicker order-processing, and speedier delivery, as well as in producing products faster” (Milgrom and Roberts 1990, 512).

However, these circumstances also increased the density of competition and the ambiguity of investment alternatives. Teece, Pisano, and Shuen (1997, 509) summarized the “Schumpeterian world” fairly well as consisting of “innovation-based competition, price/performance rivalry, increasing returns, and the ‘creative destruction’ of existing competences.” An enormous expansion of foreign trade to emerging markets also confronted regional firms with unfamiliar cultures, unknown market procedures, and other countries’ regulatory affairs. Firms were now not only obliged to “do things right” but also to allocate their scarce resources against the backdrop of alternative uses, means to “do the right things.”

3.2.2 Division Logic: Effectivity

Research on organizational effectiveness draws on a rich and almost impenetrable tradition culminating in the 1970s. Coulter (1979), for instance, collected various definitions of (organizational) effectiveness, dividing them into behavioral-attitudinal, processual, and goal-attaining models. The first focuses on the individual’s characteristics, the second on the performance of the organization’s inner (competencies) and outer (environment) resources, and the third on “the extent to which the organization achieves its goals or objectives” (Coulter 1979, 66). Several researchers at the time (as well as more recent researchers) concluded that effectiveness is relative. Ultimately, “organizational effectiveness is what the relevant parties decide it should be” (Campbell 1977, 52), since “effectiveness criteria reflect the utilities or self-interest of various groups” (Jobson and Schneck 1982, 26). In accordance with what Yuchtman and Seashore (1967, 898) discussed as “the exclusion of any specific goal (or function) as the ultimate criterion of organizational effectiveness,” here, the division logic *effectivity*⁵ is understood as “linking the organization to its environment” (Coulter 1979, 65; called the ‘processual model’) – in other words, to the requirements resulting from a given situation.

3.2.3 Structural Implementation Method: Contextualization

As the zeitgeist of those days evolved, the question was no longer just how efficiently the labor had been divided but also whether there was a demand for the outcome. Purely first-order divided labor (i.e. decontextualized *ad extremum*) can be compared with King Sisyphus from Greek mythology, who was doomed to roll a massive boulder up a mountain, after which the boulder would roll back into the

5 This paper speaks of *effectivity* not *effectiveness* to distance the term from the established meaning of a property or measure in the established research stream of organizational effectiveness, which focuses on profitability and goal attainment.

valley each time, over and over again for all eternity. How fast or efficiently he did the job did not make a difference since, contextually, this was a punishment by Zeus, just as it makes no difference how efficiently labor is first-order divided if there are no needs or there is not enough purchasing power to satisfy the needs of those markets' customers. As a result of considering the context, effectiveness in firms "establishes the degree to which an organization realizes its goals under a given set of conditions" (Etzioni 1975, 135).

Table 2: Second-order DoL.

Definition	Division of labor for optimal output in relation to the goal(s).
Zeitgeist	Schumpetrian – Globalization Emerging markets
Division logic	Effectivity Economies of scope <i>“Doing the right things”</i>
Struct. Impl. logic	Contextualization <i>“About the known unknowns”</i>
Org. paradigm	Corporation “The multi-divisional mass-production corporation with strategic integration but operating autonomy in the divisions” (Bodrožić and Adler 2018, 91)
Narrative patterns	Markets, customers, and competitors enhanced by strategies, portfolios, and forecasts associated with attributes such as smart, disruptive, and leading.
• Exemplary streams and paradigms in organization and management science •	
Contingency theory	(Lawrence and Lorsch 1967) “...examining complex organizations is to study more systematically and empirically their internal functioning in relation to the demands of the external environment on the organization and the ability of the organization to cope effectively with these demands ... ” (p. 2)
Strategic Choice	(Child 1972) “...organizational structure as a product of primarily economic constraints which contextual variables are assumed to impose.” “...‘strategic choice’ typically includes not only the establishment of structural forms but also the manipulation of environmental features and the choice of relevant performance standards.” (p. 1)
Organizational ecology	(Hannan and Freeman 1977) “...explicit focus on populations of organizations.” “...using explicit competition models to specify the process producing isomorphism between organizational structure and environmental demands, and by using niche theory to extend the problem to dynamic environments.” (p. 933)
Absorptive Capacity	(Cohen and Levinthal 1990) “...ability to recognize the value of new information, assimilate it, and apply it to commercial ends.” (p. 128)
Core competencies	(Prahalad and Hamel 1990) “First, a core competence provides potential access to a wide variety of markets.” “Second, a core competence should make a significant contribution to the perceived customer benefits of the end product.” “Finally, a core competence should be difficult for competitors to imitate.” (p. 83)
Dynamic capabilities	(Teece, Pisano, and Shuen 1997) “...to stress exploiting existing internal and external firm-specific competences to address changing environments.” (p. 510) “...as the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments ... ” (p. 516)
• Exemplary management tools and fashions •	
SWOT-Analysis	(Henderson 1970) “This simple SWOT framework points to the importance of both external and internal phenomena in understanding the sources of competitive advantage.” (Barney 1995, p. 49)

Table 2: (continued)

Definition	Division of labor for optimal output in relation to the goal(s).
Porter’s Five Forces Framework (Porter 1979) “ <i>The nature and degree of competition in an industry hinge on five forces: the threat of new entrants, the bargaining power of customers, the bargaining power of suppliers, the threat of substitute products or services (where applicable), and the jockeying among current contestants.</i> ” (p. 137)	
Competitive Strategy (Porter 1998 [1980]) “... examines the way in which a firm can compete more effectively to strengthen its market position.” (p. XVIII)	
McKinsey 7S framework (Peters and Waterman 2004 [1982]) “... <i>any intelligent approach to organizing had to encompass, and treat as interdependent, at least seven variables: structure, strategy, people, management style, systems and procedures, guiding concepts and shared values (i.e., culture), and the present and hoped-for corporate strengths or skills.</i> ” (p. 9)	
Balanced Scorecard (Kaplan and Norton 1992) “... <i>allows managers to look at the business from four important perspectives.</i> ” “How do customers see us?” “What must we excel at?” “Can we continue to improve and create value?” “How do we look to shareholders?” (p. 72)	
Customer Centricity (Fader 2012) “ <i>Focus on the Right Customers for Strategic Advantage.</i> ” (subtitle)	

A third phenomenon that has been more frequent for at least the past two or three decades is the division of labor, which no longer follows exclusively along the logic of efficiency and effectivity but also on a third order: *viability*.

3.3 Third-Order Division of Labor

Third-order DoL differs from first-order and second-order DoL in that it cannot be derived from the results of both lower instances, but in turn, refers to these as the source for its divisions (Table 3). Instead, this division type is related to the “unknown unknowns” by enhancing the efficiency orientation (“things to be done right”) and effectivity orientation (“right things to be done”) with viability (“checking the rightness of ‘right’”). Thus, third-order DoL is defined as *a firm’s division of labor to challenge the appropriateness of first- and second-order divided labor*.

3.3.1 The VUCA Zeitgeist: From Predictable Growth to Resilience and Reason

Once strategy departments, competition analysts, and market-research teams became established, the run for supernormal profits became routine, products progressively complex, markets more ephemeral, and modernization demands more ambiguous. This “new competitive reality, which is characterized by dynamism, connectivity, non-linearity and emergent properties” (Luoma 2006, 101), can be

interpreted as a result and stimulus of disruptive innovations (Millar, Groth, and Mahon 2018, 5). VUCA became a widely used acronym for emphasizing four crucial aspects: volatility, uncertainty, complexity, and ambiguity. The VUCA zeitgeist is characterized by instability and unpredictability, by acting beyond the frontiers of knowledge, by joined elements offering an incalculable number of possible solutions, and by unknown causalities (Bennett and Lemoine 2014, 312 ff.).

The troublesome capriciousness of the VUCA environment, embodied in mind-changing and market-destroying suddenness, has also been accompanied by several massive unintended side and distant effects. The human-outperforming progress in AI technologies, for instance, restructures the labor market and loads the human workers “with dilemmatic demands, competence erosions, status losses, and damage to work identity” (Meisinger 2023, 2656). The worsening climate change, for instance, forces firms more and more to re-adjust their mission-guiding value systems away from cost externalization to nature and/or unknown. The firms’ highly meshed and globalized transactions lead more frequently to incalculable events and, thus, to targets for management that are difficult to meet. As a result, the number of employees who have been absent due to psychological distress has more than tripled in the last ten to fifteen years in the EU (Aumayr-Pintar, Cerf, and Parent-Thirion 2018). Psychological diseases, such as occupational burnout and depression, have even become among the most frequent illness and thus among the most frequent causes of sick leave in firms, driving unwanted costs and a bad image. Management consultants now attract more and more attention from corporate executives. Management researchers, in parallel, have transformed the increased environmental complexity of practicing firms into ever more sophisticated solutions. Managers can hardly be expected to know how to apply these academic constructs in the practical realm outside of science laboratories – that has finally been translated by “management fashion setters” (Abrahamson 1996, 254) into costly but permeable “transitory collective beliefs.”

3.3.2 Division Logic: Viability

To cope with these new challenges, firms gradually institutionalized a higher degree of self-reference: the insurance of the “right” in their striving for “doing the right things right.” Glasersfeld (1995, 142) claims that something survives in a radically social-constructive sense because and as long as “it has the wherewithal to cope with, and thus to fit into, the environmental constraints.” According to this reading, structures “are viable if [...first- and/or second-order DoL] fit the purposive or descriptive contexts in which [...firms] use them” (Glasersfeld 1995, 14). This type of labor requires the fitness of already established first- and second-order divided labor and is thus separated from the actual execution of the labor, which

means that viability deals precisely with the often-quoted relativeness of efficiency (Rowlinson and Procter 1997) and effectivity (Campbell 1977). In the conventional meaning of “efficiency” or “effectivity,” performance is built on an understanding that, in most cases, it is quantifiable and comparable since the relevant variables are known—not necessarily their exact value, but their name. Viability, however, requires qualitative approaches, openness to pluralistic explanations, empowerment of employees, and the consideration of potentially unintended side and distant effects. This order exclusively deals with the consequences of first and second-order divided labor.

3.3.3 Structural Implementation Method: Reflection

In the first order, all labor is divided that is necessary to develop, produce, and sell products most efficiently. In the second order, labor is divided that is necessary to embed labor efforts most effectively into the situational context of customers, markets, and competitors. The third order relates to reflection – or as a property of structures: reflexivity. Compared to the others, this third-order incorporates the highest degree of self-reference. Reflexivity has a long research tradition in management science (e.g. Alvesson, Blom, and Sveningsson 2017; Pina e Cunha et al. 2017; Schön 1983; Schippers, Hartog, and Koopman 2007) as well as with flanking accentuations (Alvesson, Hardy, and Harley 2008; Cotter and Cullen 2012; Hardy and Clegg 1997; Johnson and Duberley 2003; Umpleby 2007). The attribute “reflexivity” is rooted in human cognition and is thus tightly linked to individuals as an “inalienable human capacity” (Holland 1999, 472) but has gained rather less attention on an organizational level (Moldaschl 2007; Ortmann, Sydow, and Windeler 2000). Ortmann, Sydow, and Windeler (2023, 116) conceptualized organizational reflexivity as a supra-individual, recursive flow in which organizational knowledge is produced and brought into new recursive loops of organizational action. Compared to Gorli, Nicolini, and Scaratti (2015), for instance, who observed practical reflexivity on an organizational level constituted through “managers as practical authors” in social interaction processes, reflexivity is a quality of institutions in this reading.

In most studies, reflexivity is associated with progress in modernization, innovation, effectiveness, or efficiency (Beck, Giddens, and Lash 2007; Farnese, Fida, and Livi 2016; Hoegl and Parboteeah 2006). Contemporary evidence in management practice appears in the form of project management offices, organizational development departments, compliance offices, corporate health departments, think tanks, innovation management, and at the center of the current omnipresent socio-ecological debate as CSR departments.

Table 3: Third-order DoL.

Definition	Division of labor to challenge the appropriateness of first and second-order divided labor.
Zeitgeist	VUCA – Volatility Uncertainty Complexity Ambiguity
Division logic	Viability “Checking the rightness of ‘right’”
Struct. Impl. logic	Reflection “About the unknown unknowns”
Organizational paradigm	Network “Linking and rationalizing processes across internal and external boundaries” (Bodrožić and Adler 2018, 91)
Narrative patterns	Complexity, ambiguity, and sustainability enhanced by sensemaking, reflexivity, and learning associated with attributes such as meta, purposeful, and responsible.

• Exemplary streams and paradigms in organization and management science •

Social systems theory (Luhmann 1995 [1984]) | “...concepts [that are used] like: meaning, time, event, element, relation, complexity, contingency, action, communication, system, environment, world, experience, structure, process, self-reference, closure, self-organization, autopoiesis, individuality, observation, self-observation, description, self-description, unity, reflection, difference, information, interpretation, interaction, society, contradiction, and conflict.” (p. XLIX)

Sensemaking (Weick 1995) | “...sensemaking begins with the basic question, is it still possible to take things for granted?” (p. 14) | “To talk about sensemaking is to talk about reality as an ongoing accomplishment that takes form when people make retrospective sense of the situations in which they find themselves and their creations. There is a strong reflexive quality to this process.” (p. 15)

Organizational learning as Double-loop learning (Argyris and Schön 1996) | “The actions we take to promote productive organizational learning actually inhibit deeper learning.” (p. 281)

Meta-Learning (Visser 2007) | “...a number of conceptualizations refer to the aspect of cognitive rethinking, critical reflection, and inquiry ...” (p. 660) | “Meta-learning refers to the reflection on and inquiry into the process of (single-loop and double-loop) learning at the individual and group level in organizations.” (p. 665)

Meta-Teams (Santistevan and Josserand 2019) | “...dynamic social entities that are recognized internally and externally as a shared space of reference of common mind-sets and operational practices that facilitate teaming.” (p. 530)

• Exemplary management tools and fashions •

The fifth Discipline (Senge 1990) | Personal Mastery, Mental Models, Building Shared Vision, Team Learning, and Systems Thinking | “Each has to do with how we think, what we truly want, and how we interact and learn with one another.” | “...as the five component learning disciplines converge they will not create the learning organization but rather a new wave of experimentation and advancement.” (p. 11)

Business Process Reengineering (Hammer and Champy 1993) | “Why do we do what we do at all?” (p. 4) | “...how we want to organize work today, given the demands of today’s markets and the power of today’s technologies.” (p. 2) | “...identifying and abandoning the outdated rules and fundamental assumptions that underlie current business operations.” (p. 3)

Cynefin framework (Kurtz and Snowden 2003) | “...a sense-making framework, which means that its value is not so much in logical arguments or empirical verifications as in its effect on the sense-making and decision-making capabilities of those who use it.” (p. 468)

TOC—Theory of constraints (Goldratt and Cox 2004 [1984]) | “This challenging of basic assumptions is essential to breakthroughs.” (p. 4)

Purpose-Driven Organization (Quinn and Thakor 2018) | “By connecting people with a sense of higher purpose, leaders can inspire them to bring more energy and creativity to their jobs. When employees feel that their work has meaning, they become more committed and engaged. They take risks, learn, and raise their game.” (p. 81)

4 Conclusion: on Rigor and Relevance

The paper has reconstructed the gradual emergence of three orders of the DoL which complement each other rather than crowd each other out. Along the three orders, organizations gained structural self-reference from the three division logics of *efficiency*, *effectivity*, and *viability*, to which firms respond with the structural implementation methods of *specialization*, *contextualization*, and *reflection*. Thus, the paper has yielded a fertile framework to establish further research on the orders of the DoL and the increased structural self-reference. Based on this view, the study closes with some critical limiting notes on the study's rigor and its relevance.

4.1 Rigor

The conceptualized taxonomy has been developed based on empirical data from the literature on organization and management, not on direct observation of organization and management. However, is it appropriate to equate the analysis of a certain academic discourse with the actual changes in organizational and management forms? It depends on the literature to be analyzed. A literature base composed only of publications intended for a scientific audience would probably lead to a different taxonomy than the exclusive study of models and methods intended for practical application. The paper, therefore, considered both the “interdependent, yet semiautonomous, domains” (Astley and Zammuto 1992, 443) of *management science* and *management practice* in their coevolution, especially because in management science, “it is impossible to assess relevance of research output [only] within the system of science” (Kieser and Leiner 2009, 516). However, in contrast to the natural sciences, where the apple does not care whether we know about the gravity that pulls it down to the ground, the coevolution of social sciences and the future behavior of these sciences' research subjects should be expected. With recourse to popular management techniques and academic concepts which have been widely recognized, the idea behind the taxonomy was to reconstruct phases of a collective development process that reflects different narratives (zeitgeist) but also allows for individual exceptions. The applied socio-ontological deconstruction of the division practices not only revealed an increasing self-reference⁶ of organization structures from a wider distance and a more extended period but also related well-known terms (for instance efficiency to specialization and also to effectivity on the same categorial

⁶ The presented concept of self-reference, however, is not to be confused with *autopoiesis* in the sense of (closed) social systems (Luhmann 1986).

level and so forth), systematically to each other whereas they were previously only loosely connected.

In addition to organizations, the orders of the division of labor may also be researched in other system structures, for instance, in *public administration* or *markets*. A focus on the first would probably lead to different results, as public administration in particular is not subject to competitive market selection pressure. Moreover, these structures differ not only in their financing mechanisms, more formal decision-making processes, distinctive alignment with public interests, and orientation towards other performance indicators compared to private firms, but also in their adaptation patterns of management fashions. A focus on markets would lead to even more different results. As Herzog (2020) pointed out, markets on the other hand are embedded in a kind of “epistemic infrastructure” where information is not only processed by the (efficiency-based) Hayekian price mechanism. Instead (epistemic) labor with higher degrees of self-reference—i.e. morally responsible agency—is divided and “outsourced” to involved actors and institutions.

As Langton (1984, 352) notes, however, “[i]t is difficult, if not impossible, to falsify the major propositions of (...) behavioral theory of sociocultural evolution” since the theory is “a concatenated system of loose, but apparently true and heuristic propositions.” In order to link the three different eras to the three orders of the division of labor, complexity was necessarily reduced, and contrasts were sharpened by an accentuation of (dis)similar features. This implies that the taxonomy offered could of course also have been constructed from a different perspective, e.g. not on the degree of self-reference resulting from the way in which firms divide their work, but on the intensity of the interconnectedness of the divided labor or the effects of different proportions of the three orders in a single organization.

4.2 Relevance

However, what will managers in their role of organization designers deduce from this framework? Outside the research labs, practicing managers almost entirely use organization charts based on hierarchy (on a horizontal and vertical extent showing sub-/super-ordination) to exemplify their organizational design strategies. Scholars, on the other hand, work on far more abstract and much less applicable design criteria.⁷ The approach outlined here tends to be categorized as one of the latter, in that it identifies self-reference as a crucial time-diagnostic property of structures—just as strategy can also be seen as part of the organizational structure and not

⁷ See chapter 1, paragraph 1 of the paper for various examples.

mutually exclusive, as has been debated over decades in the form of strategy follows structure or structure follows strategy (Kühl 2023, 266 f.).

However, following Kieser and Leiner (2009, 516), gaps between rigor and relevance in management research are (from a system-theory perspective) not a failure, but reflect normality. As they argue, “researchers and practitioners cannot collaboratively produce research, they can only irritate each other,” since social systems are autopoietic. That means communication elements cannot be authentically integrated into a system that did not actually create them (ibid.).

Although “[a]lmost every leader is a champion of simplicity” (Galbraith 2012, 1), the single best structure has already been rejected with the beginning of the contingency approach. This paper might “irritate the practitioners” by sensitizing them to the degree and complementarity of the three orders of the division of labor that shape company structures by self-reference. It provides a novel orientation on how organizations’ designs can be analyzed and modified based on the introduced orders and structural implementation methods. The taxonomy offers new room for maneuvering and possibly inspires the reorganization process when firms are faced with current issues that are meanwhile occasionally being treated in an oversimplified way, for instance, declaring costs (direct/indirect), combining activities to organizational units, consolidating poorly performing business areas, or developing indicators for internal revision instances.

Undoubtedly, today more than ever, firms must cope with volatile, uncertain, complex, and ambiguous environments. They need “to restore the fit with the external complexity by an increasing internal complexity” (Sitter, Hertog, and Dankbaar 1997, 498). The present inquiry has reconstructed this expanding complexity from a wider perspective over a longer period. The increased structural self-reference, however, does not mark the end of a long search for the ideal type but is an artifact of the present *zeitgeist*, since organizations manage wayward objects and moving targets. In doing so, they will continue to evolve, just as their structures do.

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