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STRATEGIC BELIEF MANAGEMENT

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ABSTRACT

While (managerial) beliefs are central to many aspects of strategic organization, interactive beliefs have been rather neglected. In an increasingly connected and networked economy, firms confront coordination problems that arise because of network effects. The capability to manage beliefs will increasingly be a strategic one, a key source of wealth creation, and a key research area for strategic organization scholars.

KEYWORDS: Interactive beliefs, coordination, network economy, common knowledge.

JEL CODE: D84, M30

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THE CENTRALITY OF BELIEFS IN STRATEGIC ORGANIZATION

The formation and content of beliefs — as well as more or less closely associated notions such as expectations, real options, scenarios, etc. — are central to many aspects of strategic organization. Beliefs may be expectations about the specific actions of other players. However, players can also form beliefs about the beliefs of other players. Here are some examples of the centrality of beliefs in strategic organization.

On the Barney (1986) factor market argument, the very phenomenon of competitive advantage is ultimately a matter of beliefs, because the creation of competitive advantage fundamentally involves differential beliefs concerning resource value. Relatedly, entrepreneurship, that is, the exercise of judgment under uncertainty over how to use and deploy resources for the satisfaction of future wants, must also fundamentally involve beliefs concerning future states. The notion of “corporate vision” (Hamel and C.K. Prahalad, 1994) refers to corporate entrepreneurial beliefs and how these may mould future competitive landscapes.

A particularly striking illustration of the importance of beliefs to competitive advantage is provided in a provocative paper by Ryall (2003). In a game theory setting, he shows how a self-confirming equilibrium can arise in the context of market interaction when managers’ subjectively rational decisions produce events that are consistent with the same managers’ expectations. An implication of Ryall’s analysis is that firms can hold competitive advantages simply because their rivals entertain erroneous beliefs about them.¹ More generally, (non-cooperative) game theory approaches to competitive strategy shows the importance of this kind of “interactive epistemology” — that is, strategizing is ultimately rooted in what you believe about your competitors, what they believe about you, what you believe that they believe about you, etc. (Tirole, 1988; Shapiro, 1989). Hence, the importance of signalling by means of sunk costs, rationally irrational actions,

¹ For example, Pepsi management long held the view that Coca-Cola enjoyed market leadership because of their superior bottle design, and that, accordingly, Pepsi should beat Coca-Cola in the design dimension. Thus, to a certain extent Coca-Cola was successful because its closest rival “... consistent failed to grasp certain fundamental realities of its competitive environment” (Ryall, 2003: 938). It was only as a result of a major consumer-research study that Pepsi discovered that it was feasible to change to larger size packages that Coca-Cola’s marketing advantage from its unique bottle began to erode.

etc. in this approach. From a psychological perspective, there is a rich literature on managerial cognition (see Walsh, 1995), and there are attempts to link managerial beliefs to competitive interaction (e.g., Weigelt and MacMillan, 1988; Porac and Thomas, 1990; Fiegenbaum and Thomas, 1995). A related literature, perhaps beginning with Spender (1989), discuss commonly held and socially constructed beliefs in the context of industries (e.g., Porac, Thomas and Baden-Fuller, 1989; Lant and Baum, 1995). Even more fundamentally, White (1981) traces the formation of markets themselves to interactive beliefs.

Because beliefs seem so obviously central to central phenomena studied in strategic organization, one would naturally expect the study of belief management to constitute a central part of strategy.² However, in spite of the above literature(s), beliefs are arguably under-researched in strategic organization. Or, to put it more precisely, *interactive beliefs*, the formation of beliefs about the beliefs that other hold (e.g., with respect to oneself), are under-researched in the context of strategic organization.

The reason arguably has to do with the introverted nature of our dominant theories of strategic organization. Thus, the resource-based view instructs the strategist to utilize the information that s/he, and no (or only few) others, possesses in order to be able to utilize possible divergences in the beliefs about the true values of resources on factor markets. Implicitly, this is taking the beliefs of other players as given and unchanging. Approaches that are more inspired by evolutionist ideas usually assumes so much firm-level myopia that while managerial beliefs may be a part of the story, they are rigid and mainly inward-looking. In none of these is the formation of beliefs related to the actions of competitors, complementors, customers and suppliers central (and their beliefs don't matter either). Therefore, belief management is not a capability that is stressed in our dominant theories.

INTERACTIVE BELIEFS AND STRATEGIZING

² Management scholars with a strong sociological bent, such as some scholars working from the perspective of population ecology, may wish to play down the role of beliefs (in the sense they are defined here, namely as expectations) relative to norms, rules, and regulations as determinants of action. First, there is no general claim here that only beliefs matter to strategizing. However, the essay is taken up with situations where beliefs are the important determinants of action. Second, the emphasis on norms, rules, and regulations does not necessarily seem contradictory to an emphasis on beliefs. Indeed, norms etc. may be important exactly because the act as focal points in processes of interactive belief making.

At the most fundamental level, interactive beliefs matter to strategizing to the extent that firms play games against other players than nature. Given that, strategies are at least partly based on beliefs about other players, that is, beliefs about their information sets, their available strategies, their knowledge of the rules of the game, etc. This may include what they believe about other players (and perhaps even what they believe other players believe about what they believe about other players, etc.). It is intuitive that interactive beliefs may influence the state of a social system.

To illustrate, would-be thieves may believe that few resources are spent on protecting property in a neighborhood. Their beliefs may be correct, and they may get away with capturing property. In response, victims of such capture update their beliefs about the probability of thieves invading their property, and spend resources on expanding the protection of their property rights (burglar alarms, more secure doors and windows, armed guards, big dogs, etc.) until the expected benefits of this equal the costs on the margin. In turn, thieves may update their beliefs about the level of protection of property rights in the neighborhood. In the final equilibrium, aligned or converging beliefs will perfectly delineate property rights so that only what is, in net terms, worth capturing will be captured (Barzel, 1994). Of course, fully rational and perfectly informed thieves and property owners will perform these mental operations in a split second (or less) and will immediately home in on the equilibrium.

It is easy to extend this example to strategic competition with, for example, property owners playing the role of incumbents and entrants playing the role of thieves. It is also easy to see how the situation may be complicated by means of introducing asymmetric information in such settings. Game theoretical industrial organization economics shows how this carves out an essential role for signaling in deterring entry, making cartel agreements last, etc. Indeed, Shapiro (1989) comes close to *defining* the study of business strategy as concerning how firms may favorably influence rivals' beliefs by means of signaling. It is furthermore intuitive that we can, in principle, throw various behavioral monkey wrenches into the game theoretical machine to complicate matters and get other equilibria than those produced under the assumption of perfect rationality.³ Closer to the

³ The indeterminateness of oligopoly theory was one of Simon's (1978) key arguments in favor of bounded rationality. Cyert and March (1955) applied behavioural arguments to oligopolistic interaction. See Alos-Ferrer, Ania and Schenk-Hoppe (2000) for a more recent contribution.

theme of this essay one can also doctor the assumption of that common knowledge conditions obtain. Thus, assumptions of “almost common knowledge” about certain variables may yield different competitive outcomes (Rubinstein, 1989).

So far, the argument here may be read as a call for strategic organization scholars to (re-)read recent industrial organization economics and its strategic management applications, and make the beer/quiche game the centerpiece of strategic organization research. However, the message here is somewhat different.

Thus, overall the argument is that the ability to influence beliefs will increasingly be a central strategic capability, and one that goes beyond competitive interaction (whether in product or factor markets). The ability to influence beliefs will be increasingly important in managing *cooperation*. Thus, it will be central to managing supply networks, to influencing customers and users, and increasingly it will be the key to managing employees. Belief management will become a key source of wealth creation as we become increasingly immersed in an economy that is not only knowledge-based, but network-based. In this economy, firms will increasingly become confronted with what game theorists call “coordination problems” that arise for various reasons, primary among which are “network effects.” In situations that may be characterized as presenting a coordination problem to players, such as building installed base, managing beliefs can be an effective way of overcoming the problem and assist other players in coordinating on a preferred outcome. This is beneficial to all players, including the player that engages in belief management.

COORDINATION PROBLEMS

To understand what a coordination problem is, consider Figure 1a.

XXXXXXXXX *Insert Figure 1 Here* XXXXXXXXX

The 2x2 matrix in figure 1a maps a coordination game that involves two players, A(rthur) and B(rian). We may associate strategy 1 with choosing one kind of interface standard for an electronic widget that Arthur and Brian are producing, while strategy 2 is associated with another interface standard. Clearly, it doesn't matter which interface standard they choose, as long as they choose the same one.

Now assume that one of the standards may actually be better than the other one (i.e., Figure 1b). The standard associated with Arthur and Brian both choosing and executing strategy 2 is better than that associated with strategy 1, and Arthur picking strategy 2 complements Brian picking strategy 2. So, will they both choose strategy 2, given that they don't know what the other player will choose? The intuition is that they will, because it is "obviously" in their mutual interest to do so. The problem is that this intuition is not necessarily correct. In fact, in experiments, although the majority of players do coordinate on the standard that is associated with the high payoffs, not all do. The reason is that there is an element of risk: How can you be absolutely sure that the other player is completely rational — and, even if he is, how do you know that he knows that you know that he is completely rational? In Figure 1c the risk element is even more pronounced, and intuition is that this makes it harder for the players to coordinate on the (2,2) equilibrium. Such intuition is confirmed by experimental practice (Camerer and Knez, 1994): In lab experiments, most pairs fail to coordinate. Players evidently believe that it is too risky to play strategy 2. Thus, their mutual beliefs lead them to play the inferior equilibrium (1,1).

In these situations, communication often helps; in fact, in the stylized settings of the experimental game theorist, two-way communication makes everybody coordinate on the optimal equilibrium. But still, there are many situations where players for various reasons cannot communicate. Sometimes focal points help players coordinate their strategies. But often there may be no obvious focal points. In those cases where pair-by-pair communication is costly or where there are no obvious focal points, something else may substitute, namely the willed creation of what game theorists, following Aumann (1976), call "common knowledge" conditions, that is, belief management of a certain kind.

Focal Points

To understand this argument, consider the notion of focal point (Schelling, 1960). Why is it that a particular place, say, a bar, may solve the coordination problem that arises when a band of friends have agreed to meet at a certain time, but unfortunately forgot to make an agreement about where they would meet? In other words, in which way does a focal point influence beliefs? If one of the friends is asked, she may reply that she chooses a particular strategy, because she is convinced that the other players, those with whom she wishes to coordinate her actions, will also play the focal point strategy. And if she thinks

further about it, she may realize that she also (albeit implicitly) relies on her friends knowing that she knows that they will pick the focal point strategy, and that she knows that they know that she knows, etc. ... that they will pick the focal point strategy.

Thus, something (an event, a fact ...) is common knowledge among a group of players if each player knows it, each one knows that the other players know it, each player knows that other players know that the other players know it, and so on (Aumann, 1976). This may sound too extreme to have any relation to the practical world, for it seems to require that interactive belief making goes on to an infinite degree, that is, that the sequence of “I know that you know that I know that...” is infinite. However, as Chwe (2001) points out, in everyday interaction we often succeed in shortcutting the regress and approximate common knowledge condition.⁴ Focal point coordination implies much the same: When there is a focal point, you don’t have to think through anything; you can just play the focal point strategy. The actions of a charismatic leader may have the same effect (Foss, 2001). In a number of industries of the present and the future, increasingly the ability to effect strategic belief management, for example, by means of the provision of focal points, will be a key capability. Even if the epistemic condition of common knowledge may not obtain — and there are reasons to believe that in many situations it is extreme because the ability to think interactively in a sophisticated manner cannot always be taken for granted —, belief management may still matter. However, because it is a convenient benchmark, reference will continue to be made to common knowledge.

STRATEGIC BELIEF MANAGEMENT IN A NETWORKED ECONOMY

The Need for Coordination in a Networked Economy

Belief management increasingly matters because ours is an increasingly networked economy. Networks have their own logics, and to the extent that the economy is becoming more and more networked, theirs is the logic that business will have to obey. In particular, networks introduce the critical mass phenomenon through network externalities (Varian and Shapiro, 1989). This means that coordination problems of the kind we have just considered are becoming increasingly important. While strategic

⁴ The classic example is eye contact which means that “... I don’t have to think through anything; I can simply infer from past experience that usually when we make eye contact, common knowledge is formed” (Chwe 2001: 77).

organization scholars are well aware that industries with a high degree of connectivity pose special strategic problems relating to the build-up of installed base, the importance of complementor firms, etc. (e.g., Schilling, 1998; 2002), the particular challenges in such industries relating to the strategic management of beliefs have seldom and usually only indirectly been touched upon.

Strategic Belief Management: An Example

As strategic organization researchers we seldom question the economics assumption that consumers have perfect “consumption capabilities,” that is, can perfectly rank the consumption alternatives, process available information, understand why and how various goods and services produce utility, and compute what one can afford to buy. However, in real-life settings consumers (or users) are not likely to come equipped with such perfect consumption capabilities. Thus, much of advertising is really *educating* consumers, not only about prices and where to get the goods, but also about how products fit with each other, and how a given buyer will “fit” with all other buyers once he has purchased the product.

A particularly subtle example, discovered and interpreted by Chwe (2001), is Super Bowl advertising. The Super Bowl is the most popular program on network television that occurs regularly. It is likely to be seen by a majority of American households. In fact, any American household is likely to know that a majority of other households have seen it. The Super Bowl, in other words, is one giant common knowledge generator. Now, if one checks, as Chwe did, what kind of products are typically advertised on the Super Bowl transmission, it is products such as the Macintosh, the Discover card, Chrysler's Neon automobile and various Nike and Reebok athletic shoes. Is there anything special about such goods? Yes, indeed: buying each one of them constitutes a coordination problem because of network externalities. For example, the problem for a 1984 would-be Mac buyer is that he doesn't know whether a sufficient number of other buyers will in fact buy a Mac for there to be critical mass. Enter the Super Bowl transmission. As a potential Mac buyer, at least this will make you know that other potential Mac buyers have seen the Mac ad. In fact, this goes for *any* potential Mac buyer who has seen the Super Bowl transmission. In other words, common knowledge is established.

Products and services with the quality that they introduce coordination problems of the above kind are arguably increasingly important in the economy. Therefore, firms that wish to compete in industries where such products and services are produced need to understand the role of interactive beliefs in networks. The above reasoning suggests that belief management in the sense of taking cognitive leadership is most likely to be successful in the case of goods and services that are genuinely new and which are not necessarily complementary to a lot of other products (athletic shoes? movies?). (Otherwise, one may be up against too much installed base). Aggressively engaging in pre-launch tactics, such as massively announcing new soon-to-be-marketed products, is an important way of establishing cognitive leadership. Another, potentially complementary one, is to use alliances with other (complementor) firms to credibly signal that your product will become or already is popular. For example, Sun engaged in such belief management when it ran full-page ads in support of Java that listed all participants in the Java coalition (Shapiro and Varian 1999: 276). Another example is the promotion of Ethernet by the DIX (Digital, Intel and Xerox) alliance.

One important means of trying to establish the common knowledge that secures coordination is through emphasizing *simplicity*. A classic example that pertains to a coordination product is movies, specifically the very different ads for Steven Spielberg's *Jaws* and Robert Altman's *Nashville*, both from 1975 (Chwe 2001: 81). While the *Jaws* poster showed little more than a swimming (and naked) woman and a shark, the *Nashville* poster showed the whole 24 characters cast emblazoned on the back of a blue denim jacket. The simpler poster is likely to be noticed and remembered by many more than the more complicated poster. It is therefore more likely to help creating common knowledge.

CONCLUSIONS

I began by noting that (interactive) beliefs have been given scant attention in the strategy discipline. Perhaps this reflects a belief that beliefs cannot be molded or manipulated (or, if this can be done, that this is the task of marketing people rather than strategists) or that beliefs are just inherently too flimsy, unpredictable, vague, etc. to be something you can successfully influence in your favor. The argument in this paper has been that as we enter an economy that is increasingly, information-rich and networked, latent coordination problems will become increasingly prevalent. Often these coordination problems arise because of network externalities and critical mass effects — phenomena that have often been discussed in connection with IT markets. However, these coordination problems are becoming ubiquitous, and not just limited to IT markets, as connectivity becomes equally ubiquitous (and also apply to consumer goods, cf. Langlois and Cosgel, 1998; Cosgel, 1994).

There are many ways in which firms can influence beliefs to their advantage. Thus, they can gain advantage by more accurately understanding the coordination aspects of the products and services they offer and the motives of their customers. The ability to manage beliefs in a favorable way is potentially a resource that conforms to the VRIN conditions (Barney, 1991).

In terms of theory building and the source theories for strategic organization, the reasoning in this paper suggests that strategic organization researchers revitalize the concern with interactive belief formation found in, for example, Weigelt and MacMillan (1988), Spender (1989), Porac, Thomas, and Baden-Fuller (1989), Porac and Thomas (1990), Fiegenbaum and Thomas (1995), but do so building on rigorous game theory

research on interactive beliefs (for an early, accessible paper, see Brandenburger, 1992), ideas on informational cascades, and the like. Better known and more standard ideas on signalling in games may also come handy here (and they have already enjoyed some application in strategic organization). The application of ideas on common knowledge in this paper is just one, admittedly somewhat crude, exemplification of such an approach.

In terms of the teaching of strategic organization, it would seem that interactive reasoning is a teachable skill. There are behavioural reasons to think that we often may not reach very far in the hierarchy of interactive beliefs and instead apply shortcuts (i.e., “I believe that you believe” rather than “I believe that you believe that I believe ... etc.”) (Weigelt and MacMillan, 1988). However, there are situations where taking interaction reasoning to higher levels and avoid shortcuts pay off, and teaching may concentrate on doing exactly this.

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Figure 1: *Coordination games*

		B	
		1	2
A	1	1,1	0,0
	2	0,0	1,1

1a: Symmetric

		B	
		1	2
A	1	1,1	0,0
	2	0,0	2,2

1b: Asymmetric

		B	
		1	2
A	1	1,1	1,0
	2	0,1	2,2

1c: Assurance

BIO STATEMENT

Nicolai Foss is a Professor of Strategy and Organization at the Copenhagen Business School and the Director of CBS' Center for Strategic Management and Globalization. His research interests are strategic management, the economics of the firm, and the methodology of the social sciences. Mail address: njf.smg@cbs; website: <http://www.nicolai foss.com>. He blogs on <http://organizationsandmarkets.com>

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