

How Do Chief Executive Officers Make Strategy?

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Abstract. We survey 262 chief executive officer (CEO) alumni of Harvard Business School and gather evidence on three aspects of each executive's strategy practice: how formalized it is, how it is developed, and how it is implemented. We report three main results. First, firms with higher adoption of structured strategy practices outperform their peers; they grow faster and are more profitable, especially in industries with greater strategic complexity. Second, the appointment of CEOs with more structured styles appears to drive this outperformance, not firm-specific effects. This raises the question of how an executive comes to adopt more structured strategy practices. Our third finding provides a partial answer; business education can have a lasting impact on a CEO's strategy practices as evidenced by a regression discontinuity analysis centered around a curriculum change at Harvard Business School.

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1. Introduction

Strategic complexity—the need to manage many firm activities and their interdependencies (Rivkin 2000)—has reached unprecedented levels, driven by recent technological, political/social, and environmental trends. Digitalization and artificial intelligence have dramatically expanded the range of strategic actions available to organizations. Simultaneously, the need to navigate rising diversity and political polarization of customers and employees as well as the pursuit of purpose beyond profit (Edmans 2020, Henderson 2020, Gartenberg and Serafeim 2023) further amplifies interdependencies within a modern enterprise. Growing strategic complexity means that practices that help boundedly rational executives to make (Simon 1947) and execute (Weiser et al. 2021) decisions become ever more critical. Yet, to our knowledge, unbiased data on how chief executive officers (CEOs) make *and* execute strategic decisions across a broad range of firms do not exist.

Three main obstacles have limited empirical research on this topic. First, CEOs are rarely willing to complete in-depth surveys (Bandiera et al. 2020) or be interviewed for extended periods, so detailed data are typically available only for field studies with a few participating companies. Second, it is difficult to elicit truthful answers from top managers on how they really make decisions,

and the results of closed-end surveys are known to be biased (Bloom and Van Reenen 2010). Third, most empirical work on strategy content and process only focuses on isolated aspects, such as generic strategies (Thornhill and White 2007, Yang et al. 2021) or business models (Zott et al. 2011) within strategy content or on how strategy is developed (Fredrickson 1983, Fredrickson and Mitchell 1984, Samba et al. 2021) as opposed to implemented (Kim and Mauborgne 1998, Bloom and Van Reenen 2007, Brynjolfsson and McElheran 2016). This lack of combined measurement of strategy content and process is unfortunate, especially because approaches leading to an interaction between multiple aspects—such as A/B testing—are becoming more common (McGrath and Macmillan 1995, Ries 2011, Athey 2019, Camuffo et al. 2020, Koning et al. 2022) and likely help executives navigate strategic complexity (Csaszar and Levinthal 2015, Csaszar 2018, Gavetti and Levinthal 2000).

We overcome all three obstacles and provide a new survey instrument, with newly collected data serving as a proof of concept that our survey can collect informative large-scale data on strategy content and process.

We overcome the first challenge—the reluctance of CEOs to be interviewed for extended periods—by surveying alumni¹ of Harvard Business School (HBS), where two authors of the paper are based. This yields

a much higher response rate and sample size than previous studies.

To address the second challenge—the lack of truthful responses on CEO decision making—we minimize biases on the part of both interviewees and interviewers by using open-ended survey questions rather than leading closed-ended survey questions and by employing trained interviewers to double-blind score responses. This approach, modeled on the method of the World Management Survey (WMS) (Bloom and Van Reenen 2007), helps us gather high-quality, comparable assessments of strategy practices across a variety of firms.

Our solution for the third challenge—the lack of a combined measurement of strategy content and process—is to design a novel survey instrument that assesses both of these aspects. The survey provides a quantitative index, with higher values corresponding to greater adoption of proactive, consistent, and hypothesis-driven decision making and learning practices (also defined as more structured practices). We refer to this new measure as strategy practices and highlight that it captures three related dimensions of strategy content and process. Formalization captures the ability of the CEO to articulate the goals, scope, and distinctive advantage (Porter 1996) of the company and relates to fundamental choices that guide other choices (Van den Steen 2017) and organizational practices (Leiblein et al. 2018). Development captures the degree of procedural rationality (Simon 1978, Fredrickson 1983, Samba et al. 2021) and practices to abductively elaborate initial hypotheses and conjectures and to subject them to rigorous debate among top managers (McGrath and Macmillan 1995, Felin and Zenger 2009). Implementation captures procedural justice practices to motivate buy-in by employees, even if they disagree with the strategy (Leventhal 1980, Kim and Mauborgne 1998, Gartenberg and Serafeim 2023), as well as practices to validate and test strategic theories (Lee and Puranam 2016, Pillai et al. 2020). Importantly, the development and implementation sections together allow us to capture hypothesis-driven learning or the feedback process between initial hypotheses articulation, rigorous testing, and revision of hypotheses. Additionally, formalization interacts with development and implementation as guiding choices on where to play and how to win (Lafley and Martin 2013) impact what types of strategic options are developed and ultimately implemented.

Having overcome these obstacles, we collect data on the strategy practices of 262 senior executive alumni of HBS. They lead firms that are unusually large (the average firm employs around 2,000 employees), mature (the average firm age is 43 years old), and more likely than the typical firm to be publicly traded. Despite this strongly selected sample from a single school, we document large variation in strategy practices among the

firms, most of which cannot be explained by industry differences. Our investigation into the nature of this variation leads to three main results. First, using performance data from the Internal Revenue Service (IRS) and the U.S. Census Bureau, we find that firms with better strategy practices outperform their peers; they grow faster and are more profitable, especially in industries with greater strategic complexity. Although we do not claim that these findings show that better strategy practices cause better performance, this analysis does rule out that the variation of our strategy practices measure is dominated by measurement error. Second—and relatedly—we show that firms only begin to outgrow their competitors after the arrival of CEOs with more structured strategy practices, thereby ruling out reverse causality as an explanation for the correlation of strategy practices and firm performance. Indeed, the appointment of CEOs who implement more structured strategy practices appears to drive outperformance, not firm strategic needs.

This naturally raises the question of what determines the strategy practices that CEOs use. Our third finding identifies one determinant of adoption by demonstrating how a radical shift in the HBS master of business administration (MBA) curriculum significantly affected CEOs' strategic decision-making style, even decades later.

This paper is structured as follows. Following this introduction, Section 2 outlines our contribution to the literature in management, strategy, and economics. Section 3 outlines our empirical methodology, including a description of our survey instrument. Section 4 discusses our empirical findings related to variation of adoption of strategy practices, and Section 5 discusses the correlations between strategy practices and a set of performance variables. Then, Section 6 explores one possible explanation for the variation that we observe in how executives make strategic decisions: business education. Finally, Section 7 concludes.

2. Related Literature

This paper contributes to several literatures. First, it contributes to research on management practices (Bloom and Van Reenen 2007, Bloom et al. 2019) but also differs from this prior work. The management practices literature focuses on firms' operations or the sum of tasks and activities used to produce a given set of firm offerings. It emphasizes structured practices for monitoring, target setting, and incentives within firms, with the typical respondent being an establishment manager. In contrast, we focus on strategic decision making by CEOs, which determines firm offerings and the general direction of the business. Additionally, although our survey covers practices on strategy implementation, these components are focused on how implementation feeds back into strategic decision making by CEOs through

learning (Weiser et al. 2021). Neither of these topics is addressed in the main data sets used in the management practices literature: the WMS and the Management and Organizational Practices Survey (MOPS). Our survey topic is also distinct from data-driven decision making (Brynjolfsson and McElheran 2016, McElheran et al. 2022), which is a set of “practices surrounding the collection and analysis of external and internal data” (Brynjolfsson et al. 2011). Although it shares with data-driven decision making its emphasis on evidence-based decisions, a key emphasis of hypothesis-driven learning is the generation of novel theories, even without large samples of data (Felin and Zenger 2009). Indeed, a focus of our survey instrument is the articulation of initial assumptions and hypotheses whenever there is no data on which to base a strategic decision. Additionally, measures of data-driven decision making from the MOPS, as used by McElheran et al. (2022), focus on data collected and used in operations instead of CEO strategic decision making.

Second, this paper relates to a classic literature in strategic management on procedural rationality in strategic decision making (Simon 1978, Fredrickson 1983, Eisenhardt 1989, Eisenhardt and Zbaracki 1992, Samba et al. 2021), which focuses on the concept of “comprehensiveness,” defined as a process that is “exhaustive in the identification and selection of goals and the generation and evaluation of alternatives” (Fredrickson 1983) or a process that is exhaustive in collection and analysis of data sought for decisions (Miller and Toulouse 1986). The earliest empirical results in this literature suggested that comprehensiveness relates to firm performance (Fredrickson and Mitchell 1984), and this correlation is mitigated by industry dynamism (Fredrickson 1984). However, the metastudy of 37 empirical studies on comprehensiveness by Samba et al. (2021) in the last 40 years shows a lack of statistically significant correlations between comprehensiveness and firm performance when performance data are either objective or moderately objective.² Additionally, “environmental dynamism does not have a moderating impact on this comprehensiveness-outcomes linkage” (Samba et al. 2021). Research in strategic decision making has also been limited by examining a comparatively small set of strategy practices (at best only one or two practices), often with limited sample sizes, thereby offering a relatively narrow window through which to understand the relationship between strategy practices and firm performance. Our measure of strategy practices examines a much broader set of practices and uses open-ended, double-blind interviews instead of the closed-ended surveys used in almost all of the literature on comprehensiveness and strategic decision making.³ At the same time, we show that strategy practices are systematically

correlated with objectively measured firm performance and that this effect is moderated by differences in strategic complexity across industries. Because of our use of objective performance data as well as firm samples from multiple industries, our results are robust to the methodological issues raised by the metastudy of Samba et al. (2021) and provide evidence on how a broader set of strategy practices might impact firms.

Finally, this paper relates to a recent literature on scientific approaches to entrepreneurship (Felin and Zenger 2009, Lafley et al. 2012, Camuffo et al. 2020, Novelli and Spina 2022, Yang et al. 2022, Zellweger and Zenger 2023) and experimentation more generally (Kerr et al. 2014; Agrawal et al. 2021, 2024; Koning et al. 2022; Shelef et al. 2025). Indeed, parts of hypothesis-driven learning tie together development and implementation, and they are closely related to ideas about scientific approaches to strategic decision making. However, we are also cognizant of potentially important differences between entrepreneurial and more general strategic decision making (Busenitz and Barney 1997), so our measure of strategy practices goes beyond hypothesis-driven learning by capturing formalization as well as procedural rationality and procedural justice. We develop a new survey methodology to measure strategy practices in a comparable way across firms of all sizes from small entrepreneurial ventures to publicly traded corporations, fully expecting strategy practices to differ across firm types. Our paper can, therefore, be considered a proof of concept that enables future research to collect comparable data on strategic decision making across large samples of firms and possibly, also in other contexts, such as other industries and countries or even nonprofit organizations or government agencies.

3. Empirical Methodology

This section describes how we crafted, revised, and cognitively tested the survey instrument. Additionally, we lay out three validation steps following common practice (e.g., Gatignon et al. 2002). The first step consists of using expert judges to confirm content face validity and is briefly discussed in Section 3.1, with additional details provided in Online Appendix 1. The second step uses standard statistical tools of confirmatory factor analysis (CFA) and Cronbach’s alpha to showcase statistical validity and reliability. The results of this step are reported in Section 4.1. The third step—also called “nomological validity” in the psychology literature—considers whether the measure of strategy practices correlates with other outcomes, such as firm performance, in a way consistent with the intended survey design. Results for this validation step will be discussed in the related analyses in Sections 4 and 5.

3.1. Developing a Strategy Practices Survey Instrument

Our starting point is a set of practices for strategic formalization, decision making, implementation, and learning recommended by Lafley et al. (2012) and Lafley and Martin (2013). In our survey instrument, a firm adopting this full set of practices would receive the highest possible score (of five). Lafley et al. (2012) describe a hypothesis-driven approach, in which company leaders craft competing strategic alternatives and hypotheses for the causal mechanism of each strategy's potential success and then, test them with empirical evidence. Lafley and Martin (2013) more broadly embed this hypothesis-driven learning into a broader strategic process, including formalization, development, and implementation.

Given this starting point, we first simplified and generalized the practices, so we could capture companies using frontier practices that resemble in effect the Lafley and Martin (2013) process, even if they do not exactly follow all of the same steps. Our review of additional literature facilitated this generalization step; we provide details in Online Appendix 1 and especially, Figure A.1 in Online Appendix 1. However, these frontier practices are unlikely to be adopted by many firms, so it becomes necessary to systematically measure scores for firms inside the frontier. The second initial survey design step, therefore, developed

three main themes for the scoring: proactivity, consistency, and hypothesis-driven learning. Proactivity is defined as the degree to which CEOs anticipate issues instead of reacting to them. Consistency (or routinization) is defined as the degree to which regular practices are followed across all decisions. Hypothesis-driven learning (or evidence-based decision making) is defined as the degree to which cause-effect links are clearly defined and tested. Figure 1 provides a more detailed metascore grid that we used to develop the individual practices that, in turn, we used to construct scores for the 14 questions of our survey.

Once we had drafted the initial survey instrument, we moved to content validation of the survey questions and the scoring grid. Content validation encompassed four dimensions: accurate question design, topic comprehensiveness, grid plausibility, and scoring accuracy. Initially, cognitive testing and piloting focused on refining question design, ensuring comprehensive topic coverage, and validating the plausibility of the scoring grid. Our three-stage process began with expert feedback from retired CEOs as well as a focus group of current CEOs, leading to revisions in the survey design. The second stage involved 20 pilot interviews with HBS alumni to refine questions and test grid plausibility. In the final stage, we trained MBA students to test the teachability of the interview process and ensure scoring accuracy. At this point, we

Figure 1. (Color online) Metascore Grid as Shown in the Interviewer Training Material

WSS: three themes

- **Proactivity:** anticipate issues and needs instead of reacting when forced
- **Evidence-based decision-making:** use clearly defined “cause-effect” relations and update based on evidence (from implementation)
- **Routinization:** deliberate choice on the “rules of the game” to avoid arbitrariness

Proactivity: Is the decision making process structured to inspire farsighted strategies that shape competition rather than responding to it?

Score	1	2	3	4	5
GENERAL GRID	Nothing	Reactive, i.e. response only to strong performance drops	Regular (conducted irrespective of performance)	Proactive, i.e. process structured to anticipate needs	Most proactive, i.e. process structured to systematically identify and seize opportunities
Notes	When scoring, keep in mind the following guidelines: • Is there a regular process? (“Standard operating procedure”?) • Why is the process set up this way? • Is the process built to encourage farsighted behavior (respond before immediate need to change)? Asking for examples helps illustrate the manager's answers.				

Evidence-based decision making: Are clear, falsifiable hypotheses defined and tested?

Score	1	2	3	4	5
GENERAL GRID	Only intuition	Performance drop triggers more data-intensive review of “what to fix”	All decisions are evidence/data-based when possible but undocumented guesses if no data	Evidence & data when possible and systematically document guesses and mechanisms for why choices work	Conditions for alternative choices to be optimal and mechanisms for why choices work are documented and systematically tested and revised based on evidence/data on outcomes
Notes	When scoring, keep in mind the following guidelines: • Do managers formulate hypothesis for “why this will work” that could be rejected by evidence or data? • Do executives clearly state and document guesses, when no data is available? • Do managers always go back to revisit their initial assumptions after strategy outcomes are clear? Or do they revisit only if things went wrong?				

Routinization: Are the rules of decision making clearly defined for all decisions?

Score	1	2	3	4	5
GENERAL GRID	Nothing	Routines only established for emergencies	Routine is defined for “important” decisions only	Routine covers all decisions, but evaluation is incomplete	All elements necessary for comprehensive evaluation and decision-making are routinized
Notes	When scoring, keep in mind the following guidelines: • Is there a regular process? (“Standard operating procedure”?) • Why is the process set up this way? • How many elements of the process are standardized? • How well is the process integrated? Who/What levels of the firm/plant are involved? Tip: If unsure, ask for how long the routine has been in place. If it has been established very recently, chances are that things are still going to chance and the routine is not very standardized yet. Asking for examples helps illustrate the manager's answers.				

Note. WSS, World Strategy Survey.

conducted a large-scale pilot with 92 executives to further validate the instrument and scoring grid. Online Appendix 1 provides details of this content validation step.

3.2. Scoring Strategy Practices

This development process yielded a survey instrument that focuses on three different categories of strategy practices: formalization, development, and implementation. Within each of these areas, we assess the extent to which the executive follows approaches that are proactive, consistent, and hypothesis driven.

To anchor CEOs' responses to their actual process for making strategic decisions, we began by giving the respondent a brief definition of a "strategic change" as any decision that "significantly impacts your business or changes your strategy." We then gave examples, such as significant investments, entering a new line of business, or entering a new geographic area. We refrained from any more specific definitions of "strategic change" both because what constitutes a

strategic decision can vary significantly between firms (e.g., small versus large firms make strategy decisions on different scales) and to avoid confusing interviewees with excessively abstract concepts. To ensure comparability of responses, we also asked the respondent to give us three examples of "typical strategic changes" in his or her firm from the previous five years. These examples served to ground interviewees in their actual process for making strategic decisions and kept the conversation from becoming more abstract. We referred back to these examples throughout the interview to keep the conversation grounded. We also classified these decisions independently into potentially overlapping sets of 17 different decision types, including mergers & acquisitions (M&A), new business, geographic expansion, and so on. Table 1 in the Online Appendix provides summary statistics on the 17 different types of strategic changes into which we categorized the example decisions; see also Figure A.2 in the Online Appendix.

Table 1. Descriptive Statistics

	Observations	Mean	Standard deviation	Min	Max
Panel A: Firm and executive characteristics					
Firm characteristics					
Number of employees	262	2,063.81	8,066.25	1	90,000 ^a
Firm age	262	43.03	31.69	1	100 ^a
Public ownership	262	0.11	0.31	0	1
Family ownership	262	0.20	0.40	0	1
Executive characteristics					
Female	262	0.09	0.28	0	1
Age of executive	262	57.34	12.14	24	95
Tenure in position	262	13.86	11.31	0	51
Tenure in company	262	17.31	14.23	0	69
Bachelor's degree in business or economics	262	0.38	0.36	0	1
Bachelor's degree in engineering	262	0.04	0.15	0	1
MBA from HBS	262	0.71	0.45	0	1
Panel B: Strategy practices	262	2.78	0.48	1.56	3.89
Formalization					
F1: Strategy statement	262	3.04	0.54	1.33	4.33
F2: Deliberate scope and advantage	262	2.51	0.71	1.00	5.00
F3: Deliberate strategic distinctiveness	262	2.89	0.94	1.00	5.00
Development					
D1: Initialization	262	3.68	0.95	1.00	5.00
D2: Justification of decisions	262	2.72	0.81	1.00	4.33
D3: Regular peer review	262	2.63	0.86	1.00	5.00
D4: Justification of decisions	262	2.74	0.81	1.00	5.00
D5: Regular peer review	262	2.60	1.33	1.00	5.00
D6: Effective peer review	262	2.51	1.32	1.00	5.00
D5: Exploration of alternatives	262	2.98	1.34	1.00	5.00
D6: Peer review of risk	262	2.85	1.23	1.00	5.00
Implementation					
I1: Implementation planning	262	2.54	0.70	1.00	4.40
I2: Testing and follow-up	262	2.09	0.94	1.00	5.00
I3: Validating causal mechanisms	262	3.02	1.20	1.00	5.00
I4: Strategy communication	262	2.81	1.02	1.00	5.00
I5: Learning about resistance	262	2.83	1.21	1.00	5.00
	262	1.94	0.86	1.00	5.00

Notes. Strategy questions are scored with values between one and five. Strategy practices (all questions), formalization (F1–F3), development (D1–D6), and implementation (I1–I5) are averages of the underlying questions. Missing observations are imputed at the sample mean.

^aThis entry has been rounded to avoid disclosure of confidential information.

After this brief introduction, we proceeded to the three main sections on strategy, spanning 14 different initial open-ended questions. Within each main question, we used a detailed scoring grid to rate responses on a one to five scale. However, scoring for each question consisted of many detailed practices recorded in response to follow-up questions, and a company was never rated very highly without many practices confirming the presence of a proactive, consistent, and hypothesis-driven process.⁴ Figure 2 shows our detailed scoring grid for formalization, development, and implementation as

well as the open-ended questions with which we started each question area.

After introductory questions on strategic decisions, we began with the first main section of the instrument—on strategy formalization (henceforth formalization). This section explored three factors.

F1. Strategy statement. The ability of the executive to state concisely the goals, scope, and competitive advantage of his or her company.

F2. Deliberate scope and advantage. The ability of the executive to articulate clearly the markets that the

Figure 2. Strategy Practices Scoring Grid

Formalization		1	3	5
F1	Strategy Statement: What is your company's strategy?	Respondent is unable to summarize	There is an informal statement, covering scope and possibly goals.	A formalized, concise statement exists, that summarizes: goals, scope and (competitive) advantage.
F2	Deliberate scope and advantage: What is your most important choice of "where to compete" in terms of products, geography or customers?	No priorities are set, regarding scope.	There are clear priorities, but reasons for these priorities are vague.	Clear priorities are related to internal advantage and external market opportunities.
F3	Deliberate strategic distinctiveness: If I asked your customers, how your company differs from the competition, either in the products/services you offer or in the way you provide them, what would they say?	The company is neither different in terms of products, nor in terms of business process or price, relative to the competition.	The company is different, in terms of products, processes or prices, relative to the competition. But information that ensures uniqueness is mostly informal (e.g. customer feedback).	The company is unique either in terms of in terms of products, processes or prices, relative to the competition. Data on customer feedback, and competitors is utilized to track how unique the company is.
Development		1	3	5
D1	Initialization: How do you typically first come to consider changes to strategy?	We go with our gut to decide whether change is needed.	Change strategy before imminent performance changes. Qualitative and quantitative info from internal and external sources used, but no details are mentioned.	Proactively seek opportunities based on subtle shifts, using a broad range of quantitative and qualitative information on current and future external conditions to determine the need for change. Regular information updates combine internal and external sources.
D2	Justification of decisions: What type of information do you use to select a strategic change rather than its alternatives?	To decide on a strategic change, we don't use any information beyond our own intuition.	To select among alternatives, we use quantitative information on external conditions. But no details are provided. When we lack data, we make our best guess.	To select among alternatives, we use a broad range of quantitative and qualitative information on current and future external conditions. Regular information updates combine internal and external sources. When we lack data, we articulate initial assumptions/hypotheses for an alternative to be beneficial.
D3	Regular peer-review: How often do strategy development meetings take place? And why? Are there recurring themes across strategy development meetings?	We do not have regular meetings dedicated to strategy development.	Most strategic decisions are made in annual strategy exercises (strategy retreats, annual planning cycle of functional staff). Budgeting and compensation questions dominate.	Strategy development is embedded in regular formal and informal meetings, as strategy and implementation go together. Strategy discussions take priority.
D4	Effective peer-review: How are strategy development meetings prepared? What is the typical structure? Who participates? What is the role of the different participants?	We do not have regular meetings dedicated to strategy development.	Recurring meeting structure is dominated by presentations. Process is led by functional staff (strategy, finance...)	Recurring meeting structure is dominated by discussions, with detailed advance preparation. CEO and operating managers jointly lead the process.

Figure 2. (Continued)

D5	Exploration of alternatives: Do you typically consider alternatives to given possible strategic change? How much information on these alternatives is there? How do you typically first come to consider these alternatives?	We know what we have to do and do it.	We consider mostly 1 alternative. But, alternatives are not regularly generated and there might be no vetting of alternatives.	We usually consider at least two realistic and feasible alternatives. We have a routinized process in place to explore feasible alternatives, even without immediate need. For each alternative, we specify initial assumptions/hypotheses if there is no data.
D6	Peer-review of risk: When you are considering a strategic change, when and how do people express potential concerns?	Concerns are expressed irregularly.	We have public discussions, but managers also express concerns in private. Public discussions are mostly done for “important” decisions only.	All concerns were voiced and debated, using a systematic process of criticism, risk evaluation and open discussion. All strategic changes and possible alternatives are vetted through the same process.
Implementation		1	3	5
I1	Implementation planning: When you make a strategic decision, which implementation details are clear and what remains to be figured out?	Steps to implement a strategy are typically not articulated at the time of the decision.	The most important steps for implementation are clearly defined for directly involved department heads. Department targets reflect these steps. But no details on performance targets or incentives are clear.	Detailed steps and intermediate targets for all directly and indirectly involved departments and individuals are defined. Performance and compensation were tied to the completion of these steps at the individual and team level.
I2	Testing and follow-up: How do you review the progress of a strategic change?	No or irregular review.	Reviews discuss successes/failures and follow-up goals are usually stated. But either discussion minutes or follow-ups do not regularly exist.	Strategy review discussions discuss successes/failures, risks/opportunities and review of initial assumptions or hypotheses. Minutes document discussion and follow up plans with clear goals.
I3	Validating causal mechanisms: How would you typically know whether a strategic change has succeeded or failed? What happens if a strategic change does not meet your expectations, either positively or negatively?	We typically do not know whether a strategy succeeded or not.	We use performance in a targeted area to measure success but often do not know how strategy worked. Large surprises are reviewed but often no adjustment steps are taken or lessons for strategy discussed.	We judge success/failure relative to targeted effects using customized measures informative about the way strategy works and try to separate strategy design from luck and implementation issues. We investigate why outcome was surprising and have an ongoing detailed dialogue on surprise outcomes and their implications for operations and strategy.
I4	Strategy communication: When and how are employees outside top management typically informed about strategic changes?	As changes take place, “word trickles out”.	Official (CEO) memos go out in advance and announce the change. Employees mostly do not interact with superiors during communications.	Official statements go out in advance and inform employees through a variety of channels such as CEO statements, town-hall type Q&As, personal meetings throughout the organization. Communications include: what is done, why change was needed, how it affects employees.
I5	Learning about resistance: There might sometimes be individuals opposed to a strategic change? How do you find out about them? Are you usually able to overcome their resistance? If so, how?	We do not identify resisters.	Before the decision, we identify resisters, as they voice opposition. Resisters are sidelined, neutralized or compliance is bought.	When preparing strategy considerations, we proactively identify influential individuals or groups, who might oppose the change. There is a routinized process to increase support for changes, elicit constructive criticism and keep management informed about potential implementation-issues from resistance.

Note. Q&A, question and answer.

company prioritizes and the way that the firm intends to win in those markets.

F3. Deliberate strategic distinctiveness. The ability of the executive to say how the company differs from its main competitors.

The formalization section, therefore, allowed us to capture ideas related to fundamental concepts of strategy, such as strategy as the deliberate choice of “a different set of activities to deliver a unique mix of

value” (Porter 1996) or strategy as “key choices that guide other choices” (Van den Steen 2017).

The second section—on strategy development (henceforth development)—focused on hypothesis development (Felin and Zenger 2009, Lafley et al. 2012) within hypothesis-driven learning and procedural rationality (Simon 1947, 1978; Fredrickson 1983), defined as “the effectiveness, in light of human cognitive powers and limitations, of the procedures used to choose actions”

(Simon 1978). Development consists of practices related to six factors.

D1. Initialization. Whether strategic problem framing was proactively generated based on subtle environmental cues.

D2. Justification of decisions. Whether firms used data to inform their strategic initiatives (and if so, which types) and abductively formulated assumptions if data were missing.

D3. Regular peer review. Whether decision making was embedded in routine top management meetings, which connected strategy with implementation.

D4. Effective peer review. Whether decisions were considered in well-prepared, discussion-based strategy meetings.

D5. Exploration of alternatives. Whether a routinized process generated strategic alternatives and ensured similar information on the feasibility, benefits, and initial assumptions/hypotheses of each alternative.

D6. Peer review of risk. Whether there were processes for executives to systematically voice potential concerns about proposed decisions.

This survey section directly measures practices of proactively generating hypotheses—what Lafley et al. (2012) call “strategic possibilities”—and articulating initial hypotheses and causal theories for each possibility (Felin and Zenger 2009, Lafley et al. 2012),⁵ the latter being necessary to learn from evidence during implementation. These development practices also relate to rational decision making (Simon 1947)⁶ and related work on comprehensiveness (Fredrickson 1983),⁷ and they add practices to embed procedural rationality into a continuous decision-making process⁸ (Fredrickson 1983, Lafley and Martin 2013).

The third section of the survey—on strategy implementation (henceforth implementation)—captures the following factors.

I1. Implementation planning. Whether executives anticipated interdependencies across activities and provided strategy-consistent targets and incentives.

I2. Testing and follow-up. Whether the firm conducted regular reviews of its strategic decisions’ outcomes and compared outcomes with initial assumptions and hypotheses.

I3. Validating causal mechanisms. Whether the firm collected evidence on mechanisms through which the strategy works, separated strategy design from luck, separated strategy development issues from implementation issues, and systematically learned from surprise outcomes about initial assumptions and hypotheses.

I4. Strategy communication. Whether executives regularly and systematically communicated strategies to employees outside top management.

I5. Learning about resistance. Whether executives anticipated potential resistance to strategic decisions/changes outside of their firms’ top management.

These questions allow us to measure how strategy execution outcomes and hypothesis testing allow CEOs to learn about initial theories and conjectures (Drucker 1967,⁹ Felin and Zenger 2009, Camuffo et al. 2020, Zellweger and Zenger 2023),¹⁰ practices that complement hypothesis development in the development section. At the same time, we track factors related to procedural justice (Leventhal 1980, Kim and Mauborgne 1998, Gartenberg and Zenger 2023), which are defined as practices that are “judged to be fair” (Kim and Mauborgne 1998) and therefore, foster employee buy-in, even if employees have reservations about the strategic decision.¹¹

Online Appendix 1 and especially, Figure A.1 in the Online Appendix give more details on references used to construct the detailed scoring grid associated with each question.

3.3. Additional Data

3.3.1. Strategy Decisions: Number and Speed. In addition to the strategy practices discussed above, the survey captured data on strategic decision and implementation characteristics as well as on the type of competitive advantage that the company pursues. To measure how quickly each firm makes and implements strategic decisions, we asked the respondent to estimate the average number of strategic decisions made over the previous five years as well as the time that it took both to make and to implement each of the three examples of strategic decisions that the respondent mentioned.

3.3.2. Firm Characteristics. We collected data on several important firm characteristics at the end of the interviews. We asked interviewees to describe the ownership structure of their firms and the founding year, and where possible, we verified this information from third-party sources. Finally, we asked for the number of full-time employees at the respondent company. Importantly, we asked all of these questions at the end of the interview, lest any particular description of CEOs’ firm characteristics bias any subsequent responses.

Separate from our survey, we obtained additional information on the American firms in our sample from two databases maintained by the U.S. Census Bureau: the Longitudinal Business Database (LBD) and the Census of Manufactures (CMF). The LBD has two features that are particularly helpful for analyzing firms, their strategy practices, and their performance. First, the data come from IRS tax files, which are gathered independently from our survey. Associated performance data are, therefore, free of any survey bias in the reporting of performance. Additionally, both the reporting firms and the IRS have strong incentives for truthful reporting. Second, the census has invested deeply to maintain longitudinal links in the data, and

this allows us to reliably measure firm growth over time. This panel dimension is important for separating firm effects from CEO effects of strategy practices. In contrast to the LBD, the CMF is cross sectional, and it records data at the level of establishments (the location of a business, such as a factory or a store), not firms. The CMF data that we use are linked to firm identifiers (census “alphas”), which ensures that we can reliably link establishments to firms for which we measure strategy practices. Despite only being a cross-section for 2017, the CMF data allow us to calculate markups/profitability, an important additional dimension of performance.

3.3.3. CEO Characteristics. To examine how CEOs’ characteristics might affect their strategic decision making, we collected three measures that capture each CEO’s level of experience: tenure at the company, tenure as CEO, and age. We did not directly ask for the respondent’s age during the interview to avoid any awkwardness. Instead, we used the following protocol to estimate respondent age from public sources. We searched for CEOs’ LinkedIn pages, recorded their college graduation years, and estimated their ages assuming that they graduated at age 21. If there was no information on the graduation year, we relied on the date of graduation from HBS for MBAs. Because HBS typically requires work experience before entering the MBA program, we assumed that HBS MBAs were 27 when they graduated. If neither of these steps yielded an approximate age, we reverted to the interviewer’s initial guess of the respondent’s age.¹²

3.3.4. Noise Controls and Interviewer Effects. We also recorded data that serve as possible interview noise controls, such as the time of day, interview duration, and interviewer scores of respondent expertise about strategy practices as well as respondent honesty. Because each interviewer conducted multiple interviews, we can control for interviewer fixed effects (none of which were significant in our models). Additionally, for a subset of our firms (approximately 23%), we interviewed other C-level executives instead of the CEO (such as the chief operating officer or chief financial officer) or board chairs, so we constructed a non-CEO dummy variable as an additional control variable and confirmed that our main results were robust on the 77% data subset of CEOs.

3.4. Sampling Frame

Because we are interested in strategic decision making by the top decision makers within firms, our ideal interviewees are CEOs or equally senior managers. Our sampling frame was drawn from the population of alumni of Harvard Business School. Although HBS alumni are not a representative sample of all managers, focusing on them offers several benefits. First, the fact

that two coauthors are affiliated with HBS helped us reach a type of manager who is notoriously hard to engage in surveys. Although response rates of around 10% are common in CEO surveys (Ben-David et al. 2013), focusing on HBS alumni allowed us to achieve a response rate of over 30%. Second, variation in strategy practices among managers who were exposed to a similar educational experience will likely represent a lower bound to the actual variation that exists in the general population of managers. Third, this sample enabled us to match the survey data with detailed information on the respondents’ background and education (e.g., graduation year and MBA versus executive education), which allowed us to study the impact of business school education on strategy practices as we explain in more detail in Section 6.

For this study, we chose to focus on the U.S., Canadian, and UK manufacturing sectors to maximize the amount of performance-related data that we could obtain from the U.S. Census Bureau as we anticipated (correctly) that the majority of our CEO interviewees would work for privately held firms with limited publicly available performance data. To construct our sample, we started with a sample of more than 3,100 HBS MBA and executive education alumni who were listed in the HBS alumni database as working in the manufacturing sector in the United States, the United Kingdom, or Canada. From this list, we selected managers with the title of CEO or equivalent (e.g., president or managing director). As the information in the alumni database is self-reported, we took several steps to verify it. First, we extensively researched each executive on our list using CapitalIQ, Factset, LinkedIn, and company websites to ensure that each individual was still employed at his or her respective firm in the target role of CEO or another C-suite officer (or equivalent). We required each executive to be employed at his or her firm for at least a year. Next, we collected information on each of the listed firms in the database to confirm that they were manufacturers (e.g., a maker of goods as opposed to a distributor or retailer). Our research on individual firms also allowed us to collect additional data on these respective firms, including six-digit NAICS (North American Industry Classification System) codes (from CapitalIQ and Orbis) as well as location and contact information. Ultimately, these selection criteria left us with a total of 863 CEOs and equivalent managers for our sampling frame. Of these, 63% were alumni of the HBS MBA program, and 37% were graduates of the handful of HBS executive education programs that grant alumni status.¹³

3.5. Collecting Accurate Responses

We followed a simple protocol to recruit executives to participate in our telephone-based interviews. We first sent each executive in our sampling frame a brief

email message explaining the purpose of our research and inviting him or her to participate in an hour-long interview. Individuals who did not respond to our initial email received a follow-up request a week later. Next, we telephoned the remaining executives in our frame to invite them to participate in our study, following up again a week later if we did not receive a response. Executives who did not respond to our two rounds of emails and telephone calls were not contacted further. Ultimately, we could interview 262 executives from our sample frame (a response rate of 30%).¹⁴

The survey was administered from Harvard Business School by a team of six interviewers and scorers, mostly Harvard MBA graduates, in late 2017 through 2018. Interviewers received a total of five days of training, including several one-on-one practice sessions and mock interviews.

To ensure accurate responses, we explained to interviewees that we did not know what a “best practice” is and were interested in understanding the strategy processes of different companies. In particular, to avoid leading respondents and to reduce social desirability bias, we used almost exclusively open-ended questions throughout the survey. We took great care in balancing the scope and wording of questions, on the one hand, to be specific enough that we would get clear, accurate responses but also, on the other hand, to not be so specific as to risk leading interviewees to provide responses that did not reflect their actual strategy practices.

We took several additional steps to reduce further any pressure to provide socially desirable answers. First, we assured interviewees that our conversations would be anonymous. Second, we informed interviewees that we would not ask for any performance-related information (to reduce any sense that interviewees might be assessed or judged according to their firms’ performance during the interviews)¹⁵ and that they were free to decline to answer any questions that they deemed too sensitive. Third, to reduce any sense of assessment or judgment, the interviewees were not told that they were being scored during the interview. Additionally, we instructed the interviewers to be supportive and positive about any answers provided by respondents, regardless of the nature of those responses or what they might reflect about a firm’s performance. Finally, to allow us to review the content of the interviews at a later date, we asked interviewees for permission to record our conversations. The vast majority of the executives agreed.

To minimize the risk that subjective interpretations of the interviewer were driving the scoring, two people—a main interviewer and a second listener—scored each interview independently. A potential drawback of open-ended questions is that individual

interviewers must use judgment in scoring the answers, but having a second listener present in every interview helped reduce errors in judgment or scoring. Throughout each interview, the interviewer and the second listener were connected through a chat program, so the second listener could suggest clarification or follow-up questions in case a respondent’s answers were vague or unclear.¹⁶ To minimize any potential biases or errors resulting from incorrect information recall if interviews were scored following the interview, answers to each question were scored “live” throughout the interview by both the interviewers and the second listeners. After each interview, the interviewer and the second listener compared their scoring, discussed and reconciled any differences, and recorded consensus scores, which were used in our final analysis.

To gain additional information and improve the accuracy of the scoring, we also used software-supported funneling of responses; responses that suggested a more structured strategy process automatically triggered follow-up questions on details of practices or examples. Online Appendix 2 discusses this practice.

3.6. Final Sample

Some features of our 262 interviewees and their firms are summarized in panel A of Table 1. The average firm in our sample¹⁷ reports around 2,000 employees, and it is more than 43 years old, which highlights that the sample is dominated by large, mature, and successful firms.¹⁸ A histogram of the size distribution is provided in Figure A.4 in the Online Appendix. The large reported standard deviations show that our sample exhibits a high degree of heterogeneity across firms from large multinational enterprises to entrepreneurial start-ups. Second, ownership patterns are evenly distributed, with the largest fraction of firms owned by private companies.¹⁹ Publicly listed companies constitute around 11% of the sample and therefore, are strongly overrepresented compared with the U.S. economy.²⁰ None of the CEOs who we interviewed work for a government-owned company, and 20% work in a family-owned firm (second generation or more). Figure A.4 in the Online Appendix provides a pie chart with the ownership breakdown of our sample firm. Third, most firms in our sample sell at least some of their products or services to other businesses, whereas many sell at least some of their products to consumers.

Among the executives surveyed, 91% were male. The average respondent was 57 years old, had been with the same company for 17 years, and had been in his or her current position for nearly 14 years. Around 38% of our interviewees reported having an undergraduate degree in either business or economics. Over

70% of respondents held an MBA from HBS, whereas the rest attended executive education courses at HBS.

4. Heterogeneity of Strategy Practices

We begin this section by reporting statistical validation of our survey measures. We then characterize the overall distribution of strategy practices. We contrast within-industry heterogeneity in the degree of structured strategy practices to across-industry heterogeneity.

4.1. Statistical Validity and Reliability

Our survey construction assumes that the different questions and practices reflect one underlying latent construct.²¹ Not all of the questions that we measure may in fact relate to the latent construct of strategy practices. As we laid out in Section 3.2, different practices have been discussed in different academic literatures from a scientific approach to entrepreneurial decision making to procedural rationality and procedural justice. However, at least in the experience of A. G. Lafley—on which the practices discussed by Lafley et al. (2012) and Lafley and Martin (2013) are based—these different dimensions worked together in a cohesive strategy process at Procter & Gamble. We investigate whether our 14 items reflect a coherent latent construct with CFA. For our CFA, we assume that we measure a single latent construct with the 14 questions,

where each question also includes mutually independent and identically distributed error terms. If these questions indeed reflect the same latent construct, we should expect factor loadings on each question to be positive and statistically significant. Table 2 reports the results of our CFA analysis and confirms indeed that all our questions relate positively to the latent construct and that 11 of 13 factor loadings are highly significant.²² Additionally, panel D of Table 2 documents a coefficient of determination of 0.91, meaning that the latent factor explains about 91% of the variation in responses to the 14 items.²³

A separate concept from statistical validity is statistical reliability, defined as the degree to which all survey items consistently measure the same construct. This is typically measured by Cronbach's alpha, which we report in the second row of panel D of Table 2. We find Cronbach's alpha value of 0.79, which is the level of reliability of approximately 0.8 recommended by Nunnally and Bernstein (1994) for applied research.²⁴ This relatively high reliability value suggests that the classical measurement error is of moderate importance. In Sections 4.2 and 5.1, we continue our analysis of classical measurement error from an econometric perspective.

4.2. Overall Distribution of Strategy Practices

Panel B of Table 1 provides the summary statistics for the strategy practice scores. We use the one to five

Table 2. Strategy Practices: Statistical Validity and Reliability

Panel A: Development	Factor loading	Panel B: Implementation	Factor loading
D1: Initialization	1	I1: Implementation planning	0.917*** (0.195)
D2: Justification of decisions	1.015*** (0.186)	I2: Testing and follow-up	1.233*** (0.273)
D3: Regular peer review	2.448*** (0.472)	I3: Validating causal mechanisms	1.041*** (0.223)
D4: Effective peer review	2.439*** (0.472)	I4: Strategy communication	0.906*** (0.209)
D5: Exploration of alternatives	0.851*** (0.196)	I5: Learning about resistance	0.827*** (0.207)
D6: Peer review of risk	1.506*** (0.276)		
Panel C: Formalization	Factor loading	Panel D: Statistical measures of reliability and validity	Value
F1: Strategy statement	0.261 (0.177)	Validity (coefficient of determination)	0.914
F2: Deliberate scope and advantage	0.090 (0.182)	Reliability (Cronach's alpha)	0.789
F3: Deliberate strategic distinctiveness	0.534*** (0.173)		

Notes. Panels A–C report factor loadings of a single-factor structural equation model for confirmatory factor analysis, with error terms assumed to be mutually independent. Questions have been normalized to have zero mean and unit standard deviation. Robust standard errors are reported in parentheses.

*Significant level 10%, ** Significance level 5%, and ***Significance level is 1%.

scale from Figure 2 and display the average value across CEOs for each question and each section. Answers to all individual questions display the full range of possible values, highlighting that our survey instrument captures a realistic range of practices and that no practice had standards so high that no company attained them.

To aggregate the separate questions into an overall score, we take a simple average across questions. To ensure the robustness of this method, we experimented with different means of aggregation, such as principal component analysis and clustering, and we found that the results were very similar. We observe a minimum average strategy practice score of 1.6 and a maximum average strategy practice score of 4. An average of one would mean that strategic decision making is entirely gut driven and does not rely on *any* practices to formulate theories or test them empirically. In contrast, an average score of four means that a CEO explicitly formulates hypotheses and tests them, with some areas of less proactive adoption, for example, in implementation planning or learning about resistance. We also

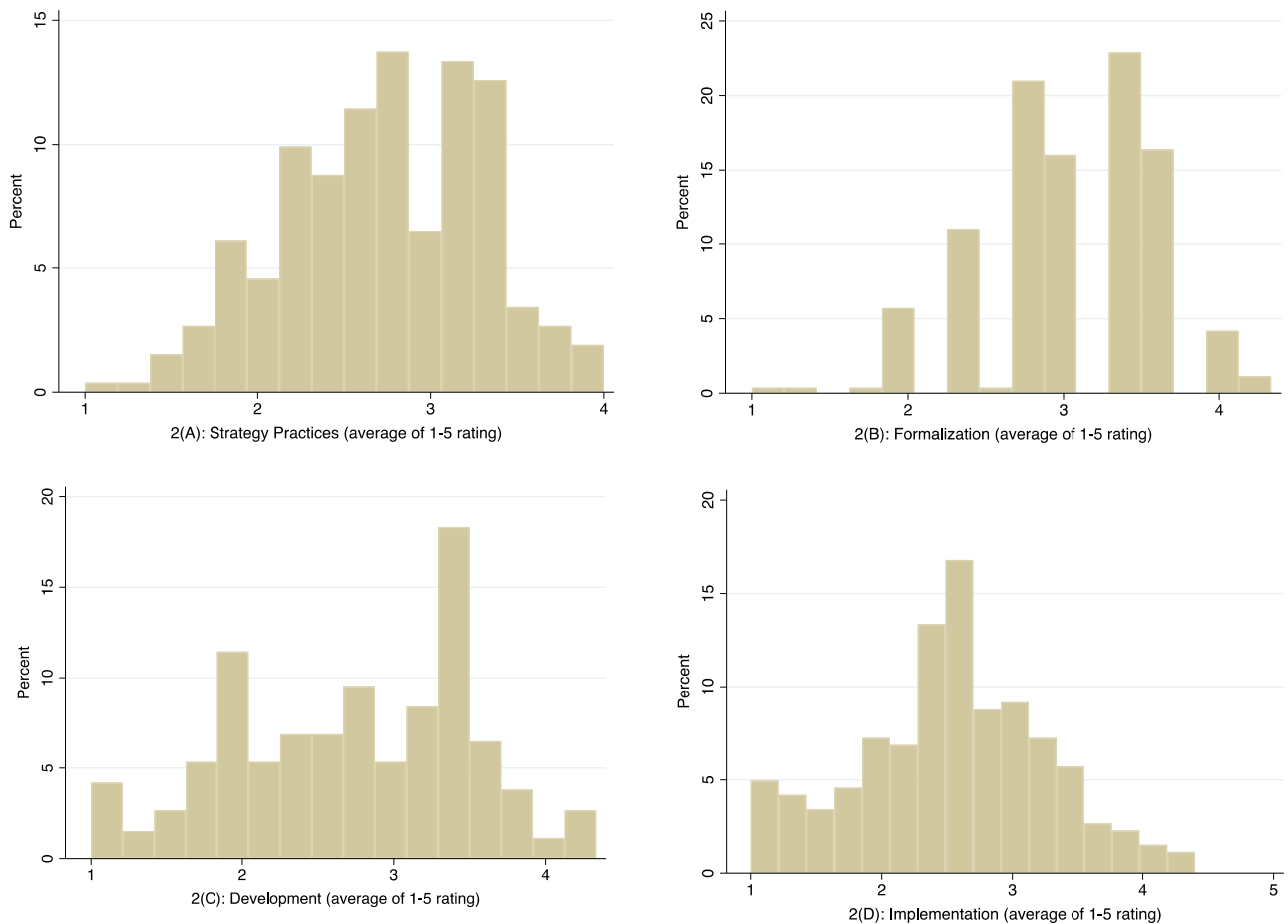
constructed subscores for the areas of formalization, development, and implementation and display them in panel B of Table 1.

Even among our very selected sample of HBS alumni, strategy practices vary widely. Overall, development scores display the greatest dispersion followed by implementation and formalization. For additional clarity, Figure 3 displays a histogram of the strategy practice score as well as histograms for the subscores. Our strategy practice scores are distributed widely along our scoring grid.

For better interpretation of regressions, we first standardize the score on each of the 14 items and then take the average of scores across all items. Finally, these constructed z-scores are standardized again for ease of interpretation.

One potential explanation for the high degree of heterogeneity across respondents is classical measurement error. One way to assess the importance of measurement error is to analyze what percentage of the total variation in our overall strategy practice score is

Figure 3. (Color online) Distribution of Strategy Practices



Notes. The strategy practices score is an unweighted average of the score for each of the 14 strategy questions. The subscores consist of unweighted sums for questions (F1)–(F3) for formalization, questions (D1)–(D6) for development, and questions (I1)–(I5) for implementation.

driven by our noise controls (including time of day, interview duration, and respondent knowledge and honesty) as well as interviewer fixed effects. When regressing our normalized strategy practice score on noise controls and interviewer fixed effects, we find only one variable²⁵ to be significantly correlated with the overall score, leading to an adjusted R^2 of 0.036. This result is consistent with our Cronbach's alpha result, which suggests low degrees of measurement error.

To understand the potential relationships between different areas of strategy practices, we analyze correlations among the strategy subscores in Online Appendix 3 and the related Table 2 in the Online Appendix. Development is strongly positively correlated with both formalization and implementation, whereas formalization and implementation are negatively and insignificantly correlated. This same pattern can be found at the level of individual questions; companies strongly structured on some dimensions can be unstructured on others. This contrasts with prior surveys (Bloom and Van Reenen 2007), where different dimensions of management practices (e.g., operations and human resources) tended to be highly correlated. Our finding of differing correlations has at least two different interpretations. First, in contrast to the operational practices measured in the WMS, less complementarity may exist between dimensions of strategic decision making. Alternatively, different aspects of strategic decision making may actually be complementary in principle (e.g., developing theories and testing them empirically), but executives might not have fully recognized these complementarities in practice (Siggelkow 2002). We show in Online Appendix 3 how to distinguish between these two explanations empirically and provide preliminary evidence that formalization and implementation are not complementary.

4.3. Within- vs. Across-Industry Variation

A natural question to ask is as follows. How important are industry differences for understanding differences in strategy practices? If industry differences explain much of the variation in strategy practices, then the different levels of strategy practices that we observe could be optimal contingent responses to differing competitive environments (Lawrence and Lorsch 1967). However, it is well known that firms in the same narrow industry can perform differently and that industry effects often explain only some of those differences (McGahan and Porter 1997, Ruefli and Wiggins 2003, Syverson 2011, Gibbons and Henderson 2012). One reason to think that the importance of industry effects might be limited in explaining the variation in strategy practices is that our targeted sample includes only manufacturers. On the other hand, the manufacturing sectors in our sample are diverse,

ranging from data-driven and intellectual property (IP)-intensive industries, such as pharmaceuticals, biotechnology, and semiconductors, to more traditional capital-intensive manufacturing industries, such as industrial machinery or beverages.

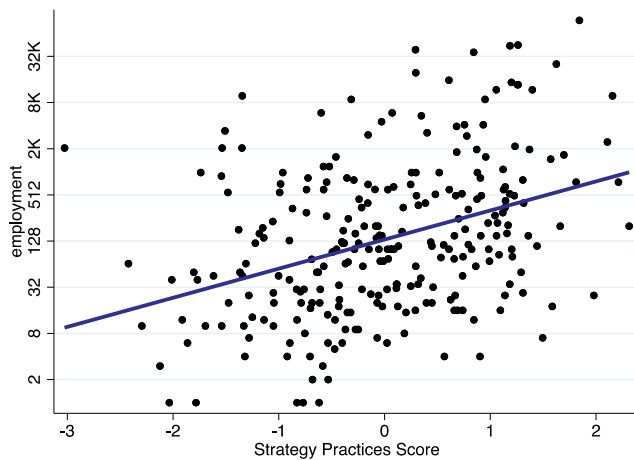
We find that industry effects have little explanatory power for the strategy practice scores. When we regress the strategy practice scores on three-digit NAICS industry dummies, industry effects have very low adjusted R^2 values, such as -0.02 for the overall structured strategy score, -0.04 for the strategy formalization score, -0.01 for the strategy development score, and -0.00 for the strategy implementation score. Even at finer industry aggregations, such as six-digit NAICS, the adjusted R^2 value for the overall strategy practice score is only 0.0457, which is very low considering that we use 132 industry categories for a sample of 262 firms.²⁶ This implies that strategic approaches vary within industries; a CEO's specific industry environment appears to offer little explanatory power for the differences that we observe in how much firms structure their strategic decision making. We, therefore, turn in the remainder of the paper to better understanding the crossfirm variation of strategy practice scores.

5. Strategy Practices and Firm Performance

In this section, we turn to the correlation of strategy practices and different measures of firm performance, which serves two purposes. On the one hand, nomological validity in the terms of the psychometric literature can be shown if strategy practices are positively correlated with firm performance as might be expected given our intended survey construct. At the same time, as is well known in econometrics, classical measurement error attenuates effect sizes toward zero so that large degrees of measurement error would result in quantitatively small and statistically insignificant regression coefficients when regressing firm performance on strategy practices. On the other hand, establishing a significant correlation between strategy practices and objective and moderately objective measures of firm performance helps address methodological concerns raised by Samba et al. (2021) and therefore, supports the case that our strategy practice measure can be used to establish reliable stylized facts that future research can build on. Section 5.1 analyzes firm size as a moderately objective measure of firm performance. Section 5.2 then turns to the question of whether firms with better strategy practices tend to outperform their competitors using subjective and objective measures of firm performance.

5.1. Strategy Practices and Firm Size

We start with an analysis of the relation between strategy practices and firm size. The basic measure of size

Figure 4. (Color online) Unconditional Correlation of Strategy Practices and Firm Size

Notes. The strategy practices score is an average of the score for each of the 14 strategy questions, where each question is normalized to have zero mean and standard deviation of one. The score has been normalized to have zero mean, and the unit standard deviation employment is measured as the number of full-time employees at the company.

that we use here comes from the end of our survey, where we ask about the number of full-time employees at the respondent company. Because size can also be measured objectively in the census data, we confirm

that our basic result from this section also holds in the census data in Section 5.2.3. Firm size as measured by employment speaks to the productivity of firms as it is well documented that larger firms tend to be more productive (Bartelsman and Doms 2000) and that better-performing firms will typically attract more resources, such as employees, in well-functioning markets, such as the United States. Our baseline regression analysis of size controls for three-digit NAICS industry dummies.

Figure 4 shows the unconditional correlation between firm employment and our strategy practices score, and column (1) in Table 3 provides statistical evidence that strategy practices scores are positively correlated with firm size.²⁷ Columns (2), (3), and (4) in Table 3 confirm that this relationship holds up when one controls for firm age and other firm and CEO characteristics. A natural question is whether these findings are potentially driven by selection bias on unobservables (Hamilton and Nickerson 2003). One might be CEO skill, which might cause firms to become bigger while also adopting better strategy practices. The observable controls that we add in columns (2)–(4) in Table 3 only address selection on these observables, but the controls leave selection on unobservables unaddressed. We, therefore, follow Oster (2019) and combine information on changes in the

Table 3. Strategy and Firm Size

Dependent variable	log employees							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Strategy practices	0.972*** (0.139)	0.927*** (0.142)	0.865*** (0.123)	0.67*** (0.121)				
Formalization					0.311*** (0.119)			0.242** (0.111)
Development						0.619*** (0.128)		0.507*** (0.143)
Implementation							0.404*** (0.138)	0.177 (0.147)
log firm age			1.177*** (0.122)	1.106*** (0.155)	1.175*** (0.166)	1.053*** (0.160)	1.145*** (0.162)	1.102*** (0.158)
Noise controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional firm and CEO controls	No	No	No	Yes	Yes	Yes	Yes	Yes
R ²	0.162	0.389	0.571	0.610	0.572	0.605	0.578	0.622
Selection on unobservables-adjusted strategy practices coefficient		0.846	0.769	0.546				
Observations	262	262	262	262	262	262	262	262

Notes. Strategy practices score is a normalized z-score with unit variance, which is the sum of all 14 normalized strategy questions with mean zero and unit variance. Formalization (F1–F3), development (D1–D6), and implementation (I1–I5) are also z-scores with unit variance. Noise controls include interviewer fixed effects, time of day, interview duration, ratings of interviewee expertise and interviewee honesty, and non-CEO dummy. Industry dummies are three-digit NAICS dummies. Additional firm and CEO controls include a family ownership dummy, a public ownership dummy, CEO age, CEO tenure in company, and CEO tenure in position. The row “Selection on unobservables-adjusted strategy practices coefficient” reports the coefficient estimate on strategy practices adjusting for selection on unobservables following Oster (2019) under the assumptions that (a) the maximum possible R^2 is 1.3 times the R^2 of the specification with all controls recommended by Oster (2019) and that (b) selection on unobservables has the same magnitude as selection on observables. Missing observations are imputed at sample means, with imputation dummies included whenever observations are imputed. Robust standard errors are reported in parentheses.

Significance level is 5%; *significance level is 1%.

regression coefficient of interest with changes in the R^2 to quantify how important selection on unobservables might be.²⁸ We apply the Oster approach to our setting using the assumption that selection on observables is of the same magnitude as selection on unobservables. As the row “Selection on unobservables-adjusted strategy practices coefficient” in Table 3 shows, the correlation of firm size and strategy practices remains quantitatively large and statistically significant. Furthermore, with the most conservative set of controls in column (4) in Table 3, selection on unobservables would have to be over five times larger than selection on observables to remove this positive correlation.

To understand which practices are more correlated with firm size, we separate the overall strategy practice score into its main components of formalization, development, and implementation. As columns (5)–(7) in Table 3 show, all subcomponents are positively and significantly correlated with firm size. Additionally, column (8) in Table 3 includes all subcomponents jointly in the regression to analyze whether the three subcomponents contain variation independent of each other. This might, for example, be the case if some large firms have higher implementation scores because they systematically test, validate, and communicate their strategies but do not specify assumptions, develop theories, or peer review them; therefore, they have low development scores. Interestingly, the results in column (8) in Table 3 indicate that development and implementation scores are strongly correlated, which is consistent with the view that development and implementation practices tend to be jointly adopted at higher rates.

5.2. Do Firms with More Structured Strategy Practices Outperform Their Peers?

Having established the heterogeneity of strategy practices among the firms in our sample and explored the correlations between strategy practices and firm size, we now seek to understand the relationship between higher levels of strategy practices and a broader range of firm performance metrics.

5.2.1. The Number and Speed of Strategic Decisions.

The outcome that we examine here is, in essence, a management team’s capacity to make and execute decisions. On a conceptual level, the idea that getting things done is a key task for effective executives can be traced back at least to Drucker (1967) and continues to be popular (Gibbons et al. 2013). Indeed, authors such as Mankins and Steele (2006) have argued that the number of decisions made by an organization is a natural metric to evaluate the quality of its strategic decision making. The speed of decision making and implementation matters for almost any context and is especially valuable in very competitive and

fast-changing environments (Eisenhardt 1989, D’Aveni et al. 2010).

This section illuminates whether a more structured strategy process is positively or negatively correlated with executives’ capacity to make and execute decisions. Either is possible in theory. On the one hand, more structured strategy practices may be an example of well-honed routines (Nelson and Winter 1982) that allow management teams to work through many decisions effectively and quickly. On the other hand, more structured strategy practices may cause “paralysis by analysis” and delay strategic change (Peters and Waterman 1982, Lenz and Lyles 1983). This is a major criticism of the traditional long-range strategic planning systems of the 1970s (Mintzberg 1994). Intuitive or heuristic-based decision making, in contrast, may lead to almost immediate and surprisingly accurate decisions as cognitive psychologists, such as Klein (2004) and other researchers (Eisenhardt and Bingham 2017), have argued.

Our analysis here reveals that better strategy practices are systematically associated with two critical decision-making properties: decision speed and decision volume. In Table 4, we report that more structured strategy practices are significantly and positively associated with the number of decisions made, but a higher score is also associated slower decision making. All regressions include controls for the types of strategic decisions made and therefore, only compare similar strategic decisions (e.g., M&A or product innovations) with each other. (They also all include the basic firm, CEO, and noise controls included in Table 2; see the notes of Table 4.) A one-standard-deviation increase in the overall strategy practice score is associated with a 17% increase in the number of decisions made (with the results driven by the implementation score) and 22% longer time required to reach a decision (driven by the development score). Interestingly, we find that implementation speed does not differ significantly for firms with higher strategy practice scores.

These results suggest that firms with higher strategy practice scores experience countervailing effects. On the one hand, they can pursue several strategic initiatives simultaneously, but on the other hand, their deliberations on each given initiative are slower. Once a decision is made, however, hypothesis-driven learning does not appear to delay implementation. These patterns can be an asset in some contexts and a liability in others. Specifically, longer decision times can lead to costly delays in very volatile environments, where decision speed matters (Baum and Wally 2003). At the same time, the ability to multitask will be especially beneficial in situations where taking account of many potential decisions and interdependencies across decisions is critical. In other words, multitasking is especially helpful in situations of high strategic complexity (Rivkin 2000).

Table 4. Strategy Practice Scores and Strategic Changes

	(1) log number of strategic changes	(2) log decision time (weeks)	(3) log implementation time (weeks)
<i>Strategy practices</i>	0.171** (0.070)	0.222** (0.104)	0.08 (0.084)
<i>Formalization</i>	0.014 (0.069)	0.074 (0.094)	0.033 (0.081)
<i>Development</i>	0.05 (0.065)	0.271** (0.108)	0.106 (0.079)
<i>Implementation</i>	0.180*** (0.059)	0.122 (0.097)	0.034 (0.071)
Observations	262	262	262

Notes. Each coefficient corresponds to a different regression. Number of strategic changes is the estimated number of changes over a five-year horizon. The strategy practices score is a normalized z-score with unit variance that is the sum of all 14 normalized strategy questions with mean zero and unit variance. All columns include controls for noise controls (interviewer fixed effects, time of day, interview duration, ratings of interviewee expertise and interviewee honesty, and non-CEO dummy) and firm and CEO controls (firm age, family ownership dummy, public ownership dummy, CEO age, CEO tenure in company, and CEO tenure in position). All columns include controls for decision-type fixed effects, including dummies for 17 nonexclusive types of strategic changes pursued. All columns include controls for industry, which are three-digit NAICS dummies. Missing observations are imputed at sample means, with imputation dummies included whenever observations are imputed. Robust standard errors are reported in parentheses.

Significance level is 5%; *significance level is 1%.

There are at least two potential concerns with our analysis of the number and speed of strategic decisions that both relate to the fact that the outcome data are based on memories and imperfect recall instead of being independently recorded as “administrative data,” like our outcomes in the following sections.²⁹ First, recalled data might be inaccurate. In this context, a long literature on eyewitness testimony has focused on whether a high fraction of objective facts can be reliably retrieved (“input-bound analysis”). The main finding is that memories are imprecise and incomplete (Koriat et al. 2000). However, for the outcome variables in this section, the relevant question is whether the accuracy of recalled items is high (“output-bound analysis”). In this context, a recent field experiment by Diamond et al. (2020) has shown accuracy rates of over 93% for recalled data when real-world events were verifiable to researchers and even when respondents recalled events as far back as several years.

Second, even if respondents can recall past strategic decisions accurately, their responses might be biased, for example, because of consistency-seeking bias, under which respondents who told us that they are pursuing better practices also tell us that they take a long time to make decisions because they think that this is consistent with better decision making. There are several reasons why this bias is unlikely to affect our estimates. The most important is that our double-blind survey design for the strategy practice score implies that respondents do not know that they are scored and therefore, do not know which responses are consistent with better strategy practices. Additionally, any

social desirability bias would induce respondents to uniformly downward bias their reported strategic decision and implementation times and upward bias the reported number of strategic decisions, but it is likely to leave the correlation between strategy practices and decision/implementation speed and the number of strategic decisions unaffected.

5.2.2. Firm Profitability in Administrative Data. In this section, we bring in administrative data from the IRS and the U.S. Census Bureau to analyze whether firms with more structured strategy practices outperform their competitors in terms of profitability. This section serves at least two purposes. First, correlating our strategy practices measure with firm performance can be seen as a test of the nomological validity of our survey measures. Second, the analysis of this section will be able to consider industry contexts for which more structured strategy practices might be especially beneficial. We show that, in certain contexts, firms with more structured strategy practices tend to outperform their competitors disproportionately.

We merged our survey with cross-sectional data from the CMF in 2017. The data merged successfully and matched around 50 firms, which control around 100 establishments. (Firm and establishment counts have been rounded to preserve confidentiality.) Because firms can control multiple establishments, we cluster our standard errors at the firm level. Our main measure of profitability is markups, defined as sales revenue minus operating costs (cost of intermediate inputs and energy plus wage bill) divided by operating costs.

Table 5. Strategy Practices and Profitability (Census of Manufacturing)

Dependent variable	markup/profitability					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Strategy practices</i>	0.155** (0.069)	0.180** (0.070)	0.193*** (0.057)	0.223*** (0.055)	0.166*** (0.053)	0.211*** (0.049)
<i>Strategy practices</i> × <i>Complexity</i>			0.202*** (0.067)			0.177*** (0.048)
<i>Strategy practices</i> × <i>Forecast error dispersion</i>				−0.351*** (0.090)		−0.243 (0.162)
<i>Strategy practices</i> × <i>Sales persistence</i>					0.189** (0.089)	0.109 (0.071)
In <i>employment control</i>	Yes	Yes	No	No	No	No
In <i>capital stock control</i>	No	Yes	No	No	No	No
Noise controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Observations (rounded)	100	100	100	100	100	100
Number of firms (rounded)	50	50	50	50	50	50

Notes. The strategy practices score is a normalized z-score with unit variance that is the sum of all 14 normalized strategy questions with mean zero and unit variance. Environmental contingencies are calculated at the four-digit NAICS level. Complexity is measured as the sum of different strategic decision types (e.g., product innovation as well as mergers & acquisitions [M&A] and geographic expansion) among the three typical strategic decisions discussed by each respondent and aggregated to the industry level by taking the median. Forecast error dispersion is measured as the standard deviation of forecast errors for sales across establishments using the 2015 MOPS and the 2017 Census of Manufacturing. Sales persistence is measured as average AR(1) coefficient across establishments within the same four-digit NAICS industries for 2006–2017. Markup is defined as sales minus operating costs (intermediate inputs, energy costs, and wage bill) divided by operating costs. Noise controls include interviewer fixed effects, time of day, interview duration, ratings of interviewee expertise and interviewee honesty, and a non-CEO dummy. Column (6) additionally controls for the interaction of strategy practices and velocity, which is measured as the median of the standard deviation of growth of e-commerce within the establishment during 2006–2017. Industry dummies are four-digit NAICS (17 industries in sample). Missing observations are imputed at sample means, with imputation dummies included whenever observations are imputed. Robust standard errors are reported in parentheses.

Significance level is 5%; *significance level is 1%.

Columns (1) and (2) in Table 5 show that firms with higher strategy practice scores also tend to be more profitable than other firms in the same industry. These results do not reflect differences in firm size or capital intensity and if anything, strengthen if capital is controlled for as shown in column (2) in Table 5. The quantitative implications are large. A one-standard-deviation increase in strategy practices is associated with a 15.5-percentage-point-higher markup as shown in column (1) in Table 5.

The CMF data also provide an opportunity to investigate more closely how firms with higher strategy practice scores outperform peers. Specifically, we construct measures of different industry characteristics on the four-digit NAICS³⁰ industry level, of which 17 industries are in sample. We use the following specification:

$$y_i = \beta_1 \cdot \sigma_i + \beta_2 \cdot \phi_s + \beta_3 \cdot (\sigma_i \times \phi_s) + D_s + \epsilon_i, \quad (1)$$

where y_i is establishment-level profitability, σ_i is the standardized measure of strategy practices for establishment i based on the strategy practice score of the underlying firm, ϕ_s is a characteristic for four-digit NAICS industry s , and D_s are industry dummies.³¹ The key parameter of interest in (1) is β_3 , which captures whether firms with higher strategy practice scores outperform

their competitors disproportionately in industries with higher industry characteristic ϕ_s .

We begin this analysis by considering strategic complexity, defined as the average number of different types of strategic changes jointly pursued in the same strategic decision. Having more decision types indicates the need to manage more firm activities and consider more interdependencies (Rivkin 2000, Leiblein et al. 2018). Our measure of strategic decision complexity is based on the classification of each strategic change into multiple nonexclusive categories of strategic decisions by the interviewers as described in Section 2 and shown in Figure A.2 in the Online Appendix. Because we ask CEOs to name three typical strategic changes, we average across all three and aggregate to the industry level by taking the median of complexity across firms. The theoretical literature on scientific approaches to entrepreneurship recognizes complexity as a key contingency for strategic decision making. Zellweger and Zenger (2023) write that “[a] challenge for the entrepreneur is that product features are seldom simply additive in their capacity to solve a targeted problem, but rather demonstrate complementarity in patterns unknown to the entrepreneur ex ante.” Consistent with their arguments, we

argue that hypothesis-driven learning is likely to be especially important for making complex decisions well³²—particularly for reasons related to practices captured in development (D1, D2, and D5) and implementation (I2 and I3) in our study. Specifically, strategic theories guide cumulative learning after falsification of predictions by encouraging executives to consider which assumption is wrong and how to replace it. (See also Felin and Zenger 2017.) Furthermore, practices to understand the mechanisms of strategy outcomes nudge CEOs to sequentially isolate and test theories and separate strategy effects from luck. These practices encourage simplification of theories to reduce overfitting (Zellweger and Zenger 2023) and channel attention toward the most important potential mechanisms. Consistent with this view, column (3) in Table 5 shows that firms with high strategy practice scores tend to outperform their industry peers, even more so in industries with higher strategic complexity. This is consistent with our findings in Section 5.2.1, where we showed that firms with higher strategy practice scores tend to make more strategic decisions and are potentially better at multitasking.

The second factor that we analyze is uncertainty as measured by the dispersion of forecast errors across establishments. The 2015 MOPS asks managers of manufacturing establishments to forecast revenues for their plant for the year 2016 and elicits subjective expectations about five possible scenarios from worst-to best-possible sales forecast along with probability estimates for each. Based on this information, we can construct expected sales growth from 2015 to 2016 for each manufacturing establishment as the probability-weighted average sales growth. At the same time, we have access to actual sales information in 2016, which then allows us to construct a forecast error for the sales growth of each establishment. Our measure of uncertainty is the dispersion (standard deviation) of sales growth forecast errors across establishments within an industry, with higher dispersion indicating that accurate forecasts of sales are harder and sales are, therefore, more uncertain.

In theory, strategy practices could help or hurt a firm as it tries to cope with uncertainty. Research based on real options (McGrath 1997) and referred to as “discovery-driven planning” (McGrath and Macmillan 1995, 2000) suggests that firms with higher strategy practice scores might outperform peers more in highly uncertain competitive environments. On the other hand, the structure that comes with strategy practices may inhibit a firm from adapting quickly in an uncertain environment (Fredrickson and Mitchell 1984, Mintzberg 1994). Column (4) in Table 5 supports the latter view; firms with higher strategy practice scores perform worse in industries with greater uncertainty. This finding is consistent with our results in

Section 5.2.1, where we showed that firms with higher strategy practice scores take more time for their decisions.

The third factor under consideration is performance persistence (McGahan and Porter 1997, Ruefli and Wiggins 2003, Syverson 2011, Gibbons and Henderson 2012), quantified as autocorrelation of revenues, estimated with a first-order autoregressive process (AR(1)) model across all establishments within the same four-digit NAICS industry in the ASM. Column (5) in Table 5 shows that firms with higher strategy practice scores especially outperform in industries with higher performance persistence. This finding is consistent with the result in column (4) in Table 5; strategy practices are especially associated with strong firm performance in stable environments. The finding is also consistent with the results in Section 5.2.1, where we found that firms with higher strategy practice scores were less able to make decisions quickly and therefore, were presumably better equipped for stable environments.

Two additional insights emerge in Table 5. First, although the various interaction effects across columns (3)–(6) in Table 5 point to important industry-level contingencies, note that across all columns in Table 4, the baseline association of strategy practices and establishment markup stays consistently positive and varies little in magnitude. Second, if we include all interactions between strategy practices and observable industry characteristics (as in column (7) in Table 5), then all estimated effects remain similar in magnitude, even though two of the effects become statistically insignificant, potentially because of collinearity across the different interaction terms.

5.2.3. Firm Size/Growth in Administrative Data. Our results in Section 5.2.2 show that strategy practices are potentially beneficial, but we cannot establish the causality of this relationship because of the cross-sectional nature of the survey and the performance data. In this section, we leverage a different administrative data set from the U.S. Census, the LBD, which provides panel data on employment and firm growth—again objective performance data from IRS tax records. Although these data do not enable us to establish causality, they help rule out at least some forms of endogeneity, such as reverse causality and assortative matching.³³

The first column in Table 6 reports the correlation results for firm size, corresponding to similar regressions in Table 3. Compared with results using our moderately objective measures of firm size, the effects remain significant—somewhat smaller in magnitude yet still economically important. According to column (1) in Table 6, a one-standard-deviation increase in strategy practices is associated with a 1.58-fold ($=\exp(0.464)$) increase in firm size, which is only slightly smaller than the relationship that we reported in Table 3.

Table 6. Strategy Practices and Firm Size/Firm Growth in Census Data (LBD)

Dependent variable	(1) log employees	(2) 1-year firm growth	(3) 5-year firm growth	(4) 1-year firm growth
Strategy practices	0.464** (0.198)	0.047*** (0.012)	0.095** (0.037)	−0.049 (0.034)
log initial employees		−0.049*** (0.007)	−0.095*** (0.019)	−0.058*** (0.009)
Strategy practices × CEO appointment				0.085** (0.041)
CEO appointment				−0.061* (0.036)
Noise controls	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Observations (rounded)	200	2,000	1,300	2,000
Number of firms (rounded)	200	200	150	200

Notes. Results are based on merging the strategy practice data into the Longitudinal Business Database and aggregating the data to the firm level. The strategy practices score is a normalized z-score with unit variance that is the sum of all 14 normalized strategy questions with mean zero and unit variance. Growth rates are based on the Davis et al. (1996) formula. Industry fixed effects are two-digit NAICS dummies. *CEO appointment* is a dummy that is one from the first year of the CEO's tenure in this position onward and zero prior to that year. Additional firm and CEO controls include a family ownership dummy, a public ownership dummy, CEO age, CEO tenure in company, and CEO tenure in position. Missing observations are imputed at the sample means, with imputation dummies included whenever observations are imputed. Robust standard errors are used for column (1), whereas all other columns have standard errors clustered at the firm level. Standard errors are reported in parentheses.

*Significance level is 10%; **significance level is 5%; ***significance level is 1%.

We move next to investigate firm growth, and we find that more structured strategy practices are positively correlated with it. We measure firm growth in the LBD by using symmetric firm growth measures proposed by Davis et al. (1996): $g_t = 2 \cdot \frac{(x_t - x_{t-k})}{x_t + x_{t-k}}$ for $k = \{1, 5\}$, where x is employment. Additionally, we control for initial firm size to capture any mean reversion effects in firm growth patterns (Dunne et al. 1988, 1989) and use firm-level clustering for standard errors. Columns (2) and (3) in Table 6 report the results. Column (2) in Table 6 displays short-run correlations of strategy practices and firm growth as measured in annual growth rates. These results are quantitatively and statistically significant. According to column (2) in Table 6, a one-standard-deviation increase in the strategy practices score is associated with a 4.7% increase in the annual growth rate. These results continue to hold for long-run growth rates as measured by an overlapping five-year growth rate measure in column (3) in Table 6. In the long-run growth analysis, a one-standard-deviation increase in the strategy practices score is associated with a 9.5% increase in the firm growth rate over a five-year horizon—an economically important effect.

Although these associations of strategy practices and firm growth are suggestive, they cannot be interpreted as evidence of causality. In particular, better strategy practices might mean that a CEO's style elevates a firm's performance or that high-ability CEOs

might tend to join better-performing firms with highly structured strategy practices. In this case, a CEO's decision-making approach might reflect the firm's needs.

To differentiate between these two possible directions of causality, we use the following specification. We continue to use employment growth rates $g_{i,t}$. Let $A_{i,t}$ denote the CEO appointment dummy variable, with $A_{i,t} = 1$ for every year after the appointment to CEO and $A_{i,t} = 0$ for all years before. σ_i is the standardized measure of strategy practices for firm i , $\ln N_{i,t-1}$ is initial firm size, and D_s denotes industry dummies. The resulting specification is

$$g_{i,t} = \beta_1 \cdot A_{i,t} + \beta_2 \cdot \sigma_i + \beta_3 \cdot (A_{i,t} \times \sigma_i) + \ln N_{i,t-1} + D_s + \epsilon_{i,t}. \quad (2)$$

In this specification, there are two main coefficients of interest. First, β_2 captures whether firms with higher strategy practice scores had high growth prior to the appointment of the CEO. Second, β_3 captures the effect of strategy practices on firm growth after the appointment of the CEO. To estimate (2), we use all available annual growth rates for the unbalanced sample of all firms that we can match every year to the LBD.

Column (4) in Table 6 shows no significant growth pretrends for firms with higher strategy practice scores. Indeed, the sign of β_2 indicates that, if anything, firms with higher strategy practice scores tended to grow more slowly before the appointment of their focal

CEOs. Importantly, our estimates of β_3 indicate that firm growth accelerates for CEOs with high strategy practice scores *only after* their appointments. Together with our result on β_2 , this rules out the hypothesis that CEOs learn better strategy practices from high-performance firms. However, these results do not rule out the possibility of assortative matching in which boards of high-performance firms tend to hire better CEOs in combination with a strategic mandate to pursue particular actions. Following arguments of Bandiera et al. (2020), we, therefore, investigate the timing of firm performance changes after the CEO appointments. Specifically, if assortative matching with a strategic mandate drives our results, we would expect firm performance to have the strongest increase right after the hire because the need for the new strategic actions is highest then. In other words, high-ability CEOs are likely to first pursue the highest-return strategic changes for which they were hired. Firm performance should then decelerate as the preset strategy would eventually produce diminishing returns. We investigated the pattern of firm growth after CEO appointments by tracking the impact on firm growth over different time horizons in the census LBD data. However, confidentiality concerns prevented us from fully disclosing these results. At the same time, census personnel permitted us to disclose the following qualitative statement: “Estimates of β_3 tend to become larger in magnitude for regressions with employment growth over 2, 3, 4, 5 years as opposed to employment growth over 1 year.” This pattern is the opposite of the expected performance pattern under reverse causality.

To summarize, our analysis of panel data from the LBD suggests that the adoption of more structured strategy practices is not driven by CEOs’ decision-making approach reflecting firm needs. Instead, our results are consistent with CEOs bringing their own structured strategy practice style to firms and learning how to apply this approach to the firms that they lead over time. Our results suggest that the way that CEOs adopt structured practices strongly reflects their personal styles (Bertrand and Schoar 2003). This can explain the considerable differences in the use of strategy practices observed, even within the highly selected sample of HBS alumni. Factors unique to each CEO, like his or her experience, differ significantly. These individual differences lead to a range of approaches in the adoption of structured strategic practices.

6. The Impact of Business Education on Strategy Practices

The results of Section 5.2 show that firms whose CEOs use more structured strategy practices systematically outperform industry peers. Moreover, our evidence in the last section is consistent with the view that CEO

styles are critical in this context. This begs the question. How can the adoption of structured strategy practices by CEOs be facilitated? In this section, we examine one way to boost the adoption of potentially beneficial strategy practices: business education (Jung and Shin 2018, Heshmati and Csaszar 2024). To do so, we take advantage of the fact that our interviewees who obtained their MBA at HBS collectively experienced a sharp discontinuous change in the MBA strategy curriculum: the 1983 appointment of Michael Porter—a leading strategy academic—as head of the required HBS MBA strategy course.

We examine whether this change (or shock)—which is plausibly exogenous to cohorts that joined HBS just before and just after Porter was appointed head of the strategy course—alters parts of the strategy practice score for which the curriculum change is likely to have been most consequential: formalization. In particular, we argue that Porter’s strategy curriculum gave students a framework for analyzing the external competitive environment systematically as they crafted strategy.

6.1. Institutional History

Some history of Harvard Business School motivates our analysis. A longtime hallmark of the HBS MBA curriculum was the business policy course. Launched in 1912, only four years after the school’s founding, the course emphasized from its earliest days features that would become central concepts in business strategy, such as a focus on “the intimate connection of [functional] groups” and “the substitution of careful, conscious analysis of managerial problems for unconscious analysis” (Harvard University 1915, pp. 35–36). Business policy became a required course in 1920–1921 and soon stretched across the entire second year of the MBA curriculum. In the 1950s and 1960s, professors such as C. Roland Christensen, Kenneth Andrews, and Edmund Learned used business policy to implant the term “strategy” in management education (Andrews 1971). As Kiechel (2010) writes, the business policy course through the 1970s emphasized general managerial skills instead of analytic frameworks to understand the situation of a company.³⁴ Analysis in the course was careful and conscious, but it was hardly structured or systematic. Moreover, analysis focused more on the inside of a company than on its external environment.

Although the course evolved gradually over the decades, more fundamental changes happened to it in the late 1970s and early 1980s. In 1979, a desire to have an integrative course earlier in the MBA curriculum caused HBS faculty to split business policy into two separate courses (Porter and Siggelkow 1999). Business Policy I would be taught in the second term of the MBA’s first year and would emphasize the formulation of formal strategy. Business Policy II would

remain in the second year and focus on strategy implementation.

In 1983, Michael Porter became the head of Business Policy I in what traditionalists at HBS saw as a dean-mandated takeover. He overhauled the curriculum and introduced new course content built upon his recent research in industrial organization economics that was captured in his first book *Competitive Strategy: Techniques for Analyzing Industries and Competitors* (Porter 1980). Porter, an upstart economist, had used deep contact with managers when teaching executive education courses as well as an MBA elective to pioneer insights on industry analysis and to define the elements of strategic choice (Porter 1980, 1985). In sharp contrast to the fuzzier notions of strategy historically taught in business policy, Porter offered a holistic framework to evaluate the attractiveness of an industry, drawing on insights from the literature on structure-conduct-performance in industrial organization. A key innovation of this framework was that it took a broad view of potential sources of competition. Porter's course encouraged students to go beyond incumbent rivals and consider firms that might not yet exist (potential entrants) or firms that offer different products but satisfy similar underlying needs (substitutes). Furthermore, although firms cooperate with suppliers and customers to create value, they also compete with suppliers and customers to claim value in the form of profits. Porter's version of Business Policy I, soon renamed Competition & Strategy, would go on to become one of the most influential courses at HBS and to influence an entire generation of CEOs.

Using material from the HBS archives, we sought to examine and confirm the nature of Porter's changes to the Business Policy I course curriculum over the full time span when our MBA alumni interviewees attended HBS. Online Appendix 4 compares the course description for the year prior to Porter's restructuring (1982) with the course description for his first year (1983). The contrast is striking. Although the 1982 course pays little attention to a firm's external context ("competition or adverse circumstances"), the overhauled 1983 course stresses the analysis and understanding of a firm's competitive environment as a determinant of its success and performance. Although the 1982 course description emphasizes the importance of general management of the entire enterprise (i.e., "what needs to be done"),³⁵ the 1983 course description clearly moves away from any deep focus on issues related to management, execution, and implementation.³⁶

To investigate whether other simultaneous curriculum changes might have affected our analysis, we reviewed the entire curriculum for all HBS MBA classes for the academic years 1982–1983 and 1983–1984.³⁷ This review revealed that 11 other courses were taught

in both years. Those courses were the same in both years. Ten of the 11 had word-for-word *identical* course descriptions in both years. The remaining course had two words in its 1983–1984 description that were not in the 1982–1983 description. Specifically, India and China were added to a list of countries that were studied. We can, therefore, rule out that any other unobserved curriculum changes in the HBS MBA core program might drive our results.

6.2. Econometric Specifications

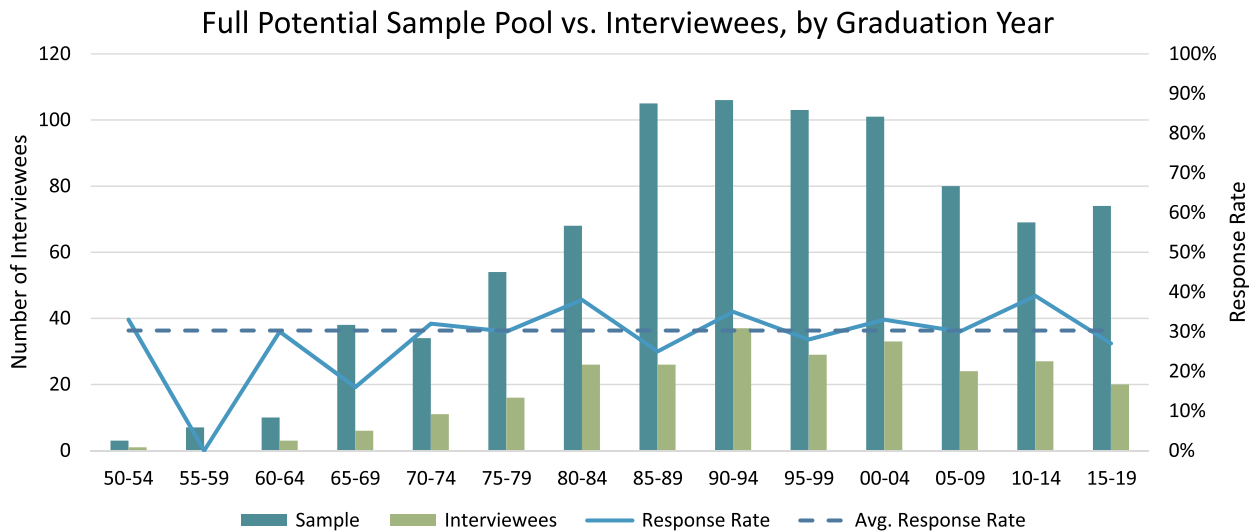
We use this sudden and exogenous (to the students) change in the core strategy curriculum in 1983 at HBS as the source of a regression discontinuity that allows us to quantify the causal impact of MBA education on formalization. We use HBS MBA cohort years as the running variable for a regression discontinuity design (RDD). To fix ideas, let C_i be the MBA cohort year of CEO i and X_i different outcomes, such as formalization. The econometric specification can be written as

$$X_i = f(C_i) + \beta_1 \cdot 1_{\{C_i \geq 1983\}} + \epsilon_i, \quad (3)$$

where ϵ_i is a random error and $f()$ is a continuous function. The key identification assumption in this approach is that unobserved characteristics of MBAs entering HBS are continuous, whereas only the change in the HBS strategy curriculum is discontinuous. We use a step function $1_{\{C_i \geq 1983\}}$ to estimate the effect, both because it is less problematic in terms of potential model misspecification and because data requirements for estimation are less demanding, which is important for our application given our limited sample. Our baseline specification uses a local, nonparametric RDD using the optimal bandwidth selection procedure of Imbens and Kalyanaraman (2012), which in our case, produces a bandwidth of three years before and after 1983. Additionally, we use a global or parametric approach to Equation (3), which uses all 185 observations of executives with HBS MBAs and specifies the functional form of $f(C_i)$ as either second-order polynomial $f(C_i) = f_1 \cdot C_i + f_2 \cdot C_i^2$ or third-order polynomial $f(C_i) = f_1 \cdot C_i + f_2 \cdot C_i^2 + f_3 \cdot C_i^3$. This increases the precision of our estimates at the expense of potential bias from the misspecification of the functional form for $f(C_i)$. Furthermore, more complex and flexible functional forms for $f(C_i)$ will lead to overfitting, thereby eventually rendering the estimates less precise again. In Online Appendix 5, we use different optimal bandwidth approaches as well as global parametric approaches to show estimates for all subquestions.

6.3. Results

We start our results by reporting the distribution of the MBA subsample of CEOs across graduation years.³⁸ Figure 5 shows the number of potential and realized MBA interviewees (within our target set of manufacturing industries) in the HBS alumni

Figure 5. (Color online) Distribution of Observations Across Graduation Years

Notes. The overall number of potential interviewees per year is measured by the number of alumni in the HBS alumni database with a degree from HBS, including MBA and executive education programs. The response rate has been calculated as the ratio of the number of executives who agreed to participate relative to the number of executives who could successfully be contacted. Avg., average.

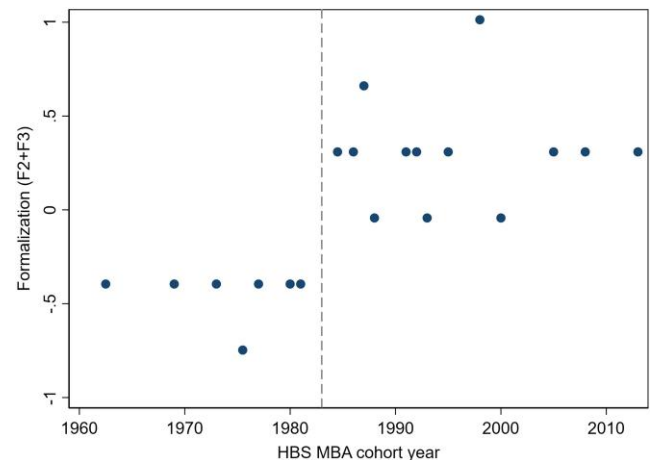
database by graduation year. Importantly, the response rates do not seem to differ significantly for the cohorts immediately before 1983 compared with those following 1983. This is reassuring as it is consistent with the view that selection implies only continuous changes along unobservable dimensions.

We then estimate the effect of the HBS strategy curriculum restructuring on the strategy practices included in our survey that are most likely to have been affected by the curriculum change: formalization. Specifically, given the curriculum changes, one would expect Porter's influence to make aspects of strategy related to deliberate choices on markets and scope of the firm, competitive advantage, and strategic distinctiveness (captured in questions F2 and F3) more salient to managers.

We begin by presenting the graphical analysis of the RDD in Figure 6, in which the individual points are medians of observations for the different cohort years. The discontinuity in strategy formalization is apparent in the jump of the cohort averages at the cut-off: 1983. Panel A of Table 7 confirms these results with econometric RDD results. Panel A of Table 7 shows that CEOs who were exposed to the restructured HBS MBA core curriculum were more likely to make deliberate and distinct strategic choices and therefore, had higher degrees of formalization. This result is shown for two common nonparametric regression discontinuity estimators plus two different parametric estimators with quadratic and cubic polynomial controls, respectively. Importantly, these results show that changes in business education can influence CEOs' decision-making styles on a persistent basis. It is also worth emphasizing that our results on the impact of business education on decision making even decades

later are consistent with theories of "imprinting," which captures the idea that people are especially susceptible to lessons and experiences early in their education and careers (Jung and Shin 2018).

To examine the validity of our RDD identification strategy, we also investigate a placebo treatment. Specifically, a few years before Porter's restructuring of the HBS MBA core strategy class, the school introduced a new mandatory first-year MBA class, Human Resource Management (HRM), led by Michael Beer.³⁹ Beer et al. (1984) write: "In response to changes in

Figure 6. (Color online) Regression Discontinuity Plot of the Causal Impact of the HBS Core Strategy Course Restructuring by Michael Porter in 1983

Notes. In the bin scatterplot, every dot represents the median of the values in the cell with 20 equally sized cells. The sample includes all interviewed executives in our sample with an HBS MBA (185 observations).

Table 7. Porter RDD Effects on Strategy Practices

Estimator	Nonparametric: IK-NN (1)	Nonparametric: IK-PI (2)	Parametric: Cubic control (3)	Parametric: Quadratic control (4)
Panel A: Dependent variable: <i>Formalization</i> , Porter treatment cutoff year: 1983				
Porter treatment	0.845** (0.424)	0.832** (0.373)	0.583* (0.307)	0.582** (0.245)
Sample observations	185	185	185	185
Estimation observations	36	36	185	185
Panel B: Dependent variable: <i>Formalization</i> , placebo cutoff year: 1981				
HRM treatment	−0.524 (0.393)	−0.516 (0.376)	0.188 (0.306)	0.329 (0.255)
Sample observations	185	185	185	185
Estimation observations	27	27	185	185

Notes. Effects show the impact of MBA cohort year after the cutoff date of 1983 when the Porter curriculum change occurred. The placebo cutoff year 1981 was chosen based on the introduction of a mandatory human resource class by Michael Beer. Formalization (F2 and F3) is an average of the underlying questions normalized to zero mean and unit variance. Columns (1) and (2) use nonparametric local regressions with optimal bandwidth selections and constant effect only. The baseline uses bandwidth selection (Imbens and Kalyanaraman 2012) with a nearest-neighbor variance estimation denoted by IK-NN (Calonico et al. 2017). IK-PI uses the same bandwidth selection procedure with analytic heteroscedasticity-robust “plug-in” variance estimates (MacKinnon 2013, Calonico et al. 2017). Columns (3) and (4) use parametric approaches and assume different functional forms for the continuous function $f(\cdot)$. It is assumed to be either quadratic or cubic. The sample includes only HBS MBA alumni. Robust standard errors are reported in parentheses.

*Significance level is 10%; **significance level is 5%.

society and the competitive environment, a consensus developed among the alumni and faculty of the Harvard Business School that a new required course in Human Resource Management (HRM) was needed. That course was launched in 1981.” The new HRM class is an ideal placebo experiment for our purposes. On the one hand, its content should not impact formalization at all because HRM is a different topic. On the other, the course was introduced years earlier and therefore, allows us to run an RDD with 1981 as the cutoff year. The results of this analysis are shown in panel B of Table 7. Not only are the results statistically insignificant, but the effect signs differ across specifications, which starkly contrasts with the results of the Porter treatment on formalization.

6.4. RDD Robustness

In this section, we briefly discuss three potential issues with our RDD approach and how we address these concerns.⁴⁰ The detailed empirical analysis for all of the concerns can be found in Online Appendix 5.2. The first concern is that assignment of potential MBA students into cohorts before and after 1983 might not have been random. In Online Appendix 5.2.1, we follow Imbens and Lemieux (2008) and show that placebo outcomes that should be unaffected by the cutoff point around 1983 indeed do not exhibit any jumps. Among the placebo outcomes are several predetermined characteristics, such as CEO gender, whether the CEO inherited the leadership of a family firm, and the CEO’s undergraduate major.

The second concern is that potential MBA students might have systematically selected into different cohort years because they had private information about the quality of teaching from Michael Porter as well as about his appointment to head the MBA core strategy class. Based on the institutional history, we believe that this is unlikely, but we offer an analysis of the implications of such sorting. In Online Appendix 5.2.2, we follow McCrary (2008) and test for mass points in the distribution of MBA students across years. If there was systematic sorting, one would expect the cohorts shortly after 1983 to exhibit systematically more students and the cohorts shortly before 1983 to exhibit fewer students. We explore this implication not just in our small sample of 185 MBA students but also, with data of all HBS graduates in the BoardEx database (see Online Appendix 5.2.2), which allows us to increase the statistical power of these tests with sample sizes of around 1,000 and around 2,900, respectively. In all three samples, we fail to find any evidence of bunching, which is consistent with the absence of systematic selection of potential students across cohort years in anticipation of Michael Porter becoming head of the core strategy class.

The third potential concern is that the year 1983 might be a problematic cutoff year; it is just after the 1981–1982 recession, which might affect selection into the HBS MBA program. To address this concern, we re-estimate our RDD for the years 1990, 1991, and 1992, which are years around the 1991 recession. If our results are driven by the 1981–1982 recession, we should find similar effects around 1991. Online

Appendix 5.2.3 reruns our RDD estimation strategy for all years between 1990 and 1992 as placebo RDD cutoffs and fails to find any effects comparable with our results in panel A of Table 7.

7. Conclusion

A fundamental task of managers is to make decisions, and no decisions of top executives are more consequential than those setting a firm's strategic direction. Yet, the empirical literature in strategy is largely silent on how chief executives make strategic decisions and how their decision-making processes relate to firm performance, despite long-standing calls to answer these questions (Porter 1991). In this paper, we have aimed to begin formulating an answer.

In doing so, our paper makes several contributions. A key contribution is to develop techniques to collect data systematically on the strategy-making processes of CEOs. To this end, we devised a novel survey instrument that examines the formalization, development, and implementation of strategy. We used open-ended questions and highly trained interviewers to gather data on how 262 HBS-educated chief executives make choices. In particular, we assessed the degree to which they use structured strategy practices.

Our second contribution is to show that compared with their gut-driven counterparts, CEOs with higher strategy practice scores lead firms that are larger, more profitable, and faster growing. Importantly, we show that growth effects are driven not by firms' needs for more structured strategy practices but by CEOs' decision-making styles being structured. We further examine these results under different environmental conditions. The profitability effects are especially large and positive in the face of strategic complexity but not uncertainty—results consistent with our findings that strategy practices allow firms to handle more decisions but not to make decisions faster.

Our third contribution is to analyze the potential of business education to increase adoption of structured strategy practices in the long run. Thanks to a unique aspect of our sample—its focus on Harvard Business School alumni—we have some causal evidence that business education can indeed boost adoption of more structured strategy practices. In particular, CEOs exposed to a curriculum that emphasized systematic analysis of the external environment use a different set of strategy practices, making their strategy scope decisions more deliberately than do their predecessors who received a less analytical education. Remarkably, the impact of this sudden change in HBS's curriculum can be discerned decades after the shift occurred, which suggests that business education can promote structured strategy practices.

Much remains to be learned about how CEOs make strategic decisions. Further investigation of executives'

processes for making strategic decisions in other geographies, in other sectors of the economy, or among non-HBS graduates, for instance, will likely reveal additional insights on this important topic. Subsequent studies might aim for more causal evidence of either the antecedents or the consequences of differences in decision-making processes. We hope that this paper makes the case that follow-up work is worthwhile and clarifies how such work might be conducted.

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Endnotes

¹ We will use the word "alumni" to refer to both female and male graduates throughout the rest of the paper.

² Samba et al. (2021) define purely subjective performance measures as measures that cannot be validated with other external data sources, such as the perception of rank of the firm relative to competitors. Objective performance measures are data that are externally validated (e.g., publicly available). Moderately subjective data include data that might be reported by a person on a nonaudited survey but could in principle be validated with external records. Most of the performance data that we use are either objective, like the employment or profit data from the IRS/U.S. Census, or moderately objective, like self-reported employment data. Neither of these is subject to spurious results as documented by Samba et al. (2021). However, we also do use subjective data on decision and implementation speed in Section 5.2.1.

³ A notable exception is small-sample field studies, such as Eisenhardt (1989).

⁴ Indeed, we record data on 170 distinct practices. For example, a question like D2 on the justification of decisions included whether information on internal strengths/weaknesses or external risks/opportunities was reviewed and within these, the nature of internal or external information (i.e., qualitative versus quantitative); whether many types of information were used; how regular information was reviewed on internal versus external issues; whether internal or external sources were used; what was done in response to lacking information (no action, using a guess, seeking targeted information, pilot and scale, or articulate the conditions for success) and for each of these; and within each step, whether the step was documented, etc. Overall, this question leads to the recording of 28 data items/

fine-grained practices, which we then aggregate into the one to five score according to the scoring grid.

⁵ Specifically, D1 captures problem framing based on initial observational fragments (Felin and Zenger 2009). D2 and D5 measure specification of initial hypotheses and conditions for each strategic alternative to be beneficial (McGrath and Macmillan 1995, Felin and Zenger 2009, Lafley et al. 2012, Lafley and Martin 2013). D5 reflects “imagination of possibilities” (Felin and Zenger 2009, Lafley et al. 2012, Lafley and Martin 2013). Additionally, D6 tracks the degree to which barriers and problems are rigorously and systematically discussed (Lafley et al. 2012, Lafley and Martin 2013).

⁶ Concretely, proactive scanning for opportunities (D1) and the exploration of strategy alternatives (D5) directly expedite listing of all alternatives as discussed by Simon (1947). Similarly, practices to base decisions on evidence or explicit initial assumptions (D2) as well as regular discussions on operational feasibility (D3) lead to a better understanding of the consequences of different strategic choices as described by Simon (1947). Finally, to promote the objective evaluation of alternatives as listed by Simon (1947), meetings on strategy development should be well prepared and structured to enhance discussions (D4) and should systematically seek out potential concerns (D6).

⁷ The review of 37 studies on comprehensiveness in Samba et al. (2021) from the last 40 years lists the factors that this literature has measured, such as “problem identification, alternative generation, and option vetting” (as measured in the context of factors D1 for “problem identification,” D5 for “alternative generation,” and D2 as well as D6 for “option vetting”) as well as “information sought, collected, and analyzed” (as measured the context of factors D2 and D5).

⁸ Fredrickson (1983) lists more general synoptic strategic decision processes that include some elements of these, whereas Lafley and Martin (2013) discuss the need for an ongoing dialogue and engagement between decisions and strategies. We measure these related practices in D3 and D4.

⁹ Drucker (1967) motivates the need for learning within the decision process as follows: “Finally, a feedback has to be built into a decision to provide a continuous testing, against actual events, of the expectations that underlie the decision. ... One needs organized information for the feedback. One needs reports and figures. But unless one builds one’s feedback around direct exposure to reality—unless one disciplines oneself to go out and look—one condemns oneself to a sterile dogmatism and with it to ineffectiveness.”

¹⁰ Specifically, I2 includes practices to review initial assumptions and hypotheses based on ongoing reviews of implementation outcomes, whereas I3 captures practices to validate causal mechanisms, including whether CEOs use custom-tailored tests of hypotheses (Lafley et al. 2012, Zellweger and Zenger 2023), whether they seek to understand the mechanisms by which individual strategy characteristics affect outcomes (Pillai et al. 2020), whether CEOs systematically separate intended strategy from luck (Camuffo et al. 2020), whether they separate issues with the strategic theory from implementation issues (Lee and Puranam 2016), and whether lessons learned affect resource allocation and lead to strategy redesign (Camuffo et al. 2020, Pillai et al. 2020).

¹¹ In particular, Kim and Mauborgne (1998) describe the three key elements of “engagement” (considering employee’s input), “explanation” (communicating reasons for decisions), and “clarity of expectations.” I1 on “implementation planning” includes practices to clearly define responsibility and targets, leading to “clarity of expectations.” I4 on “strategy communication” includes practices to clearly communicate why strategic changes were needed, what decisions were made, and how employees are affected. Additionally, I5 covers practices for seeking constructive feedback by employees potentially opposed to strategic decisions as required for engagement.

¹² Occasionally during interviews, CEOs independently mentioned their age. In those cases, we replaced our age estimate with the reported age.

¹³ Executive education participants at HBS can attain alumni status only if they have attended one of the so-called “comprehensive leadership programs.” These are long programs, typically 8–12 weeks in duration.

¹⁴ Within our sampling frame, interviewed firms were slightly more likely to be based in the United States (using a linear probability model in which the dependent variable is a dummy taking a value = 1 if the firm was ultimately interviewed, the coefficient on the U.S. dummy is 0.085, with the base being firms based in the United Kingdom and Canada, and standard error is 0.045). We could gather employment data for 522 executives in the sampling frame, of which 170 were interviewed. In this subsample, we find that interviewed firms are smaller than noninterviewed firms (coefficient on log employment controlling for country of location and SIC2 dummies is -0.024 , and standard error is 0.008).

¹⁵ This tactic provided the added benefit of reducing potential bias in the scoring of our interviews as interviewers and scorers were “blind” as to any potential connection between strategy practices and firm performance.

¹⁶ As with the main questions in the interview, we carefully designed the wording of follow-up questions to prevent “leading” questions that might inadvertently pressure interviewees to provide a socially desirable response.

¹⁷ To preserve privacy, we have truncated the summary statistics in our replication data set for very old and very large firms to avoid accidental disclosure of firm identities through the replication data. We, therefore, report all results in this paper using the privacy-protected data set.

¹⁸ Because it is well known that firm-size distributions are skewed and fat tailed, one could also consider medians; in our case, the median firm size is 110 employees, and the median age is 36 years.

¹⁹ The five main types of ownership that we observe are founder ownership, family ownership, other private ownership, ownership by other companies (such as venture capital or private equity firms), and distributed ownership of a publicly traded company.

²⁰ There are over 7 million employer firms in the United States and 4,000 publicly listed companies, so public companies represent less than 0.1% of all U.S. employer firms.

²¹ This is also called a “reflective construct,” for which causality runs from the latent construct to the measured items. This is usually contrasted with “formative constructs,” in which causality runs from the measured items to the underlying latent construct; see Coltman et al. (2008). We use a reflective construct approach as we believe that the latent construct of strategy practices exists as exemplified by the process used by A. G. Lafley at Procter & Gamble. Furthermore, as pointed out by Edwards (2011), formative constructs require additional reflective measures to be identified.

²² The 14th factor loading is normalized to be one.

²³ Some studies report additional test statistics, such as chi-square tests, which we do not report as we used robust standard errors, consistent with the way that standard errors are used later in our regression analysis.

²⁴ Indeed, Nunnally and Bernstein (1994) recommend a reliability value of at least approximately 0.7 for early-stage research, such as the novel survey construction pursued in this paper.

²⁵ This variable is interview duration. The positive correlation between strategy score and interview duration is explained by the fact that our semistructured interviews (described in Online Appendix 2) meant that CEOs with more structured practices were asked more follow-up questions than CEOs with unstructured practices and thus, had longer interviews.

²⁶ Generally, F tests of the joint significance of industry dummies hover around a value of one across specification (i.e., industry dummies are jointly insignificant).

²⁷ All specifications include noise controls (interviewer fixed effects, time of day, interview duration, ratings of interviewee expertise and interviewee reliability, and non-CEO dummy) and industry dummies (three-digit NAICS dummies).

²⁸ Specifically, Oster (2019) shows that given selection on observables and unobservables, the unbiased coefficient can be calculated using the formula $\beta^* \approx \beta - \delta \cdot [\hat{\beta} - \tilde{\beta}] \cdot \frac{R_{\max} - \tilde{R}}{\tilde{R} - R}$, where β^* is the unbiased coefficient, $\hat{\beta}$ is the regression coefficient without controls, $\tilde{\beta}$ is the regression coefficient with controls, δ is the importance of selection on unobservables relative to selection on observables, $R_{\max}$ is the maximum possible R^2 , $\tilde{R}$ is the R^2 of the regression without controls, and $\tilde{R}$ is the R^2 of the regression with controls. Of these variables, everything is observable, except for δ and $R_{\max}$. Consequently, we follow Oster (2019) and set $\delta = 1$ and $R_{\max} = 1.3 \cdot \tilde{R} = 0.8$.

²⁹ In the terminology of Samba et al. (2021), our measures on the number and speed of strategic decisions are clearly “subjective.”

³⁰ We allow for slightly finer NAICS industry dummies as well because the performance data in this section are recorded at the establishment level.

³¹ Because of the industry dummies, the effect β_2 will not be separately identified and is, therefore, omitted from Table 4.

³² Our measures of strategy practices and strategic complexity (at the four-digit NAICS level) are also significantly positively correlated when we regress the strategy practice score on strategic complexity, with an estimated coefficient of 0.45 with a standard error of 0.17.

³³ Unfortunately, confidentiality considerations force us to drop some of the largest firms, and the current vintage of LBD data (which ends in 2016) limits our ability to match the very small and young (typically entrepreneurial) firms in our main sample in the census data. Both of these factors are likely to reduce the overall variation in our data and might, therefore, plausibly attenuate our baseline results.

³⁴ Kiechel (2010) summarizes the philosophy behind the pre-Porter HBS business policy education as follows: “What Andrews and his colleagues in the Business Policy course resolutely refused to do—and the main reason his ideas largely disappear from the subsequent history of strategy—was to agree that there were standard frameworks or constructs that could be applied to analyzing a business and its competitive situation. Oh, they might allow one, perhaps because they had helped develop it: so-called SWOT analysis, which called for looking at the strengths, weaknesses, opportunities, and threats besetting an enterprise. But nothing more schematic and hard-edged than that. Individual companies and industries were just too idiosyncratic, and the ambitions and values of their managers too rich and varied to be mapped on any single template.”

³⁵ To confirm this de-emphasis of implementation topics in the curriculum, we also interviewed veteran faculty at HBS who confirmed that following Porter’s changes to the course, discussions of implementation faded from the curriculum.

³⁶ The reduced emphasis on implementation can also be traced to Porter’s writings years later. Specifically, Porter (1996) argues: “Constant improvement in operational effectiveness is necessary to achieve superior performance. However, it is not usually sufficient. Few companies have competed successfully on the basis of operational effectiveness over an extended period, and staying ahead of rivals gets harder every day.”

³⁷ We would like to thank an anonymous referee to raising this issue.

³⁸ We restrict our sample for this analysis to only the MBA graduates in our sample because we cannot collect data on and therefore, observe and specify which, if any, comparable changes may have occurred in HBS’s executive education programs.

³⁹ We would like to thank an anonymous referee for bringing this to our attention.

⁴⁰ We would like to thank two anonymous referees for raising these concerns and suggesting parts of this analysis.

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