FLORIAN HOOF

ANGELS OF EFFICIENCY

A MEDIA HISTORY OF CONSULTING

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TRANSLATED BY DANIEL FAIRFAX

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" . . . we are on the road to our ideal, a self-perpetuating system of management . . ."

—Henry L. Gantt, *Work, Wages, and Profits*, 1919

"You can also visualize who will be the next man at the machine. You can visualize if there is going to be a change. You can visualize that the planning department is at fault in not getting work in the second set of hooks. You can visualize the names of the best workers. [. . .] Your chart department is the greatest visualizing device of all."

—Frank B. Gilbreth, *Visualizing the Problem of Management*, 1921

"The medium of visualization [. . .] is an automatic machine that takes the raw material of management and converts it into a finished uniform article by the law of transfer of skill, just the same as any other automatic machine."

—Chester B. Lord, *Management by Exception*, 1931

"The slide rule is a small symbol carried in one's breast pocket and sensed as a hard white line over one's heart. If you own a slide rule and someone comes along with big statements or great emotions, you say: 'Just a moment, please—let's first work out the margin for error and the most-probable values.' "

—Robert Musil, *The Man Without Qualities I*, 1921–1930

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Acknowledgments

Introduction

Angels of Efficiency

The history of consulting as a form of knowledge begins with the case of a dead man in a telephone booth. The site of this tragic event is the Lackawanna railroad station in Montclair, New Jersey, an outer suburb of New York City. On a sunny day, June 14, 1924, the corporate consultant and film pioneer Frank B. Gilbreth embarked on a trip to Manhattan. He needed to organize a visa for a planned journey to Europe, to attend the Prague International Management Conference. But he never got that far. During a phone call with his wife, he suffered a heart attack and died. The ensuing newspaper obituaries not only highlighted his services to managerial practices, but also laconically noted that, with his idiosyncratic methods, he had brought about his own downfall. Together with his wife, Lillian, the first woman in the United States to receive a doctorate in industrial psychology, Frank belonged to the first generation of modern corporate consultants. The specialty of their consulting firm, Gilbreth, Inc., was lab-based consulting, the filmic analysis of motion in industrial labor processes, with the goal of raising worker productivity. In the end, as some of the obituaries implied, Frank succumbed to the stress of an optimized life. In any case, the circumstances that afternoon resulted in one of the first publications of modern consulting appearing posthumously. Three months after his death, the magazine *Management and Administration* publicized the consultancy model used by Gilbreth, Inc., "The One Best Way to Do Work," an article which consists of a grammar of motion, defining seventeen elementary motor acts.[1] With these "therbligs" (an anagram of the name Gilbreth), all the motion episodes occurring in industry could be modeled. The text assigned a specific symbol to every therblig and compared different strategies of labor organization in the workplace through flow charts and graphs. Individual therbligs were assigned to specific

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[1] Frank Gilbreth and Lillian Gilbreth, "Classifying the Elements of Work: Methods of Analyzing Work into Seventeen Subdivisions," *Management and Administration* 7, no. 8 (1924): 151–54; Frank Gilbreth and Lillian Gilbreth, "Applications of Motion Studies: Its Use in Developing the Best Methods of Work," in *Management and Administration* 7, no. 9 (1924): 295–97. The seventeen therbligs are "search," "find," "select," "grasp," "transport loaded," "position," "assemble," "use," "disassemble," "inspect," "pre-position for next operation," "release load," "transport empty," "rest for overcoming fatigue," "unavoidable delay," "avoidable delay," "plan."

time units, which allowed businesses to calculate labor activities in advance. This consulting model, based on hundreds of filmed motion studies conducted by Frank and Lillian Gilbreth since 1912, was an initial prototype of a simulation system for human labor. Having recorded motion patterns, the Gilbreths subsequently synthesized them in the therblig system. This system involved "at least a hundred variables that are important [. . .] and our list contains several thousand variables." Since this list was not to be relayed to potential customers of their corporate consulting firm, the Gilbreths reduced their framework to a simple, clear model: "We have adopted a 'Wheel of Motion' not altogether unlike the 'Wheel of Life' of Hindus, for explaining therblig study to the employees of our clients."[2] One of the first models of corporate consulting is thus a wondrous mix of Hindu/Buddhist symbolism, the latest technologies in cinema and the principle of graphic representation (see Figures 1 and 2).

As one of the earliest visual models of consulting, this piece appeared toward the chronological end of the time frame of this book (between 1880 and 1930), during which time—as my central hypothesis has it—the use of media in business and industry rapidly expanded. As the earlier example shows, the use of charts, graphics, photographs, and film increased to the point that they became self-evident components of corporate management. Consultants and managers themselves also became passionate filmgoers and pondered the role that film could play as a new communication medium for businesses. In what follows, I will examine, from the perspective of the history of film, media, and knowledge, the visual culture that arose as a result of this phenomenon. There are only a few preexisting studies that are concerned with media in a business context and could thus offer orientation to my endeavor. Elspeth H. Brown explored the role played by photography in large corporations, while Brian Price and Richard Lindstrom have tackled Frank Gilbreth's biography.[3] Some preliminary considerations on how to conceive of film in relation to business have, however, come from research carried out on industrial cinema.[4] Occupying the zone between

[2] Ibid., 295.

[3] Elspeth H. Brown, *The Corporate Eye. Photography and the Rationalization of American Commercial Culture: 1884–1929* (Baltimore: Johns Hopkins University Press, 2005); Brian Price, "One Best Way: Frank and Lillian Gilbreth's Transformation of Scientific Management, 1885–1940" (PhD diss., Purdue University, 1987); Richard Lindstrom, "Science and Management: Popular Knowledge, Work, and Authority in the Twentieth-Century United States" (PhD diss., Purdue University, 2000).

[4] Florian Hoof, "'The One Best Way': Bildgebende Verfahren der Ökonomie als strukturverändernder Innovationsschub der Managementtheorie ab 1860," *montage a/v* 15, no. 1 (2006): 123–38; Vinzenz Hediger and Patrick Vonderau, eds., *Films That Work: Industrial Film and the Productivity of Media* (Amsterdam: Amsterdam University Press, 2009); Scott Curtis, "Images of Efficiency: The Films of Frank B. Gilbreth," in *Films That Work: Industrial Film and the Productivity of Media*, ed. Vinzenz Hediger and Patrick Vonderau (Amsterdam: Amsterdam University Press, 2009), 85–99; Vinzenz Hediger, Florian Hoof, and Yvonne Zimmerman, eds., *Films That Work Harder: The Global Circulation of Industrial Cinema* (Amsterdam: Amsterdam University Press, forthcoming).

Figures 1 and 2 From the sketch outline of the Wheel of Motion. The results of roughly ten years of filmic motion analysis, reduced to an easily communicated analytic framework for corporate consultants.

film, media, and economic history, my study draws on this work, describing the culture of rationalization resulting from industrial films and situating it as a part of the history of corporate consulting.

This much can be said right away: the form of knowledge emerging from this work has proven to be extremely stable, and it continues to prevail in present-day forms of corporate consulting. In this regard, the Wheel of Motion is an exemplary model that intended to clarify the relations existing between the different variables contained within. It is not sufficient to implement a single change at a single point in a single labor activity. "The variables affect all of the therbligs and must be all carefully considered in order to obtain The One Best Way to Do Work." All conditions must be thought of in an equilibrium with the center of the model: *use*. "The more *use*, the more production."[5] There are two kinds of therbligs. On the one hand, they can be a "method of attack,"[6] with which changes in the existing corporate structure can be undertaken. On the other hand, they can aid in the comprehension and representation of a new type of knowledge: consulting knowledge.[7]

This form of knowledge is subject to very particular demands. It must be modular and flexible, and it must also follow a persuasive, stable inner logic. Changes undertaken, or considered, in the framework of a consulting commission must

[5] Gilbreth and Gilbreth, "Applications of Motion Studies," 295. Emphasis in the original.
[6] Ibid., 297.
[7] Here, I take the term to refer not only to knowledge in the strict sense, but also as an epistemological concept, as proposed in historical epistemology.

be confirmed with the clients, and at the same time communicated within the enterprise. It is only in this way that innovations can be successfully implemented. Consulting knowledge involves a knowledge of potentiality. It vacillates between an ideal-typical form—in this case, the system presented in the Wheel of Motion—and its profane realization as "transferable data."[8] It must address the utopian character of potential future changes in an enterprise, and at the same time appear practicable and capable of being carried out. The model of the Wheel of Motion stands for this balancing act between mundane improvements and the utopian potential for efficiencies that could be tapped into. It nonetheless promised a reproducible benchmarking (to use the vocabulary of today's corporate consultants) of human motion and labor performance, setting verifiable and comprehensible standards, and thus creating "the managerial conditions which will permit The One Best Way to Do Work."[9]

Against the backdrop of the great success of corporate consultants in the 1910s and 1920s, it seems as if consulting knowledge provided them with "the sacred knowledge of the Brahmins."[10] Corporate consultants appeared in industrial enterprises as a media version of angels of efficiency. With their "symbolistically rationalized magic"[11] and their "mimetical actions of a magician,"[12] they succeeded in creating new, unprecedented efficiency potentials. These angels of efficiency were not, however, messengers of an opaque mediality; considered from the standpoint of economic and media history, they were an apparition of differentiation that was firmly grounded in the mortal world.

The field of corporate consulting, and the knowledge tied to it, represented a new sensory system that promised to guide disoriented industrial management through moments of technological and social upheaval. The "disenchantment of the world" brought about by rationalization and intellectualization, as diagnosed by Max Weber,[13] is paradoxically accompanied by a process of idealization in the consulting industry and in the talents it cultivated. The manner in which, in the course of time, the rather profane activity of a corporate consultant was given an almost religious elevation, can to a large degree be traced back to the careful media presentations of the first consultants (Fig. 3). This special status bestowed on corporate consulting is no coincidence. Rather, it is a constitutive condition for the branch's success.

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8 Ibid., 296.

9 Ibid., 297.

10 Max Weber, "Religious Groups (The Sociology of Religion)," in *Economy and Society*, ed. Guenther Roth and Claus Wittich (Berkeley: University of California Press, 1978), 458.

11 Ibid., 407.

12 Ibid., 400.

13 Max Weber, "Science as a Vocation," in *From Max Weber: Essays in Sociology*, ed. H. H. Gerth and C. Wright Mills (New York: Oxford University Press, 1946), 129–56.

Figure 3 The corporate consultants of the 1910s–1920s used media to present themselves as angels of efficiency. An employee of the corporate consulting firm Gilbreth, Inc., surrounded by cyclegraphic recordings.

The circumstances portrayed earlier could go down in history as an episode in the expiring age of thermodynamics, as the last stirrings of an outmoded understanding of labor and production, in which workers are little more than human machines. It could be supposed that they have little in common with today's knowledge-based branches of industry. Like the Lackawanna railroad station, now closed, the consultancy practices of the time and the businesses tied to them could be understood as relics of the distant past. The station building may still be standing today, but its façade is now adorned with an oversized advertisement for the video store chain Hollywood Video, which had an outlet at the site until its 2010 bankruptcy. The age of local video stores may be over, and the structures, as well as the perceptions, of industrial management may have radically changed. And yet, up to the present day, very little has changed in consulting knowledge, as the model of the Wheel of Motion prototypically embodied it. There are two reasons why this is not such a surprise.

First, the present object and purpose of consulting processes is still identical with that of the 1920s. Its goal is to change a status quo, but also to moderate this process, to legitimize it, and to lead it to an optimal conclusion. Local considerations internal to the workplace may also play a role in management resorting to

external experts. That this strategic deployment of corporate consultants is not a new phenomenon can be seen in the opinion given by Frank B. Gilbreth on the quarreling sections of a Berlin firm, and on his status as a corporate consultant for the company: "In other words they have all been fighting for a long time and they want me to be the buffer wheel."[14] With his Wheel of Motion consulting model, Gilbreth could do their bidding, and not only in a metaphorical sense. Second, the consulting business of this period is one of the driving forces behind a new order of knowledge which imposed itself on business affairs at the turn of the century and which continues to the present. Today, it is the formation of complex processes, and not a concern for the loss of energy within thermodynamic systems, that is at the center of thinking in this area. As the example of the fractious Berlin firm shows, attention increasingly came to focus on technical and social factors, which were difficult to comprehend with the standard laws of thermodynamics. These were replaced with graphic consulting models, with which a pragmatic improvement of labor processes was to be achieved. Thinking in large-scale energy systems was replaced with thinking in modular consulting structures. Up to the present day, this paradigm shift has determined the effect that a microeconomic perspective has had on business efficiency.

A good sixty years later, in the early 1980s, Tom Peters and Robert Waterman, two consultants from the consulting firm McKinsey & Company, developed the McKinsey 7-S Framework (see Figure 4). Almost identical, in its visual form and conception, to the Wheel of Motion, it also served the purposes of business analysis. The consulting model developed in the 1920s had set itself the target of detecting efficiency reserves in bodily labor processes in the workplace, which went unrecognized before their cinematic visualization.

Peters and Waterman pursue a very similar objective, since they also seek to optimize something that is not visible. Their model does not, however, focus on the individual body of the worker, but on the enterprise as a whole. The framework of their analysis consists of seven variables, called "levers," with which they strive toward a definition of the existing "workplace culture" and the changes that need to be undertaken. It is no longer individual workers, and their motion sequences, that stand in the center of corporate consulting, but the logistical coordination of the entire business. This model does not describe firms as mere structures, but as complex systems. While business structures, such as hierarchy levels, are perceptible and visible in their institutionalized form, this does not apply to workplace culture, which evades standard forms of empiricism and

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[14] F. B. Gilbreth, letter to L. M. Gilbreth, November 12, 1914, Gilbreth LOM, SPCOLL, Purdue University Libraries, NF 91/813-6.

McKINSEY 7-S FRAMEWORK ©
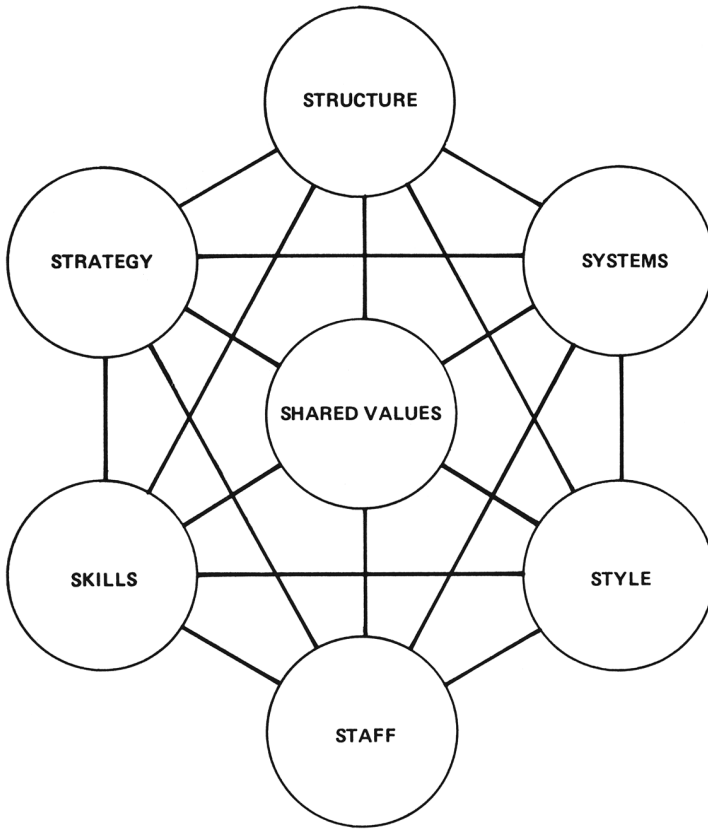
Figure 4 The 7-S Framework developed by McKinsey & Company sought to define and visualize invisible components of business organizations, such as "workplace culture."

representation. If Frank B. Gilbreth's filmic studies served to shed light on previously imperceptible motion procedures, then the McKinsey 7-S Framework has the purpose of enabling an articulation and discussion of the amorphous object that is workplace culture. In order to concretize an invisible object, Gilbreth resorts to the idea of an infallible, conclusive grammar of motion. The McKinsey 7-S Framework, meanwhile, resembles a self-contained molecular structure. Gilbreth's indivisible therbligs here take on the form of atoms forming the nucleus of the organization. It is with these construction elements that the culture of a workplace can be described, analyzed, and transformed. Whereas Gilbreth

still loudly promised the "One Best Way to Do Work," McKinsey & Company envisaged a successful "search of excellence" in the enterprise.[15]

The form and structure of both models, the "Wheel of Motion" and the McKinsey 7-S Framework, can also be seen in the standard analytic tools used by present-day corporate consultants. BCG Growth-Share Matrix, Balanced Scorecard, SWOT Analysis, and Porter's 5 Forces Analysis are analytic tools in which the form assumed by the consulting knowledge is concretized. They boast a stable inner logic and at the same time can be adapted, in a modular and flexible fashion, to changed circumstances. Moreover, they allocate visual evidence in the form of a graphic model that is coherent but cannot be understood as a representation of consulting knowledge. The systematic effects of business activity described therein can be ascribed neither to a referent, nor to an ultimate, infallible level. They are not simplified, flattened visual inscriptions of complex situations. In fact, these visual models themselves *are* the knowledge of consulting.

They are "boundary objects"[16] that are located between different orders of knowledge and seek to form bridges between them. For this reason, they must be capable of being flexibly coupled to different contexts, as well as conveying a specific agenda connected with them. Although they make reference to other knowledge holdings and forms, these are coordinated and do not determine the specific character of consulting knowledge. Consulting models do not possess conclusive, secure insights; rather, they are relational instruments for generating difference. Instead of representing knowledge as a true, well-established proposition, they promote the concept of relational accountability. Consulting knowledge, understood as an epistemological configuration, does not seek to distinguish between the true and the false, but to activate and demonstrate the possible courses of action that are practicable at any given moment.

Consulting knowledge is therefore not only a business service, but an expression of more fundamental transformations. It is part of a new, proto-cybernetic order of knowledge, which can be seen here for the first time, and which, up to the present day, has been a mainstay of managerial conduct. It breaks with the hypotheses of the thermodynamic era, in which the understanding of knowledge as a true, justified opinion predominated. In place of conclusive certainties and laws, as they still tended to manifest themselves in thermodynamic laws of energy conservation, we see the conception of knowledge as a mutable, relational, and process-based property. Managing this extremely precarious and fleeting

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15   Tom Peters and Robert H. Waterman, *In Search of Excellence: Lessons from America's Best-Run Companies* (New York: Harper & Row, 1982).

16   On the concept of "boundary objects," see Susan Leigh Star and James R. Griesemer, "Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907–39," *Social Studies of Science* 19 (1989): 387–420.

form of knowledge is the manifest goal of the ascendant branch of consulting. Consulting knowledge is thus not a simplified form of more complex knowledge holdings, or an appendage of other orders of knowledge. It is a self-sufficient knowledge possessing an efficacious structure.

In the sixty years stretching between the Wheel of Motion model and the McKinsey 7-S Framework, business and management have been fundamentally transformed. It is no longer the regulation and administration of a maximum level of labor power that is at the center of production, but questions around the management of innovation processes. The image of the "human motor"[17] has been transformed into the concept of "human capital."[18] It no longer encompasses just thermodynamic energy—pure labor power—but also psychological factors. Creativity and intellectual performance can be neither determined nor quantified with the nineteenth-century laws of thermodynamics.

Nonetheless, consulting knowledge continues to be based on the framework of the Taylorist/Fordist production regime and the forms arising in the visual culture dominant at this time. Whereas Gilbreth sought to open up the terra incognita of physical productivity with his systematization of "therbligs," now "levers" are to achieve similar results for the complex business organizations of the postindustrial era. For his Wheel of Motion, Gilbreth drew on aspects of Hinduism and Buddhism, which were extraordinarily popular between 1900 and 1920. For the first time, anthropological descriptions afforded access to these cultures, and the notions of equilibrium and stability tied to them.[19] The McKinsey 7-S Framework, meanwhile, borrowed not only from the rhetoric of Cicero, but also incorporated Japanese approaches to management.[20] It represents, at least partly, a departure from Western conceptions of rationality, by seeking to adapt certain Zen-Buddhist concepts like the Kaizen to the needs of Western corporations.

Both forms of consulting knowledge described here involve *visual* knowledge, and not, as has been previously suggested, the *visual representation* of

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[17] Anson Rabinbach, *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (Berkeley: University of California Press, 1992).

[18] Jacob Mincer, "Investment in Human Capital and Personal Income Distribution," *The Journal of Political Economy* 66, no. 4 (1958): 281–302. See also Dirk Baecker, *Postheroisches Management: Ein Vademecum* (Berlin: Merve, 1994); Brigitta Bernet and David Gugerli: '"Sputniks Resonanzen': Der Aufstieg der Humankapitaltheorie im Kalten Krieg," *Historische Anthropologie* 19, no. 3 (2011): 433–46.

[19] See Laurence Waddell, *The Buddhism of Tibet or Lamaism, with Its Mystic Cult, Symbolism and Mythology, and in Its Relation to Indian Buddhism* (London: Allen, 1895).

[20] This model was developed in collaboration with Richard T. Pascale, professor at the Stanford Business School, and Anthony G. Athos, professor at the Harvard Business School. See Richard T. Pascale and Anthony G. Athos, *The Art of Japanese Management: Applications for American Executives* (New York: Simon & Schuster, 1981).

knowledge. Behind the Wheel of Motion model there stands an entire arsenal of various visualization practices utilized for consulting purposes. Gilbreth deployed the most advanced media technologies of the day, such as newly invented charting techniques or filmmaking instruments. The stability of this visual knowledge has been reproduced up to the present day, with models of corporate consulting such as the McKinsey 7-S Framework. Here, too, the model is part of a visual ensemble comprising PowerPoint presentations, flip charts, cluster maps, statistical pie charts, and bar graphs. Consulting no longer assumes the form of written reports; instead, it consists of loosely gathered visual decision-making cues, which are tailored for the fast-paced nature of executive meetings and the decisions made therein.

Since this time, the consulting industry has developed into a knowledge system that is central to the economy. It is a cornerstone of strategic decision making, which often determines the success or failure of a business, and thus has direct effects on society as a whole. At the same time, the principle of consulting (and the science based on it) is essential for the faith put into managerial decisions. Consulting is the *ultima ratio*, the only approach that is still legitimate and practicable, in which commercial enterprises, on account of certain intractable impasses, seem to encounter their limits. It is for this reason that the form of this knowledge, with which I will be occupied in the following analysis, is so decisive. I understand consulting not only as part of the economy, but also as a point of intersection where the boundaries of economic logic and legitimation are on view, one that is newly determined on a constant basis. Consulting is the attempt to integrate the destructive, crisis-prone traits of the capitalist economy into the business itself, and to thus profit, as Schumpeter puts it, from the creative aspect linked to destruction.[21] Corporate consulting is, therefore, not a mere sideshow in the economy as a whole, but a sphere in which the contradictions of this form of society manifest themselves, and are given over to processes of reworking.

In order to reach a better understanding of present-day, self-evident forms of visual business communication, and to place them in their historical context, in what follows I will reconstruct the emergence of visual forms of managerial communication between 1880 and 1930, with an emphasis on the development of consulting knowledge.[22]

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[21] Joseph Alois Schumpeter, *Capitalism, Socialism and Democracy* (New York: Routledge Chapman Hall, 2005 [1946]); Werner Sombart, *War and Capitalism (European Sociology)* (North Stratford, NH: Ayer, 1975 [1913]).

[22] For a similar perspective, see Adam J. Tooze, "Die Vermessung der Welt: Ansätze zu einer Kulturgeschichte der Wirtschaftsstatistik," in *Wirtschaftsgeschichte als Kulturgeschichte: Dimensionen eines Perspektivenwechsels*, ed. Hartmut Berghoff and Jakob Vogel (Frankfurt a. M.: Campus Verlag, 2004), 325–51.

Media, "Visual Management," and Consulting

The time span of my investigation, from 1880 to 1930, covers three parallel developments, which lead to a fundamental transformation of industrial knowledge structures. First, there is the constitution of an independent form of managerial activity in industry. Second, and at the same time, there is the establishment of the field of corporate consulting. Third, there is the emergence of a series of visualization techniques after 1880, which are at the disposition of the first two spheres, management and corporate consulting.

Managerialism

The notion of the concrete activity of "managing" is relatively young. In around 1830, we can find evidence of distinctly "managerial" practices in commercial and industrial enterprises.[23] The success of the 1832 publication *On the Economy of Machinery and Manufactures* is a paradigmatic example of this.[24] In this book, Charles Babbage recommends defining clear areas of responsibility in a business. Up to 1860, individual practices of corporate control were bundled together to form a corporation-centric, paternalistic, direct managerial practice, which mainly rested on oral communication in the form of direct instructions and commands.[25] From the 1860s on, the constricted relationship between management and the enterprise was progressively dissolved.[26] Firms expanded to become "multiunit business enterprises."[27] The increased need for coordination and growing geographical distances between individual sites of production overtaxed existing direct, oral management practices and led to a "crisis of control."[28] As a reaction to this, practices based on the "written record" were imposed.[29] New media techniques such as the "typewriter, duplicating methods, and filing systems"[30] led to the establishment of a bureaucratic system

[23] Sidney Pollard, *The Genesis of Modern Management: A Study of the Industrial Revolution in Great Britain* (Aldershot, UK: Gregg Revivals, 1993).

[24] Charles Babbage, *On the Economy of Machinery and Manufactures* (London: Charles Knight, 1832).

[25] JoAnne Yates, *Control Through Communication: The Rise of System in American Management* (Baltimore: Johns Hopkins University Press, 1989), 3.

[26] Thomas K. McCraw, ed., *Creating Modern Capitalism: How Entrepreneurs, Companies, and Countries Triumphed in Three Industrial Revolutions* (Cambridge, MA: Harvard University Press, 1999), 14; Claude S. George, *The History of Management Thought* (Englewood Cliffs, NJ: Prentice-Hall, 1972), 81.

[27] Alfred Chandler, *The Visible Hand: The Managerial Revolution in American Business*, 16th ed. (Cambridge, MA: Harvard University Press, 2002 [1977]).

[28] James Beniger, *The Control Revolution: Technological and Economic Origins of the Information Society* (Cambridge, MA: Harvard University Press, 1986), 10.

[29] Yates, *Control Through Communication*, 164.

[30] Ibid., 21.

of constant control and readjustment, dubbed "systematic management."[31] At the beginning of the twentieth century, the new medium of film was integrated into this practice.

Consulting

It is certainly no coincidence that the corporate consulting industry emerged at a time when there was a generalized trend toward standardization and bureaucratization in the corporate world. Only a handful of corporate consulting firms, such as Sedgwick (founded in 1858), existed before this period.[32] In 1886, the Arthur D. Little Company was founded. In 1907, Harrington Emerson established his first corporate consulting firm. The pace of this development accelerated in the 1910s.[33] Frank and Lillian Gilbreth created their consultancy Gilbreth, Inc. in 1912; the next year Arthur Anderson came into existence, followed by Booz Allen & Hamilton in 1914.[34] In addition, a number of individual efficiency experts, such as Henry L. Gantt and Carl G. Barth, emerged from the milieu surrounding Frederick W. Taylor. Around 1900, they began to install the Taylorist system of scientific management in different industries.[35] The great majority of these consultants were either engineers or came from the sphere of accounting or business administration.[36] Between 1903 and 1913, the first societies in the consulting industry were founded.[37] In 1912, Harrington Emerson inaugurated the New York Efficiency Society.[38] By this point, the Taylor Society had already been in existence for two years, and Frank B. Gilbreth was a significant participant in its initiation.[39] Beginning in the 1910s, the industry was professionalized. This can be seen, for instance, in the introduction of courses in business administration

[31] Joseph Litterer, *The Emergence of Systematic Management as Shown by the Literature of Management from 1870–1900* (New York: Garland, 1986).

[32] Sugata Biswas and Daryl Twitchell, *Management Consulting: A Complete Guide to the Industry*, 2nd ed. (New York: John Wiley & Sons, 2002), 17–19.

[33] Staffan Canback, "The Logic of Management Consulting: Part 1," *Journal of Management Consulting* 10, no. 2 (1998): 4.

[34] Biswas and Twitchell, *Management Consulting*, 19.

[35] Judith A. Merkle, *Management and Ideology. The Legacy of the International Scientific Management Movement* (Berkeley: University of California Press, 1980), 59.

[36] Biswas and Twitchell, *Management Consulting*, 18.

[37] Matthias Kipping, "Consultancies, Institutions and the Diffusion of Taylorism in Britain, Germany and France, 1920s to 1950s," *Business History* 39, no. 4 (1997): 69.

[38] Horace B. Drury, *Scientific Management: A History and Criticism* (New York: Columbia University Press, 1915), 19.

[39] Daniel Nelson, "Scientific Management, Systematic Management, and Labor, 1880–1915," *The Business History Review* 48, no. 4 (1974): 479–500.

studies in business schools, which had only recently come into existence.[40] These consultancy firms developed their own methods, such as "forecasting," which were no longer tied to efficiency increases on the factory floor. For example, Booz Allen & Hamilton offered a "business research service," which extended its field of activity from corporate consulting to the sphere of strategy and future planning.[41] Frank B. Gilbreth, meanwhile, developed a graphic system for the rationalization of decision-making processes in management.[42] Prior to the outbreak of World War I, therefore, the consulting industry had established itself under the label of "efficiency engineering,"[43] as well as developing and practically experimenting with its first instruments, models, and forms of consulting science.

The Graphic Method

Simultaneous with the professionalization of management and the rise of the corporate consulting industry, the *graphic method media network*[44] was formed, a "heterogeneous ensemble"[45] of technologies, practices, and actors, which were grouped around a modality of media representation. The point of departure for this phenomenon is the development of graphic visualization techniques in

[40]   The first business school to be established was the University of Pennsylvania's Wharton School in 1881, which was followed by the UK's Manchester Metropolitan Business School in 1889, the Universität St. Gallen, the University of Chicago School of Business, and the College of Commerce at UC Berkeley in 1898, Dartmouth College's Tuck School of Business in 1900, the Harvard Business School in 1908, and the Columbia University Business School in 1916. See also Rakesh Khurana, *From Higher Aims to Hired Hands: The Social Transformation of American Business Schools and the Unfulfilled Promise of Management as a Profession* (Princeton, NJ: Princeton University Press, 2007).

[41]   Canback, "The Logic of Management Consulting: Part I," 4.

[42]   Frank B. Gilbreth, "Graphical Control on the Exception Principle for Executives," *The Journal of the American Society of Mechanical Engineers* 39, no. 4 (1917): 311–12.

[43]   George, *The History of Management Thought*, 107.

[44]   The term used in the original German edition of this book, *Medienverbund*, refers to the work of Friedrich Kittler, who uses the term to describe media technologies that underpin society. *Medienverbund* was translated in the American edition of his writings as "media link." See Friedrich Kittler, *Gramophone, Film, Typewriter*, trans. Geoffrey Winthrop-Young and Michael Wutz (Stanford, CA: Stanford University Press, 1999). Nonetheless, the German word *Verbund* carries other connotations than those associated with the idea of interlinked technologies. It is etymologically derived from the Middle High German word *Bündnis*, a word which not only describes the connections between technological apparatuses or materials, but also alliances of economic organizations. This conscious, strategic usage of "allying oneself" (*sich verbünden*) is lost in the narrowing of the term to the level of mere technological linking between different entities. My praxeological-materialist approach, by contrast, focuses precisely on the level of usage. Hence, *Medienverbund* will be translated with the more broadly conceived term "media network." This also connects to approaches that sought to describe the interrelations of media technologies, culture, and society, such as Alison Griffiths, *Wondrous Difference: Cinema, Anthropology, & Turn-of-the-Century Visual Culture* (New York: Columbia University Press, 2002), where she establishes close ties between film, anthropological research, and the museum institution.

[45]   See Michel Foucault, *Power/Knowledge: Selected Interviews & Other Writings 1972–1977*, ed. Colin Gordon (New York: Pantheon Books, 1980), 194–210.

the nineteenth century. In this "golden age" of the graphic method,[46] a variety
of innovations in the area of data visualization took place. Taken together, they
form a media network that encompasses a wide range of visualization techniques.
Graphic methods such as diagrams, pictorial representations of tabular informa-
tion, or apparatuses for visual recording originally come from scientific disciplines
such as mathematics, materials science, statistics, or physiology. Their deployment
and development are linked with names like William Playfair, Étienne-Jules Marey,
Francis Galton, Charles Lallemand, Jacques Bertillon, and Eadweard Muybridge.
By the end of the nineteenth century, stable, proven practices of data visualization
had been developed. At the same time, these techniques, and the modes of repre-
sentation connected with them, were propagated and popularized. They were com-
plemented with innovations such as film. With the aid of various media, data were
visualized, calculated, and graphically compared, while previously imperceptible
processes were photochemically depicted or graphically registered and modeled.

In the interaction between these three areas—the rise of management, the
establishment of the consulting industry, and the possibilities of the graphic
method media network—we can observe a visualization drive in the corporate
world. This is not, however, simply a managerial fashion[47] with a short shelf-life,
but a structurally transformational development that yields new forms of mana-
gerial and industrial knowledge. In the following pages, I will dub this new visual
"regime"[48] of the economy *visual management*.

Visual Management

Visual management was the initial form taken by an abstract, self-referential
system of making and implementing decisions. It is based on a feedback system
which was oriented toward the ideal of real-time functioning, and which ab-
stracted all incoming data through the use of visualization processes. With
visual management, data could be successfully selected, hierarchized, and
interpolated. Data were thus used for the most important aspect of indus-
trial management: making quick decisions that were appropriate for the situ-
ation and that could be easily reproduced. This managerial logic, which many

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[46] Michael Friendly, "The Golden Age of Statistical Graphics," *Statistical Science* 23, no. 4 (2008): 502–35.

[47] See Alfred Kieser, "Rhetoric and Myth in Management Fashion," *Organization* 4, no. 1 (1997): 49–74.

[48] On Rancière's notion of the "regime," see Jacques Rancière, *The Politics of Aesthetics: The Distribution of the Sensible*, trans. Gabriel Rockhill (New York: Continuum International Publishing Group, 2004); Jacques Rancière, *Aesthetics and Its Discontents*, trans. Steven Corcoran (Cambridge: Polity Press, 2009).

writers have related to the rise of cybernetics in the 1940s,[49] was, in the early twentieth-century consulting industry and among its customers (large-scale industrial enterprises), already a progressive, avant-garde anchor orienting further developments in management. Far from merely being a tentative ideal, it is a widespread practice that can be found in managerial literature as well as in the systems of administration and regulation developed by businesses. Located in a transitional phase between thermodynamic and cybernetic managerial practice, visual management is also symptomatic of the crisis of earlier attempts to model commercial activity.

The practices of administration and regulation in the thermodynamic age were still aimed at using clearly defined resources, such as labor power, as efficiently as possible. In contrast, the model of visual management represented the mirror image of this procedure. The administrative doctrine constructed on this basis, taking *temporal* aspects into account, places systemic factors in the foreground. Instead of essentialist notions of clearly defined energy resources underpinning everything, it proposes a relational and temporal understanding of unstable factors mutually influencing each other. In this new situation, hitherto existing oral and written managerial practices, which overwhelmingly served to take stock of resources, proved to be deficient. Unstable systemic effects, constantly in a state of flux, could not be apprehended within this rigid logic of documentation.

The rise of visual management's proto-cybernetic administrative logic is considerably shaped by the consulting industry, the historical situation of industrial and commercial enterprises, and the new availability of visualization techniques. I describe this process as a *medialization drive* in the corporate sector. The sphere of corporate consulting made a significant contribution to this phenomenon. It was here that a certain virtuosity in the handling of visualization practices was developed. Its specific function, the preparation of consulting knowledge, yielded a close symbiosis with the visualization techniques available at the time. Such techniques appear to be particularly well suited for conveying knowledge related to consulting, while the knowledge thus propagated nonetheless remained flexible enough to adapt to the local conditions of each firm. I therefore conceive of consulting as a boundary object, in which disparate epistemological orders encounter one other. From this collision arises a point of difference, which can lead to existing presuppositions appearing in a new light. This recognition is henceforth operationalized as a resource for change. At the same time, the prescribed form of visual presentation forestalls an impression of total capriciousness. The local situation discovered in the course of a consulting exercise is subordinated

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[49] See Claus Pias, ed., *Cybernetics—Kybernetik: The Macy-Conferences 1946–1953*, Vol. II (Zurich: Diaphanes, 2003).

to a set of methods and devices consisting of graphics, charts, and pictorial representations, and is thus, to a certain extent, visually standardized. The forms of visual knowledge partly coincide with the forms of consulting knowledge. The visual form not only represents the concrete data of the given business situation, but points to and highlights the external character of consulting. In doing so, it creates the point of difference from the everyday production routine needed for an organization to undergo a transformative process. Such a form is responsible for this point of difference being discerned and becoming subject to description and comparisons. In this way, consulting gains in authority and thus the capacity to implement its recommendations.

A Media History of Consulting

One of the points of departure for this book is the observation that disciplinary perspectives strongly determine methodological access to the overlapping spheres of media, economics, and business. On the one side, there are approaches drawing on film studies, media studies, and cultural studies, with their primarily aesthetic or media-technological perspectives, which only peripherally grapple with the field of business.[50] On the other side, there are methods taken from economic history and organization studies, which question the productivity, stability, and functionality of markets, organizations, and institutions such as corporate consulting.[51] The goal of my methodology is to consider these two perspectives in conjunction with one another, in order to pursue the epistemological ramifications of the film and media studies approach in economic contexts.[52] Until now, the interaction of these two registers—corporate institutions and commercial rationality, on the one hand, and the specific logic

[50] Exemplary, in this regard, is Marta Braun, *Picturing Time: The Work of Etienne-Jules Marey (1830–1904)* (Chicago: University of Chicago Press, 1992); and Kittler, *Gramophone, Film, Typewriter*.
[51] Christopher McKenna, *The World's Newest Profession: Management Consulting in the Twentieth Century* (Cambridge, MA: Cambridge University Press, 2006); Thomas Armbrüster, *The Economics and Sociology of Management Consulting* (Cambridge, MA: Cambridge University Press, 2006); Thomas Armbrüster, *Management and Organization in Germany* (Hampshire, UK: Ashgate, 2005); Matthias Kipping and Lars Engwall, *Management Consulting: Emergence and Dynamics of a Knowledge Industry* (Oxford: Oxford University Press, 2001); Matthias Kipping, "Consultancies, Institutions and the Diffusion of Taylorism in Britain, Germany and France, 1920s to 1950s," *Business History* 39, no. 4 (1997): 67–83; Matthias Kipping, *Management Consultancies in Germany, Britain and France: 1900–60* (University of Reading, Discussion Papers in Economics and Management, Series A, 1996).
[52] For a transdisciplinary perspective on business history, see Hartmut Berghoff and Jakob Vogel, "Wirtschaftsgeschichte als Kulturgeschichte: Ansätze zur Bergung transdisziplinärer Synergiepotentiale," in *Wirtschaftsgeschichte als Kulturgeschichte: Dimensionen eines Perspektivenwechsels*, ed. Hartmut Berghoff and Jakob Vogel (Frankfurt a.M.: Campus Verlag, 2004), 9–41.

of media aesthetics and technology, on the other hand—is far from having been adequately understood. At the crux of these approaches stands the question of how strategic managerial decisions in the corporate sphere are defined and co-determined by media.[53] The resulting work aims to open the consulting industry up to perspectives from both film and media studies *and* economic history, and that also represents an experimental methodological bridge between two disciplines that heretofore have functioned rather autonomously from one another.[54]

In the spirit of this bridge-building exercise, and, perhaps, rather unusually for a media history of corporate consulting, I will begin my book with a cursory summary of the approaches to consulting found in the field of economic history—approaches which implicitly and explicitly grapple with systems of communication and coordination in industrial contexts. It is on this basis that the new field of research opened up by the connection I propose will become apparent.

Media and Economic History

The time frame of my research, from 1880 to 1920, corresponds with that of Alfred Chandler's study *The Visible Hand*, which describes the formation of the modern "multiunit business enterprise" in the mid-nineteenth century, and the consequent need for coordination and communication.[55] Chandler diagnoses a "communication revolution" unleashed by the advent of the postal system, the telegraph, and the telephone. As he puts it, communication media are part of general technological developments, in which management replaces older, inefficient technologies with new communication media.[56] Chandler operates with a concept of media which, on the one hand, is restricted to the sphere of communication technologies and, on the other hand, displays an instrumentalist character. Communication media appear as part of "latent pattern maintenance"[57] in order to maintain or bolster existing structures and modes of functioning.[58] But

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53 For a perspective toward a shift in the understanding of media in organizational research, see Florian Hoof and Sebastian K. Boell, "Culture, Technology, and Process in 'Media Theories': Towards a Shift in the Understanding of Media in Organizational Research," *Organization* 26, no. 4 (2019): 636–654.

54 For arguments toward a historic turn in organization studies, see Peter Clark, "The Treatment of History in Organisation Studies: Towards an 'Historic Turn'?" *Business History* 46, no. 3 (2004): 331–52; Roy Stager Jacques, "History, Historiography and Organization Studies: The Challenge and the Potential," *Management & Organizational History* 1, no. 1 (2006): 31–49.

55 Alfred D. Chandler Jr., *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, MA: Harvard University Press, 2002)

56 Ibid., 195.

57 Talcott Parsons and Neil J. Smelser, *Economy and Society: A Study in the Integration of Economic and Social Theory* (London: Routledge and Kegan Paul, 1956), 18–19.

58 For a critique of Chandler's approach, see Neil Fligstein, *The Transformation of Corporate Control* (Cambridge, MA: Harvard University Press, 1990).

he does not ascribe them with a specific efficacy. He ignores the epistemological character of media in favor of a functional interpretation.

In contrast, Marxist approaches focus less on management's changing conceptions of control, and more on the constant battle for power and influence between workers and corporate power structures. Here, there can even be a focus on film and media techniques, such as the time-and-motion studies that Frank and Lillian Gilbreth carried out with the aid of photographic and cinematic procedures. From a Marxist perspective, these practices mainly play the role of enabling management to accumulate and monopolize business and production knowledge.[59] This perspective has been criticized for excessively focusing on one specific type of control.[60] Moreover, it does not give consideration to the fact that normative management approaches such as Taylorism were not unconditionally successful in the past,[61] nor does it help to explain the specific form taken by the particular conception of management that finally prevails.

Drawing on this critique, Richard Edwards has pointed to the central role of asymmetrical forms of implicit experiential knowledge in the perpetuation of an undisrupted fostering of performance.[62] Total control is impossible, because management is always dependent on the cooperation of workers. From this observation, Edwards draws the plausible conclusion that managerial control must be investigated in the context of the available "social media of control."[63]

Nonetheless, such macro-theoretically constructed approaches in economic history, whether Chandler's evolutionist-universalist approach[64] or Braverman's and Edwards' (neo-) Marxist perspectives, tend to consider processes of communication and mediation as historical details with no ability to affect the process as a whole. They understand the specificity of communication and media technologies only to a very limited degree.

More recent studies have attempted to fill this gap. James Beniger's *The Control Revolution*, for example, describes the establishment, from the 1840s on, of new communication technologies such as feedback processes, time-and-motion

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[59] See Harry Braverman, *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century* (New York: Monthly Review Press, 1974), 120–21.

[60] Niels Beckenbach, *Industriesoziologie* (Berlin: Walter de Gruyter 1991), 166.

[61] Richard Edwards, *Contested Terrain: The Transformation of the Workplace in the Twentieth Century* (New York: Basic Books, 1979), 110.

[62] Ibid.

[63] Beckenbach, *Industriesoziologie*, 169.

[64] See Charles Booth and Michael Rowlinson, "Management and Organizational History: Prospects," *Management & Organizational History* 1, no. 1 (2006): 6; Roy Stager Jacques, *Manufacturing the Employee: Management Knowledge from the 19th to 21st Centuries* (London: Sage, 1996), 14; Simon Down, "Knowledge Sharing Review the Use of History in Business and Management, and Some Implications for Management Learning," *Management Learning* 32, no. 3 (2001): 402.

studies, advertising strategies, the development of the postal system, the introduction of standard time zones, the rise of modern bureaucracy, and even the invention of punch-card systems.[65] The breadth of his focus has been criticized on the basis that, despite having thematized the role of technology, Beniger nonetheless did not devote enough specific attention to it.[66] Following on from this work, JoAnne Yates has developed a perspective that more closely focuses on the distinct dynamics of new media technologies. Restricting her study to the period 1850–1920, she explores individual innovations such as storage systems, the typewriter, and duplication technologies, in order to analyze their immediate effects on management. Yates sees the real effect of media technologies in the accompanying written recording of workplace communication.[67] This process gives rise to new possibilities. For example, written records also allow for the preservation and replication of workplace processes.[68] Communication acts are capable of retrospective verification and evaluation. "Formal internal communication" is developed into an effective tool of managerial control.[69] Yates sees the introduction of media technologies as being linked to the "rise of system" described by Joseph Litterer.[70] Litterer, for his part, argues that management at the end of the nineteenth century can be characterized by its systematization of existing workplace structures and procedures.[71] For Yates, the phenomenon observed by Litterer forms the backdrop to the implementation of new communication technologies. Without it, the implementation of "systematic management" and the resulting interconnection of organizational hierarchies in businesses would simply not have been possible.[72] Nonetheless, the notion of "systematic management," which Yates adopts to describe this transition, encompasses only a part of those function which comprise management. "[It] was basically concerned with the managerial functions of directing and controlling, but not with other functions such as planning, organizing, or facilitating."[73] What kind of an influence this medialization drive had on the planning and organization of management remains an open question.

Whereas aspects of control in existing approaches to economic history have a relatively broad and detailed significance, the genesis of the strategic planning

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[65] Beniger, *The Control Revolution*.
[66] Yates, *Control Through Communication*, xvi.
[67] Ibid., 65–77.
[68] Ibid., 56–63.
[69] Ibid., 2.
[70] Ibid., xvi.
[71] See Joseph Litterer, "Systematic Management: The Search for Order and Integration," *The Business History Review* 35, no. 4 (1961): 461–76; Joseph Litterer, *The Emergence of Systematic Management as Shown by the Literature of Management from 1870–1900* (New York: Garland, 1986).
[72] Litterer, "Systematic Management," 469.
[73] Ibid., 476.

competencies of management has not been adequately addressed. I would like to close this gap. Building on Yates's study, and the conclusion that summarizes it: "formal internal communication became a managerial tool for coordination and control,"[74] I seek to interrogate the media-epistemological backdrop of managerial planning and decision-making practices.

In the framework of established written forms of business communication, new forms of data visualization, as my thesis has it, have had a similar, if not greater, influence on managerial *planning and strategy competencies*. Strategic decisions were no longer simply gut decisions based on the values of "subjective" experience. The more rapid accessibility of business data and the possibility of visually representing complex relations gave management new possibilities for discussing the decision-making process at hand and weighing up different scenarios against one another. The visual-graphic regime provided the conditions for the possibility of managerial self-reflection, which lies at the basis of the formation of a distinct methodological canon of strategy planning, as well as the development of the elite function of managerial employees.

In this sense, I will use a broader notion of media, which describes media approaches and apparatuses not only as tools for enabling communication. I do not conceive of them as a technology whose contours are borrowed from mathematical models,[75] thereby producing systematic, linear communication paths. The analytic separation of the functions of *control* and *coordination* from the functions of *planning* and *future anticipation* obscures the epistemic effects of media processes more than it helps to comprehend them. Certainly, media techniques enable communication and are part of the sphere of control and coordination, but they also constitute the conditions with which the content communicated can be represented or modified. This directly flows into the sphere of strategic planning and stands paradigmatically for the overlapping epistemological values of media. From management's point of view, the goal in deploying media may well be clearly formulated, but the resultant effects in the workplace corresponded to this predetermined program only in the rarest of cases.[76] The epistemological structures of the medium are the main reason for this. Such media

[74] Yates, *Control Through Communication*, 7. See also JoAnne Yates, "Graphs as a Managerial Tool: A Case Study of Du Pont`s Use of Graphs in the Early Twentieth Century," *The Journal of Business Communication* 22, no. 1 (1985): 5–33.

[75] See C. E. Shannon, "A Mathematical Theory of Communication," *The Bell System Technical Journal* 27, nos. 7, 10 (1948): 379–423; 623–56.

[76] Hesse makes a similar argument in his investigation of the contingent effects of postal, telegram, and telephone communication on the economic system as a whole. See Jan-Otmar Hesse, *Im Netz der Kommunikation: Die Reichs-Post- und Telegraphenverwaltung: 1876–1914* (Munich: Beck, 2002), 423.

"specificities" or structures are often at cross-purposes to the desired media effects that have been tacitly assumed by management upon their introduction.

Media Epistemology and Management

From the perspective of the history of knowledge and media, this represents a problem of epistemology.[77] New representational forms for corporate data should not, therefore, be understood exclusively as improved means of communication. Rather, they directly alter the form of corporate knowledge. Visual knowledge exists in a different form from that of written knowledge, for example. It is disseminated, stored, and communicated in different ways. Moreover, through the utilization of media originally used in the sciences, such as film or graphic methods,[78] it can constitute an importation of new knowledge concepts from science to the business world. This coincides with a more fundamental change which transformed the relationship between business and science in the years 1850–1920, which can be roughly described as the scientification of a business's knowledge holdings. Industrial engineers increasingly had recourse to the models and methods of scientific disciplines such as mathematics in order to install more efficient production systems. They replaced and complemented existing forms of implicit experience-based knowledge with scientific expertise. This shift also affected the manner in which such knowledge holdings were processed, conveyed, stored, and circulated. Although implicit forms of experience-based knowledge had always been a part of industry's organization of production, the new forms of explicit knowledge were actively disseminated in the workplace. Thus, the tendency toward visualization that took hold in the 1880s centered not only on the issue of control, but also on the simple and rapid accessibility of knowledge. In the process, industrial engineers, early corporate consultants, and managerial staff had recourse not only to scientifically tested forms of visualization, but also, and more overwhelmingly, to the visual principles of popular culture and its most widely used media. In this sense, the medialization drive led to principles from other fields of media culture having an influence on the newly delineated forms of administrative knowledge. The new communication media not only served to refine techniques of control; they

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[77] Gaston Bachelard, *Épistémologie: Textes Choisis* (Paris: PUF, 1971); Georges Canguilhem, *Ideology and Rationality in the History of the Life Sciences*, trans. Arthur Goldhammer (Cambridge, MA: MIT Press, 1988); Georges Canguilhem, ed., *Études d'histoire et de philosophie des sciences concernant les vivants et la vie* (Paris: Vrin, 1968).

[78] Scott Curtis, *The Shape of the Spectatorship: Art, Science, and Early Cinema in Germany* (New York: Columbia University Press, 2015); Oliver Gaycken, *Devices of Curiosity: Early Cinema and Popular Science* (Oxford: Oxford University Press, 2015).

also formed a point of crystallization for innovation processes to become visible in the form of specific media. Hence, they often appeared to defy rational interpretation.

The history of the reciprocal effects of media, economics, and management on each other is reflected in exemplary fashion in the practice of corporate consulting. Here, I will investigate the various circumstances that initially made possible the complex and heterogeneous practice of corporate consulting, shaping it and keeping it stable over a long period of time. The transition in managerial practices that took place during this time is central to the form of visual management. It complements the previously existing forms of *written* and *oral* management. In relation to the knowledge practice of corporate consulting and management, the modus of visual management is of central importance. For a business's managerial layers, this led to immediate changes in the form, structure, and accessibility (via external consultants) of its corporate knowledge.

In the following pages, I will identify the practice of corporate consulting as a significant driving force for the visual media paradigm shift in the business world. However, this neither takes the form of a history of efficiency measures, in which new approaches to management necessarily lead to better forms of administration, nor does it assume the guise of a disciplinary history, in which innovations appear as the continual progress of a constant *dispositif* of control. Instead, a media history of accidents, experiments, and mishaps will emerge,[79] which will seek to clarify the question as to why and in what form these media techniques were implemented, and what effects this change had for management and its related forms of industrial administration, decision making, control, and planning. This complements and completes approaches drawn from economic history, which largely concentrate on the institutional, economic, and juridical conditions of consulting.[80] Not only institutional changes, but also continually changing managerial knowledge practices, exert an influence on consulting. This can be apprehended through an approach based on the history of knowledge and media. With respect to the forms of consulting knowledge that arose between 1880 and 1930, it is possible to write the history "of lapsed knowledge and that

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[79]   On the productive nature of misguided solutions, see Susan Leigh Star, "The Structure of Ill-Structured Solutions: Boundary Objects and Heterogeneous Distributed Problem Solving," in *Distributed Artificial Intelligence vol. II*, ed. Les Gasser and Michael N. Huhns (London: Pitman, 1989), 37–54. See also Erkki Huhtamo and Jussi Parikka, eds., *Media Archaeology: Approaches, Applications, and Implications* (Berkeley: University of California Press, 2011); Charles Acland, ed., *Residual Media* (Minneapolis: University of Minnesota Press, 2007).

[80]   See McKenna, *The World's Newest Profession*.

of sanctioned knowledge [. . .] which is still current because still being used."[81] Which forms of consulting knowledge have disappeared into one of history's many dustbins? More important, which forms still characterize the industry of corporate consulting up to the present day?

Structure

This book includes historical case studies that illuminate the different areas of commercial and industrial activity in which visualization techniques were implemented at the beginning of the twentieth century. It is divided into two parts. In the first section, encompassing Chapters 1 and 2, I will use a media-archeological perspective, in which media are understood as the practices and expressions of a historical time span which sheds light on the increasing role played by media techniques in the business sphere at the turn of the twentieth century. I will describe and explore the conditions which favored the drive toward medialization in the economy and follow their development. Chapter 1, "Visualizing 'Everything under the Sun': Mapping Graphic Media Networks," deepens the methodological considerations already broached at the beginning of this book and develops a research program for a praxeological historical epistemology of media. It describes and systematizes the various dimensions of the graphic method media network and traces the popularization of the graphic method in the early 1900s. Chapter 2, "Visual Culture and Consulting: Charting, Simulation, and Calculation Devices," outlines the medialization drive in the sphere of industry and commerce. It gathers together case studies on early visual management systems, apparatuses, and practices with which industrial processes were turned into data and transformed into a graphic-pictorial form. These include Karol Adamiecki's "harmonogram," developed in the late nineteenth century, which was a management system that consisted of a central chart on which the relevant data for steel production were visually rendered in order to manage production disruptions. A few years later, the American engineer Henry L. Gantt, part of Frederick W. Taylor's business consulting team, designed Gantt-Charting, a similar graphic system of control and administration which visually depicted production standards. Red markings ("danger lines") indicated delays that affected the entire factory floor. Using graphic calculations, the Norwegian mathematician Carl Barth similarly developed calculation methods that facilitated the installation and operation of lathe machines. Nomographic tool cards

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[81] Georges Canguilhem, "The Object of the History of Science," in *Continental Philosophy of Science*, ed. Garry Gutting (Oxford: Blackwell, 2005), 201.

introduced in the German metallurgy industry in the 1910s served the same purpose. Nomographic calculation processes became standard practice in the planning and installation of production machinery.

In the context of the medialization drive described in the first chapters, a three-part case study of the American consulting firm Gilbreth, Inc. forms the conclusion to my study. Chapter 3, "Gilbreth, Inc.: Selling Film to Corporations," describes how, in the 1910s, the consulting firm began to use the latest development in media technology—film—for industrial purposes. In motion-study laboratories, they undertook filmed motion studies in order to improve labor activity. They also built three-dimensional wire models and made pedagogical films, using cinema in order to promote their method of film-based corporate consulting. Chapter 4, "Consulting, Cinematic Utopia, and Organizational Restraints," describes the influence of film culture in the period between early cinema and the first feature-length films on the practices of corporate consulting. This concerns the human image linked to it and the pedagogical approaches of model-based and film-based learnings that were deployed. The book ends with Chapter 5, "Failing in Style: Business Consulting in Wartime Berlin," which reconstructs the progression of a consulting commission in the Berlin-based Auergesellschaft at the beginning of World War I. This was the first consulting project in the world that made extensive use of the visualization techniques of film and the graphic method. It was here that the first forms of visual consulting knowledge manifested themselves. From this experimental phase of knowledge formation, we subsequently turn to the Wheel of Motion, described earlier, as the prototypical form of consulting knowledge.

These case studies show the central importance of media practices for the consulting industry and business management. The medialization drive thus appears less as an abstract movement; instead, it can be contextualized concretely as a process prone to disruption. A common factor in the efforts of both internally employed industrial engineers and external corporate consultants is their recourse to a wide variety of visualization techniques, from film to graphic representation. Here it is less a matter of adopting individual media forms, like film, graphic charts, or photography, *as such*. Due to the simultaneity with which different media forms entered into economic relations in the framework of the projects undertaken by corporate consultants, I consider them from an epistemological and media-historical perspective not as individual mediums, but as a media network. How did the genesis of corporate consulting and the knowledge surrounding it unfold, and what influence did these developments have on the inception of Visual Management? My focus rests on three areas, which mutually overlap and infiltrate each other.

First, I concern myself with the conditions for the emergence of visual consulting knowledge. What visualization techniques did the first corporate consultants rely on? They faced the challenge of having to represent potential but as yet unrealized transformations. How did they operationalize media techniques in order to predict the future for the purpose of corporate consulting?

Second, I focus on the reciprocal effects that consulting knowledge and concrete business management practices had on each other. How was the potential knowledge of the consultancies transformed into practical changes in the workplace, at the end of which stood the media-based forms of visual management?

Third, these forms of economic rational action will be historicized as a part of more general media conditions. Here I insist on the medialization drive as a significant independent factor. Consequently, I will define the visualization techniques utilized as an interrelated media network, with which a new dimension of activity finds its way into the sphere of commercial and industrial activity. Here, I will supplement the existing approaches of economic and management history with a media-history perspective.

1

Visualizing "Everything under the Sun"

Mapping Graphic Media Networks

The corporate drive toward media-oriented forms of "visual management," as I describe it later, rests on a wide range of practices of visual representation, which I call a "graphic method media network." It incorporates visualization techniques for the graphic display of available data, such as bar and line diagrams. To these, we can add graphic calculation techniques such as nomography, as well as graphic means of recording data on kinetic motion processes. Among other things, they include physiological techniques of pulse and muscle analysis, and, later, filmic processes for analyzing body movements. In the course of the nineteenth century, such visualization methods were developed into self-evident, frequently used tools in disciplines like statistics, commercial science, mathematics, engineering, physiology, political science, and macroeconomics. From the 1880s on, management in industrial and commercial firms increasingly made use of these graphic, photographic, and filmic techniques, which could be utilized for obtaining, analyzing, communicating, and processing data. At this point, media networks and business practices represent, to borrow a phrase from George Canguilhem, two roads merging into each other.[1] This connection leads to fundamental changes in business practices, which I will define and describe with the concept of *visual management*.

Discussions of the historical development of visualization processes (available since 1880) generally concentrate on their relevance for individual disciplinary areas, such as statistics.[2] For the 1800s, this may represent an appropriate form of historicizing media devices, but it is easy to overlook the fact that, at the end of this century, the popularity of graphic methods led to the disciplinary spaces of their development and utilization being left behind. From 1880—and at the latest since the publication of Michael G. Mulhall's work, whose title *The Balance*

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[1] Canguilhem, "The Object of the History of Science."

[2] See Michael Friendly, "The Golden Age of Statistical Graphics," *Statistical Science* 23, no. 4 (2008): 502–35; Ian Spence, "No Humble Pie: The Origins and Usage of a Statistical Chart," *Journal of Educational and Behavioral Statistics* 30, no. 4 (2005): 353–68; Stephen E. Fienberg, "Graphical Methods in Statistics," in *The American Statistician* 33, no. 4 (1979): 165–78; James R. Beniger and Dorothy L. Robyn, "Quantitative Graphics in Statistics," *The American Statistician* 32, no. 1 (1978): 1–11; H. Gray Funkhouser, "Historical Development of the Graphical Representation of Statistical Data," *Osiris* 3 (1937): 269–404.