



Strategy and the Strategist: How it Matters Who Develops the Strategy

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Abstract

This paper studies how strategy – formally defined as ‘the smallest set of (core) choices to optimally guide the other choices’ – relates to the strategist, for example, whether an optimal strategy should depend on who is CEO. The paper first studies why different people may systematically consider different decisions ‘strategic’ – with marketing people developing a marketing-centric strategy and favoring the marketing side of business – and derives two rational mechanisms for this outcome, one confidence-based and the other implementation-based. It then studies why it matters that it is the CEO and important decision makers (rather than an outsider) who formulate the strategy and shows that outsider-strategists often face a trade-off between the quality of a strategy and its likelihood of implementation, whereas the CEO’s involvement helps implementation because it generates commitment, thus linking strategy formulation and implementation. In some sense, the paper thus explains why strategy is the quintessential responsibility of the CEO. Moreover, it shows that the *optimal* strategy *should* depend on who is CEO. It then turns that question around and studies strategy as a tool for exerting leadership, asking when the set of strategic decisions are exactly the decisions a CEO should control to give effective guidance. It finally shows how a CEO’s vision, in the sense of a strong belief, about strategic decisions makes it more likely that the CEO will propose a strategy and that that strategy will be implemented. But strong vision about the wrong decisions, such as subordinate or others’ decisions, may be detrimental to strategy and its implementation.

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1 Introduction

How does it matter *who* develops an organization's strategy?¹ How do strategy and the strategist relate? Business strategy – an issue of great interest to business with more than 70,000 books on the topic (Kiechel 2010b) – is often approached and taught as a purely analytical issue, a puzzle to solve. But there are strong indications that strategy has an important personal aspect. First, there is a widely held view that strategy is the job of the CEO and not that of some smart analyst or advisor. Why would it matter who develops the strategy, if it's just a matter of getting it 'right'? And why would the CEO's view – rather than the view of a very smart analyst – somehow be the 'right' one? This relates to the intriguing observation that many companies with great strategies – such as Walmart, Dell, Ryanair, McKinsey, etc – often had a CEO or founder with strong beliefs.

Second, persistent and honest disagreement among otherwise very smart people is almost the norm for strategy, especially when there is a crisis – as with the financial crisis. This contrasts with the 'impersonal view' that rational people should all agree on the optimal strategy. Moreover, both casual and systematic observation shows that a strategist's background gives important clues to the type of strategy she will develop (Dearborn and Simon 1958, Chaganti and Sambharaya 1987, Bertrand and Schoar 2003). That raises the question whether the strategy *should* optimally depend on who is CEO.

On second thought, a 'personal side' to strategy should probably not surprise. In particular, strategy often deals with the fundamental uncertainties a company faces: which technology will succeed, how a particular competitor will respond, how markets will evolve, etc. Indeed, Van den Steen (2013) showed that such controversial decisions with fundamental uncertainty are more likely to be strategic. As Knight (1921) observed, such 'business decisions [...] deal with situations which are far too unique [...] for any sort of statistical tabulation to have any value for guidance. The conception of an objectively measurable probability or chance is simply inapplicable.' And there is often no way to resolve such uncertainty except by waiting for the outcome. This fundamental uncertainty forces people to rely on intuition and judgement, which are by definition personal and thus different across people. This causes people to have personal or subjective views about a firm's optimal strategy. And it then matters who develops the strategy.

To formally analyze how strategy relates to the strategist, I start from the model of strategy developed in the companion paper Van den Steen (2013). That paper formalizes 'strategy' as 'the smallest set of (core) choices to optimally guide the other choices'. This definition captures existing ideas about strategy (from the management literature and from strategy courses) in a form that is

¹In the body of the paper, I will use the term 'strategy' in its everyday sense, rather than its game-theoretic sense. Whereas the proofs use the term in both meanings, the meaning will be clear from the context.

both transparent and amenable to formal analysis. In particular, it formally captures the idea that strategy is the core of a – potentially flexible and adaptive – intended course of action (or plan). Van den Steen (2013) shows that this formal definition coincides with the equilibrium outcome of a ‘strategy formulation game’ where a strategist can – at a cost – look ahead, investigate, and announce a set of (intended or actual) choices to the rest of the organization. Section 3 discusses this formal approach to strategy in more detail, including some results on what makes a decision ‘strategic’ and what makes strategy important. To now introduce fundamental uncertainty in this analysis, I will assume that people can hold differing priors, i.e., they can potentially openly disagree, an assumption that I will discuss in more detail in Section 2. I then use the resulting model to investigate four closely related issues: 1) how is the content of an optimal strategy affected – in a systematic way – by *who* formulates the strategy, 2) how does involvement of the CEO in strategy formulation matter, 3) turning this issue around: are strategic decisions exactly the decisions a CEO should focus on in order to lead effectively, and, finally, 4) how is strategy formulation and implementation affected by vision – in the sense of a strong belief about the right course of action – of the strategist.

With respect to the first question, I show that *different people systematically consider different decisions to be strategic*, i.e., build the strategy around different decisions. Marketing people will consider marketing decisions as more strategic and are thus more likely to define a marketing-centric strategy. I derive two new mechanisms that differ from the ‘biased perception’ explanation that is common in the literature (Hambrick and Mason 1984). A first mechanism is that different people often have different levels of confidence across decisions – based on their experience and expertise – and this leads them to rationally consider different decision as being strategic: it makes more sense to guide the organization via decisions about which you are very confident than via decisions about which you have lots of doubts. Note that this is driven by confidence in the right course of action and thus different from a biased perception explanation: marketing people being confident about marketing decisions is different from seeing everything as a marketing problem. The second mechanism is that a participant can more credibly commit to a course of action for decisions that he controls himself than for decisions that are controlled by others. A strategy built around the strategist’s own decisions is therefore more credible and more likely to be implemented. Both mechanisms also generate two further interesting results. First, it will look as if a strategist with a background in marketing *favours* the marketing department, since she chooses marketing decisions optimally and then aligns the rest to it. Second – though this second result is probably more surprising than important – even when two people agree on every individual decision, they may come up with very different strategies that lead to very different outcomes because they differ in

their relative confidence about decisions.

I then turn to the question why it should be the CEO and other important decision makers who develop the strategy, rather than some outsider or consultant. I show, in particular, that when decisions are controversial – when people may disagree on the optimal course of action – a strategy developed by an outsider may lack credibility and fail to be implemented. In fact, I show that such an outsider – when developing a strategy – may purposely choose a strategy that is suboptimal (in her own eyes) but built around less controversial, and thus more credible, choices than the optimal strategy. In other words, the outsider faces a trade-off between the quality of the strategy and the likelihood that it will be implemented. Strategy formulation and execution are thus closely linked, and the key decision makers such as the CEO should be deeply involved, directly or indirectly, in the development of strategy. These results are relevant, for example, for the division of work between a board and a CEO and for the optimal use of consultants and staff functions in strategy. Note that CEO involvement in strategy formulation can also be achieved by promoting the strategist to CEO, a not uncommon outcome for firms that undergo drastic change.

I also look at this from the opposite perspective: instead of asking why a strategy should be developed by a CEO, I now ask whether the set of strategic decisions is exactly what a CEO or management team should control – directly, through proxy, or indirectly – to be effective?² The result shows that there is an additional criterium: the strategist needs to control only the decisions that are both strategic *and* controversial (in the sense of giving rise to considerable open disagreement). But being strategic is indeed a necessary condition. As such, strategy becomes a defining responsibility for the CEO, which provides an interesting link to the etymological origin of strategy as the issues that are specifically under the authority of the army’s general or overall commander. But strong leadership can be both a complement and a substitute for strategy. These last two results also establish an important theme: the strength of the link between leadership and strategy is deeply affected by fundamental uncertainty or differing priors.

Whereas the above results studied how the *structural* position of the strategist – being a decision-making participant versus being an outsider – affected her ability to give direction, I now turn to the effect of an important *personal* characteristic: the degree to which the strategist has vision in the sense of a strong belief about the right course of action. Strategy and vision both provide direction to an organization. So how do they relate? I show that CEOs with a clear vision, in the sense of a strong belief about the right course of action, are more likely to propose a strategy and that their strategy is more likely to be implemented because it has higher credibility. Strategy and vision are thus to some degree two sides of the same coin. But I also show that the wrong kind of

²To say this another way: whereas the earlier results effectively asked ‘given a strategy, why should the CEO be involved’, this section asks ‘given a desire to guide, which decisions should the strategist control?’

vision – about others’ decisions or about (strategically) subordinate decisions – may in fact hinder strategy formulation and strategy implementation. To be effective, vision thus has to be targeted correctly. Apart from giving insights in strategy, this analysis also uncovers some important implicit assumptions of the earlier economic literature on vision.

Literature As this paper looks at this relationship between strategy and strategist from a number of angles, it connects to a number of different literatures.

With respect to how the content of strategy is influenced by who formulates it (Section 4), both the management literature and the economics literature have documented how different people develop different strategies, depending on their background and experience. In particular, the management literature has a long tradition along these lines, using experimental methods (Dearborn and Simon 1958), case studies (Donaldson and Lorsch 1983, Chaganti and Sambharaya 1987), and empirical methods (Tyler and Steensma 1998, Strandholm, Kumara, and Subramaniam 2004). This literature has focused in particular how manager’s functional background predicts their later decisions as CEO. More recently, the work of Bertrand and Schoar (2003), who used a very careful identification approach to confirm that there are clear manager-specific effects in company policies, has brought this issue into the economics literature. The standard interpretation for this ‘personal effect on strategy’ is that it results from biased perceptions by the manager: marketing managers see everything as a marketing problem. The reason is that a manager’s past experience makes him or her especially attuned to specific data and interpretations that cause the manager to filter and interpret the information in a biased way (Hambrick and Mason 1984). This perspective has given rise to a large literature on ‘top management teams’ (Hambrick 2007). The current paper points to some very different mechanisms, as the results are not driven by bias but by confidence and control: a manager’s confidence in, and control over, certain decisions makes her more likely to make these decisions strategic and makes her announced decisions more credible.³

The results on strategy and vision (Section 6) relate to the economic literature on vision per se (Rotemberg and Saloner 2000, Van den Steen 2005, Blanes I Vidal and Möller 2007, Ferreira and Rezende 2007, Van den Steen 2010d, Bolton, Brunnermeier, and Veldkamp 2012). To put the results here in perspective, it is important to go into some detail. In their seminal work, Rotemberg and Saloner (1994, 2000) considered a setting where two employees were exogenously assigned to different projects. Rotemberg and Saloner (1994) then implicitly equated strategy with a choice to pursue only one of these projects and not the other, i.e., a choice of scope, whereas Rotemberg and Saloner (2000) modeled a manager’s vision as a bias in favor of one project over the other. They showed that such scope choice or bias may improve the incentives and *effort* of the ‘favored’ employee

³A player can be more confident about some state without being biased (on average) about its expected value.

(but reduce the incentives for the ‘disfavored’ one) and that that may sometimes be optimal. They also observed that ‘vision as bias’ can be more effective at inducing effort than ‘strategy as scope choice’ because it is less rigid. Absent a formal definition of strategy, however, they did not discuss exactly how vision and strategy relate.⁴ Relative to that work, Section 6 studies the interaction between strategy and vision explicitly and formally, starting from the formal model of strategy of Van den Steen (2013) and thus clearly distinguishing between strategy and vision.

Van den Steen (2005), which is the vision paper closest related to the current paper, focused instead on the *direction setting*, rather than effort-inducing, role of vision. To that purpose, that paper allowed employees to *choose* between projects and to choose which manager to work for and showed that vision – as a strong belief about the right course of action – gives direction through 3 mechanisms. First, employees will *choose* projects that fit the CEO’s vision since such projects are more likely to get the CEO’s support. Second, extending Rotemberg and Saloner (2000), employees will exert more effort when they chose a project aligned with the CEO’s beliefs. Third, and potentially most powerful, employees will prefer to join a firm whose CEO’s vision they agree with, since they can then pursue the projects that they believe in. Such sorting makes it ‘as if’ the employees have internalized the manager’s beliefs and creates corporate culture (Van den Steen 2006). Van den Steen (2005) also argued that vision helps *coordination*, as all three mechanisms lead all employees in the same direction. Van den Steen (2010a) showed formally how shared beliefs, potentially induced by vision, lead to coordination in a normal form 2x2 *coordination* game. Bolton, Brunnermeier, and Veldkamp (2012) studied a closely related model where this guiding function of vision also leads to coordination in a setting where employees get, by assumption, a direct payoff from aligning their decision with the manager’s decision in a continuous quadratic distance model. They show that also in such a setting strong beliefs again lead to more coordination. In all these models, the role of vision is essentially to create persistence on a course of action in the face of an ex-post shock – being a cost shock in Rotemberg and Saloner (2000) and Van den Steen (2005) or the arrival of new information in Blanes I Vidal and Möller (2007), Ferreira and Rezende (2007), or Bolton, Brunnermeier, and Veldkamp (2012).⁵ Blanes I Vidal and Möller (2007) and Ferreira and Rezende (2007) both study how vision interact with the optimal revelation of information, but both the issues and the results are very different from the ones in this paper. Empirically, Kaplan, Klebanov, and Sorensen (2012) provide some interesting recent evidence on

⁴They cite Andrews (1971) as the (only) explicit definition of strategy: ‘the pattern of decisions in a company that determines and reveals its objectives, purposes, or goals.’

⁵Note that while Bolton, Brunnermeier, and Veldkamp (2012) use the term resoluteness, their formal modeling is identical to the model interpretation in Van den Steen (2005): all players receive similar signals but have different confidence in these signals. In both models, all players update rationally and optimally, given their biased priors about the signals. But the prior bias leads to a posterior bias in the decisions.

these issues by showing that, in a sample of 300 CEOs, persistence was a characteristic that was often associated with CEO success. Relative to that literature, Section 6 explicitly separates vision from strategy, explicitly distinguishes the three roles of strategist, visionary, and central decision maker, and also considers the effect of multiple state variables. Section 6 then derives three sets of new insights. First, with an explicit model of strategy, it shows formally how vision interacts with strategy. Second, with multiple state variables, it shows that vision may also be bad and hinder strategy. Third, the analysis exposes important implicit assumptions of this existing literature on vision, such as the assumption that the strategist and the central decision maker are automatically one and the same person. This literature obviously also relates to the management literature on vision (e.g., Bennis 1982, Nanus 1992) as discussed in detail in Van den Steen (2005).

The results on the importance of CEO involvement are somewhat related to the literature on change (e.g., Kotter 1996, Beer and Nohria 2000), which also has stressed the role of the CEO. But there are some important differences. First, this paper is focused on strategy in general and is thus both broader (with respect to strategy) and narrower (with respect to change). Second, there is also an important difference in focus, with Sections 5 and 6 being very focused on formal micro-foundations and on implications for boundary conditions and comparative statics, such as the role of fundamental uncertainty and the importance of whether a choice is strategic or not (and what that is driven by). And the methodologies are obviously also very different and complementary.

The strategy model itself relates obviously to a broad literature on strategy, team theory, and organization, which is discussed in more detail in the companion paper Van den Steen (2013), and some of the parts directly related to strategy summarized in Section 3.

From a broader perspective, this work is also motivated in part by a recent call in the more practitioner-oriented management literature for increased attention to the role of the strategist and CEO in strategy (Montgomery 2008, Kiechel 2010a, Montgomery 2012). Montgomery (2008), for example, calls for leaders to ‘own’ the strategy and to be the steward of the strategy. This paper studies in more detail why exactly that would be so important.

Contribution The main contribution of this paper is to formally study the relationship between strategy and the strategist, starting from a clear (functional) definition of strategy. By focusing on this one basic question, it provides a series of new results and insights: it provides new insights on why different people systematically differ in their strategies, focusing on the role of confidence and control; it shows how the link between formulation and implementation forces outsiders into a fundamental trade-off between quality and implementation and formally explains the importance of CEO involvement in strategy formulation in terms of its effect on strategy implementation; it derives when strategic decisions are exactly the decisions a CEO should focus on in order to lead effectively;

it shows how vision about strategic decisions may help strategy formulation and implementation but vision about subordinate decisions may be counter-productive.

The next section describes the paper’s model, whereas Section 3 discusses the strategy definition of Van den Steen (2013) on which this paper relies. Sections 4 through 6 consider the role of people and the link with vision. Section 7 concludes. The proofs are in Appendix A.

2 Model

This paper studies a setting in which a group of people are engaged in a common project, say a company, and must make choices that affect the project’s outcome. Participants have only local information and may openly disagree – in the sense of differing priors – about the optimal decisions. One person – the strategist – can, at a cost, look ahead and publicly announce a set of (intended) choices as the firm’s strategy. The basic research question is how the characteristics of the strategist affects the strategy and its implementation. The model combines the formal model of strategy of the companion paper, Van den Steen (2013), with a model of differing priors. I will point out the differences at the end of this section.

Payoff Structure Formally, consider a project that generates revenue Π , which depends on K choices $\{C_1, \dots, C_K\}$. Each choice C_k selects a course of action from an infinite set \mathcal{C}_k of alternatives, i.e., $C_k \in \mathcal{C}_k = \{c_k^1, \dots, c_k^f, \dots\}$.⁶ The project revenue Π will depend *both* on whether the choices are correct by themselves (on a standalone basis) *and* on whether the choices *align* correctly. With respect to C_k being correct on a standalone basis, one and only one of the alternatives is correct, as captured by the decision state variable $T_k \in \mathcal{C}_k$, (and the others wrong): choice C_k is correct if and only if $C_k = T_k$ and it is wrong otherwise. With respect to C_k and C_l aligning correctly, there is a one-to-one correspondences (or bijection) T_{kl} between the choice sets \mathcal{C}_k and \mathcal{C}_l , with for each $c_k^f \in \mathcal{C}_k$ a pair $(c_k^f, c_l^g) \in \mathcal{C}_k \times \mathcal{C}_l$: C_k and C_l are aligned correctly iff $(C_k, C_l) \in T_{kl}$. I will refer to the T_k and T_{kl} as respectively choice states and interaction states and use \mathcal{T}_k and \mathcal{T}_{kl} for the sets of all possible states. The revenue Π is then an increasing function of the choices being correct on a standalone basis and of the choices interacting correctly. In particular, the project revenue has the following parametric form:

$$\Pi = \sum_{k=1}^K \alpha_k I_k + \sum_{k=1}^K \sum_{l=1}^{k-1} \gamma_{kl} I_{kl}$$

⁶Formally, I will assume – when necessary – that \mathcal{C}_k has M elements with $M \rightarrow \infty$. Results for $K = 2$ and $M = 2$ can be found in Van den Steen (2013).

where $I_k = I_{C_k \in T_k}$ is the indicator function whether choice C_k is correct, $\alpha_k > 0$ is the parameter that measures the importance of the choice, $I_{kl} = I_{(C_k, C_l) \in T_{kl}}$ is the indicator function whether the choices C_k and C_l are aligned correctly, and $\gamma_{kl} \geq 0$ is the parameter that measures the importance of the interaction. The interaction states T_{kl} capture what is often called ‘internal alignment’ while the choice states T_k capture ‘external alignment’ (e.g. Bower et al. (1995)). The choice labels c_k^f are arbitrary and have no particular meaning or order. For example, nothing would or should change if the $\{c_k^1, \dots, c_k^f, \dots\}$ labels on some particular choice were permuted and/or renamed to $\{x_k^1, \dots, x_k^f, \dots\}$.

The project – consisting of the set of K decisions and $K!$ potential interactions – is partitioned into K (decision) tasks Z_k , each containing one decision C_k and a number of its interactions. For each such task, there is a project participant P_k who is responsible for that task: P_k makes the choice C_k , with each participant having at most one task. Apart from these K project participants, there will at times also be an outsider O and/or a principal P , whose roles are discussed later. The only formal difference between O or P and the project participants P_k is that O and P do not make any project decisions. One of these $K + 2$ players will be designated the strategist S , whose role will also be discussed later.

Belief Structure All players, including S , know the parameters α_k and γ_{kl} , but have initially – at the start of the game – no knowledge of the states T_k or T_{kl} . In particular, each player starts with a prior belief that the T_k and T_{kl} are independent random draws from the sets of all possible states \mathcal{T}_k and \mathcal{T}_{kl} with all states being equally likely.⁷ The empirical probability distribution of the states and interactions is also that each of the possible states is equally likely.

Whereas all players start with uninformative priors, each project participant P_k will – in the course of the game per the timing below – learn and form beliefs about his own decision state T_k and also learn each of the interaction states T_{kl} in his task perfectly. P_k does not learn (directly) about any other choice state T_l ($l \neq k$) or about any other interaction states T_{lm} . (If he makes no relevant inference from the strategist’s announcements, then P_k thus keeps his prior beliefs about these T_l and T_{lm} .) The strategist S can also – per the timing below – investigate a choice states T_k at a cost c_k , and then forms a belief about that state. The players may openly disagree in their beliefs.⁸ (In Van den Steen (2013), the strategist can investigate any set of states at a cost per state, while the strategist’s signal is a garbling of the participants’ signal. Introducing differing priors

⁷Formally, $\#C_k = M \rightarrow \infty$. Hartigan (1983) showed that improper priors are consistent for conditional (probability) statements.

⁸I focus on differing priors about decision states – as opposed to disagreement about interactions – because informal observation suggests that strategic disagreement usually reflects disagreement about optimal standalone decisions (due to disagreement about the state of the outside world) rather than disagreement about interactions, which are more often an internal and less controversial issue.

requires some simplifications to keep the model tractable.)

The belief formation process is as follows. When player i learns (directly) about a decision state T_k , she forms a personal (subjective) belief $\nu_k^i \in (0, 1)$ that $T_k = \theta_k^i$ for some $\theta_k^i \in \mathcal{C}_k$, while with complementary probability $1 - \nu_k^i$ any alternative is possible with each alternative equally likely. So i 's beliefs distribution puts a probability ν_k^i on some θ_k^i and a probability that converges to zero on each of the other alternatives, with the combined probability of the other alternatives being $1 - \nu_k^i$. A player's belief realizations are independent across states T_k or T_{kl} .

Players can openly disagree in their beliefs about a decision state ($\nu_k^i \neq \nu_k^j$), in the sense of differing priors: they may disagree about a decision state T_k even though they have no private information. The interpretation is that all players who learn about a particular state T_k see the exact same signals about that state but may interpret these signals differently, i.e., they have differing priors about the meaning of these signals (like two people reading the same economic indicators but disagreeing what it means for the optimal economic policy.) Each player thinks her own interpretation is correct and the other is wrong, so that when P_i has learned about T_k and then learns that P_j holds different beliefs about T_k , she will not update her beliefs about T_k but she will simply think that P_j misinterpreted the signal.⁹ This captures the fact that players may have different mental models or different intuition about the signals. I discuss differing priors in more detail at the end of this section.¹⁰

Even though players may disagree on decision states, their beliefs about these states may be correlated. In particular, I assume that any two players i and j will – after learning about a state T_k – agree on the optimal standalone decision with probability $\lambda_k^{ij} \geq 0$ with λ_k^{ij} an exogenously given parameter, and disagree otherwise. Agreement or disagreement will be conditionally independent events across both players and states. These correlations are common knowledge, so that players who have not directly learned about some decision state but observe others' beliefs about that state will partially update their own beliefs, taking into account the (commonly known) likelihood that they may openly disagree with the other person on that decision.

To summarize the belief formation on decision states, consider two players i and j who both learn about state T_k . These two players will disagree on the optimal standalone decision for \mathcal{C}_k with probability $1 - \lambda_k^{ij}$. Moreover, players i and j each believe that they are correct with probability ν_k^i and ν_k^j respectively. Since these are all personal subjective beliefs, there is no necessary connection

⁹If the model would also include private information – which is more realistic but less tractable – then there would be some updating after observing disagreement, but disagreement would persist. In a model with only differing priors, no amount of discussion or communication among them will resolve such open disagreement.

¹⁰As the players start from identical priors about the states, the terminology ‘differing priors’ may seem somewhat confusing in this context. In particular, the differing prior beliefs are here about the meaning of the signals. To avoid confusion, I use as much as possible the terminology ‘personal beliefs’ in this paper.

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| <p>Strategy formulation</p> <p>a The strategist decides whether and, if so, which state T_k to investigate at cost k. The strategist forms a belief ν_k^S that $T_k = \theta_k^S$ for some $\theta_k^S \in C_k$.</p> <p>b The strategist can announce a set of choices C_k.</p> | <p>Strategy implementation</p> <p>a Each participant P_k learns (perfectly) the interaction states T_{kl} in her task (and these interaction states only) and also forms a personal belief ν_k^k about her decision state T_k (and about that state only).</p> <p>b Each participant makes his or her decision (sequentially without observing others' decisions or simultaneously).</p> |

Figure 1: Timing

among ν_k^i , ν_k^j , and/or λ_k^{ij} . There is common knowledge about the fact that any two players may disagree, the confidence levels ν_k^i , and the disagreement probability λ_k^{ij} .

Except when otherwise noted, I will assume that both the likelihood of disagreement and the confidence about decision states depend only on the decision and not on the identity of the players ($\lambda_k^{ij} = \lambda_k$ and $\nu_k^i = \nu_k, \forall i, j, k$) with disagreement being independent events across decisions. I will denote this as the ‘base case.’

Timing The timing of the game is then indicated in figure 1. At the start of the game, the strategist decides which decision state to investigate, if any, and then forms beliefs as described above.

In stage 1b, the strategist can announce a decision based on what she learned. Following the analysis of Van den Steen (2013), this announcement coincides with *the strategy*, as defined there and discussed further in Section 3. This announcement is pure cheap talk. I will assume that there is no cost from announcing decisions but that everyone has a lexicographic preference for announcing less: when otherwise indifferent, everyone prefers less decisions to be announced. This is equivalent to assuming an infinitesimal cost of announcing a decision.

In stage 2a of the game, each participant P_k learns and forms a more precise belief about his or her local decision and interaction states (T_k and T_{kl} 's). By the end of stage 2a, each participant P_k thus perfectly knows all the interaction states T_{kl} in her task. Moreover, each P_k also has a personal belief ν_k^k about his T_k . In stage 2b, all participants then make their decisions either simultaneously or sequentially (in random order) without observing each others' decisions, to capture the setting of a large organization. (Almost all of the analysis would also go through for sequential decisions that are publicly observed.)

Each participant P_k , when she is not the strategist, tries to maximize the payoff from her task Z_k , $\Pi_k = \alpha_k I_k + \sum_{T_{kl} \in Z_k} \gamma_{kl} I_{kl}$, which is equivalent to assuming that P_k 's utility is a strictly increasing function of Π_k and that players are risk neutral. (Van den Steen (2012) analyzes instead the team theory version of the model where all players, including S , share the same objective.) The objective

of the strategist and of the principal or outsider is to maximize overall project payoff, including costs. When the strategist is a participant then that participant cares about the overall payoff.¹¹ To break indifference – which considerably simplifies the statements of proofs and propositions without affecting the essential results and which obviously only matters in a set of measure zero – I will assume that upon indifference, any player prefers an α -payoff over a γ -payoff; when still indifferent prefers the payoff with the lowest index or sum of indices.

Equilibrium Selection I will focus in the analysis on pure-strategy equilibria that are locally symmetric: when permutating the (arbitrary) labels on a choice (and on all its interactions), the labels for that choice are also permutated in the equilibrium. The local symmetry condition ensures that the equilibrium does not depend on a particular labeling and is robust to arbitrary labels. This property does not seem to drive any of the results but considerably simplifies the statement of the propositions and the analysis, especially with respect to the potential cheap talk equilibria. The property could be endogenized as part of the game but at the cost of considerable additional notation and complexity. Note that this does *not* affect the equilibrium itself: it is a traditional Bayesian-Nash equilibrium.

Relative to the model in Van den Steen (2013), this model has been simplified in two important ways: by limiting the strategist’s investigation and by eliminating the signal garblings for the strategist. In both cases, the eliminated elements would not play a role in the results and eliminating them simplifies the discussion and analysis.

Throughout the paper, I will use ‘more likely’ as meaning ‘in a larger part of a symmetric parameter space’ (and thus ‘more strategic’ as meaning ‘strategic in a larger part of a symmetric parameter space’). This could be formalized further by letting all parameters of the game ($\alpha_k, \nu_k^i, \lambda_k^{ij}, \gamma_{kl}, \forall k, l, i, j$) be drawn from iid distributions per parameter ($\alpha_k \stackrel{\text{i.i.d.}}{\sim} f_\alpha, \dots$, etc.) with all parameters independently distributed (and by then conditioning on the right parameters when necessary). I will also use some recurring notation. Let $\beta_k^i = \alpha_k \nu_k^i$ combine the importance and eventual confidence of decision C_k for player i and let t_k^i denote the optimal standalone decision for C_k according to player i , i.e., $t_k^i = \theta_k^i$. Let $\Gamma_k = \{C_l : T_{kl} \in Z_l\}$ denote the set of all choices potentially guided by C_k . Let $\bar{N}_l = \{C_m \in \Gamma_l : \gamma_{ml} > \beta_m^m\}$ and $\underline{N}_l = \{C_m \in \Gamma_l : \lambda_l^{lS} \gamma_{ml} > \beta_m^m\}$ denote the sets of choices that align with C_l in different types of equilibria.

Differing Priors The model in this paper assumes that people can openly disagree, i.e, they can agree to disagree, which requires players to have differing priors (Aumann 1976). This assumption

¹¹This does not drive the results. In particular, all results would go through if the strategist-participant had a global objective when formulating the strategy but reverted to agency incentives when making her own choice.

of (unbiased) differing priors captures the fact that people may have different ‘intuition,’ ‘mental models,’ or ‘belief systems,’ which may lead people with identical data to draw different conclusions. Although not (yet) fully mainstream in economics, differing priors has a long tradition in economics, including articles such as Arrow (1964), Wilson (1968), Harrison and Kreps (1978), Varian (1989), Harris and Raviv (1993), Morris (1994), Yildiz (2003), Bolton, Scheinkman, and Xiong (2006), Boot, Gopalan, and Thakor (2006), and Geanakoplos (2009). The differing priors assumption fits an analysis of strategy particularly well, as the fundamental role of ‘belief systems’ has been stressed by academic studies of managers and managerial decision making (Donaldson and Lorsch 1983, Schein 1985). A more in-depth discussion of differing priors can be found in Morris (1995) or Van den Steen (2010a,b), including discussions of why disagreement on important decisions will not necessarily be resolved, where differing priors come from, why the differing priors assumption does *not* allow to ‘prove anything’, how to deal with the issue of ‘bets,’ etc.

3 Business Strategy

A formal analysis of the role of people in strategy requires a clear sense for what ‘a strategy’ exactly is. To that purpose, I start from the companion paper Van den Steen (2013), which defines and formalizes a strategy as the ‘smallest set of (core) choices to optimally guide the other choices’. This definition captures existing ideas about strategy in a form that is both transparent and amenable to formal analysis. Notice that this is a functional definition (‘what strategy does’) rather than the *descriptive* definitions (‘what strategy looks like’) common in the literature, and therefore more practical to use.¹² Given its role in this paper, it is useful to discuss this definition in some more detail.

To motivate the definition of strategy as the ‘smallest set of (core) choices to optimally guide the other choices’, Van den Steen (2013) starts from the question what characterizes an ‘absence of strategy’. When people say that an organization ‘lacks a strategy,’ they usually mean that the organization took a number of actions that – while each may make sense on its own – do not make sense together, i.e., that lack a unifying logic. Strategy thus ensures that all decisions fit together, over time and at a point in time, like a plan.¹³ This fits the Oxford Dictionaries Online’s definition of strategy as ‘a plan of action designed to achieve a long-term or overall aim’ and Mintzberg’s (1987) characterization that ‘to almost anyone you care to ask, strategy is a plan [...] a guideline.’ But a strategy is *not* a detailed or comprehensive plan; it is a plan of action boiled down to its core

¹²A definition of a gun that describes it without mentioning that it is ‘something to shoot with’ is not practical.

¹³Note that ‘decisions fitting together’ and ‘guiding towards an objective’ are effectively two sides of the same coin. On the one hand, whether decisions fit together is always relative to some objective. On the other hand, effectively guiding towards an objective always implies that decisions will fit together to the degree possible.

choices. Capturing that formally leads to the definition of strategy as the ‘*smallest set of (core) choices to optimally guide the other choices*’. A strategy, so defined, provides each decision maker with just enough of the full picture to ensure consistency.

One result of the analysis, then, is that the choices and decisions in a strategy are typically high-level central choices – such as a choice of target customer or product scope – that then serve as guides or objectives for the rest of the organization. A manufacturer’s strategy, for example, may be to ‘serve price sensitive US customers with a simple standard design, using mass assembly of outsourced components, sold through mass retailers, and with bare-bones service and support’. These few core choices then guide the organization in its further decision making. This formal definition of strategy fits well with Collis and Rukstad (2008) who proposed that a well-defined business unit strategy should specify a choice of objective, a choice of scope, and a choice of advantage. This list of choices can be interpreted as an average experience-based ‘smallest set of (core) choices to optimally guide the other choices’ for the most common situations for business units. The definition in this paper thus complements and provides a rationale for such an experience-based list.

The qualifier ‘optimally’ refers to a few things. First, ‘optimally’ refers to the fact that the strategy may have an important dynamic component and be *intended* to be updated when more information comes available. Second, strategy should guide but not necessarily fix decisions. Most often, strategy will give the direction and range but leave it up to employees to refine these decisions based on their more detailed information. For example, a ‘low cost’ strategy does not fix any particular decision but guides employees in making their local decisions. Both of these reflect the fact that it is often prohibitively costly to investigate all information up-front and that communicating a very detailed strategy may not be helpful. Moreover, not all information is available at the time of strategy formulation, which may require flexibility and learning. Strategy should thus give direction, but should do so while taking into account the cost (and feasibility) of information collection and communication and the need for flexibility or learning.

Van den Steen (2013) then observed and formally showed that a strategy – as defined above – coincides with the set of decisions announced in equilibrium in stage 1b of the game in Section 2. I will therefore identify in this paper ‘the strategy’ with the equilibrium set of decisions announced in period 1b.¹⁴ And again following Van den Steen (2013), I will also define a decision to be ‘strategic’ if it is, in equilibrium, part of the optimal strategy.

Van den Steen (2013) builds on this definition to study what characteristics make a decision ‘strategic’ and when and how strategy creates value. Apart from the already mentioned result

¹⁴The agents in the model may be interpreted as a unit of the firm, such as the production or marketing function or a product division. The CEO’s strategy then specifies the minimum set of decisions to guide all decisions of functions. Each function, such as marketing or production, on its turn then translates that to a marketing or production strategy.

that central and high-level choices are more strategic, it shows, for example, that irreversibility or automatic commitment do *not* make a decision more strategic, and may even make it less strategic, but that persistence does; that choices that are ex-ante uncertain or ambiguous are more strategic (hence making ‘generic’ choices such as ‘maximize shareholder value’ non-strategic); that strategy bets can be optimal; that long-term strategies and strategies in fast-changing settings will be more concise, etc. It also considers how this definition plays out in a competitive or in a dynamic setting.

4 The Strategist’s Personal Influence on Strategy

How do strategies differ when developed by different people? Both casual and systematic observation suggest that a strategist’s background, position, and experience can be predictive of the strategy she will develop (Chaganti and Sambharaya 1987, Tyler and Steensma 1998, Bertrand and Schoar 2003, Strandholm, Kumara, and Subramaniam 2004). A CEO with a marketing background, for example, will lean towards a marketing-centric strategy; a CEO with an operations background will focus on operations instead.

The standard explanation is that people’s background biases their *perception of the problem*: marketing people see everything as a marketing problem; operations people see everything as an operations problem (Dearborn and Simon 1958, Hambrick and Mason 1984, Walsh 1988). This paper derives two alternative mechanisms. First, marketing people tend to be more confident about marketing decisions and it is then subjectively optimal to develop their strategy around decisions about which they are most confident. Intuitively: why develop a strategy around a production decision that you feel you know little about, when you could develop a strategy around marketing decisions about which you feel very confident? Second, a marketing manager can more credibly commit to (his own) specific marketing choices than to (someone else’s) operations choices, both because she has control over these decisions and because she is confident (and thus more persistent) about them. As a consequence, a marketing manager has more credibility with a marketing-centric strategy, and such strategy is also more likely to be implemented. I will first focus on the confidence-based mechanism and will discuss the implementation-based mechanism below and in the next section. Both mechanisms also have an important further implication: in both cases it will look as if the marketing person also *favours* the marketing side of the business: marketing decisions will be taken optimally and other decisions will (have to) adjust to them. It will therefore look as if the strategist is playing favorites with her own people.

Confidence-based Mechanism To study the confidence-based mechanism formally, consider two firms, A and B , with identical α_k , γ_{kl} , and identical underlying true states T_k , T_{kl} . Each firm

has a strategist, denoted respectively S_A and S_B , who can be an outsider or any participant of the firm. To focus completely on the role of the strategist's beliefs, I will assume that in each of the two firms, all participants always interpret signals in the same way as the firm's strategist. So in each firm all participants – including the strategist – agree ($\lambda_k^{ij} = 1, \forall i, j, k$) but the two strategists – and by extension any two employees of the two different firms – may disagree. Participants may also differ in their confidence ($\nu_k^i \neq \nu_k^j$).

The following proposition then formally derives that the strategists will systematically differ in which decision they consider strategic, and will consider decisions about which they are more confident as more strategic.

Proposition 1 *Strategists S_A and S_B will disagree (in a subset of the parameter space) on which decision is strategic. Strategist S_x considers a decision about which she is more confident to be more strategic, i.e., to be strategic in a strictly larger set of the parameter space.*

The further result that the strategist will end up favoring her own department is captured in the following corollary.

Corollary 1 *A decision about which strategist S_x feels more confident is more likely to be chosen correctly (on a standalone basis) according to the participants in firm F_x .*

Remarkably, the result of Proposition 1 also leads to the following rather surprising outcome which puts the result in very sharp terms (even though the result's practical relevance may be limited): even if strategists S_A and S_B agree for each decision on the optimal choice ($t_k^{S_A} = t_k^{S_B}, \forall k$), they may *still* develop very different strategies with very different outcomes. Consider, for example, a setting with $K = 3, C_2, C_3 \in Z_1, \alpha_1 = \alpha_2 = \alpha_3 = 1, \gamma_{12} = \gamma_{13} = 2$ while $\gamma_{23} = 0$. Assume that both strategists agree on the optimal standalone choices $t_2^{S_A} = t_2^{S_B} = c_2^f$ and $t_3^{S_A} = t_3^{S_B} = c_3^g$, but have different levels of confidence $\nu_2^{S_A} = \nu_3^{S_B} = .9, \nu_3^{S_A} = \nu_2^{S_B} = .6$. Let finally $(c_1^f, c_2^f) \in T_{12}$ and $(c_1^g, c_3^g) \in T_{13}$. Then S_A will announce as strategy $C_2 = c_2^f$, which will lead to outcome (c_1^f, c_2^f, c_3^g) while S_B will announce as strategy $C_3 = c_3^g$, which will lead to (c_1^g, c_2^f, c_3^g) . This thus shows the following observation.

Observation 1 *Even if $t_k^{S_A} = t_k^{S_B}, \forall k$, strategists S_A and S_B may develop different strategies leading to different outcomes.*

What is happening here is that whereas both players agree on each decision, they will build their strategies around different decisions because they are differentially confident about these decisions. When these decisions conflict, the strategies will be different and lead to different outcomes.

Whereas the analysis here focused on disagreement on the ν_k^i 's (and the α_k 's were common knowledge), disagreement about the α_k 's would have a similar and very intuitive effect: a strategist is more likely to consider a decision C_k to be strategic when she believes α_k to be high.¹⁵

Implementation-based Mechanism Consider now the implementation-based mechanism, i.e., the mechanism that the strategist considers decisions over which she has more control as more strategic, because she can more credibly announce such decisions. To that purpose, consider the base case ($\lambda_k^{ij} = \lambda_k$ and $\nu_k^i = \nu_k^j = \nu_k \forall i, j$) of the model of Section 2 for one firm. The base case excludes confidence-based mechanisms and thus focuses the analysis on implementation.

The following proposition shows that each participant considers his own decision to be more strategic because he can more credibly commit to his own choices than to someone else's.

Proposition 2 *Each participant P_k considers her own decision C_k to be more strategic – in the sense of being strategic in a larger subset of a symmetric parameter space – than any other decision.*

The intuition will be clear from the discussion of Proposition 3b, which follows below.

Personal Influence on Strategy under Common Priors It may seem, at first, that Proposition 1 is similar to the idea that the identity of the strategist may matter because different people may have access to different information. It turns out, however, that the effects of differences in information are very different from the effects of differences in confidence derived here.

To see this, consider the following variation on the model of Section 2 with differential access to information (but common priors): at the start of the game (rather than in stage 2a) each P_k learns the local interactions T_{kl} in her task and gets an objective signal (rather than subjective belief) about her local decision state T_k . For all other states, each P_k has uninformative priors, as before. Different people may now come up with different strategies (even under common priors) because they start with different information, which affects their cost of developing specific strategies. For example, P_1 prefers to develop a C_1 -based strategy since he does not incur the cost of investigating T_1 . But the bias is now limited above by the cost of investigation. If that cost is infinitesimal, then the difference is limited to a knife edge case.

¹⁵I thank Bob Gibbons for pointing this out.

5 The Importance of Personal Involvement in Strategy Development

The above analysis gives insight into why different people systematically differ in their strategies. But it does not address why, or when, it should be exactly the *CEO and top management* who develop the strategy rather than some smart outsider or a committee of experts. Why would the CEO's and top management's view be of particular importance in strategy?

I will show here formally that (part of) the answer lies with the link between strategy formulation and strategy implementation. The latter – strategy implementation – is a critical issue for strategic management as an estimated 70 to 90% of strategies fail to get implemented (Kaplan and Norton 2000). I will, in particular, show that the likelihood of strategy implementation improves when key decision makers – those who control strategic decisions – are involved in strategy formulation, because such involvement gives the strategy credibility. In particular, a strategy that was personally developed by the CEO and top management reveals their beliefs and what these imply for strategic decisions. These revealed beliefs lend credibility to the strategy as they imply that the CEO and top management will pursue it and will use their authority and influence to make others pursue it. Even cheap talk strategy can thus be a credible predictor for strategic decisions and will affect the expectations about these decisions, thus guiding – by construction (Van den Steen 2013) – other decisions.

This has two further implications. The first is that these beliefs may generate a self-reinforcing cycle: other participants following the strategy makes it more attractive for the key decision makers to also stick to the strategy. The public announcement thus becomes a commitment device. This is, however, absent from the (main) model in this paper,¹⁶ but can be seen in the team-theory model of Van den Steen (2011). The second implication, and the converse of this, is the ‘implementation-based mechanism’ for why the strategist’s background may systematically bias her strategy: because a strategist has more credibility on decisions she controls, she will tend to make her own decisions strategic.

I now study first how strategy implementation is affected by the strategist’s role: whether the strategist is an outsider, or the (‘strategic’) insider with control over the strategic decision, or another insider. I will say that a strategy is ‘implemented’ if 1) the strategic choices are as announced and 2) those subordinate choices that would align if the strategic choices were always as announced indeed

¹⁶The result can be seen in the proof of Proposition 6, which has a cost of making an explicit choice. As the strategist-participant cares about the full payoff, she may decide to make an explicit choice in part based on the alignment payoff from other choices. The reason why it is absent from the main model is because a participant only cares about the overall project payoff when she is the strategist, and then always agrees with the strategy and implements it anyways.

do align.

One challenge for studying the likelihood that a strategy will be implemented is that, in equilibrium, a participant will only announce a strategy if she knows it will be implemented. I will therefore explicitly condition in the proposition on the strategist announcing a strategy, say a C_l -strategy. Consider then the subgame starting in stage 2a.

Proposition 3a *Conditional on the strategist S having developed and announced a C_l -strategy, that strategy is more likely to be implemented in stage 2 when the strategist controls C_l ($S = P_l$) than when the strategist is either an outsider ($S = O$) or some other insider ($S = P_k \neq P_l$).*

The likelihood of implementation (of the C_l strategy) for the outsider and the other subordinate insiders increases in the probability of agreement about the strategic decision λ_l , increases in the importance of the interaction (γ_{kl}) between the strategic decision and the subordinate decisions ($k \in \underline{N}_l$), and decreases in the importance and eventual confidence of the subordinate decisions (α_k and ν_k for $k \in \underline{N}_l$).

The main reason why the outsider and non-strategic insider have a difficult time implementing the strategy is a lack of credibility (or commitment): other decision makers P_k doubt that the strategic decision maker P_l , with control over the strategic decision, will follow a strategy developed by some outsider O , by P_k herself, or by some other non-strategic decision maker. This doubt reduces P_k 's expected benefit from aligning on the announced strategy and thus makes it more attractive to follow her own piecemeal optimal action t_k^k . When, on the contrary, the strategy was developed by the strategic participant P_l herself, then that participant will follow her announced strategy, which makes it optimal for others to align on the strategy.

The comparative statics then show that credibility is more of a problem if the strategic decision is more controversial in the sense that there is a higher probability of disagreement. Being controversial makes it more likely that P_l disagrees with others and thus reduces the credibility of a strategy by someone other than P_l . The implication for practice is that CEO involvement in strategy development is particularly important in the face of controversial strategic decisions and of open disagreement. Alternatively, one could also show that people who are more aligned with the CEO in their beliefs are more credible – and thus more effective – strategists. Credibility is also more of an issue when γ_{kl} is low and α_k and ν_k high. The reason is that, for P_k , the trade-off between alignment versus standalone optimality tilts towards the latter when γ_{kl} is low and α_k and ν_k high. More credibility is needed to convince P_k to forgo standalone optimality and to (try to) align with C_l . In practical terms, management involvement thus matters more when employee decisions are more important. A second issue that hinders implementation is that (even when the other participants align with the announced decision of P_l) the strategic participant P_l may disagree with

the strategist and follow her own belief, rather than the announced strategy.

In practice, this means that either the CEO has to be actively involved in the strategy formulation (directly or by credible proxy) or the strategist can be made CEO. The latter is not uncommon, especially for firms that undergo considerable change. Note that if the outsider could *fix* the strategic decisions then such commitment would also resolve the implementation issue. This fits Andrews' (1987) view that 'the essence of successful implementation is commitment'.

From a broader perspective, the key insight here is that strategy formulation and execution will be linked. To develop this insight further, I now turn to the overall equilibrium of the game and how that is affected by who develops the strategy. One important insight is that these implementation issues feed back into the optimal strategy formulation.

For this analysis, I will now compare strategy development as done by different people. To this purpose, define the 'dominant' decision $C_{\bar{k}}$ to be the decision that maximizes the gain from strategy, $\bar{k} = \operatorname{argmax}_l \sum_{m \in \bar{N}_l} (\gamma_{lm} - \beta_m \lambda_m)$, and call other decisions 'subordinate' and denoted $C_{\underline{k}}$. I will then compare strategy development by the dominant decision maker $P_{\bar{k}}$ with both strategy development by the outsider O and strategy development by a subordinate decision maker $P_{\underline{k}} \neq P_{\bar{k}}$. The following proposition shows not only that the outsider and the subordinate insider have a harder time getting a strategy implemented but also that they will sometimes propose a strategy that is suboptimal in their own eyes in order to increase the likelihood of implementation. This is a trade-off that, in my experience, consulting firms explicitly recognize. For the formal statement, I will say that an outcome is non-trivial when at least one player chooses $C_k \neq t_k^k$. Here and in the next section, I will also define a player's 'standard strategy' to be the strategy that she would announce if she could publicly fix the strategic decision, i.e., if it were as if her announcement publicly fixed the strategic choice (or as if there were no credibility issues for her announcement).

Proposition 3b *In equilibrium, both an outsider and a subordinate insider $P_{\underline{k}}$ are less likely than the dominant insider $P_{\bar{k}}$ to be able to implement a non-trivial outcome through strategy.*

When implementing a non-trivial outcome through strategy, both the outsider and $P_{\underline{k}}$ are more likely than $P_{\bar{k}}$ to implement an outcome that is suboptimal from their own respective perspectives, in the sense of being different from their standard strategy (i.e., the strategy they would choose if they could publicly fix the strategic choice).

An important insight from this proposition is that both the outsider and the subordinate decision maker will sometimes choose a strategy that implements a suboptimal outcome from their own perspective. The intuition here is that the dominant decision is so controversial – in the sense that any two players are very likely to disagree on the optimal choice – that O and $P_{\underline{k}}$ have insufficient credibility to implement a strategy around that dominant decision. Both the outsider and a sub-

ordinate decision maker will therefore look at less controversial decisions – where they have more credibility in terms of the effective strategy – to build their strategy around. This is captured in the following corollary that follows immediately from the proposition.

Proposition 3c *For both an outsider or a subordinate decision maker, less controversial decisions – in the sense of having a higher λ_k – are more strategic.*

One important implication is the ‘implementation-based mechanism’ for personal influence on strategy discussed in Section 4: the subordinate decision maker will consider his own decision – on which he has obvious credibility – as more strategic.

The role and importance of disagreement in these results is also highlighted in the following corollary.

Corollary 2 *With full disagreement, i.e., $\lambda_k = 0, \forall k$, there is completely no value in a strategy developed by an outsider. Any explicit strategy by a subordinate insider $P_{\bar{k}}$ is always based on her own (subordinate) decision $C_{\bar{k}}$.*

With no disagreement on the strategic decision, i.e., $\lambda_{\bar{k}} = 1$, the content and value of a strategy developed by an outsider or a subordinate insider is the same as that developed by a dominant insider.

It is thus not cheap talk per se that complicates implementation, but the combination of cheap talk with disagreement. Absent disagreement, even a cheap talk strategy accurately states what choices the critical decision makers will make. This credibility makes it optimal for others to follow the strategy too. But disagreement weakens the link between the cheap talk strategy and the eventual choices, making the strategy less credible.

What does this imply for a principal who owns the firm but does not make any decisions, as under the standard separation of ownership and control? I will consider here how such outsider-principal is affected by the identity of the strategist, comparing as strategists the principal herself, another outsider, such as a consultant, and the dominant decision-maker $P_{\bar{k}}$.

Proposition 4 *The principal’s expected profit is higher when $P_{\bar{k}}$ develops the strategy than when an outsider O other than the principal or the principal herself develops the strategy.*

The reason why the principal should let $P_{\bar{k}}$ develop the strategy is again that, whereas $P_{\bar{k}}$ ’s strategy may be suboptimal in the principal’s eyes, $P_{\bar{k}}$ is more effective at implementing.¹⁷

¹⁷Van den Steen (2011) shows that this result changes somewhat when all participants care about the overall payoff: in that case, the principal can sometimes be strictly better off developing the strategy herself as long as there is not too much disagreement (but will also sometimes be better off letting $P_{\bar{k}}$ develop the strategy).

6 Strategy and Vision

Both strategy and vision give direction to an organization. So how do they relate? The observation that companies cited for their great strategies – such as Walmart, Ryanair, Apple, and the original Dell – often had a very strong founder or CEO with a clear vision, suggests a deep link.¹⁸

I will argue here that, while very different concepts, strategy and vision – in the sense of strong beliefs about the right course of action – are to some degree two sides of the same coin. In the one direction, vision is often needed to give strategy the credibility it needs to get implemented. I will show, in particular, that a CEO’s vision can provide a commitment to the strategy that makes implementation more likely. As a consequence, a CEO with appropriate vision is more likely to announce a strategy and more likely to get that strategy implemented. But the vision has to be appropriate: in particular, I also show that the wrong kind of vision – vision about others’ decisions or about subordinate decisions – may at best be irrelevant or at worst hinder strategy formulation and implementation. Studying vision in this context thus generates new insights not only for strategy but also for vision. And it reveals some critical implicit assumptions in the existing economic literature on vision.

But just as vision is important for effective strategy, strategy is also an important leadership tool, a means to effectively guide towards an intended outcome. In particular, strategy expresses precisely *those* beliefs of the CEO that are essential to guide the organization.

To explore this bi-directional relation between strategy and vision, I will first explore whether the set of strategic decisions is exactly the set of decisions a manager should control (directly or indirectly) to exert effective leadership. This effectively asks the question when strategy is the best means to express vision. I next study how vision – in the sense of ‘a strong belief about the right course of action’ – affects strategy. This effectively asks the question when vision is necessary to implement strategy.

An important theme here is that the strength of the link is largely driven by the presence of fundamental disagreement or ambiguity (in the sense of differing priors), i.e., by the presence of uncertainty that cannot be reduced to objective odds but where people have to exert personal judgment or use intuition and may thus agree to disagree. It is the presence of fundamental disagreement that makes vision necessary for effective strategy implementation.

6.1 Leadership and strategic decisions

I start with the question: Is strategy exactly the set of decisions that a manager needs to control to exert effective leadership?

¹⁸I thank Jonathan Day for pointing this out to me.

Van den Steen (2013) showed that strategy coincides with the smallest set of choices that needs to be decided from a centralized perspective to get (appropriate) consistency. This raises the obvious question whether a manager should focus on the strategic decisions in order to exert effective leadership. I will show here that this is partially, but not exactly, true. The result is somewhat a converse to the earlier result that those who control controversial strategic decisions should be involved in decision making: in order to guide effectively, managers should control – directly, through proxy, or indirectly – the decisions that are simultaneously strategic *and* controversial (in the sense that there is considerable open disagreement about the optimal choice).

Before turning to the formal analysis, I need to point out two things. First, the manager does not need direct control over these decisions. Instead, control through proxy or indirectly suffices. A manager could, for example, appoint someone who shares her beliefs. Second, the analysis here considers only two tools to exert leadership: cheap talk announcements and direct control. Obviously, there are important other tools that remain outside the analysis, such as persuasion, HR decisions, etc. The interaction with these other tools is an important topic for further research.

For the formal analysis, I will consider how much the value of the project improves – from the strategist’s perspective – when the strategist goes from being an outsider-strategist to having control over a particular decision. To separate this from the effect of vision, I will assume – as in Section 5 – that all players have the same confidence in each of the decisions.

When looking at the value of control, however, it is important to distinguish two things. First, in the presence of fundamental disagreement or differing priors, there is a *direct value of control*, which comes from taking a decision according to one’s own beliefs. For example, when two managers openly disagree over which marketing message will work best, each manager values control over that choice if his or her career depends on it.¹⁹ Van den Steen (2010b) showed that this value of control increases in the importance of the decision (i.e., the degree to which it affects the agent’s utility), the strength of the agent’s beliefs, and the likelihood of disagreement. In this organizational setting, there is also a *strategic value of control*, which is the value that comes from the ability to better guide others’ choices by having control over specific choices. This strategic value of control equals the degree to which the value of strategy is increased by having control over specific choices. The following proposition focuses on that strategic value.

Proposition 5 *The strategic value of control is, conditional on a C_l -strategy, higher for control over C_l than for control over any other choice and is then higher when C_l is more controversial.*

¹⁹As Van den Steen (2010b) showed, this result requires differing priors: if the disagreement comes from differences in information, then each manager wants the manager with most information to have control, independent of who that is.

The reason why, from a strategic perspective, the strategist does not need to control strategic decisions that are *not* controversial – in the sense that there is little open disagreement about them – is that for non-controversial decisions, a cheap talk statement (based on an investigation of the decision state) provides a reliable indicator for the future action. It is therefore not necessary for the strategist to have control over that decision to make the strategy credible. I now turn to the role of vision in strategy.

6.2 Vision and Strategy

The strategist in this paper guides by announcing a strategy. She is thus in some way a leader, i.e., ‘a guide’ (Merriam Webster Online). Management scholars such as Bennis and Nanus (1985) and Kotter (2001) have stressed the importance of vision in leadership. Van den Steen (2005), building on Rotemberg and Saloner (2000)’s work on vision’s effect on effort, formally showed that a manager’s vision gives *direction* to a firm 1) by directly influencing employees’ choice of projects because vision makes clear which projects will get the manager’s support, 2) by influencing employees’ effort on their chosen project (extending Rotemberg and Saloner (2000) to a setting with a choice of projects), and 3) by attracting employees with similar beliefs which makes employees act ‘as if’ they internalized the vision. That obviously raises the question how vision and strategy – both direction-setting tools – relate.

I therefore study here how strategy interacts with vision – in the sense of ‘strong beliefs about the right course of action’ (Van den Steen 2005). To that purpose, I study the setting of Section 2 where a manager can formulate an explicit (cheap-talk) strategy in the face of multiple interacting decision states and consider how the strategist’s confidence levels affects her ability to give effective guidance. The key insights from this analysis are then as follows:

1. It is indeed beneficial for a strategist to have strong beliefs about *strategic* decisions, for two reasons. First, the commitment that comes with such vision forces other participants to align, making it more likely that the strategy will be implemented. Second, stronger beliefs make the strategist more likely to propose a strategy, as she values control more.
2. However, for vision to be useful through this commitment mechanism – both here and in prior economic analyses of vision and mission – three conditions must be simultaneously met: 1) her beliefs and their implications must be known to the organization, i.e., the person with strong beliefs must be (the equivalent of) the strategist, 2) the beliefs must be about decisions that the strategist (or a proxy) directly or indirectly controls, and 3) most importantly, these decisions must be strategic and thus guide other decisions.

3. Strong beliefs about non-strategic decisions can have adverse effects: they may hinder alignment and strategy implementation and they may reduce the likelihood that the strategist proposes a strategy. The distinction between strategic and non-strategic decisions – in the sense of Van den Steen (2013) – thus turns out to be critical.
4. Strong beliefs about others’ decisions do not affect the implementation but may reduce the likelihood that the strategist will propose a strategy.

Apart from its implications for strategy, this analysis also provides new insights on vision. In particular, all existing economic models of vision posit a central decision maker whose beliefs are somehow publicly known and who controls a central decision that affects the payoffs of the agents’ actions, with the strong beliefs being about that particular central decision.²⁰ In all these papers, the beliefs essentially commit the central decision maker to some future course of action, which then influences the agents’ choices in the desired way. All these settings thus implicitly satisfy simultaneously the triple conditions outlined above: the beliefs of the manager are known, they are beliefs about a decision that the manager controls, and the decision guides the employees’ choices. These (mostly implicit) assumptions exclude, by construction, questions such as whether effective vision requires some form of control. Second, and even more important, there is only one decision state in all these models. That excludes by assumption the possibility of ‘*bad*’ vision about non-strategic decisions – or ineffective vision about others’ decision states – and equates ‘coordination’ with moving everyone in the same direction, which misses out on all coordination cases that don’t have a fixed and complete distance ordering that characterizes the coordination.

To study the effects of strong beliefs formally, I consider the base case of the model of Section 2 but allow players to differ in their confidence (ν_k^i). To give vision more bite, I also introduce a cost of implementation somewhat similar to Rotemberg and Saloner (2000) or Van den Steen (2005).²¹ In particular, each participant P_k has the option in stage 2b *not* to make any explicit choice. In that case, the choice alternative is randomly selected, with all alternatives equally likely. Making an explicit choice is costly: If participant P_k makes an explicit choice, her task incurs a cost that equals $c_k \geq 0$ with probability κ and 0 with probability $(1 - \kappa)$, with the realization of the costs being independent across tasks or participants. The actual cost (0 or c_k) is privately revealed to P_k in stage 2a, so each participant can take into account her cost when making her choice. In the case of multiple equilibria, I will select for simplicity the Pareto-dominant equilibrium.²²

²⁰The agents’ choice takes various forms: effort (Rotemberg and Saloner 2000, Van den Steen 2005), a project direction (Van den Steen 2005, Bolton, Brunnermeier, and Veldkamp 2012), or which firm to join (Van den Steen 2005).

²¹Equivalently, I could introduce some extra signal as in Blanes I Vidal and Möller (2007) and Bolton, Brunnermeier, and Veldkamp (2012).

²²The results are the same under a risk-dominance-like selection rule, as in Van den Steen (2011), which is probably more realistic for a setting like this but more complex.

I then study two questions. First, if the strategist proposes her standard strategy – as if her strategy announcement would publicly fix the strategic decision – will it be implemented? Second, will the strategist propose in fact a strategy? The following proposition then captures the results how implementation, alignment, and the likelihood of formulation are affected by the strategist’s confidence in her own and in others’ decisions. Let $S = P_k$ be the designated strategist. Remember also that a strategy is ‘implemented’ if 1) the strategic choice is as announced and 2) those subordinate choices that would align if the strategic choice were always as announced, do indeed align.

Proposition 6 *Conditional on $S = P_k$ investigating and proposing a C_l strategy, a stronger belief by the strategist S in her own decision ν_k^k*

- *makes alignment and implementation more likely when C_k is strategic (i.e., $C_k = C_l$);*
- *makes alignment and implementation less likely when her own decision is non-strategic.*

A stronger belief by the strategist $S = P_k$ in her own decision ν_k^k

- *makes her always more likely to propose a strategy if her decision is strategic*
- *makes her often less likely to propose a strategy if her decision is non-strategic*

A stronger belief in some other’s decision ν_l^k , makes her less likely to propose a strategy.

To develop the intuition for these results, it is useful to start from the role of vision in implementation. When a player has very strong beliefs about her own decision, then she is likely to follow her beliefs on that decision, independent of what other decisions are taken and even when she faces a cost for making an explicit decision. Vision – as a strong belief about the right course of action – is thus a credible indicator for that player’s likely future action. This has two effects. First, this player’s decision will not (let itself) be guided by other decisions, thus preventing implementation when the decision was in fact subordinate. Second, with this focal decision fixed and committed, other decisions will then adjust, so that the focal decision effectively guides the others. This also makes clear why these strong beliefs have to be about the player’s own decisions to be helpful: strong beliefs about someone else’s decisions don’t provide commitment for the other’s decision that would help implementation. For the effect of vision on strategy formulation, then, notice that the fact that vision about strategic decisions improves implementation also makes it more attractive to formulate a strategy to begin with, as it pays more to formulate a strategy when it gets implemented. Analogously, vision about subordinate decisions make it less attractive to propose a strategy.

These results have practical implications that seem to fit with informal observations. First, effective managers' strong beliefs should be about a few core principles – such as the importance of low cost, or of customer service, or of perfection – rather than about a large array of minute decisions. Second, the 'visionary' manager should have effective control, rather than being an expert advisor. Another way to express this is that vision and being an insider with control over strategic decisions are complements: vision is more effective if you wield – directly or indirectly – control and having vision about strategic decisions makes you a more attractive candidate for such a strategic insider position.

Note that vision does not necessarily reflect better insight in this model, an assumption that is made for methodological reasons and is thus not meant to be realistic. Optimally, a manager's vision should reflect a better understanding of the future. But from a research point of view, the interesting question is whether vision may have a role *independent of* its informational content.

Overall, these results show that vision and strategy are complements: strategy is more effective when it derives from a vision and a vision can be put into action through strategy. It is important to point out, though, that vision and explicit strategy are also, to some degree, substitutes. In particular, if the manager's beliefs are widely known through other means than strategy, then an explicit strategy may not be necessary and common knowledge about the manager's belief may then substitute, in part, for an explicitly formulated strategy. Another way to say this is that in this case, the vision *is* the strategy, just announced in a different way than a formal statement.

The Role of Culture as Shared Beliefs There is also an indirect way how leadership may affect strategy: through corporate culture (in the sense of shared beliefs and values). The fact that corporate culture is strongly influenced by leadership was proposed and argued by Donaldson and Lorsch (1983), Schein (1985), and Kotter and Heskett (1992).²³ Van den Steen (2010d) analyzed this idea formally and showed that selection, self-sorting, and learning cause the employees' beliefs to resemble those of the CEO and of each other, leading to shared beliefs and thus culture, and derived explicit comparative statics.

To see how culture, on its turn, affects strategy, remember from Section 5 that implementation problems are caused by the combination of cheap talk with disagreement. A strong culture – by its nature as 'shared beliefs and values' – reduces disagreement (on specific dimensions) and should thus reduce or eliminate implementation problems. This suggests that strategy would be more effective in an organization with a strong culture and thus that strategy and culture are complements.²⁴

²³There is also a literature in economics, starting with Kreps (1990), that interprets corporate culture instead as an equilibrium selection rule. While this is a very different concept than that in the management literature, the two are related (Van den Steen 2010d).

²⁴I thank Hongyi Li for this observation.

But, similar to leadership, there is also a sense in which culture and strategy can be substitutes, because they both make others' decisions more predictable and thus facilitate coordination. In particular, Van den Steen (2013) showed that strategy is more valuable when there is high ex-ante uncertainty because such uncertainty makes it difficult to predict what others will do and thus to align. Culture as shared beliefs, on the contrary, makes it easier to predict what others will do and may thus reduce the value of strategy. This suggests overall that culture as shared beliefs may allow more concise strategies because members of a strong-culture organization may understand each other with half a word. These are important issues for further research.

7 Conclusion

This paper explored how strategy and the strategist interact in a world with open disagreement. It relied – for the analysis – on the formalization of strategy as *'the smallest set of (core) choices to optimally guide the other choices'*, developed in the companion paper Van den Steen (2013).

This paper first derived two mechanisms – different from the existing biased-perception explanation – for why a strategist's background and position would systematically affect her strategy. First, a strategist is more likely to build her strategy around choices about which she is very confident (than around decisions about which she has doubts). Second, a strategy built around decisions that the strategist controls is more credible. Both effects will make someone in marketing more likely to consider marketing decisions as strategic and to develop a marketing-centric strategy. These mechanisms will also make it look *as if* the strategist favors her own.

Having established that the strategy will be systematically influenced by the person who formulates it, I then studied why it matters that it is the CEO or a central decision maker (rather than some smart analyst) who formulates the strategy. On this issue, the paper showed that an outsider-strategist may be forced into a trade-off between the quality of strategy and the likelihood of implementation and that involvement of the central decision maker in strategy formulation improved strategy implementation, thus establishing an important link between formulation and implementation.

Turning this issue (why the CEO should formulate the strategy) around, I also showed that – in order to provide effective leadership – a strategist should optimally control (directly or indirectly) decisions that are both strategic and controversial. This result reflects a broader theme that open disagreement is a key driver of the link between strategy and leadership.

I finally turn from structural to personal characteristics and investigate the role of vision (in the sense of strong beliefs about the right course of action) in strategy. I show that vision about strategic decisions can provide a commitment that improves implementation. A strategist with appropriate

vision is more likely to propose a strategy and also more likely to get her strategy implemented. But the wrong kind of vision – about others' decisions or about subordinate decisions – may hinder strategy formulation and strategy implementation.

Overall, the paper develops new insights on how, and when, strategy and the strategist interact.

A Proofs of Propositions

Let \mathcal{I} denote the (single) state that was investigated in stage 1a or the empty set if no state was investigated. Similarly, let \mathcal{M} denote the (single) message in stage 1b when there was indeed one message, or the set of message when there was more or less than one. Let $Z_k^i = \{l : C_l \in Z_k\}$, let $\Gamma_k = \{C_l : k \in Z_l^i\}$ denote the set of all interactions guided by C_k , $K_{-k} = K \setminus \{k\}$. Let $c_k^f = a_k(c_l^g)$ if $(c_k^f, c_l^g) \in T_{kl}$. Let $\Theta_k = \{\theta_k^k\} \cup \{T_{kl} : l \in Z_k^i\}$ and $\Theta = \cup_k \Theta_k$. Let $\underline{N}_l = \{C_m \in \Gamma_l : \lambda_l^{lS} \gamma_{ml} > \beta_m^m\}$ and $\overline{N}_l = \{C_m \in \Gamma_l : \gamma_{ml} > \beta_m^m\}$. Let $\overline{N}_l = \{C_m \in \Gamma_l : \gamma_{ml} > \beta_m^m\}$ and $\underline{N}_l = \{C_m \in \Gamma_l : \lambda_l^{lS} \gamma_{ml} > \beta_m^m\}$. Let the event $\text{ND} = \{\theta \in \Theta : \forall k, l \in K, \forall i, j \in \mathcal{P}, \theta_k^i \neq a_k(\theta_l^j)\}$.

Lemma 1 *The event ND has probability 1.*

Proof : Consider first the case where each choice has M , rather than an infinite number of, alternatives. For randomly drawn $(\theta_k^i, \theta_l^j, T_{kl})$, the probability that $\theta_k^i = a_k(\theta_l^j)$ equals $1/M$, which converges to zero. It follows that the probability of ND indeed converges to 1 (as both K and \mathcal{P} remain finite). \blacksquare

Lemma 2a *1. In any equilibrium, \mathcal{I} is common knowledge (on the equilibrium path). If $\mathcal{I} = \emptyset$ then $\mathcal{M} = \emptyset$, whereas if $\mathcal{I} = T_k$ then either $\mathcal{M} = \theta_k^S$ or $\mathcal{M} = \emptyset$. At the start of stage 2, either θ_k^S is common knowledge or no participant beyond S has any information beyond their priors.*

2. *If nothing is investigated or announced in stage 1, then the equilibrium outcome is for each participant P_k to choose t_k^k .*
3. *Conditional on $\mathcal{M} = \theta_l^S$, the equilibrium outcome is (with probability 1): P_l chooses t_l^l ; if $l \neq S$ (resp. $l = S$) all $P_k \in \underline{N}_l$ (resp. \overline{N}_l) choose $a_k(\theta_l^S)$, while all $P_k \notin \underline{N}_l$ (resp. \overline{N}_l) choose t_k^k .*
4. *If $\mathcal{I} = T_l$ but $\mathcal{M} = \emptyset$, then the equilibrium outcome is (with probability 1) the trivial outcome unless $S = P_k \neq P_l$ and $\beta_k^k < \gamma_{kl} \lambda_l^{lS}$ in which case the outcome is that $P_k = S$ chooses $a_k(\theta_l^S)$ while all other P_m choose t_m^m .*

Proof : ²⁵ In any pure strategy equilibrium (henceforth PSEq), S either investigates nothing or investigates some particular state T_k . As the equilibrium is common knowledge, so is S 's equilibrium action and thus \mathcal{I} . In any PSEq, S 's message in stage 1b can only depend on its signal θ_k^S , if any. It follows that if $\mathcal{I} = \emptyset$, then the signal must be constant, and local symmetry (henceforth LS) then further implies that $\mathcal{M} = \emptyset$. (By contradiction: if S would always send some message c_l^g , LS implies that switching the labels c_l^g with some other c_l^h should cause the signal to switch too, contradicting the implication that the signal is constant.) Finally, if $\mathcal{I} = T_k$, then LS again implies (by a completely analogous argument) that either always $\mathcal{M} = \emptyset$ or always $\mathcal{M} = \theta_k^S$. It thus also follows that at the start of stage 2, either θ_k^S is common knowledge (which requires that $\mathcal{I} = T_k$) or no participant beyond S has any information beyond their prior beliefs.

²⁵The proof uses local symmetry early on. The reason is that applying local symmetry early dramatically simplifies the arguments. Given the dimensionality of the problem, this is important for tractability. Obviously, local symmetry is just a form of equilibrium selection.

Consider now the subgame starting in period 2. The best response by P_k in stage 2b depends on P_k 's beliefs about how his own choice aligns with other choices such as C_l . Let δ_k^l denote the choice for C_k that P_k believes to be most likely to align with C_l and let $\psi_k^l \geq 0$ denote P_k 's confidence (or belief) that $\delta_k^l = a_k(C_l)$. If $P_k \neq S$ then P_k solves

$$\max_{C_k} \beta_k^k I_{C_k=t_k^k} + \sum_{l \in Z_k^i} \gamma_{kl} \psi_k^l I_{C_k=\delta_k^l}$$

Since $\beta_k^k, \gamma_{kl}, \psi_k^l \geq 0$, the payoff increases in $I_{C_k=t_k^k}$ and $I_{C_k=\delta_k^l}$. It follows that P_k 's best response must be in $\{t_k^k\} \cup \{\delta_k^l\}_{l \in Z_k^i}$. Moreover, conditional on event ND, P_k 's strategy in any LSPSEq must be to 'choose always Y ' for some $Y \in \{t_k^k\} \cup \{\delta_k^m\}_{m \in Z_k^i}$. If $P_k = S$, an analogous argument implies that, conditional on event ND, P_k 's strategy in any LSPSEq must be to 'choose always Y ' for some $Y \in \{t_k^k\} \cup \{\delta_k^m\}_{m \in K_{-k}}$.

Consider now P_k 's belief about δ_k^l , first for either $P_k \neq S$ or for $P_k = S$ with $\mathcal{M} = \mathcal{I}$. As P_k 's belief can only depend on $\Theta_k \cup \mathcal{M}$ while P_l 's choice can only depend on $\Theta_l \cup \mathcal{M}$, P_k 's belief about δ_k^l can only depend on \mathcal{M} and, if $l \in Z_k^i$, T_{kl} . Combined with the fact that P_l 's strategy must be to 'choose always Y ' for some $Y \in \{t_l^l\} \cup \{\delta_l^m\}_{m \in Z_l^i}$ or, if $S = P_l$, for some $Y \in \{t_l^l\} \cup \{\delta_l^m\}_{m \in K_{-l}}$, it follows that P_k 's belief about δ_k^l is either her (ignorance) prior or $\delta_k^l = a_k(\theta_l^S)$ (which requires that $l \in Z_k^i$ and $l \in \mathcal{M}$) or $\delta_k^l = \theta_k^S$ (which requires that $k \in \mathcal{M}$ and that P_l chooses δ_l^k , which further requires $k \in Z_l^i$). If $P_k = S$ and $\mathcal{I} = T_l \neq T_k$ but $\mathcal{M} = \emptyset$, then there is the additional possibility that $P_k = S$ believes that $\delta_k^l = a_k(\theta_l^S)$ (which requires that $l \in Z_k^i$ and $l \in \mathcal{I}$ but $l \notin \mathcal{M}$ and that $\mathcal{M} \neq \mathcal{I}$).

I can now derive the equilibrium outcome. If $\mathcal{I} = \emptyset$, then all players have ignorance beliefs about others' actions and each P_k 's problem is reduced to $\max_{C_k} \beta_k^k I_{C_k=t_k^k}$ so that the subgame equilibrium is for each to choose $\hat{C}_k = t_k^k$, and the equilibrium outcome is the trivial outcome.

Consider next the case that $\mathcal{M} = \theta_l^S$ (which implies that $\mathcal{M} = \mathcal{I}$). Consider first P_l . P_l 's beliefs about δ_l^m must be either her ignorance prior or $\delta_l^m = \theta_l^S$ (which requires that $l \in Z_m^i$). If $P_l = S$ so that $\theta_l^S = t_l^l$, then it is obviously always optimal for P_l to choose $t_l^l = \theta_l^S$. If $P_l \neq S$, then P_l 's belief about δ_l^m is the ignorance prior for all $m \in Z_l^i$ (as anything but the ignorance belief requires $l \in Z_m^i$), which reduces P_l 's problem to $\max_{C_l} \beta_l^l I_{C_l=t_l^l}$ so that the optimal choice is again t_l^l . It follows that P_l will always choose t_l^l and P_k 's beliefs that $\delta_k^l = a_k(\theta_l^S)$ equals $\psi_k^l = \lambda_l^{lS}$. Consider now $P_k \neq P_l$. If $l \notin Z_k^i$ then P_k 's problem is again reduced to $\max_{C_k} \beta_k^k I_{C_k=t_k^k}$ so that the optimal choice is $\hat{C}_k = t_k^k$. If, on the other hand, $l \in Z_k^i$, then P_k 's problem is reduced to

$$\max_{C_k} \beta_k^k I_{C_k=t_k^k} + \gamma_{kl} \lambda_l^{lS} I_{C_k=a_k(\theta_l^S)}$$

where I used immediately $\psi_k^l = \lambda_l^{lS}$, so that P_k 's equilibrium action is 'always choose Y ' with either $Y = t_k^k$ or $Y = a_k(\theta_l^S)$, depending whether $\gamma_{kl} \lambda_l^{lS} > \beta_k^k$.

It follows that the subgame equilibrium when $\mathcal{M} = \theta_l^S$ is indeed that P_l always chooses t_l^l ; if $P_l \neq S$ (resp. $P_l = S$) all $P_k \in \underline{N}_l$ (resp. \bar{N}_l) choose $a_k(\theta_l^S)$, while all $P_k \notin \underline{N}_l$ (resp. \bar{N}_l) choose t_k^k , with S -expected payoff $\beta_l^S \lambda_l^{lS} + \sum_{k \in \underline{N}_l} \gamma_{kl} \lambda_l^{lS} + \sum_{k \in K_{-l} \setminus \underline{N}_l} \beta_k^S \lambda_k^{kS}$ (resp. $\beta_l^S + \sum_{k \in \bar{N}_l} \gamma_{kl} + \sum_{k \in K_{-l} \setminus \bar{N}_l} \beta_k^S \lambda_k^{kS}$).

Consider finally the case that $\mathcal{M} = \emptyset \neq \mathcal{I} = T_l$. If S is an outsider or $S = P_l$, then this is equivalent to $\mathcal{I} = \emptyset$. Consider thus $S = P_k \neq P_l$. In that case, all other participants still hold the ignorance prior and will thus choose t_m^m . P_k 's problem then reduces to

$$\max_{C_k} \beta_k^k I_{C_k=t_k^k} + \gamma_{kl} \lambda_l^S I_{C_k=a_k(\theta_l^S)}$$

and he will either choose t_k^k , which reduces this to the case with $\mathcal{M} = \emptyset$, or $a_k(\theta_l^S)$. The outcome in this case is thus the trivial outcome if $S \notin \mathcal{P}$, if $S = P_l$, or if $\beta_k^k \geq \gamma_{kl} \lambda_l^S$ or the outcome where all P_m choose t_m^m while $P_k = S$ chooses $a_k(\theta_l^S)$. This completes the proof. \blacksquare

Proof of Proposition 1: As firm F_x 's participants and strategist all agree, $\theta_k^S = t_k^k$, independent of which participant is strategist S_x . It follows that when $\mathcal{M} = \theta_k^S$, then 1) $\hat{C}_k = t_k^k$, 2) $\forall l \in \bar{N}_k, \hat{C}_l = a_l(\theta_k^S)$, and 3) $\hat{C}_l = t_l^l$ for all others. As the S_x -expected payoff then equals $\bar{V}_k^{S_x} = \beta_k^{S_x} + \sum_{m \in \bar{N}_k} \gamma_{km} + \sum_{m \in K_{-k} \setminus \bar{N}_k} \beta_m^{S_x}$, it is maximized when $\mathcal{I} = T_{\bar{k}^{S_x}}$ for $\bar{k}^{S_x} = \operatorname{argmax}_k \bar{V}_k^{S_x}$. As long as $\Delta \bar{V}_{\bar{k}^{S_x}}^{S_x} = \bar{V}_{\bar{k}^{S_x}}^{S_x} - \sum_k \beta_k^{S_x} > c$, where the second term is the trivial payoff, it is optimal to investigate and announce $T_{\bar{k}^{S_x}}$. The first part of the proposition follows whenever the $\nu_k^{S_x}$ differ across S_A and S_B in such a way that $T_{\bar{k}^{S_A}} \neq T_{\bar{k}^{S_B}}$. The second part of the proposition follows from the observation that the definition of \bar{k}^{S_x} implies that if C_k is strategic for strategist S_x at some $\nu_k^{S_x}$, then it will remain strategic for all higher $\nu_k^{S_x}$ (as $\Delta \bar{V}_k^{S_x}$ remains unchanged but $\Delta \bar{V}_l^{S_x}$ decrease). This proves the proposition. \blacksquare

Proof of Corollary 1: As all participants of a firm agree, it suffices to show that P_k is more likely to choose t_k^k when $\nu_k^{S_x}$ increases. To that purpose, consider a setting where P_k chooses t_k^k . This means that either C_k is strategic or, with C_l strategic, $C_k \notin \bar{N}_l$. Either way, the $\nu_k^{S_x}$ -derivative of the S_x -expected payoff for this equilibrium outcome equals α_k , which is at least as large as – and sometimes strictly larger than – for any other potential equilibrium outcome. It follows that this outcome remains optimal from S_x 's perspective, so that the strategic decision remains unchanged, and C_k will keep being t_k^k . This proves the result. \blacksquare

Consider now the base case ($\lambda_k^{ij} = \lambda_k$ and $\nu_k^i = \nu_k^j = \nu_k, \forall i, j, k$). Let $\bar{V}_l = \beta_l \lambda_l + \sum_{m \in \bar{N}_l} \gamma_{lm} + \sum_{m \in K_{-l} \setminus \bar{N}_l} \beta_m \lambda_m$ and $\underline{V}_l = \beta_l \lambda_l + \sum_{m \in \underline{N}_l} \gamma_{lm} \lambda_l + \sum_{m \in K_{-l} \setminus \underline{N}_l} \beta_m \lambda_m$. Let $V_0 = \sum_l \beta_l \lambda_l$ and $V_0^k = \beta_k + \sum_{l \neq k} \beta_l \lambda_l = V_0 + \beta_k(1 - \lambda_k)$. Let $\Delta \bar{V}_l = \bar{V}_l - V_0 = \sum_{m \in \bar{N}_l} (\gamma_{lm} - \beta_m \lambda_m)$ and $\Delta \underline{V}_l = \sum_{m \in \underline{N}_l} \gamma_{lm} \lambda_l - \beta_m \lambda_m$. Let, finally, $\bar{k} = \operatorname{argmax}_l \Delta \bar{V}_l$, $\hat{k}^O = \operatorname{argmax}_l \underline{V}_l$, and $\hat{k}^l = \operatorname{argmax}_{\{n: l \notin \underline{N}_n\}} \underline{V}_n$.

- Lemma 2b**
1. If $S = P_{\bar{k}}$, then the overall equilibrium is as follows: if $\Delta \bar{V}_{\bar{k}} > c$ then S investigates $T_{\bar{k}}$ and announces $\theta_{\bar{k}}^S$; $P_{\bar{k}}$ always chooses $t_{\bar{k}}^{\bar{k}}$; all $P_k \in \bar{N}_{\bar{k}}$ choose $a_k(\theta_{\bar{k}}^S)$; while all $P_k \notin \bar{N}_{\bar{k}}$ choose t_k^k ; else S investigates nothing and the equilibrium outcome is the trivial outcome.
 2. If $S = O$, then the overall equilibrium is as follows: if $\Delta \underline{V}_{\hat{k}^O} > c$ then S investigates $T_{\hat{k}^O}$ and announces $\theta_{\hat{k}^O}^S$; $P_{\hat{k}^O}$ always chooses $t_{\hat{k}^O}^{\hat{k}^O}$; all $P_k \in \underline{N}_{\hat{k}^O}$ choose $a_k(\theta_{\hat{k}^O}^S)$; while all $P_k \notin \underline{N}_{\hat{k}^O}$ choose t_k^k ; else S investigates nothing and the equilibrium outcome is the trivial outcome.
 3. If $S = P_l \neq P_{\bar{k}}$, P_l investigates and announces among l, \hat{k}^O, \hat{k}^l with respective strategy payoffs

$\Delta\bar{V}_l, \Delta\underline{V}_{\hat{k}^O} - \beta_l(1 - \lambda_l), \Delta\underline{V}_{\hat{k}^l}$ the one with the highest payoff, at least as long as the payoff gain exceeds c . For some parameters P_l investigates and announces T_l and for other parameters $T_{\bar{k}}$.

Proof: Let $S = P_{\bar{k}}$. If $\mathcal{M} = \theta_{\bar{k}}^{\bar{k}}$, then $P_{\bar{k}}$'s expected payoff equals $\beta_{\bar{k}} + \sum_{m \in \bar{N}_{\bar{k}}} \gamma_{\bar{k}m} + \sum_{m \in K_{-\bar{k}} \setminus \bar{N}_{\bar{k}}} \beta_m \lambda_m = \bar{V}_{\bar{k}} + \beta_{\bar{k}}(1 - \lambda_{\bar{k}})$. If, on the other hand, $\mathcal{M} = \theta_{\bar{k}}^S$, then $P_{\bar{k}}$'s expected payoff equals $\beta_k \lambda_k + \sum_{m \in \underline{N}_k} \gamma_{km} \lambda_k + \sum_{m \in K_{-k} \setminus \underline{N}_k} \beta_m \lambda_m = \underline{V}_k$ if $\bar{k} \in \underline{N}_k$ and $\beta_k \lambda_k + \sum_{m \in \underline{N}_k} \gamma_{km} \lambda_k + \sum_{m \in K_{-k} \setminus (\underline{N}_k \cup \{\bar{k}\})} \beta_m \lambda_m + \beta_{\bar{k}} = \underline{V}_k + \beta_{\bar{k}}(1 - \lambda_{\bar{k}})$ otherwise. It follows (since $\bar{V}_{\bar{k}} \geq \bar{V}_k \geq \underline{V}_k$) that $P_{\bar{k}}$'s optimal strategy is $\mathcal{M} = \theta_{\bar{k}}^{\bar{k}}$ and the gain from strategy is then $\bar{V}_{\bar{k}} + \beta_{\bar{k}}(1 - \lambda_{\bar{k}}) - (V_0 + \beta_{\bar{k}}(1 - \lambda_{\bar{k}})) = \bar{V}_{\bar{k}} - V_0 = \Delta\bar{V}_{\bar{k}}$.

Let $S = O$. If $\mathcal{M} = \theta_l^S$, then S 's expected payoff is \underline{V}_l . It follows that S 's optimal strategy is to investigate and announce $T_{\hat{k}^O}$, with gain from strategy $\Delta\underline{V}_{\hat{k}^O}$. That implies the second part of the proposition.

Let, finally, $S = P_l \neq P_{\bar{k}}$. If $\mathcal{M} = \theta_l^l$, then the payoff equals $\bar{V}_l + \beta_l(1 - \lambda_l)$ and the gain from strategy equals $\Delta\bar{V}_l$ (as the trivial payoff equals $V_0 + \beta_l(1 - \lambda_l)$). If $\mathcal{M} = \theta_m^l$ and $C_l \in \underline{N}_m$, then the payoff equals \underline{V}_m , while it equals $\underline{V}_m + \beta_l(1 - \lambda_l)$ when $C_l \notin \underline{N}_m$. In the first case (\underline{V}_m), the payoff is maximized when $m = \hat{k}^O$ and the payoff is then the same as with $S = O$, i.e., $\underline{V}_{\hat{k}^O}$. The gain from strategy is then $\Delta\underline{V}_{\hat{k}^O} - \beta_l(1 - \lambda_l)$. (The P_l has a higher expected trivial payoff, as an insider, which explains why his gain from strategy may in fact be lower than for an outsider.) In the second case, the payoff is maximized when $m = \hat{k}^l$ and the payoff then equals $\underline{V}_{\hat{k}^l} + \beta_l(1 - \lambda_l)$ so that the gain from strategy equals $\Delta\underline{V}_{\hat{k}^l}$. In equilibrium, S will choose the one that maximizes the payoff.

To see that P_l will sometimes investigate T_l , consider $\lambda_k = 0, \forall k$. In that case, the P_l -expected payoff from investigating and announcing T_l equals $\beta_l + \sum_{m \in \bar{N}_l} \gamma_{lm}$ while the P_l -expected payoff from investigating and announcing any other state equals β_l (using the fact that $\underline{N}_l = \emptyset$, which reduces this to the case where the payoff is $\underline{V}_m + \beta_l(1 - \lambda_l)$ which equals β_l at $\lambda_l = 0$ and $\lambda_m = 0$). It follows that for some parameters, P_l will investigate and announce T_l . To see that P_l will sometimes investigate $T_{\bar{k}}$, consider $\lambda_k = 1, \forall k$. In that case, all S investigate and announce the same state, so that P_l will indeed investigate and announce $T_{\bar{k}}$. ■

Proof of Proposition 2: I need to show that for a P_l -insider, C_l is more likely to be strategic (in the sense of being strategic in a larger part of a symmetric strategy space) than any other decision. To that purpose, note that for an outsider all choices are equally likely to be strategic (in the sense of being strategic in an equal part of a symmetric strategy space). It thus suffices to show that the gain from becoming a P_l -insider is always larger when C_l is strategic than when some other decision is strategic. The gain from becoming a P_l -insider when C_l is strategic equals $\Delta\bar{V}_l - \Delta\underline{V}_l + \beta_l(1 - \lambda_l) \geq \beta_l(1 - \lambda_l)$, while it equals at most $\beta_l(1 - \lambda_l)$ when any other decision C_k is strategic. This proves the proposition. ■

Proof of Proposition 3a: When the strategist controls C_l (i.e., $S = P_l$) and develops and announces a C_l strategy ($\mathcal{M} = \theta_l^S$), it will always be implemented.

When the strategist is an outsider or another insider and develops and announces a C_l strategy, then 1) the strategic decision will only be executed with probability λ_l and 2) even when it gets executed, the strategy is only fully implemented if for all $m \in \bar{N}_l$, $\beta_m^m < \gamma_{ml} \lambda_l$. This implies both the first and the second part of

the proposition. ■

Proof of Proposition 3b: A strategist is more likely to implement a non-trivial outcome through strategy if the expected value from investigating and announcing a strategy is higher. Following Lemma 2b, if $S = P_{\bar{k}}$, the value from investigating and announcing a strategy equals $\Delta \bar{V}_{\bar{k}} = \sum_{m \in \bar{N}_{\bar{k}}} (\gamma_{\bar{k}m} - \beta_m \lambda_m)$. For $S = O$, that value equals $\Delta \underline{V}_{\bar{k}O} = \sum_{m \in \underline{N}_{\bar{k}O}} (\gamma_{\bar{k}O m} \lambda_{\bar{k}O} - \beta_m \lambda_m)$. Since for any C_l , $\Delta \bar{V}_l \geq \Delta \underline{V}_l$ and $\bar{k} = \operatorname{argmax}_l \Delta \bar{V}_l$, the value of strategy for $S = P_{\bar{k}}$ is larger than for $S = O$. Consider now the case for $S = P_l \neq P_{\bar{k}}$. In that case, the payoff from strategy is $\max(\Delta \bar{V}_l, \Delta \underline{V}_{\bar{k}l}, \Delta \underline{V}_{\bar{k}O} - \beta_l(1 - \lambda_l))$. An argument completely analogous to above completes the first part of the proposition.

For the second part of the proof, note that if there wasn't potential disagreement with the strategic participant, then both the outsider and the subordinate insider would choose \bar{k} as the strategic decision. Lemma 2b shows that they typically don't, thus proving the second part of the proposition. ■

Proof of Proposition 3c: With $S = O$, the value from a C_k -strategy equals $\sum_{m \in \underline{N}_k} (\gamma_{km} \lambda_k - \beta_m \lambda_m)$ which clearly increases in λ_k (both directly and by increasing \underline{N}_k). For $S = P_l \neq P_{\bar{k}}$, the argument is completely analogous. ■

Proof of Corollary 2: When $\lambda_k = 0$, the value from a C_k -strategy when either $S = O$ or $S = P_l \neq P_k$ is non-positive (because $\underline{N}_k = \emptyset$), which implies the first part. For the second part, note that if all participants agree on $C_{\bar{k}}$, then the value from a $C_{\bar{k}}$ -strategy is the same for all and since $\bar{k} = \operatorname{argmax}_l \bar{V}_l$ and $\bar{V}_l \geq \underline{V}_l$, it follows that that is for each the optimal strategy. ■

Proof of Proposition 4: The principal's expected profit when $S = P_{\bar{k}}$ equals $\bar{V}_{\bar{k}}$ while it equals $\underline{V}_{\bar{k}O}$ when $S = O$ or $S = P$. The result then follows from the fact that $\bar{k} = \operatorname{argmax}_l \bar{V}_l$ and $\bar{V}_l \geq \underline{V}_l$. ■

Proof of Proposition 5: For an outsider with no control over C_l , the value of a C_l -strategy equals $\Delta \underline{V}_l = \sum_{m \in \underline{N}_l} \gamma_{lm} \lambda_l - \beta_m \lambda_m$. The value of a C_l -strategy with control over C_l equals $\Delta \bar{V}_l = \sum_{m \in \bar{N}_l} (\gamma_{lm} - \beta_m \lambda_m)$. The value of a C_l -strategy with control over some other choice C_k equals either $\sum_{m \in \underline{N}_l} (\gamma_{lm} \lambda_l - \beta_m \lambda_m)$ if $k \notin \underline{N}_l$ or $\sum_{m \in \underline{N}_l} (\gamma_{lm} \lambda_l - \beta_m \lambda_m) - \beta_k(1 - \lambda_k)$ if $k \in \underline{N}_l$.

It follows that the strategic value of control over C_l equals $\sum_{m \in \underline{N}_l} (1 - \lambda_l) \gamma_{lm} + \sum_{m \in (\bar{N}_l \setminus \underline{N}_l)} (\gamma_{lm} - \beta_m \lambda_m)$, while the strategic value of control over C_k equals either 0 or $-\beta_k(1 - \lambda_k)$. It follows that the strategic value of control is indeed largest for C_l and, for C_l , increases as λ_l decreases (directly and because lower λ_l reduces \underline{N}_l and $\gamma_{lm} - \beta_m \lambda_m > \gamma_{lm}(1 - \lambda_m)$ for $m \in \underline{N}_l$). ■

Proof of Proposition 6: Let $\zeta_k = (1 - \kappa) + \kappa J_k$ and $\xi_k = \kappa J_k$ with $J_k \in \{0, 1\}$ the indicator whether P_k makes an explicit choice. Define now $\bar{N}_l = \{C_m \in \Gamma_l : \gamma_{ml} \zeta_l > \beta_m^m\}$ and $\underline{N}_l = \{C_m \in \Gamma_l : \lambda_l^S \gamma_{ml} \zeta_l > \beta_m^m\}$, which both increase in ζ_l and decrease in β_m^m . Note that for $P_l \neq S$, the decision to make an explicit choice depends only on the payoffs of her task Z_l and the cost of making an explicit choice. However, for $P_k = S$, this decision also depends on the choices that potentially align with C_k (when C_k is strategic) because S

cares about the full payoff. Whereas this affects ζ_k and ξ_k , they will both increase in β_k^k , which is what matters for the rest of the proof.

Let $S = P_k$. Conditional on investigating and announcing C_l , P_k 's expected payoff when $k = l$ equals $\beta_k^k \zeta_k - c_k \xi_k + \sum_{m \in \bar{N}_k} (\gamma_{km} \zeta_m \zeta_k - c_m \xi_m) + \sum_{m \in K_{-l} \setminus \bar{N}_l} (\beta_m^k \lambda_m \zeta_m - c_m \xi_m)$. A stronger belief $\nu_l^l = \nu_k^k$ increases implementation in two ways. First, it increases the likelihood that the strategic choice follows the strategy as ζ_k increases. Second, it increases the set of choices \bar{N}_k that align with C_k , again because ζ_k increases. To see that it also increases alignment, note that it increases the set of choices \bar{N}_k that align on C_k and the probability $(\zeta_m \zeta_k)$ of effective alignment.

When $k \neq l$, P_k 's expected payoff from investigating and announcing C_l when $k \in \underline{N}_l$ equals $\beta_l^k \lambda_l \zeta_l - c_l \xi_l + \sum_{m \in \underline{N}_l} (\gamma_{ml} \zeta_m \lambda_l \zeta_l - c_m \xi_m) + \sum_{m \in K_{-l} \setminus \underline{N}_l} (\beta_m^k \lambda_m \zeta_m - c_m \xi_m)$ where the second term now decreases in ν_k^k because that decreases \underline{N}_l through β_k^k and thus decreases implementation. When $k \notin \underline{N}_l$, an increase in ν_k^k does not affect implementation. The argument for alignment is analogous.

This proves the first part of the proposition (on implementation and alignment).

For the second part of the proposition, consider first the case that $S = P_{\bar{k}}$ where $\bar{k} = \operatorname{argmax}_l (\beta_l^l \lambda_l \zeta_l - c_l \xi_l) + \sum_{m \in \bar{N}_l} (\gamma_{ml} \zeta_m \zeta_l - c_m \xi_m) + \sum_{m \in K_{-l} \setminus \bar{N}_l} (\beta_m^l \lambda_m \zeta_m - c_m \xi_m)$. A stronger belief in her own decision will keep \bar{k} strategic and, conditional on \bar{k} being strategic, a stronger belief in her own decision increases the value of strategy (because it increases $\bar{N}_{\bar{k}}$), and thus the likelihood that she proposes a strategy. A stronger belief in others' choices does not affect the choices that others make but it does affect how $P_{\bar{k}}$ evaluates these choices. In particular, a stronger belief in others' choices does not increase the value from strategy but will sometimes decrease it. (While it does increase the expected value of the project, it also increases the expected value of the trivial solution, in balance *not* increasing the value of strategy. In fact when the decision aligns under the strategy, an increase in that belief may reduce the value of strategy because it does not affect the project value with strategy but increases the project value of the trivial solution.) It thus makes her less likely to propose a strategy. So this proves the second part for $S = P_{\bar{k}}$.

Consider next the case that $S = P_k \neq P_{\bar{k}}$. Analogous to before, S will now choose the maximum from $\sum_{m \in \bar{N}_k} (\gamma_{km} \zeta_m \zeta_k - c_m \xi_m) - (\beta_m^k \lambda_m \zeta_m' - c_m \xi_m')$, $\sum_{m \in \underline{N}_{\bar{k}^o}} (\gamma_{\bar{k}^o m} \lambda_{\bar{k}^o} \zeta_m \zeta_{\bar{k}^o} - c_m \xi_m) - (\beta_m^k \lambda_m \zeta_m' - c_m \xi_m') - \beta_k^k (1 - \lambda_k) \zeta_k$, $\sum_{m \in \underline{N}_{\bar{k}^k}} (\gamma_{\bar{k}^k m} \lambda_{\bar{k}^k} \zeta_m \zeta_{\bar{k}^k} - c_m \xi_m) - (\beta_m^k \lambda_m \zeta_m' - c_m \xi_m')$ where ζ_m' and ξ_m' are the indicator in the trivial outcome. The decision C_k is strategic in the first case, but not in the two others. In the first case, an increase in her beliefs about her own decision ν_k^k increases the value of strategy both directly because it increases ζ_k and indirectly because it increases \bar{N}_k by increasing ζ_k . In the second case, an increase in ν_k^k decreases the value of strategy via two channels. First, it decreases the third term by increasing both β_k^k and ζ_k . Second, it decreases the second term by decreasing $\underline{N}_{\bar{k}^o}$ (except potentially when $\beta_m^k \gg \beta_m^m$). For the last case, an increase in ν_k^k again decreases the value of strategy by decreasing $\underline{N}_{\bar{k}^k}$ (again, except potentially when $\beta_m^k \gg \beta_m^m$).

An increase in her beliefs about others' decisions will not affect these choices (and thus \bar{N}_l or \underline{N}_l), only the expected payoff from them. In all cases, the expected value from strategy decreases in the strength of her beliefs about others' decisions, thus making her again less likely to propose a strategy. This completes the proof. ■

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