AN ARCHETYPE FOR OUTSIDERS IN TECHNOLOGY COMMERCIALIZATION

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I. INTRODUCTION

Many confrontations between insiders and outsiders have garnered attention in technology markets over several decades. What can we learn from these prominent confrontations? Is there anything common to them? This chapter presents an archetype of confrontations that highlights the distinctive perspective of an outsider. In this archetype *insider* refers to an established leading firm in a specific market, while *outsiders* are startups or historical non-participants in the insider's market. The chapter interprets events as a conflict between the outsider's novel point of view and the insider's established point of view. To support this interpretation, the chapter examines numerous illustrations. In each, the outsider takes actions to gain customers, which leads to a reaction from the established firm.

The archetype directs attention towards commercialization, the act of translating technical knowledge into valuable products and services, hereafter referred to as *product(s)*. In this context *valuable* or *value* refers to market value, such as the price of a product and the profits of a firm, while *commercialization* is the less glamorous sibling to invention that translates inventions into value. Here the spotlight of inquiry focuses on the range of activities affiliated with designing the product's attributes, as well as producing and distributing it – that is, offering it for sale, competing with others for buyer attention, and doing this at scale. Though outsiders and insiders differ in their points of view, they both must perform similar activities, namely, bringing their product to market. In both firms, management and employees must plan operations and distribution, execute those plans, and improve their execution by learning from experience.

The archetype contains two broad stages— specifically, *Entry* for the first stage and *Confrontation* for the second. The first stage focuses on an entrant aspiring to confront the insider's leading position. The entrant

is an outsider, by definition, because it has adopted a distinctive point of view about how to create value around a certain product. In this chapter, we examine the differing points of view between insiders and outsiders regarding how their operations can support the marketing of the product to achieve success. During the entry phase the outsider goes through a period of "experimenting," namely, developing a commercial approach along its point of view, resolving open questions about how to tailor its approach to technical limits, operational requirements, and features users find desirable. Its view may remain hidden or unrevealed to the insider for a time. Meanwhile, the insider has its own marketing strategy and point of view—sometimes not even foreseeing the potential for the product the insider is developing.

The second stage, confrontation, focuses on the reaction of the insider. During this second stage, the established firm and the outsider *both* "experiment" in the marketplace (Rosenberg, 1992)—in the same sense as just described, plus a bit more. Each firm attempts to learn about open-ended questions regarding the value of features of demand, operations, and ways of organizing commercial actions. They also may imitate each other's experiments, and learn from each other's lessons. The archetype focuses attention on this competitive interplay between two rivals with distinct points of view, and emphasizes the links between that confrontation and the ways in which the confrontation emerges.

Confrontations between insider and outsider are uninteresting when an entrants' viewpoint leads to products that lack appeal with customers. Accordingly, the archetype spends its time analyzing situations where the outsider's ideas do have some merit, and leads the outsider to confront the insider in the second stage. For similar reasons, in comparison to the outsider's novel view, the archetype focuses on insiders who either (a) mis-estimate demand for major products that use the new technology, and/or (b) misunderstand how to employ new technology while supplying goods. In all cases, errors in estimating and understanding will go unappreciated by the insider until after the outsider enters the market with a distributed good. In this sense outsiders "surprise" insiders and their novel point of view generates competitive pressures, thereby motivating the insiders to act in ways they otherwise would not have. To overstate it somewhat, in the archetype outsiders are an agent of change, either by "unexpectedly" creating value for customers, and, relatedly, by motivating insiders to respond in ways that end up creating value.

What factors contribute to generating healthy competitive interplay between outsider and insider? The first part of the chapter stresses the factors that ease entry, such as lower costs of specialization, the

prevalence of open governance, and the gains and challenges of outsiders partnering with insiders. Perceptions of sclerotic behavior from an insider – due to organizational inertia or strategic paralysis or merely persistent misperception of opportunity – also makes the competitive situation more attractive for outsiders. The origins of the outsider also play a role in fostering surprise – whether the outsider comes from to the setting with experience from another market or a university, and whether it arrives as part of a wave of entrants. The next parts of the chapter offers an inductive approach to supporting the archetype. The discussion draws heavily on many known events. It features prominent firms, such as Microsoft, IBM, Britannica, Intel, Apple, Dell, and others, drawing from events that often receive some notice in the business news before disappearing into conversations inside organizational boundaries. This part of the discussion develops several themes around organizational inertia, examining the factors that lead insiders to imitate outsiders by quickly changing their plans (or not) and by quickly altering their investment priorities (or not). The discussion stresses the mechanisms that slow down response, and potentially misdirect in ways that reduce the seeming advantages of incumbency.

The archetype is suited to recent events in technology markets in which dispersed technical leadership shapes supply conditions (See, e.g., Ozcan and Greenstein, 2018, Bresnahan and Greenstein, 1999). Many firms, both startups and established firms, have access to scientific knowledge, frontier technical tools, and essential engineering talent. Both rely on the same providers of servers, standardized software, and cloud contractors. Both employ commodity suppliers and contract manufacturers, and both get key inputs from contract labor for frontier programming. That reduces differences between outsiders and insiders, and facilitates entry by outsiders. The argument here is that different points of view about how to create value lead firms to approach the same opportunity with different operations and distinct competitive positions, leading to differentiated technological competition between entrants and established firms. The broad goal of the chapter is to establish the plausibility of that argument.

The archetype has space for only so many comparisons. Why select these events for illustrating the archetype? First, the chapter focuses on important and recent events related to the determination of technological leadership in a market – i.e., determining which organization possess the largest market share and the frontier product designs. In addition, it is rare to have sufficient information to describe one firm's point of view in any depth, even with the benefit of hindsight, and rarer still to make direct comparisons between two points of view at two different firms. The events in this chapter contain the

depth necessary to support the analysis. These confrontations described in this chapter happen to have left publicly available records, and these provide insights about both points of view. That selection criterion raises the risk that some of these confrontations appear to be sui generis, and raises questions about their generality. That heightens the importance of demonstrating the match between the archetype and actual events, a point the chapter stresses. Said another way, because the chapter makes a "proof of concept," it needs to address questions about the generalizability of the archetype. It necessarily cannot answer all such questions, and so, some attention in the conclusion will go to specifying the limits of the archetype.

I.1. Contributions

The point of departure for this chapter is a well-known theme in the history of computing. Many studies celebrate the primacy of "spinoffs" that arise from disagreements among managers at established firms. These disagreements lead experienced employees to leave and start their own firms. Among the most documented examples are the actions of the "Traitorous Eight" employees of Shockley Instruments, who left to begin Fairchild. These employees left both to escape Shockley's managerial practices, and – often less emphasized in popular retellings – because the employees had come to a different point of view (than Shockley) about the best technical direction to pursue in manufacturing transistors (Thackray et al, 2015).

More broadly, spinoffs receive attention because they play a prime role as an agent of change in the evolution of economic activity. A widely accepted model of spinoffs is due to Klepper (2007), and Klepper and Thompson (2010), who modeled the formation of new firms as a product of disagreements, and argued for the generality of the phenomenon. Note the contrast with this chapter's archetype, which would characterize disagreements, such as those at Shockley Instruments, as a "confrontation between insiders with distinct points of view." Unlike the existing theory of disagreements and spinoffs, a theory of outsiders does not start from shared experience by the managers of the insider and outsider organization prior to the entry of the outsider. Hence, a theory of outsiders also directs questions towards different questions, such as the factors that nurture entry and confrontation with insiders. For example, how do outsiders overcome lack of commercial experience and bring their new perspectives into market events?

The focus on the confrontation between outsiders and insiders draws motivation from the vast literature

motivated by Schumpeter's (1942) essay on "creative destruction."[1] Schumpeter argues that competition to gain leadership can motivate competition among firms, both striking fear in established firms and providing strong incentives to new entrants to displace them. This chapter's archetype draws closest to one strand of the literature inspired by Schumpeter, which asks whether Schumpeter's vision carries over to settings in which competitors possess different "cognitive frames" about how to create value. These different "frames" leads firms to pursue distinct strategic approaches to new opportunities in technology markets (e.g., see Kaplan and Tripsas, 2008, Eggers and Kaplan, 2013, Martins, et al, 2015, Rindova et al 2012).[2] Within this strand, this chapter's archetype most closely resembles studies that compare the approach of two or more distinct firms in an otherwise similar technology market.[3] For example, Tripsas and Zuzal, 2018, compare different strategic approaches to developing businesses for air taxis at different firms; Gavetti and Rivkin, 2007, compare different evolving strategies for developing the business of portals during the 1990s; and Eggers, 2012, 2014 develops different strategic approaches to choices for developing flat panel displays. Similar to this prior research, the analysis herein also directs attention at the planning processes and priorities of established firms. It also stresses how cognitive differences or beliefs support or limit distinct choices. Unlike the prior literature, this chapter focuses less on managerial lessons, and more on the factors relevant to the determination of market structure and leadership, such as the role of institutions that enable or discourage entry of outsiders, and the factors that limit effective responses from leading firms. It also focuses more on the features of situations that lead endogenously to differentiated market positions, each supported by distinct points of view during a confrontation.

A related literature focuses on the causes of failure at established firms, and analyzes the processes that

[1] Perhaps the most quoted summary of the Schumpeterian argument about creative destruction is this: "Capitalism, then, is by nature a form or method of economic change and not only never is but never can be stationary... The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers' goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates... This process of Creative Destruction is the essential fact about capitalism."

[2] This language uses Kaplan's (2008) characterization of arguments among executives inside a firm as "framing contests," where executives debate ways to perceive uncertain events. Kaplan (2008) does not focus on the implications for industry evolution or competitive interaction. Rather, she goes on to show how such framing contests not only shape decisions ahead of uncertain outcomes, but also shape understanding of them after the fact. This links the framing contest to organizational status and power and strategic priorities. Note that, similar to the above remark about spinoffs, Kaplan's characterization is a model of "disagreements among insiders," where sometimes a spinoff arises and often times it does not.

[3] In this sense, the archetype also offers additional examples to the related literature about "technological competition" – i.e., society's contest and choice between two distinct technical approaches to providing a seemingly similar functional need. This theme arises in the history of computing, such as studies of competition between different computing platforms – such as mainframes and client/server (Bresnahan and Greenstein, 1999).

shape choices at an established organization. Failure of established firms is an essential part of understanding market leadership, and so receives attention in this archetype as well. This chapter resembles a blend of two approaches. The first is due to Gans (2016) and Tripsas (1997), which tends to deemphasize the cognitive foundations of differentiation, and uses economic analysis to examine different types of "disruptions." (For a broad overview, see Christensen et al, 2018). As in Gans' approach, this chapter's archetype distinguishes between evolution of a leading firm's understanding of uncertain features of demand and supply, and asks how experienced managers plausibly misforecast in market areas in which they have considerable experience. This approach typically finds seeds for a misforecast in mismatches between historical experience and the requirements for a new product or service. The second approach examines manager's forecast about "radical" technical change, and examines the cognitive processes that lead to misforecasts. Here, again, the emphasis tends to stress the mismatch of experience with new requirements. For example, Tripsas and Gavetti (2000) study the confusion at Polaroid, as its managers repeatedly (mis)perceived events and, relatedly, invested in capabilities (un)suited to the new competitive challenges. This approach heightens the relevance of prior industry experience in building capabilities. It also stresses how managers can act by imitating other firms perceived to be similar. It also stresses the importance of perceiving the learning from experiments inside an organization, which takes time (Benner and Tripsas, 2012).[4] A blend of these two approaches, along with an additional emphasis on how distinct points of view arise, provides part of the framework for this chapter's analysis for why many insiders respond so slowly to new challenges, and why anticipation of such slowness inspires entrepreneurial entry. In comparison, this chapter stresses why more than just market experience nurture different cognitive approaches of outsiders, and it stresses how competitive processes endogenously encourage different points of view.

Note also the differences of this archetype with models of technical change during the industry life cycle. A large literature examines early moments of markets – i.e., before technologies "mature" into widely accepted products affiliated with modes of large scale production and design, or modes labeled as a "dominant design" (See, e.g., Kaplan and Tripsas, 2008). In contrast, this chapter's archetype makes no presumption about the life cycle and its stages. In the approach of this archetype, entry can occur at any

[4] A specific area in this literature focuses on the role of firm identity in shaping innovation (Anthony and Tripsas, 2016). In this approach, an "identity" becomes associated with it a set of norms that represent shared beliefs about legitimate behavior for an organization with that identity. Investments that contradict this identity do not receive as much attention initially, and then, once they receive attention, organizations find it more difficult to adjust their processes (Tripsas, 2009).

point in a technology's life because institutional factors, such as dispersed technical leadership, encourages entry at many moments. In addition, this archetype allows for incremental changes during competitive confrontations to accumulate into something that later observers regard as "radical," and it describes the process during confrontations. "Radical technical change," therefore, is endogenous to the features of the confrontation and the conditions that nurtured entry, and there is no necessary presumption that the entry of outsiders always leads to radical technical change.

Another important overlap and contrast with prior work arises by comparing this archetype and neo-classical economic models of Schumpeterian confrontation. As in neo-classical models, in this chapter's archetype the creative destruction takes the form of differentiated competition. However, the neo-classical tradition in economics does not contain room for lack of managerial omniscience, mistakes in logic, or misperception of business models.[5] While the neoclassical view yields exact answers about incentives, an important contrast arises in the insights about asymmetric incentives to innovative. While neoclassical approaches allow for differences in incentives linked to factors shaping cost and demand, this chapter's archetype links those asymmetric incentives to the distinct points of view held by insider and outsider, and argues that asymmetry always arises when outsider and insider hold different points of view. Hence, asymmetric incentives is inevitable in such confrontations, and should be a central feature of any analysis.

Finally, this chapter's archetype borrows a key insight from the literature that derives lessons for managers, where, as part of their competitive efforts, firms attempt to convince analysts and observers of the merits of their particular outlook (McDonald and Eisenhardt, 2017). Like this approach, the archetype in this chapter does not presume any single definition for "industry" has or has not gained wide acceptance when an outsider first enters, nor when insiders confront outsiders in the market for users. That is, the definition of "industry" is an open-ended social construction determined by market events. The confrontation between insider and outsider may lead to new definitions for the market and for the group of firms in an "industry," and the success of the outsider in gaining market leadership may determine whether that new definition receives acceptance.

[5] Such models have a long history in economic theory. See, e.g., Arrow (1962), and Gilbert and Newbery (1983). For recent advances in this approach, see Cabral (2018).

II. NURTURING FACTORS

Although many startups fail before ever making it to market, several nurturing factors play a role in the archetype examined here, which will focus most attention on outsiders who achieve enough success to motivate a response from insiders. We consider features that arise in our settings, such as organizational inertia, financial partnerships, specialization strategies, and open governance.

II.1. Organizational inertia

A long-standing puzzle lies at the core of any analysis of different points of view. An established and leading firm would seem to have enormous advantages over its competitors in a new market. Established and leading firms bring refined processes, existing distribution and production, and favorable branding. Why would a successful firm come to have any difficulties organizing for a new market? Why would a new point of view about how to commercialize a technology give rise to any challenge? The archetype below stresses the role of planning and investment delays in the face of uncertainty.

Uncertainty plays a specific role. Firms must identify the salient features of demand, operationalize production and distribution, and achieve scale in their organization; and the valuable approach for doing so remains unknown in advance of commercialization. This observation is an assumption in this archetype: there exists no inexpensive way to resolve the uncertainty with a laboratory test, or by building a prototype. Even the best experts must guess until they observe operations, distributions, and sales at scale. That uncertainty permits multiple guesses to survive.

It is tempting to say the following: Insiders or outsiders both face risks, and those risks overwhelm all else. After all, insiders fail from time to time, and the vast majority of outsiders fail to realize their grandest aspirations.[6] If nothing more than randomness determines outcomes, then any simple theory reduces to two probabilistic distributions – one determining the probability of success by an entrant, and the other determining the probability of success of a leading firm. While logically valid, this chapter will not explore

[6] There is some question whether the era of the commercial Internet—from which many of these examples are drawn—was any different in the experience of failure. One group of researchers has argued that it displayed a higher rate of private success and well-known big failures (chapter 12, Greenstein, 2015); and the emphasis of venture capital on massive profitability, which few also achieve, distorts the historical picture of the broad trends. See Goldfarb et al. (2007), and Kirsch et al. (2008).

such a theory. It is inherently unsatisfying because outcomes depend entirely on randomness. It lacks a causal explanation tying outcomes to grounded facts, and provides no insight into *why* sometimes an established firm had a poor outcome at the same time as an entrant experienced success.

The archetype in this chapter stresses the role of planning at established firms and the time it takes to invest around these plans. Both are essential features of any commercialization process at established firms.

The role of planning is essential to the operations of any large organization. Planning cycles determine which factors an organization attends to, and which factors receive low priority. Every large organization has budgeting cycles that take time and effort. Established firms rarely plan to cannibalize their own products without prompting, and rarely seek to reduce the return on investments in unique bodies of knowledge, experience, and training. Relatedly, leading firms rarely invest in developing prototypes that do not serve their own interests—at best, they underinvest in prototypes that appear distant from their own interests. Simply, even the best plans are rarely omniscient.

Even when established firms do change their priorities, new investments take time to execute. To change their priorities, established firms need time to communicate to their management and workforce about such priorities. They may need to change incentives systems to support the new business. They may need to build momentum into investing with priorities consistent with an existing business. As discussed below, such priorities manifest as several tendencies, namely, (1) to extend existing products for existing customer base; (2) to use existing talented work force in known ways; and (3) to build in ways consistent with existing firm-wide assets, where the challenges "integrating" new and old lines of business will draw particular attention. These priorities limit the actions of established firms in the short run, particularly on the scope of products and services offered. The last factor especially limits the riskiness of a firm's actions in new technology markets by limiting, for example, its ability to quickly merge with another firm and rebrand it as its own.

These two broad elements – planning and investment delays – will play a role in leading insiders astray. As shown below, entrants make different plans than established firms, those differences reflect distinct points of view, and the speed in implementing those plans plays a key role in any success. Outsiders will

seek to take advantage of the insider's delay adjusting to the new point of view, and the challenges insiders face in learning to imitate.

II.2. Outsiders Working with Selective Insiders[7]

In many settings an outsider cannot execute its plan without the cooperation of at least some insiders. Do outsiders have a difficult time finding an insider partner? In one place, venture finance, this question has been studied extensively. Do outsiders obtain finance from insiders? The answer is yes. It is one of those things frequently observed among outsiders who reach prominent success. However, examining only these successes selects observations on outcomes and does not fully characterize the situation before any cooperation emerges. In fact, some outsiders do find funding from or cooperation with insiders, because insiders do not let social station get in the way of a business investment if it appears profitable. It is a feature of modern VC practice, and a notable one, that financing can overcome social status.

One illustration of financing from insiders can be seen in the founding of HoTMaiL, which was funded by Draper, Fisher, and Jurvetson (DFJ). Tim Draper is the archetypical insider in commercial high tech; he has a Harvard MBA, and his father and grandfather were VCs on the West Coast. Following in the family's footsteps, in 1985 Draper formed a VC firm in Menlo Park, California, eventually partnering with John Fisher and Steve Jurvetson to form DFJ.

By 1995, DFJ specialized in funding entrepreneurs aspiring to start new firms. The entrepreneur's social station, age, and ethnic background did not matter to the financing. Very little about the entrepreneurs' identity mattered except what business they could build and their chances for success. Although this practice is especially risky, DFJ believed financing firms with high potential and hoping to nurture a small number of extraordinary successes would make up for the losses of the majority of the other financed firms.

It did. One day in 1995, two unknown, first-time entrepreneurs, Sabeer Bhatia and Jack Smith, pitched a product to DFJ. Even with backgrounds as far apart as possible, the parties made their deal less than 48 hours after they first met and began to create the technology that would become HoTMaiL, a new web-

[7] See chapter 8, Greenstein (2015).

based email service.

HoTMaiL grew quickly, because user communication became the instrument in spreading the adoption of the services. This behavior, eventually known as *viral marketing*, utilizes users to help the supplier sell the product. DFJ became a major proponent of the practice, and it advertised its expertise as a way to attract more startups. Eventually HoTMaiL grew to twelve million users in less than two years, and with almost no marketing. It sold to Microsoft for 400 million dollars in 1997. Even today it remains the second most popular email service.

Partnership between insiders and outsiders may or may not place constraints on that discretion on the outsider. It depends on whether the interests of the insiders and outsiders are aligned (or not). The interests of a financier and entrepreneur tend to be aligned when the young firm grows rapidly, particularly when the costs go up more slowly for both participants than the potential revenue. Yet, as examples below describe, if the costs of the partnership increase for the insider without greater increases in revenue, those interests become less aligned and produce tension.

II.3. Specialization

A specialist performs one function and takes for granted that the other functions will be performed because those other functions are part of a designed network. Many startups fail, and for a variety of reasons, but outsiders have an easier time if the market supports specialists, which increases the likelihood of success, and increases the potential for experimentation, as the following examples depict:

For example, from its founding and continuing into the present, Google is a search specialist. To deliver its service to your home today, Google must partner with every data carrier around the world—both wireline broadband firms and wireless smart phone supporters. In addition, it must partner with other firms using web technology, smartphone markers, ad exchange operators, content delivery network providers, browser and web server makers, and dozens of others.

At its founding, however, Google needed only to search, and to do it well. At that point, it needed to operate its own servers, and the software that ran on it. The software for spiders and algorithms resided

on the server. In addition, the Internet and the World Wide Web were open technologies and, by definition, were available to all. Related, web pages built by users defaulted to being open as well – a web master had to opt out deliberately – which made most of the web available to a spider without frictions.

Other successes were also specialists: HoTMaiL performed one activity, provided only one service, namely, browser-based electronic mail. Similarly, as discussed below, at the outset Netscape performed one activity. It designed, produced and distributed a browser. As another example, Microsoft's encyclopedia department was close to being a specialist. In 1991, its development team involved only four employees and separated itself from all other activities at the firm. The team focused on Encarta and expected that other functions later would receive attention from the rest of Microsoft. In fact, Microsoft actions to support Encarta did not begin to grow until after Encarta's initial success in 1993; and, during its first few years, the Encarta team was a separate organization that reported directly to the CEO (chief executive officer) and COO (chief operating officer).

II.4. Open Governance[8]

Although outsiders face many challenges when entering a market, open governance provides another nurturing factor that can ease their entry. Without established firms and other actors (e.g., government regulators) slowing down the entry of outsiders into markets, entrants have the discretion to act as they prefer.

For example, note the governance of both the Internet and the World Wide Web: There were more than twenty years of operations and refinement prior to the Internet's widespread commercialization, during which time The IETF (Internet Engineering Task Force) developed a large number of protocols for providing networking services. The idealism of the founders of the Internet played a key role in establishing open governance. The IETF was founded within academic norms, and the major participants chose to keep the institution open. Likewise, some of the same principles carried over to the World Wide Web Consortium when Tim Berners-Lee chose not to privatize the World Wide Web; instead, he operated a consortium with limited rights over information. While membership in the consortium permitted privileged access to information sooner than others, and Berners-Lee retained the ultimate right to settle

[8] The origins and operations of open governance has a long history. See Greenstein (2015), chapters 2, 3, and 7.

disputes, his consortium adopted practices that did not preclude other participants from gaining information at later moments. The open governance of the Web further altered the architecture and governance of the Internet technology, which then shaped outsider entry.

Consequently, because the Internet is decentralized, anyone with a computer can access the Internet in a variety of ways. Meanwhile, the openness of the Web allows users to share information across the Internet with transparent and clear interfaces between different parts of the Web. Any specialist working with the Internet and the Web can gather information about how to work with the rest of the network. There are no limits on who can view information about the operations of the network; and there are no limits on how the information could be deployed, nor to whom and to where.

This kind of setup provides an absence of a key legal feature that a lawyer would characterize as "reach-through" rights. In other words, specialists working with the network have full discretion to invest in their business without fear of a partner in the network interfering with their activities or making a property claim against their action.

Said simply, open governance nurtured outsiders by preventing self-interested insiders from taking actions to slow them down or blockade outsiders. It permitted outsiders to experiment without giving any veto rights to established firms. Consequently, outsiders could then learn from their experiments and further refine their products, service designs, and operations.

Summarizing, the opportunity for outsiders rises in markets with dispersed technical leadership when the market opportunities enables entry by specialists. Specialists find it less difficult to introduce their ideas when they have access to support from financial intermediaries, such as VCs, and when partnerships with insiders do not place restrictions on their actions. Open technologies also help, because that provides discretion to develop their businesses, and reduce interference from other firms.

III. ENTRY

The entry stage begins when an outsider has a point of view about how to create value, distinct from the leading insider. The outsider goes through a period of experimenting with prototypes and developing a

commercial approach to this point of view with limited interaction in the market. Its view may remain hidden or unrevealed to the consensus for a time. In fact, many of these firms fail before their point of view becomes widely known.

The examples examined here disproportionately come from prominent successful outsiders in order to economize the presentation of the archetype and show how these firms have had an impact on insiders' point of view about demand and operations.

Below we examine the entry experiences of three outsiders with unique points of view. In one case, the outsider's point of view built on its experiments and prior experience in another market. In the second example, the outsider's perspective built on its experience and experiments at a university, outside of a competitive environment. In the third case, the outsider's view and experimentation depended on a rush involving many firms. In the first two instances, the outsider's point of view remained hidden from the insider for a time, while in the latter case, the outsider's point of view only became clear to the insider suddenly. Table 1 provides a summary of the confrontations in the first three rows.[9]

III.1. Experimentation built on experience[10]

Consider the canonical and well-documented example of an outsider upending the digital age: The young Bill Gates and the introduction of Microsoft Encarta. As a young executive, Gates had many well-known obsessions, and that included entering the encyclopedia market, despite lacking any experience with it. Although the firm had only a small revenue stream, starting in 1985, he made entering the encyclopedia market a pet project, and assigned one person to pursue it.

Experience in other markets did not confer any particular advantage to Microsoft, and the early experience did not go well. No existing player agreed to enter into a joint venture with Microsoft. By 1989, a division of Britannica, Compton's, issued its first CD-ROM encyclopedia, which was met with critical acclaim but not high sales. At the same time, Microsoft had to settle for a deal for text from Funk & Wagnalls. The consensus of insiders regarded this text as low quality. It used simple language that aimed at school-age

[9] The descriptions below are necessarily cursory summaries. See the references for further details.

[10] This is a summary of a much longer and more detailed study. See Greenstein (2016).

children. The articles were short and uncomplicated. Unlike Britannica, the articles lacked the authority of recognized experts.

Many features of "a new point of view" arise in this example: (1) Microsoft saw value in the low-quality text despite others' disparagement of it; (2) persisted in pursuing the encyclopedia market, despite the refusal of other firms to collaborate; (3) foresaw the potential for the product to help its sales, in contrast to Apple's PCs, which aimed at the home market and took market share from Microsoft's operating system. Gates continued to believe that some development work might reveal insight into how to approach the situation. Success appeared unlikely to all others.

By 1990, the firm was bigger and more experienced. Microsoft's board considering killing the project, and temporarily did eliminate funding for it, but after an employee suggested a new approach, the CEO championed the project, and it was reinstated. It assigned skilled employees to the product's small four-person team. Unlike existing book encyclopedias, Microsoft anticipated it would sell the CD-ROM through third-party retailers at a low price. That approach to distribution and sales leveraged Microsoft's existing channel experience and gave it a distinct outlook for designing a digital encyclopedia.

That distinct point of view shaped design choices. For example, like any other firm, Microsoft faced severe space constraints on the CD-ROM. Its team of designers considered numerous ways to store songs, pictures and movies, and encountered the same space constraints that others had encountered before. There were only so many ways to address that constraint before it became binding. Microsoft's reaction built on its unique point of view. Cognizant that it had only a few minutes to persuade buyers to purchase the product, it chose to design a product that grabbed the attention of a shopper in a third-party outlet.

Two features turned out to matter. Having failed its first launch in the winter of 1993, Microsoft brought the price down to $99 from $299 for a relaunch in fall of 1993. In addition, the design team carefully selected videos, which appealed to parents. One such clip was Neil Armstrong's first step on the moon, and his words, "One small step for man, one giant leap for mankind." Another notable clip was from current events—in this case, the signing ceremony between Rabin and Arafat on the White House lawn, which had taken place only a few months earlier. The latter clip highlighted the difference between a CD-ROM based encyclopedia and a set of books, namely, once printed, books cannot easily add pages with

new information, but computers updated periodically, so they can use additional new information.[11]

In short, the company's point of view—lowering the price, appealing to parents, and using attention-capturing video to show how current digital encyclopedic information can be—emerged from Microsoft's experience distributing software in third-party markets, and thus shaped its design. It made an enormous difference to their commercialization. The established firm, Britannica, took a very different approach (technically novel, yet consistent with its history), and will be investigated in the section on confrontation.

III.2. Experimentation inside a university[12]

The previous example features a firm that had business experience prior to entering a new market. What about outsiders who found their first firm? Do different origins provide different paths into the market?

Consider another well-documented, canonical example: Larry Page and Sergey Brin, graduate students at Stanford, developed a project that ultimately became Google's search engine. In the late 1990s, theirs was one of several search engines and, arguably, not even among the most celebrated at the time (such as Inktomi or Altavista). Ultimately, Google became ubiquitous.

As graduate students in a laboratory, Brin and Page did not work within the commercial consensus and were outsiders to the market. In their research, they pursued a spider-enabled ranking algorithm, named *Backrub*, for making recommendations in a search engine. While deploying the search engine at Stanford and allowing the university to patent the algorithm and pursue licensees, Brin and Page made no effort to commercialize it. As the algorithm took traffic from many users at Stanford, Brin and Page experimented and refined their approach over several years. This project fulfilled the basic requirements for a laboratory project in computer science, at the outset, but commercial success appeared remote. Meanwhile, the project continued to improve the engine's accuracy and relevance through leveraging users' experiences; and the online traffic helped Backrub learn how to conduct search, though this experience taught Brin and Page little about how to generate revenue from ads.

[11] This was mostly a marketing ploy to make Encarta look current. Britannica sold a yearly "update" to its encyclopedia to address the demand for current events, and most buyers never looked at it.
[12] This example is described in more detail in Chapter 13 of Greenstein (2015).

Brin and Page did not begin their commercialization efforts immediately. Instead, they wrote two papers, one between the two of them, and one with their laboratory supervisors and thesis advisors. By 1998, both had finished taking classes, and these papers served as stalking horses for dissertation chapters. While their efforts did not remain "hidden" to anyone who bothered to read the papers or use Backrub, the technical capabilities were primitive and unrefined.

Meanwhile, Stanford patented the algorithm and tried to license the patents affiliated with the Page-rank algorithm. Most user traffic went through portals, such as Yahoo! and AOL, and these firms seemed like natural targets for the license. Several of them used search engines as a means for users to find pages and categories that otherwise had not been indexed. Inktomi, another search engine that grew out of an experiment at UC Berkeley, provided the search services for Yahoo! and others. Stanford's effort to gain further licensees from portals, including Yahoo! and Excite, did not yield much, because the asking price was too steep for the portals. In other words, none of the leading firms perceived the invention as particularly valuable.

There was nothing particularly wrong with this assessment based on the current capabilities of the software. In 1998 Backrub lacked the speed and scope that would mark its later versions— versions that had considerably larger investments in hardware behind the performance, as well as multiple programmers refining and improving the server software. Making an accurate forecast required a distinct point of view about how the capability would evolve with improvements.

Thus, Brin and Page's unique point of view to improve their technology within the university setting before beginning to commercialize not only nurtured their experimentation, but also gave them a vision about how to make their product successful. They began commercialization only *after* several years of experience improving their technology in the university. The cofounder of Sun Microsystems, Andy Bechtolsheim, himself a former graduate student of Stanford's computer science department, decided to act as an angel investor, providing money, advice, and connections, which not only gave Brin and Page access to other investors and VCs, but also helped them with the first difficult steps of starting a business. Ultimately, after Brin and Page received funding, and only after they had been operating their firm for a while, did the VCs insist on experienced management, which led to hiring CEO Eric Schmidt and CMO Jonathan Rosenberg.

Brin and Page's unique point of view also included their neutrality to several commercial opportunities, which ultimately shaped the business. Initially, Sergey Brin and Larry Page continued on the path they had pursued at the university, namely, combining Page-rank and spiders to create a search engine. The search engine was oriented toward giving users the most satisfying experience, and was "commercially neutral" with respect to advertisers. This deliberate approach was regarded by some VCs as naïve and unlikely to lead to much revenue, because it differed from other experiments to build search engines that yielded revenue by listing the firms that bid the most.

Experimentation took a very neutral form as well. For the first few years of its existence, Google displayed a search bar at its primary website. Next to the search bar, Google occasionally displayed banner ads, which were sold in advance and without regard to the search, but they were not regarded as the primary source of revenue. Regarding neutrality as an essential feature for licensing to multiple parties, early on, Google aspired to license its services to other portals. Similarly, the organization established a practice it would maintain for good, namely, the division that sold the ads was kept separate from the division that designed the search engine. One could not influence the other.

Many of the portals did not perceive any competitive threats, and eventually cut deals with Google for its search engine, which was still a small fraction of traffic on most portals. Following a much earlier deal with Netscape, in mid-2000 and continuing throughout 2001, Google displaced Inktomi (and eventually all other portals, as well) as the predominant search engine on Yahoo! Though these contracts accounted for only a small fraction of traffic at the portals, they gave Google a nearly ubiquitous view into the search behavior of the entire Web. The contracts also had important symbolic importance. Specifically, they provided attention and legitimacy. Why did so many firms agree to such contracts? Because the consensus view did not perceive Google as a competitive threat.

The environment was nurturing in another way— it fostered imitation. Imitating a practice invented by others, principally Goto.com, Google began experimenting in the fall of 2001 with marrying their service with an auction for ads, where the ads matched to the keywords entered by the user in a search. Google's employees reengineered many improvements to match their own unique outlook—that is, that the ad should help the user find what they wanted and should not influence the result in the search. The

experiments, once again, reflected the unique point of view of the founders. The search engine remained neutral in the sense that its results remained uninfluenced by the ads. They imitated other auctions, improved them, and applied it to advertising with the search engine. The auction eventually took a unique set of features, becoming a quality weighted-second price position auction. This design abandoned the preference for first-price auctions used elsewhere in favor of a process that showed more positive properties.

The realization of what was happening crept up on many observers gradually instead of quickly. First, and this is hard to appreciate in retrospect, for a long time Google was not given much of a chance to earn revenue. The prevailing view among most analysts favored Yahoo!, and Yahoo! treated search engines as a minor component for miscellaneous searches. Second, there were not many analysts with the experience to appreciate the accumulation of Google's many little successful experiments. In particular, Google had begun conducting A/B testing in 2000, a new practice for rapidly improving the design and conduct of their services in myriad dimensions.[13] Few appreciated what that practice would yield.

Third, and for many years, Google purposely muted its voice, trying not to be too brash in shouting about its aspirations. Later observers would give this behavior a label, calling it a "stealth strategy." Nothing was a secret to the innovating firm's employees, but for various competitive reasons they typically did not share their progress with others. Eventually, the market presence became hard to ignore, and many observers—competitors and analysts—slowly took notice. In that sense, the commercial success came as a surprise to both rivals and analysts. Competitors began taking actions later, such as Yahoo!'s purchase of Goto.com, but these were too little too late. By this point, Google had accumulated a service with considerable appeal, and, importantly, this service generated revenue. They also had put in place organizational practices for continuing to improve the service.

III.3. Experimentation During a Technology Rush[14]

The prior two examples focused on experimentation by single outsiders. Experimentation in a technology market sometimes arrives in a different form. Like the gold rushes in the 1800s, a technology rush (1)

[13] Quoted from Stephans-Davidowitz (2017).
[14] The basis for this anecdote comes from chapter 6 of Greenstein (2015).

occurs when many firms all react to the same new information and hurry to bring a technology to market and (2) is unknowable in advance. Like every historical gold rush, a technology rush is unique because it happens in a particular place at a particular time and not again. There are, however, general economic patterns to technology rushes. Before the rush, market participants are rare. Then, after information about the discovery spreads, many potential participants perceive that they must act quickly or be left out of the profits. That creates the incentive for everyone to move fast. By circular definition, the rush cannot happen until the discovery, which cannot be known in advance. Hence, forecasting the timing of a rush is impossible, even though it is easy to forecast the general tenor of economic activity after discovery.

Follow the logic of the metaphor. A prominent commercial event in a technology market typically acts as a catalyst, thereby triggering the technology rush. Predicting one of these catalytic events is near impossible, just like forecasting a gold rush. Moreover, for every one of these examples, there are scores of product launches that fail to generate the same vigorous response. That makes it even more difficult to predict which of the many young firms will become a catalyst and when.

What were many analysts waiting for? They needed something concrete, a working prototype. The working prototype had to appeal to more than a technically adept chief technology officer (CTO). It had to contain enough functionality to persuade CEOs, boards, and VCs that a mass-market user might find it appealing. Most had to appreciate how the prototype would fit into a recognizable and reliable value chain that could support packaged software. As it would turn out, Netscape fit those qualifications.

The story of Netscape's founding has been told many times. Only a brief outline is required here. Jim Clark, a well-known senior executive partnered with Marc Andreesen, who was the lead programmer for NCSA (National Center for Supercomputing Agents) Mosaic, and Eric Bina, an otherwise unknown student designer. Andreesen and Clark approached and received support from Kleiner Perkins, a name brand venture firm. Importantly, Andreesen had worked on the browser for more than two years at the University of Illinois, helping to write a browser for both Unix and Windows systems. In other words, the product had incubated in a non-commercial university environment, oriented toward large-scale use by students.

The team that developed Mosaic left the university in the spring of 1994 and founded Netscape. After

rapid development, the company released a product. Netscape's launch of its first product was a catalytic event, and it triggered a rush in February of 1995 (and, arguably, was triggered earlier by the release of the Beta version in November, 1994). Why? As has been well documented, commercial analysts lacked experience with the Internet and Web, but Netscape had incubated and improved among technical users in research universities. Many commercial analysts neither appreciated how refined and reliable the technology had become, nor perceived the Internet's value to non-technical users and the myriad and clever ways it could serve them. The insider belief also did not perceive how to build a profitable browser business. Jim Clark remarked later, "I'd say there was a fair amount of skepticism at the time about whether the Internet held any promise. And, of course, I felt that it did."

The technology rush followed quickly after the launch. The product was adopted quickly and generated an astonishing amount of revenue in a short time. Its distribution combined conventional and novel modes. The conventional side worked like any business-to-business software, involving licenses with major business users and third-party distribution of packaged software. The novel mode involved "downloading" the software at no charge, aimed primarily at households with technically sophisticated users. The latter largely displaced Mosaic, which had been available through a license from the University of Illinois, but had not been marketed aggressively. Thus, Clark's unique point of view in the Internet's commercial profitability swayed the technical market only after the product was offered.

By the time of Netscape's IPO (initial public offering) in August of 1995, there were no doubters in any part of technology markets. In May of 1995, Bill Gates had written and circulated a memo inside Microsoft stating his change in priorities for the firm regarding the Internet, and the consensus held Microsoft as already six months late, if not more. In June, Microsoft tried to buy a part of Netscape and failed to come to terms. In other words, by August of 1995, every technology analyst believed the commercial Web-enabled Internet would have an astonishing set of capabilities, and Netscape was the catalyst for this new perception, and the immediate impetus for startups that followed over the next year or so.

III.4. Summarizing Entry

What do these examples tell us? They showed the entry experiences of three outsiders with unique points of view, and showed that there was no single way of discussing the origins of their point of view. In one

case, the outsider's point of view emerged from a combination of experiments and prior experience. In the second example, the outsider's perspective emerged from experience and experiments at a university. In a third case, the outsider's view emerged during a rush involving many firms.

The outsider's viewpoints also differed in their visibility to insiders. In the first two instances, the outsider's point of view remained hidden from the insider for a time. In the latter case, the insider perceived the outsider's point of view suddenly, along with many other events. Despite that variety all shared an element of "surprise."

Table 1 provides a summary of the three cases described so far. The discussion below about confrontation will build on these entrants, and identify commonalities with several other entrants, which have not yet received attention, and who will be introduced in the text below. This delay is for the sake of brevity.

IV. CONFRONTATION & COMPETITION

The second stage begins after the outsider enters and the insider decides to react. During this stage, the established firm and outsider both "experiment" by interacting with market actions to learn about open-ended questions regarding features of demand and operations. Either the established firm changes its point of view or not—typically, it does. A competitive confrontation takes place in the market, and then experimentation continues until both insider and outsider settle into differentiated competition niches or one or both exit the market.

The key question is, Does the presence of the outsider prompt the established firm to take action that differs from what would have occurred otherwise? Obviously, a controlled experiment cannot address this question because firms take only one concrete action. It cannot compare what happened against an alternative concrete action in which they face different circumstances. Instead, they compare one concrete action with one hypothesized alternative.

Accordingly, what shapes the likely alternative? Established firms tend to develop options consistent with their present business for two essential reasons. One involves planning, and the other considers the time required to make investments.

Because the market entry of outsiders can be catalytic, insiders may act in ways that they would not have otherwise. Several reasons motivate insiders to develop new products:

- Protection of revenue: Anticipating that success from an outsider could lead to reduced revenue at the established firm in the near term, the insider becomes motivated to develop prototypes and products that reduce the likelihood of revenue declining at the established firm.

- Newly perceived awareness of a market demand: Because the outsider demonstrates a demand that the leading firm had not fully appreciated, the insider can be motivated to develop new prototypes and products.

- Control over intermediate inputs: An established firm may forecast that products, markets, and technology standards will develop outside of their control, which has consequences for their ability to generate revenue and measure demand.

- Cost: the outsider can drive up unanticipated costs for the insider who had acted as a partner. Entering the market aims at moving costs back onto the outsiders.

This understanding of motives links observed actions, confrontation, to causes, distinct points of view. It also informs an approach for analyzing situations. If a new point of view motivates change, then there should be plenty of evidence that such motives played a salient role in an insider's strategy and activity. There also should be plenty of evidence that the insider would not have taken the action, because the new action remains inconsistent with an older (pre-entry) approach to technology commercialization.

Once again, Table 1 summarizes the events. Two of the examples continue stories begun above. The three new examples appear in the fourth through sixth rows of the table.

IV.1. Internal Conflict as a Barrier to Reaction: Britannica[15]

As was discussed earlier, Microsoft was the outsider to the electronic encyclopedia market, and Britannica the insider. Britannica developed its new product in a manner consistent with its existing practices in distribution and product design. Microsoft's product did decidedly well after its second launch. Meanwhile, Britannica scrambled to respond and failed to do so effectively. But why?

Britannica's point of view was based on its established business and successful existing practices. One of the clues to ascertaining why Britannica stumbled stems from a closely related market—online encyclopedias. Britannica had a remarkable record in online encyclopedias. It was the first firm to develop one successfully and offer it in an html-compatible version. Britannica made it available in a beta format in January 1994 and began a licensing program a year later. It began selling to many libraries and began a program for licensing access to homes.

Nevertheless, while libraries responded, households did not. So, although Britannica had foresight and correctly anticipated library demand for such a product, it mis-anticipated household demand. At its peak, the licensing to libraries amounted to five percent of revenue, which made a modest contribution to the bottom line. Unfortunately, households constituted a much larger market, and so Britannica's actions were not lucrative.

More to the point, the experience in browser-compatible encyclopedias suggests Britannica did not lack the technical capabilities required for new markets, nor did it have myopia in its vision of how to transition its product into the digital era. Britannica had first-rate technical capabilities in its own technical team and successfully deployed those technical skills in the online encyclopedia market much sooner than anyone else. Indeed, it led the online category for a decade, until Wikipedia came along in 2002. In other words, Britannica had no problems with developing technical skills or deploying them. Thus, its timing and planning were solid. Britannica pursued a distinct design strategy, one that preserved its brand and existing text.

Why, then, did Britannica have a less satisfactory experience in CD-ROM encyclopedias, where it faced direct competition from Microsoft's Encarta? Why did Britannica's existing business provide challenges that slowed down its actions in the new CD-ROM market *in spite* of the possession of capabilities and a

[15] This argument is made in more detail in Greenstein (2015).

forward-looking outlook?

The answer is based in the insider's internal structure and branding. Britannica would have continued to act in certain ways even if Microsoft, the outsider, had not entered. In addition, the outsider's entry highlighted the insider's struggles

To begin, Britannica possessed a set of assets that served its interests in the existing markets of book-based encyclopedias, and those assets had to be shared with the new CD-ROM market. Sharing the assets posed an internal conflict for Britannica around (1) brand, (2) text, (3) distribution, and (4) working capital.

Brand. Britannica had invested in its brand as the leading expert encyclopedia with the most scholarly material and most complete information. While that prestige and reputation served its needs in the market for online licenses for libraries, it interfered with its needs for the home market, which wanted text aimed at school age children. Encarta oriented itself to that customer demand. Partly as a result, Britannica took cautious experiments with its brand. It first attempted to sell the Compton Branded encyclopedia, which was aimed at a younger audience, but Compton's had less brand appeal than Encarta.

Text. Britannica sought to port its text to the CD-ROM and could not. Because of Britannica's brand, which prided itself on its product's intellectual superiority, it also used a lot of "special characters" and thus was difficult to transfer into computer language. Again, this motivated the use of Compton's, which had none of the historic appeal of that associated with Britannica. Moreover, Britannica's designers sought to move existing text and photos over to the CD-ROM, and did not extensively redesign the text for the new medium. It also neither used hyper-text or search extensively, for example, nor did it reformat for display on screen. It largely sought to use its existing asset in the new setting without reconceiving of its use.

Distribution. Britannica had developed the best door-to-door sales force in the world. Employing full time staff, their sales force was well suited to selling a product that sold for $1500 dollars, where the material cost of production for a set of encyclopedias did not exceed $250. There was plenty of gross margin to support high-powered incentives for the sales force, who invested heavily in each visit to a home. A $100 CD-ROM product did not, and could not, replicate such returns. Pricing became a major source of conflict when the new product was put in the existing channel.

Working capital. Britannica had an unusual governing structure, combining private ownership with the behavior of a non-profit. It donated all profits each year to the University of Chicago, whose libraries its staff used for research. As a result, it had no cash reserve, and when demand began to drop in the face of competition from Encarta, it had limited options for borrowing funds to finance a new set of efforts.

Essentially, internal conflict at Britannica caused problems for its CD-ROM encyclopedias. Britannica needed a rapid response in 1994 to Encarta's success during the holiday season. Instead, Britannica's response was marked by conflict with its sales force. Management chose to meet the demands of its sales force, and protect the profitability of the efforts affiliated with selling the books, which, at the time, accounted for an enormous fraction of the profitability of the firm. That strategic priority manifested in the inappropriate pricing of the CD-ROM offering and an ineffectual product offering. Encarta could not have asked for a more favorable rival for its first year of existence.

Summarizing, Britannica contains a striking set of contrasts. Management anticipated the general demand CD-ROM encyclopedia, and even undertook early experiments to develop the product. Yet, management did not take actions that indicated it anticipated the precise and specific features that would eventually appeal to mass buyers, features that an outsider ended up developing. The insider's own internal struggles played a role in those misperceptions, and, arguably, possessing the correct perception might not have made any difference, because these too would have faced these internal challenges. Most important, the existence of these internal challenges played an important role in encouraging the outsider to differentiate from the insider, which it did by developing the features that allowed its product to appeal to mass users.

IV.2. Late Reaction to a New Demand: Microsoft[16]

Unlike Britannica's far-sighted view for electronic encyclopedias, Microsoft, the insider in operating systems for personal computers, was myopic and did not anticipate demand for the Internet soon enough. It changes their role from outsider to insider.

We can directly observe Microsoft's reaction to Netscape. It appears in the views and actions of Bill Gates.

[16] This summarizes the much longer analysis of Bresnahan, Greenstein and Henderson (2012).

Gate's views received attention due to the Federal antitrust case brought against the firm, which made many internal memos public. In addition, long before the antitrust case became central to events, Microsoft had been comparatively unrestrained about the importance of Gates' perspective. Gates, the best software CEO of his generation, missed the Internet. His change in vision illustrates that no CEO is omniscient.

Seen in retrospect, the insider slowly changed its point of view, and that slowly changed the investment priorities and activities of the firm. In the spring of 1994, Gates set in motion a series of investments, product designs, and marketing plans. More precisely, Gates did understand the technology behind the Internet, and he appreciated the timing of its arrival; he included plans, for example, to include TCP/IP compatibility in server software. The plans also included the key design elements for the next upgrade to Windows, which later would be called Windows95. Importantly, however, the designs did not include any plans for a browser, because Gates classified that as application software. He wrongly concluded in the spring of 1994 that the considerable expense and effort affiliated with making a browser was not worth the effort.

If Gates had perceived its commercial potential, as well as its strategic importance, to be sure, he would have authorized a team to develop such an application. Spring of 1994 was well before the launch of Windows95, so it provided sufficient time for developing a new application. (Indeed, Netscape was founded in the spring of 1994 and had a beta browser built from scratch by that November). Instead, confident in his assessment, Gates authorized no investment and deliberately declared that the software lay outside of Microsoft's interests. He believed there was no possibility that browsers would either have a strategic purpose or potential to generate revenue or a potential to achieve near ubiquity as a mass-market application. Non-actions followed directly from misperception.

A group inside of Microsoft believed this decision was problematic. A small skunk works was formed, which eventually wrote memos about the commercial potential for the Internet and the Web. Ben Slivka eventually authored four versions of these memos, with the fourth and final one emerging in May of 1995 as a twenty-page memo. It went alongside an eight-page memo from Bill Gates entitled "The Internet Tidal Wave." Slivka had been analyzing the outsiders for many months and had come to understand their point of view before Gates did.

The first major change to Microsoft's point of view came in January of 1995—right after Netscape released the beta version of its browser. Notably, Netscape's team of programmers had previously created Mosaic, a browser to which the University of Illinois retained the property rights and initiated a licensing program. So, at the beginning of 1995, Microsoft arranged for a license of the Mosaic browser. More than 100 firms had already taken out licenses by the time Microsoft did. As it would turn out, Microsoft's license would be the last and most lucrative of them.

The second major change came in April of 1995. The same personnel in the skunk works with whom Slivka worked arranged for Gates to surf the Web. After spending the better part of the night surfing the Web and educating himself on the Web's capabilities, which, until that moment, he had not experienced extensively first-hand, Gates's perspective changed. A month later Gates released his famous memo, The Internet Tidal Wave, announcing his change in perspective about the commercial potential for the Web, and its consequences for Microsoft's actions.[17]

The memo reveals several concerns. When he announces the change in strategic direction, Gates effectively concedes that the commercial Internet and Web developed in directions that he had not foreseen, though, remarkably, the memo never admits that error directly. Gates goes on to describe the general situation, and expresses concerns that many standards developed on the Web were not Microsoft standards. He also expresses concerns about the Web's potential for developing products with functionality that users find acceptable and that bypass Microsoft's products. Additionally, he foresees the possibility for these products to use APIs (application program interfaces) developed by Netscape, which would support a value chain outside of Microsoft's control.

The first consequence of this change in views came in June 1995, when Microsoft tried to invest in Netscape, buy a board seat, and/or purchase the entire company, an event that later became fodder for immense scrutiny during the federal antitrust trial. The second response occurred in August 1995, when Microsoft included a browser as part of the Windows95 "plus pack." This used the Mosaic browser that had been licensed from the University of Illinois in January. In other words, it included a set of features it otherwise would not have included. In December 1995 the third consequence became apparent when Microsoft announced that all browsers would be both available without charge and integrated into

[17] The Internet Tidal Wave is exhibit 20 for the Federal Antitrust case.

subsequent versions of the operating system.

It is not an exaggeration, therefore, to say that the "browser wars," that is, the fight for market share between Netscape and Microsoft, which took place primarily between 1996 and 1998, followed from Gates's memo, which followed from Netscape's entry. None of this would have occurred had Gates persisted in his misperceptions about the internet, which were likely without Netscape's entry.

This "war" eventually took billions of dollars of investment from Microsoft, involved competition between three upgrades of browsers from both firms, employed thousands of people, and grabbed managerial attention, as well as the attention of analysts and application providers. In other words, internal memos uncovered the links between the actions from the outsider and the insider's change in perception about the value of browsing, and these changes link directly to actions in the market place.

IV.3. Reacting to the Changing Market Conditions: IBM[18]

A rather different story arises at IBM, another insider. It too reacted to the rush created by the Netscape browser. It too changed its actions, but the manner by which IBM took these actions followed a very different path than Microsoft's. For the sake of brevity, these changes can be viewed through the lens of the career of Irving Wladasky Berger. Working at IBM the better part of his career after attaining his PhD, he became director of a number of projects and divisions. The newly arrived CEO, Louis Gerstner, tapped Wladasky-Berger for a tough assignment in 1995, namely, to become the first general manager for the IBM Internet Division. He was to put together an Internet strategy for IBM from scratch.

Two enormous problems stood in the way. First, unlike Microsoft, which strategized, albeit belatedly, to include Internet capabilities in its products, IBM did not have a strategy for the Internet/Web at all at the time. Second, the firm had just been through a near-death experience. Arguably, an Internet/Web strategy looked like a key to further prosperity, and its success could shape the employment of tens of thousands of IBM's people. Hence, solving the first issue held the potential to solve the second one, but how to do that was far from obvious in 1995. Upon taking the position, Wladasky-Berger's toured IBM's labs for electronic commerce. As it turned out, over the next few years, Wladawsky-Berger helped IBM emerge

[18] Chapter 10, Greenstein (2015).

with a healthy strategy and a lucrative line of services, and he did so by adapting IBM's point of view to the Web's unique circumstances.

The company had seen something like the Web coming and had made prototypes of many services in its labs, but most had presumed the Web-like software would be proprietary software. To Wladasky-Berger, IBM did not lack vision. Rather, all advanced prototyping in IBM had anticipated proprietary software, not the open standards of the Web and the inexpensive software approaches to building services. Supplying services required inexpensive inputs and open software, but for years IBM had developed prototypes on the basis of inappropriate assumptions. Thus, IBM's point of view changed the most during Wladaskwy-Berger's first year as he pointed out that the company had identified the demand but not the right way to provide it.

As mentioned, IBM struggled to make the transition from proprietary to open software. Many of IBM's clients—large enterprises—had large investments in proprietary software and needed help integrating the commercial Internet into their businesses processes. Because IBM had not foreseen the change in the cost of inputs, it had not developed any prototypes for transitioning large enterprises to use such inputs. To survive, it had to invent an approach for doing so.

Oversimplifying a complex and ultimately successful solution for the sake of brevity, under Wladasky-Berger, IBM invented of a type of software known as *middleware*. Integrating old IBM installations with new technology turned out to be productive, because IBM reused existing capital for new purposes instead building processes and operations from scratch. Yet, IBM had not developed the right software because its prototypes had been premised on the wrong conception of how the end product would function and where it would get its components.

As in Microsoft's case, IBM's management got its motivation from the fear that buyer revenues would go to other firms. Helped, however, by the underlying suspicion that many electronic commerce entrants did not know how to serve large enterprises, or were not developing appropriate products and services for IBM's client base, IBM changed its point of view about what technologies to use. That led their management to change their point of view about how to develop them. In addition, it also added a new layer to its point of view about demand, specifically, what users wanted.

Ultimately, IBM developed pioneering prototypes for middleware for order fulfillment and logistics. Although these applications were unglamorous, functional, and complicated, there were a large number of potential buyers for them, many from among IBM's traditional clients. In this way, IBM became a leader in providing technology to enable the "transparent firm." That is, it helped firms offer services that linked internal logistical information with queries from buyers. It also became a key part of one of the greatest turnarounds in corporate history.

Summarizing, the established insider, IBM, would not have committed resources without prompting from Netscape and those following Netscape. Incorrect assumptions about the supply of inputs were embedded in its own prototypes. Yet, unlike the first example, here the links between outsider and insider's actions differ. While IBM perceived the demand for electronic commerce, it had constructed its prototypes upon a presumption about supply that did not have relevance to the market conditions in 1995. Changing its point of view about the use of components permitted IBM to alter how it addressed the new commercial opportunities.

IV.4. A Chain of Adoption as a Reaction: Wifi.[19]

The development of Wifi illustrates another manner in which outsiders can act as catalysts. Many insiders had loads of experience trying to develop Wifi, but, like IBM with the Internet, they predicated their experimentation on the assumption of Wifi being proprietary. In contrast, Apple—the outsider—included Wifi for free, which triggered a chain of events. While all the other examples of an outsider's entry into the market created some degree of competitive pressure, the history of Wifi differs in the sequence of events. Here, the outsider triggered a chain of adoption—not a competition between two similar products. Additionally, competitive incentives drove the chain of adoption. Most important, those cascading series of actions eventually changed an entire supply chain. The outsider here is Steve Jobs, the newly returned CEO of Apple, and the insiders are all the existing OEMs (original equipment manufacturers) in the supply chain for personal computers.

Jobs sought to take a laptop, an existing product at Apple, and add one additional capability. The additional

[19] Chapter 14, Greenstein (2015).

capability was easy to describe and difficult to implement. Jobs wanted a laptop that could send and receive data without wires. In practice this required a “data-antennae capability” inside a laptop coupled with a “data-antennae” capability in a server.

Jobs concluded that Apple could use a technical standard from the Institute of Electrical and Electronics Engineers (IEEE) committee 802, which had been attempting to design standard protocols for wireless local area networks (LANs) since the early 1990s. A standard had been released in 1997, but flaws had become readily apparent. The leader of the IEEE effort came from Lucent; and the standards were in the midst of improvement when Jobs arranged a meeting with the team at Lucent. Jobs believed Lucent could produce the electronic components required for both making a wireless server and adding the wireless capability to a laptop.

The meeting was a one-sided conversation in which Jobs described his vision and the price he wanted to pay, which Lucent eventually agreed to. The components became part of the product called the Apple Airport. It was released with great fanfare in July 1999. Dramatically, on stage, Jobs took a hoop and put it around the laptop to prove that no hidden wires supported the transfer of data.

Jobs actions motivated a response by Michael Dell, the CEO of Dell Computers and the largest provider of PCs using the Windows operating system. Dell had abandoned efforts to develop a wireless capability for Dell laptops in 1993. He phoned the same Lucent team that had supplied Apple and arranged for a supply of similar components. He also arranged for Microsoft to alter Windows to support wireless capabilities. Dell’s products—a wireless laptop with an operating system that supported the device and wireless router—was released in 2001.

Like many of the other examples previously discussed, at this point, the marketing of Wifi illustrates how an outsider, Jobs, had a different point of view about how to create value and a competitor reacted. Yet, the difference is how Jobs’ action altered an entire supply chain.

Other OEMs reacted and followed Dell’s lead. The reaction had a multifold and cascading effect. First, many laptop makers began procuring cards to enable their laptops to have similar capabilities. Meanwhile, many firms entered the market to make those cards. Additionally, many firms entered the market to supply

wireless routers.

Next, the biggest supplier of computer components, Intel, responded with a program that became known as *Centrino*. With Centrino, Intel redesigned the laptop motherboard and gave away the design. The new design included an antenna and a new set of chips to support its work with the other microelectronics on the motherboard. The program also included a large certification program for OEMs, where they "earned" the Centrino brand by successfully implementing the design in their laptops. Intel also began funding support to provide geographically ubiquitous Wifi, such as programs to subsidize certification of airports and hotels that supplied routers.

Similar to Britannica, Intel had to deal with internal struggles in the face of the new product. The Centrino effort involved taking resources away from the desktop division and devoting them to the laptop division, an action that the desktop division fought. The Intel CEO, Craig Barrett, had to settle the conflicts that resulted, and, when delays and snafus interrupted Intel's best laid plans, the CEO had to publicly recommit to the strategy, putting his prestige and job on the line. During this upheaval, Intel's largest customer, Dell Computers, resisted using the Centrino program and refused to cooperate during its first year, preferring to market its own branded versions of wireless routers and laptops. Ultimately, though, Centrino was such a success in the marketplace that after a year Dell ended its opposition and cooperated with Intel.

Said simply, the outsider, Steve Jobs, acted as a catalyst. The evidence is most obvious in the behavior of the largest PC supplier, Dell, which would not have devoted resources to wireless LANs as quickly without this prompting from Jobs. A similar observation holds for other OEMs and suppliers. Finally, Intel would not have taken its actions in the absence of the outsider's catalytic actions.

IV.5. Chain of Reactions in a Partnership: Broadband Carriers.[20]

The example of Wifi illustrates a situation in which an outsider partnered with insiders, and a supply chain altered the features available to users. As in that situation, outsiders often need insiders to realize their commercial aspirations, and that is especially so at early moments. Not all such situations turn out well for the aspirations of outsiders. Insiders may benefit from the partnership, but if they do not see benefits,

[20] See Greenstein and Norris (2017).

they tend to act in ways that hinder the outsider.

The following example illustrates an outsider, Netflix, who, out of necessity, partnered with many insiders, broadband carriers, who, for a variety of business reasons, lacked enthusiasm for the partnership. When the experiments of Netflix took a direction that raised costs for the carriers, Netflix found itself with an unwilling participant. The different points of view exacerbated the conflict. The resolution of the conflict was less essential for this illustration than the fact that it was present; it illustrates how an outsider can generate reluctant actions in an insider, who otherwise would not have taken such action.

Netflix started as a video rental business by mail. It had a strong customer orientation, and began its competitive rivalry with Blockbuster by stressing the discontinuance of return fees for late returns. As the business grew, Netflix also began stressing the availability of titles (i.e., not limited by shelf space) and its recommendations for bundling demand.

While music streaming had already shown some potential as a commercial service, video streaming had been confined to short lengths, such as YouTube, due to the bandwidth required. Only pirates had made a practice of streaming full-length movies, and often these efforts used Torrents, which did not require continuous service.

Netflix, though, began experimenting with streaming movies well before others did, and it built this new business on the experience it had supplying titles to households. The service proved to be extraordinarily popular, and the number of customers grew rapidly. As it grew, Netflix began to move large volumes of data to its subscribers. By 2010 it became the largest provider of data streams in the Internet, and by 2012 it far surpassed any others. Its success became a source of tension for Netflix's business partners.

Netflix and broadband carriers were business partners out of necessity. Netflix was a specialist, and needed carriers to carry their data to homes. Broadband carriers needed content on the Internet to justify household purchase of broadband service, and this symbiotic relationship worked well for both parties when Netflix was small. As Netflix's success grew, two consequences arose:

1. The expense of success: Netflix faced a tremendous and novel operational problem, which

no firm had ever confronted on such a scale. The firm found expenses for its content delivery network (CDN) on Akamai's systems to be a major cost. It tried to reduce those costs through a variety of approaches, such as moving data across the national backbone and across many other CDNs. Netflix began offering to install a CDN devoted to its shows inside networks, and at Netflix's expense, and many small ISPs (Internet Service Providers) agreed to this. None of the large ISPs came to such an agreement, and it was rumored that they demanded collocation fees, which they had successfully gotten from other large content firms, such as Google/YouTube, Facebook, and others. Netflix refused to pay, and the two sides reached an impasse.

2. The burden of success: Netflix faced an escalating confrontation with its many partners, especially broadband carriers, which had to carry the data to end users. The carriers requested advanced notice of future traffic needs and moved to support their own investment priorities. Netflix experienced outsized growth that did not work well within the established system. Consequently, its very success left Netflix's partners trying to manage data flows at a much faster pace than carriers anticipated.

While the impasse partially arose from the costs and burdens of supplying a growing new service, it also highlighted a conflict of interest. Some of the carriers—particularly those in the cable business— also had a thriving business for video-on-demand in homes. The success of streaming movies threatened some of that revenue.

To be clear, that alone does not suggest that the carriers had incentives to slow down Netflix's success, since streaming service also could motivate new purchases of broadband service. It was an open question whether the additional revenue gained by carriers from new broadband customers exceeded the losses from foregone revenue in video-on-demand business.[21] (That said, it is also far from clear that such finely tuned calculation informed decision making among the largest broadband carriers.)

As time passed and the impasse continued, Netflix experienced more growth. Lacking CDNs inside the

[21] Little evidence at the time suggested that streaming movies was leading customers to "cut the cord," so this is not relevant to the tradeoff. In addition, Hulu, a streaming service, was a marginal effort for the carriers involved.

networks of large ISPs, Netflix found itself moving large volumes of data into ISPs "from outside the ISP's network." These streams used national backbone firms in ways that the ISPs had not planned for, and, accordingly, despite increases in traffic, they did not make investments to carry the traffic from those locations. This would have involved investing in "ports" at the handoff from the national backbone to the ISP, and investment in the infrastructure behind the ports to carry the traffic to users.

Eventually the traffic volumes exceeded capacity, and users began to experience repeated delays in viewing streaming. That made the dispute and impasse public for five months in late 2013 and early 2014. At the time it appeared that Comcast led the negotiations, and the other three large national carriers at the time—Verizon, Time Warner Cable, and AT&T—followed Comcast's lead. All refused to invest in ports, or in any other part of the network related to carrying such volumes of traffic. Not coincidently, all refused to accept Netflix's CDN program without a collocation fee.

While this situation hurt the customer experience with Netflix, it also hurt Netflix's ability to gain more subscriptions. Different opinions made it into public discussion. Some portrayed Netflix as the innovative entrepreneur with a new business, whose operations challenged a system erected for the advantage of the largest firm. Others portrayed Netflix as an obstinate entrepreneur that tried to use networks intensively without paying for the consequence, as other large data-providers had.

After the five-month impasse, they reached a deal, but the terms never became public. Only its general outline became known: In exchange for a fee for a fixed period of time, the carriers agreed to upgrade their networks. Both the fee and investment in an upgrade to accommodate streaming were novel for this partnership. From later filings of income statements, it became clear that the fee was not "material" enough to shape profitability much for either side. This suggests the confrontation was more about setting a precedent over the fee and the upgrade behavior, and not about the level of money that changed hands.

The actions taken to resolve the conflict is less essential than the general point: When the interests of the outsider and insider aligned, then both had reasons to cooperate in their partnership. When their interests did not align, as happened when the outsider drove up costs for the insider and the partners had different expectations about how the growth could be handled, a standoff emerged. In this case, the standoff motivated the outsider to start assuming some of the costs associated with growth.

IV.5. Summarizing Reaction

What general lessons emerge from these examples of reactions by insiders? Exposure to a different point of view motivates established firms to undertake experiments they might not have done. They examine opportunities for creating new value that they had not perceived, and they alter the prototypes for using technology for their customers. Insiders react to outsiders due to one or more motivations. They may seek to (1) protect revenue through development of new products and approaches to distribution (2) develop a new prototype and business to meet a demand or type of market they had not anticipated, (3) adopt new inputs into their prototypes and businesses, and (4) renegotiate their relationship with an outsider.

In most instances, the outsider's actions come as a "surprise" to the insider, and an effective response requires changes in planned activities and the priorities for investment. That suggests the importance of the outsider remaining hidden from the insider for a time. No simple reason or observation characterizes why outsiders remain hidden from insiders. Mistakes arise due to analytical error, or internal organizational conflict that interferes with accurately perceiving events. Outsiders may also deliberately try to remain hidden, especially if it delays a competitive response from an insider.

Consequently, an environment can be more nurturing for either outsider or insider. In some settings, for example, analysts track all participants, or insiders employ market analysts themselves. Such behavior can remove hidden actions. Quick action or technology rushes heighten the potential for surprising insiders.

The forgoing also identifies the importance of experimentation in the market place by both insider and outsider. Just as outsiders use actual production, distribution, and sales to learn about how to refine important features of demand and supply, so too do insiders use their own market experience for a similar purpose. And both potentially can use each other's experience to learn additional lessons.

V. CONCLUSION

This review of prominent confrontations between outsiders and insiders creates an archetype. That

archetype consists of two broad stages. The entry phase occurs during the time that an established firm, has a leading position in a market, while the outsider has a distinct point of view about how to create value. The outsider's view may remain hidden or unrevealed to the consensus for a time, either because the outsider invents without commercial motive or expectation of competition, or because the entrepreneurial effort becomes part of a "rush" that moves more rapidly than the insider anticipated. This period of time allows the outsider to grow faster, avoid failure by reaching customers before insiders, and, in most cases, surprise the insider.

During the entry phase, the outsider begins with a period of "experimenting," namely, developing a commercial approach to its point of view with limited interaction in the market. At early moments in commercial experience, the outsider experiments with prototypes that appeal to users and/or experiments with lead users. Sometimes this experimentation is situated in universities; most often it is in markets. In all cases, these experiments support inexpensive and extended prototyping with technical and distributional attributes of business, sometimes with the help of insiders, such as VC financing. At some point this experimentation becomes successful enough to generate forecasts about the growth of a large scale market.

The second broad stage begins when the insider learns enough and decides to react. During this second stage, the established firm and outsider both experiment, by attempting to learn about open-ended questions regarding features of demand, operations, and ways of organizing commercial actions. The established firm either changes its point of view or not, and a competitive confrontation takes place in the market. Experimentation continues until both insider and outsider settle into competition, which is sometimes differentiated. The outsider accumulates assets and/or capabilities affiliated with addressing prior disadvantages of outsider status. Meanwhile the outsider and (maybe) the insider learn about features of demand and operational strategy.

Three features arise in every example. First, learning takes time—for both outsider and insider. Because the value of the product remains unknown or hidden, firms must take time to learn about the product's experience in market. Reorganization of production and distribution for the new opportunity also takes time. Second, and perhaps most difficult, competitive situations cannot play out instantaneously. All participants, both insiders and outsiders, must plan and invest, and wait for user choices and operational

details to become widely known so they can assess the value of their actions. Third, the very definition of the "market" evolves over this time, as outsiders displace insiders with new products or insiders imitate outsiders with changes to their own products. Indeed, the very definition of participating in the market and "industry" evolves with these changes to production and distribution – and industry actually has no singular unchanging meaning in any of these examples. These observations confirm that the analysis adds up to distinctly Schumpeterian situations.

This archetype suggests that asymmetric innovation incentives shape insider and outsider actions. Those asymmetries arise because insiders and outsiders perceive the same situation from different time scales, and with distinct and different information about operational strategy, product design, and/or distribution strategy. Outsiders approach the new commercial opportunity with little experience or limited experience, while insiders invariably approach the opportunity with a cornucopia of experience with operations and distribution, which may or may not generate conflict and biases toward their approach to the new opportunity. It would be a remarkable coincidence if insiders and outsiders perceived the same profit potential and/or shared the same incentives to address the new commercial opportunity.

More broadly, these different incentives undermine predictions about the outcome of competition. That also represents a limitation of the archetype. In many of the examples market analysts could not forecast winners at the outset of competition. In some cases the features of the winning outcome emerged *during* competitive interaction, and as a result of the confrontation, which makes it particularly unpredictable. While users benefit from many trials from its entrepreneurs for every new opportunity, individual successes cannot be forecast in advance. Schumpeterian confrontations, therefore, are not inevitable in this situation. In addition to the usual factors that reduce the likelihood of a startup's success, an outsider requires a nurturing environment for experiments and sufficient time to work out key attributes of its business.

The archetype favors competition policy that enables unrestricted entry, and it favors policies that support institutions that permit a "thousand flowers to bloom." This fosters a policy outlook with great humility about any specific participant's ability to predict the identity of entrants because in settings with dispersed technical leadership, competitive pressures can arise from many corners. The point of policy is to raise the likelihood that it does arise *from at least one entrant*, and grow into a form that places competitive

pressures on established firms. Hence, policy focuses on nurturing the factors that encourage entry in settings with dispersed technical leadership – e.g., open governance, specialization, and mutually beneficial partnerships with insiders.

These insights come with limitations and potential pathways for additional insight. This archetype focuses on prominent outsiders and it focuses on those outsiders that confronted insiders, and does not analyze the setting where outsiders sell out to established firms through acquisition or merger. Selling out can and does shape innovation incentives—and the likelihood of Schumpeterian creative destruction. It awaits further analysis of how insiders integrate an outsider's view, and how outsiders cooperate with insiders when they begin their commercialization activities with distinct points of view. There is also considerable room for subsequent research about the generalization of this framework, and the scope of settings over which these insights apply.

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Table 1. Taxonomy of Examples to Illustrate Archetype

Technology, Insider, & Outsider	***Plans of leading firm***	***Key difference in points of view and open question.***	***Experience of outsider before entry***	***Causes of delays at insider***	***Pathway that put new point of view into practice***
CD-ROM encyclopedias, Britannica, Encarta (Microsoft)	Plans for digital future with its own proprietary content.	Does a valuable product need text and the authoritative voice of existing text? How does it need to use pictures, sound, video, & links?	Comes from PC market experience.	Faced internal conflicts distributing new products.	Outsider displaces insider in new product market.
Search, Portals (Yahoo!), Google.	Treats search as complement to their portal and indexing service.	Is search of peripheral importance, or can search serve as the primary starting point for users?	Built prototype at university, used by many students.	Lack of plans or investments. Late to recognize.	Outsider displaces insider in new market.
Browsers, Microsoft, Netscape	No plans, then plans with proprietary approach to new opportunities.	Will the Web become the primary organizer of applications? Or will the PC OS maintain that role?	Build prototype at a university, used among students.	Planned for proprietary technology. No plans for browser investment.	Insider imitates outsider & improves product. Insider displaces outsider.
The Web, IBM, Dot-com entrants in electronic commerce.	Plans in its own lab for a proprietary approach to opportunities.	Will electronic commerce build sites from proprietary software, or from software such as the Web?	Prototype used at a university & at many early dot-coms.	Planned for proprietary technology. No plans for open technology.	Insider adopts technologies of outsiders, & uses it to sell new product.
Wireless local area networks, Intel, IEEE 802.11 committee.	Plans for wireless access as option over which OEMs have discretion.	Will wireless access become a default feature of the laptop or should it remain as an option?	Prototypes at IEEE, designed into an Apple product.	No plans or investment. Late to recognize.	Outsider's technology became widely adopted, compelling insiders to act.
Video streaming, Comcast, Netflix.	Large investment in existing processes for delivering services.	Can video streaming become a viable subscription business to homes?	Comes from mail-order video rental experience.	Internal conflict related to protection of investment in existing revenue.	Insiders and outsider sign contracts, & it enables outsider to continue its experiment.