The Interplay between Open Innovation and Lean Startup,
or, Why Large Companies are not Large Versions of Startups

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Abstract

This essay considers the contribution of Lean Startup to the lack of practical advice for employing Inside-out knowledge flows in open innovation. Lean Startup offers a series of practical steps for exploring—and validating—potential new business models that might utilize otherwise neglected technologies, or potential general-purpose technologies that may be languishing. Open Innovation has some contributions to offer to Lean Startup as well, particularly in the context where Lean Startup is employed inside large established firms. We describe the basic principles of Lean Startup philosophy and discuss how Lean Startup is implemented in large companies. This is highly related to business model reconfiguration, since in many cases, incumbent companies develop a new business model as part of their innovation efforts, often with great difficulty. This line of reasoning leads us to reconsider how Lean Startup might work in established companies, and why it is so difficult due to conflicts with many roles that already exist in the established companies. We then bring forward the idea that Open Innovation can contribute to the corporate venturing process and describe both Outside-In and Inside-Out processes that may help ease the pain of a Lean Startup implementation in an incumbent firm.

Open innovation has attracted a great deal of scholarly attention since Chesbrough's (2003) initial articulation of the concept. The concept of "...purposive inflows and outflows of knowledge across the boundary of a firm in order to leverage external sources of knowledge and commercialization paths, respectively" (Chesbrough and Bogers, 2014) has primarily been analyzed in terms of the Inbound, or Outside-in path of knowledge flows. The Outbound, or Inside-Out path of knowledge flows / commercialization paths is less studied, and appears to be less practiced as well. And there is a dearth of practical advice for what to do in order to liberate unused or under-used internal technologies that lack a clear path to market inside the focal firm.

This is not only an important area of inquiry in innovation management and entrepreneurship, but in strategic management more broadly. Over the decades, research in strategic management has changed emphases many times as the field has developed and become more established (Afuah, 2009). In the early years through the 1960s, corporate planning, forecasting, and budgeting was the dominant topic, followed by the emphasis on corporate portfolios, diversification, and growth/share in the 1970s. In the late 1970s and 1980s, work shifted toward industry attractiveness, positioning, and industrial-organization economics-influenced views on competition and rivalry, including game-theory-inspired models of two different firms or *n* identical firms competing in a market.

It wasn't until the late 1980s that attention shifted toward internal sources of competitive advantage, or how and why firms could maintain advantages over longer periods of time despite imitation / entry or being in a less-than-ideal environment / industry, and this led naturally to a better understanding of path dependencies, resources, capabilities, and "core

competences." In this period of time and afterwards, it became understood that technology and innovation management would become one of the key factors for understanding what made firms different—and in many cases, kept them that way. And from the mid-1990s to the present day, a whole host of innovation, entrepreneurship, and technology management issues have risen to the forefront of strategic management thinking, including knowledge resources, new business models (originally rooted in Internet and e-commerce), network effects, "disruption," the long tail, crowdsourcing, and so on.

Thus, open innovation has become increasingly part of the toolkit for top executives as well as highly relevant for academics interested in the canonical problems of strategic management. Understanding the circumstances under which open innovation is useful falls squarely into what Leiblein et al. (2018) classify as a strategic decision: open innovation is concerned with how to allocate resources, how to organize, and how to win in the marketplace, and therefore simultaneously touches on, respectively, theories of strategic investment, theories of the firm, and theories of competitive advantage.

One area where all these issues become salient is in the discovery and subsequent commercialization of General-Purpose Technologies (GPTs). GPTs offer a broad set of capabilities, and it is far from obvious what the best uses for them are in advance, or what the best business models to commercialize those uses are. However, if commercialized successfully, we claim that the process of discovering and exploiting them may be a source of competitive advantage for a long period of time.

This essay considers the contribution of Lean Startup to this lack of practical advice for employing Inside-out knowledge flows in open innovation. As we will discuss, Lean Startup offers a series of practical steps for exploring—and validating—potential new business models that might utilize otherwise neglected technologies, or potential GPTs that are languishing. Open Innovation has some contributions to offer to Lean Startup as well, particularly in the context where Lean Startup is employed inside large established firms. After describing the basic principles of Lean Startup philosophy, we then discuss how Lean Startup is implemented in large companies. This is highly related to business model reconfiguration, since in many cases, incumbent companies develop a new business model as part of their innovation efforts. However, as we discuss below, business model reconfiguration is far from a given in large enterprises. This line of reasoning leads us to reconsider how Lean Startup might work in established companies, and why it is so difficult due to conflicts with many roles that already exist in the established companies. We then bring forward the idea that Open Innovation can contribute to the corporate venturing process and describe both Outside-In and Inside-Out processes that may help ease the pain of a Lean Startup implementation in an incumbent firm.

An Introduction to Lean Startup

Lean Startup is a relatively new concept to the world of innovation, and even more new to the world of corporate innovation. It is based upon the pioneering work of Eric Ries, in re-conceptualizing the reasons for innovation failure in startup firms. This was most clearly documented in Ries' (2011) seminal book, *The Lean Startup*. Ries applies the lean thinking philosophy found in the Toyota Production System to startup companies. Steve Blank (2013) has also played a critical role in this movement, as we will discuss below.

The core insight of Lean Startup is that most startup firms fail for reasons that are not the result of poor product development. Most of the time, the company is able to resolve the technical and operational challenges of developing its new product (or service) offering. Rather, the most common reason for failure in these startups is the lack of customer acceptance for this new offering. Yet most startups have no process to develop the market for their products—and test and validate the achievement of key milestones—in the same way that they test and validate the development of the product itself.

The traditional advice given to startups was to write a Business Plan that covered each of the areas of the business. Once that plan was complete, the startup was then counseled to follow the plan, update it as new information arrived, and launch the product that was specified and subsequently developed in the Business Plan. In essence, startups were advised to behave like small versions of big companies.

This is the polar opposite of Lean philosophy, according to Ries. Lean Thinking, inspired by the Toyota Production System, is about reducing waste in industrial processes. In production and manufacturing, "waste" is relatively easy to define as scrap materials, inefficiencies in the manufacturing process itself, and rework due to not addressing problems as they arrive (Morgan and Liker 2006). Eventually, this line of thinking was applied not only to manufacturing but also product and process development in large companies and even corporate management, oriented toward minimizing "waste" in terms of inefficiencies in the product development process, time wasted in ineffective meetings, revisiting decisions, inability to be flexible if the situation changes frequently, and so forth (Flores et al. 2017a).

More recently, Lean thinking has been applied further from the corporate innovation and operations areas toward creating and scaling startups. In this view, the most wasteful use of resources for a startup is to build a product that no one wants to buy. The Lean approach carefully determines the minimum set of features in a product that will compel a customer to buy the product, and then focuses the product development process on creating that set of features—no more, no less. This gives rise to a key concept in Lean Startup, the concept of a *minimal viable product* (MVP), which is highly related to the idea of a "minimum winning game" as articulated by Burgelman and Siegel (2007).

The roots of MVP go back to Agile Software Development, where the creation of complex code has gradually shifted away from a "waterfall" model of development (Boehm, 1988; Brooks, 1987). In the waterfall development model, one sets a product requirement specification, freezes it, then starts the software coding. Once the code meets the spec, the process tests the software for quality and for customer acceptance, and only then considers revisions to the code for the next cycle of development. Note that there is a hidden assumption in the waterfall model: the customer knows what the customer wants (hence the specification), and we simply need to develop it for him or her. Note as well that there is no learning during the code development. The only feedback comes at the end of each cycle.

In recent years, this waterfall model has given way to an "agile" model of development. In the agile model, an initial spec is developed and code is written in "sprints" to meet the spec (often in 1-2-week cycles) and then immediately shared with users and customers for feedback. This feedback is used to refine the initial specification, and another sprint occurs. This creates an iterative loop of feedback that allows the developers to learn much more rapidly about what

the users and customers really want from the software. Customers often react in surprising ways when they see the results of actual code, and either realize new needs/benefits, and/or redefine earlier needs/benefits. It can be shown that whenever customers are not entirely clear in advance on their needs for a complex piece of software, agile approaches will converge more quickly than waterfall approaches on a product that the customer will accept. This is the connection to Lean: Agile methods use fewer resources and converge on an acceptable solution much more quickly than the earlier waterfall method. So there is much less waste.

Customer Development

Steve Blank (2013) has added a key concept to Lean Startup, the concept of Customer Development.[1] Just as the product must be developed, so too must a startup company identify and seek out customers willing and able to buy its offerings. While Ries' book advises startups to perform market validation very early in the process, it was Blank who figured out a systematic process to do that. Blank develops a four-stage process to achieve this:

a. Customer discovery

b. Customer validation

c. Customer creation

d. Company building

In the *discovery* phase, it is critical in Blanks' conception to *get out of the building* to identify customers. Using the MVP as an artifact, a startup would attempt to get a prospective customer to commit to buy the product. Critically, one only exits this stage when there is an actual order from an actual customer. Note that this selling activity comes much more quickly than would be the case in a traditional waterfall innovation model. It also requires a selling

capability to be available in the earliest phase of the innovation process inside the startup. It dovetails nicely with agile methods, because the customer often requires changes to the MVP before committing to buy it (and those changes only surface after the innovator asks the customer to buy). It is imperative to make those required changes quickly, to get back to the customer and close the sale. If the customer is still unwilling to buy, the startup can either modify the product again, or try a different prospective customer the next time.

The *customer validation* process starts once an initial order has been received. In the validation stage, the company seeks other customers also willing to buy. Once multiple customers and multiple orders have been received, the validation stage is completed. In this stage, the company now has multiple customers, and is looking for a common pattern that connects the customers together. The company can now identify a market segment for its product.

In the *customer creation* stage, the company is building a sales process, to reliably replicate the validation, and to understand the cost and time required to make a new sale in that market segment. If the cost to sell to the customer is too high or takes too long, then the startup might try a different channel of distribution.

In the *company building* stage, the company now has the information needed to sell its offering, scale its business and rapidly grow its customer base. By waiting until the validation and customer creation stages are complete, the startup is less likely to waste time and money on the wrong market segments or distribution channels. Scaling too early is another way to generate waste in abundance, and is very "non-Lean."

Of course, the concept of Lean Startup is not without its critics. For example, Felin et al. (2019) question whether the concept or process is useful for truly radical or highly innovative ideas, decrying / questioning three main elements: (1) The poor analogy between lean manufacturing and startups and whether the principles can be directly applied; (2) Whether customers or potential customers are the best sources of information for very radical ideas; and (3) How useful the Business Model Canvas is as a practical, initial tool, rather than an "aspirational ending point" due to the complexity of business models and the effort of completeness required. Overall, they argue, Lean Startup guides startups into the kinds of ideas that can easily and quickly be tested by customers.

That said (and perhaps due to the fact that many technology startups are in fact amenable to customer empathy and testing), the Lean Startup approach has been very successful and it was only a matter of time before large companies started experimenting with the concepts to develop "intrapreneurship" in the hopes of successfully incubating and commercializing new ideas. It is to this topic that we turn in our next section.

Lean Startup in large corporations: Tensions and paradoxes

> "*This is the true promise of the Startup Way: a management system that contains within it the seeds of its own evolution by providing an opportunity for every employee to become an entrepreneur. In doing so, it creates opportunities for leadership and keeps the people best suited for leadership in the company, reduces the waste of both time and energy, and creates a system for solving challenges with speed and flexibility, all of which lead to better financial outcomes.*" (Ries, 2017, p. 316).

The foundational work for Lean Startup originated in the context of startup companies. More recently, people have begun to apply these concepts inside large organizations. This is

quite a different context than a startup context. The Lean Startup pioneers like Ries and Blank actually underplay this different context, in our opinion. Just as it was an error to tell startups to behave like small versions of large companies (e.g., writing and executing Business Plans), *so too is it an error to tell large companies to behave like large versions of startup companies*.

Steve Blank (2010) has an extremely useful insight about the differences between startups and large established companies. A startup is searching for a scalable business model, in his view. A large, established company has already found that business model, and has already scaled it. So the large company is focused on executing the business model it has previously found. As we shall see, this difference between searching for a new business model and executing an existing model has many implications for why large companies cannot—and should not—simply mimic the behavior of startups.

For academic scholars, Blank's distinction evokes Jim March's (1991) powerful observation about exploration processes, and how they differ from exploitation processes. Blank sees startups as driven entirely by the former (until they achieve product-market fit, and are ready to scale up). Established companies, by contrast, have achieved their scale and relative longevity due to their mastery of exploitation processes. This basic insight was further developed into an important stream in the strategic management literature, corporate ambidexterity (for example, Volberda 1996; O'Reilly and Tushman 2013; Raisch et al. 2009).

To relate corporate ambidexterity to entrepreneurship, a startup is really a single project organization, whereas a large company has many projects, and must allocate resources and attention across a portfolio of projects. There is no single best way to allocate resources

across multiple innovation projects, but some heuristics have emerged over time. McKinsey has promoted the idea of time horizons 1, 2, and 3 (Figure 1), and argued that companies should allocate their innovation budget across these three horizons (Baghai, Coley, and White, 2000). Horizon 1 is the next product (in the current market), Horizon 2 is the next generation product (in the current market or perhaps in an adjacent market), and Horizon 3 is the long term (new kinds of products and/or new kinds of markets). Google has publicly stated that it follows a 70/20/10 allocation to Core, Adjacent, and Transformational projects that appears to correspond well to these three categories.

[insert Figure 1 about here]

A critical element of this resource allocation approach of 70/20/10 is that the company must allocate its resources to each of the three in a top-down fashion and then have the discipline to maintain that allocation over time. That is, the organization must not raid the funds in Horizon 2 or 3 projects to make up for any shortfall needed to fund Horizon 1 projects. The reason that Horizon 1 projects tend to crowd out the other two categories comes from the many data advantages these projects have. Being closer to the Core business, the customers and markets are well known. The needs of these customers are likely well understood, and competitors are similarly better understood. The data on pricing, volume, and likely rate of market uptake are based on operating history, not guesswork. All of these advantages make the business case for Horizon 1 projects seem far more credible than the "guestimates" used to support the business case for Horizon 2 or 3 projects. This greater credibility causes many companies to over-allocate resources to the near term, incremental projects at the expense of

longer-term, more potentially valuable initiatives. Note that the startup firm does not worry about these issues.[2]

A second key difference in lean processes between startups and large companies is that a large company has an existing business model, and often seeks opportunities that fit with that model (Chesbrough and Rosenbloom 2002). The large company shuns opportunities that might disrupt its current business model, whereas a startup company has no existing business or business model to protect. The large company rightly must protect its current business, even as it seeks new business opportunities. This hearkens back to Abernathy and Clark's (1985) early research in technological "disruption," where incumbent firms were thought to be in danger of clinging to their existing business model in the face of innovations that had the potential to disrupt market and technological linkages. We discuss this specific issue next.

Challenge 1: Business model reconfiguration

In thinking about business model innovation, we find it helpful to draw a distinction between business model design and business model reconfiguration (Massa & Tucci 2014). *Business model design* is the very first business model developed by a company (Zott & Amit, 2010). Usually it is associated with entrepreneurial activity as a startup decides on its first business model, but it may also refer to the initial commercialization path for a GPT from a more established company as well. The startup may "pivot" in the initial stages and change some aspects of its business model as part of the business model design process. However, once the company scales up its business model, further changes require *business model reconfiguration*, which refers to the replacement or addition of a new business model inside an established company (Massa & Tucci 2014).

To synthesize the two concepts developed above, Figure 2 below shows a possible relation between business model innovation and exploration / exploitation needs of organizations. This distinction will be useful later on when we discuss validating corporate business models. In the early phase of the organization, the startup engages in exploration as they search for their first business model.

[Insert Figure 2 about here]

Business model reconfiguration, as opposed to business model design, rarely sees great success (Johnson et al. 2008; Markides & Charitou 2004; Markides & Oyon 2010). This could be due to a number of reasons, sometimes rooted in the "conflict" between the new business model and the old one (Markides & Charitou 2004), or what Chesbrough (2010) calls "structural" impediments to business model innovation. In this sense, the conflict could be truly "strategic" (in the Machiavellian sense) in that the managers responsible for the old business model sense a threat as the new one is likely to compete with (and win against) the old one. Thus, one of the reasons that business model reconfiguration is so difficult is that a rational manager, fully aware of the new business model and its implications, actively seeks to undermine or even scuttle the new business model to maximize his or her own career aspirations (number of employees, business unit size, bonus based on unit's performance rather than corporate performance, and so forth).

However, there could be less nefarious reasons why business model reconfiguration is slow to be adopted. Many of them have to do with path dependencies, or current situations that constrain future activity due to the inability to change behavior or course instantaneously as new information arrives (Coff & Laverty 2010). Some aspects could be at the "cognitive"

level of managers (Chesbrough & Rosenbloom 2002; Chesbrough 2010), who unwittingly are against adopting certain changes due to the "heuristic logic" that they use to help filter information as being valuable. Thus, changes that go against the "dominant logic" (Prahalad and Bettis, 1986) of the current business model—the current view from top management of how the company competes and how the environment operates—might be perceived as lower quality opportunities. If they instead are interesting opportunities but being incorrectly ignored, the firm may fall into a "dominant logic trap" (Chesbrough 2003).

In addition to ignoring signals of quality due to already established routines, there can be other types of routines that contribute to rigidity in business model adoption. In the face of the need to change, other kinds of organizational inertia or impediments to changing at an organizational level could come into play. These could be due to management processes (routines established around all business processes), modes of organizational learning (current sources of information and how those are understood and adopted within the organization), and established / legitimate ways of change within the organization in general.

Abernathy and Clark (1985) complements the above with an interesting point of view of what they call "market / customer linkage disruption" which we now often think of precisely as business model innovation as opposed to technological innovation / disruption. Market disruption could be new customer bases, new customer applications, new distribution channels, new knowledge of customer demand, and new modes of communication required. Part of the issue with "market disruption" is that it most likely requires some kind of business model thinking; yet, if the organization continues on with business as usual in these market-

facing aspects or similar ones, they are likely to miss the opportunity to move into what Abernathy and Clark call a new "niche."

A third category could be related to the understanding of the business model itself. Describing, communicating and agreement about business models is difficult in a large, established company. In a large enterprise, there may not be complete agreement about what the company's current business model actually is. Therefore, there is a cognitive narrative / mutual understanding story that relies on the business model as a communications tool (Massa et al., 2017). Without some kind of consensus throughout the organization, different stakeholders end up using different "languages" in decision-making processes, which leads to at the least longer decision processes and at the worst, paralysis and missed opportunities.

Computational complexity of business models also complicates business model reconfiguration (Massa et al., 2018). The number of combinations and permutations of business model elements is very large, if not infinite. Much prior research on business models breaks down business models into "components" that represent different functions of a business and different levers for profitability (e.g., Afuah and Tucci, 2000; Osterwalder and Pigneur, 2009). Usually there are anywhere from four to ten components of a business model, although in all Massa et al. (2017) identified 180 unique components proposed in the business model literature over the last twenty years! Not only is this a large number of items to digest, each of the components might have many variations, and the combination of components is multiplicative, thus leading to considerable complexity in understanding and agreement among decision makers and indeed amongst employees. This complexity amplifies the cognitive limitations of business models noted earlier.

Furthermore, beyond the sheer number of combinations of business model elements, the elements themselves might be interdependent and therefore cannot be changed one at a time without having unintended consequences. This is a different kind of complexity (cf. Massa et al. 2018) but is no less important. It is difficult to hold all elements but one constant in a *ceteris paribus* sort of analysis, and then manipulate one without having it affect one or more other components. Thus, it is difficult to predict the overall effect of small changes in a business model, let alone large changes, making systematic analysis difficult and impeding adoption.

Finally, managers we have interviewed sometimes pose the problem this way: "I take the risks to explore a possible new business model, and perhaps to obtain an initial validation. But my successor is the one who receives the credit, should the new model prove valuable." So there can also be a temporal mismatch between risk and reward in business model reconfiguration inside large companies.

As we will discuss below, the resources being reconfigured are already working at scale in an established company. This can make them rigid and inflexible when it comes to experimenting with different combinations of elements, thus making Lean Startup as it is currently conceived impractical in a large corporation.

Challenge 2: Tight integration with the corporate context

The ambidexterity and business model concepts developed above have many implications for Lean Startup, and all of them imply that it will be much, much harder to employ Lean Startup inside a large company than inside a startup. Here, we focus on three, though there are many more in practice (and these follow the pattern described here).

First, consider the concept of MVP. This is a vital concept in Lean Startup, and helps to perform Customer Discovery in Steve Blank's process. Yet to a Manufacturing and Quality organization, MVP sounds like a "quick and dirty" approach. These groups have worked hard (using Six Sigma, Total Quality Management, and other techniques) to train such "crap" out of the process in a large company. They will seek to eliminate this quick and dirty prototyping. Equally, they will make sure that they do not have to support something in the field that has been developed outside the normal, quality-controlled processes of the company. But this fundamental tension is nowhere acknowledged in the many writings of Lean Startup advocates.

Second, consider the concept of Customer Discovery. This requires the developer to talk directly to customers who can make a purchase decision, in order to get direct feedback, identify needed changes, and rapidly learn and iterate to make that all-important initial sale. Every large organization we know has a Sales function that regards this as dangerous, both to the company's sales in the current quarter or year, and to their own sales commissions. They will insist on blocking access to customers, and not distracting them with pie-in-the-sky prototypes that may never be built in volume, and worse, may give the customer a reason to delay current purchases. Again, this issue is not discussed by Lean Startup adherents.

Third, consider the procurement organization. In a large company, the procurement function is measured on its ability to cut costs, improve delivery times, and manage key suppliers. In a Lean process, developers often need to work with single source suppliers (albeit at pilot scale) and care much more about rapid learning than the cost of an input in tiny quantities. Procurement will insist on following corporate policy on acceptable vendors (such as insisting on at least three bids from three different suppliers), and will want to insert

themselves into the negotiations with these vendors. This is a recipe for failure. No procurement organization we know is measured on its speed of learning. Any corporation that attempts a Lean Startup initiative will inevitably stumble when they involve their procurement organization in the initiative in its early stages.

We could consider other aspects, such as whether to use the large company brand in the early stages of Lean Startup (the brand police refuse to risk the brand on an unproven MVP),[3] or whether to use different (and often conflicting) distribution channels in the Lean Startup process. All of these corporate resources have been scaled up and perhaps optimized to perform in a certain way. They lose their flexibility in this process. One does not utilize a job shop to perform high volume manufacturing, for example. Yet, to iterate to make frequent changes to one's MVP, a job shop may be exactly the right resource for the nascent venture.

The key point here is that a corporate context differs markedly from that of a startup firm, so the Lean Startup approaches must be adapted with great care to a corporate context, in order to avoid the barriers noted above. One can think of the difference this way: a startup fights a battle in the market. A corporate venture fights a battle on two fronts: in the market like any startup; and a second internal fight inside the corporation to access the necessary internal resources to wage the external battle.[4]

Dan Levinthal describes the process of making a pivot inside an established company as a relational contracting problem.[5] Getting the corporate resources aligned initially takes time and effort. Pivoting in a new direction requires realigning all of the various parties again. This can induce a certain amount of weariness or fatigue, reducing the responsiveness of these resources to the strategic positioning du jour of the nascent venture. For managers who see

the success of the venture as inimical to their own interests, these moments of transition become moments of opportunity to challenge or sabotage the venture. A single project startup company does not worry about these issues. Note further that this fatigue can also truncate the testing and commercialization of GPTs. Society as a whole suffers if and when GPTs are under-explored, and commercialization activity is overly myopic or constrained.

Challenge 3: Existing corporate roles

In addition to the challenge to utilizing or integrating with existing resources, there is another dimension to the tensions involved in employing Lean Startup inside an existing company: the roles in the existing company differ in important ways from that same role in a startup.

Consider the role of a CEO. In a startup, the CEO "owns" the responsibility for searching for an effective business model. Any decision to "pivot" from an initial model to a new model will be driven by the CEO (likely with the active input of the Board, which we will explore below). However, the CEO in an existing company has a very different role to play: Chief Execution Officer. The Board and the shareholders rely on the CEO position to deliver the results they expect from the business. There is now a significant operating history for the company, and next year's performance will extend that history, plus-or-minus 10-15 percent. The initial founder of the existing company is often long-departed from the scene, such that the current CEO inherited the business model and the operating history. The CEO is thus more of a steward/executor than a driver/discoverer of the business model.

In these circumstances, it is far from clear who "owns" the job of searching, validating and scaling a new business model inside a large established firm. Any functional manager in

roles such as Sales, Marketing, Operations, Engineering or Finance, lacks the ability to drive the cross-functional collaboration needed to examine new business models.[6] Staff roles in Strategic Planning lack the authority to compel functional units to interrupt their normal activities to support testing a new model. A General Manager might be an appropriate role for this process, but most GMs rotate through their assignments every 2-3 years. This might be far too short a period of time to design the necessary tests, conduct the tests, evaluate the initial results, iterate and/or pivot, validate the results, and scale them, as discussed above in the section on business model reconfiguration. In sum, there may be no individual in an established company who "owns" the business model innovation challenge in a way that a startup CEO does.

If we look at the financing of business model innovation, we see a similar challenge. In a startup, entrepreneurs must "shop" for their financing. They must pitch dozens, if not hundreds, of potential investors to raise enough capital to launch a venture. They will hear lots of NOs in this process. But if they receive at least one YES, they get to start the initiative. Corporate finance works quite differently. There is usually a single place where all requests for funding are received: the CFO's office. Corporate intrapreneurs also must discuss their venture concept with lots of people inside the company, in the process of preparing their case for internal investment. If any of those consulted say NO, that often stops the process. Unsurprisingly, this process greatly reduces the number of experiments launched, in comparison to external financing sources.

The Board of Directors also plays a very different role. In a startup venture, the Board consists of the founder(s) and the investors. The Board members know the market, are familiar with the venture and its technology, have significant "skin in the game" from their investment,

and bring substantial experience and contacts to their role. The Board meets frequently, often every four to six weeks. If there is a decision to pivot the venture to a new model, all the relevant parties are present, and the implementation can happen quickly. The Board of a large, established company behaves quite differently. These Board members are typically not major investors in the company, and often have other important jobs they perform in the course of their work. Some are CEOs of their own companies, while others are professional Board members who sit on multiple Boards. This forces these Board members to rely on internal company information for their decisions, and the Board typically delegates issues like business model testing and validation to the management team.[7]

To summarize what we have so far, an effective Lean Startup process inside a large corporation requires both careful bottom-up design, and thoughtful top-down negotiation. And the roles in this process are quite different from those in a startup. The Lean Startup people have done a good job of the bottom-up portion of this in the market, but to date they have been woefully negligent about the top-down side inside the large company. To wage this second battle, the project leader must *Get Upstairs in the Building* (to paraphrase Steve Blank's earlier admonition).

What Lean Startup Contributes to Open Innovation

How Open Innovation is consistent with Lean Thinking

Open Innovation fits very well with the thinking behind Lean Startup as well. To the best of our knowledge, this connection has yet to be explored in any academic research. OI has an "outside in" path and an "inside out" path for ideas to get to the market. Like the Lean

Startup approach, OI also offers the promise of less waste, and faster time to market. Both benefits derive from the outside-in branch of the OI model. When partnering or collaborating with external actors on a new project, the innovating firm can "start in the middle," rather than at the beginning. This means that the innovator uses what has already been developed and demonstrated by the collaborating partner, rather than starting the project from scratch. All of the blind alleys and dead ends that preceded that development are irrelevant to the innovator, and further development builds upon what has already been achieved. This saves both time and money in getting to market, a very Lean result indeed.

Collaborations with universities using open innovation follow this Lean pattern. Universities have substantial plant and equipment for performing a wide range of scientific experiments. They also have talented research staff, as well as capable support staff to manage labs, source materials, and analyze laboratory data. Open innovation collaborators can borrow these resources, instead of having to pay for their full costs upfront—a Lean savings. In essence, you are utilizing Other People's Money (and staff and other resources) when you convince a partner such as a university to collaborate with you.

Crowdsourcing has become another important mechanism to employ open innovation (Tucci, et al. 2016). It enables innovators to search far more broadly than they could through their internal channels of communications with their employees (Afuah and Tucci, 2012). Those who participate in the crowd do so with no assurance of any reward in advance. They compete with other parties in the crowd to win the award, and the attending recognition that comes with winning. This is also very Lean, in that the innovating organization only pays for results.

For GPTs, crowdsourcing represents one very cost-effective way to explore multiple potential commercial uses of the technology in parallel. Since the emergence of the book *Open Innovation* in 2003, many companies have developed sophisticated methods to search and scout for useful external technologies. One of the most famous is Procter & Gamble's Connect and Develop program, but there are now hundreds of such scouting processes in use in large companies around the world. Instead of reinventing the wheel, it is more Lean to utilize a perfectly good wheel that someone else has already created. It has been well observed that, in the earlier period before open innovation, the lab was your world. Today, with the advent of open innovation, the world becomes your lab.

There is another lean benefit from Open Innovation, a benefit that has not been seen in Lean Startup: the ability to share risk in the project with other parties. This is part of the value of crowdsourcing discussed above, but there are other Open Innovation mechanisms that have emerged that also share this principle. Some companies have created CoLaboratories, physical spaces where external parties, sometimes including customers, come and work jointly with internal staff on new projects.[8] Others utilize prize-based competitions to elicit important solutions to difficult technical problems. Others employ crowdsourcing to select the most attractive designs or products (such as Threadless or Quirky).[9] In these competitions, the innovator pays if and only if a satisfactory solution is delivered. There are no payments for trying, only for delivering a solution. What all these mechanisms have in common is that at least some of the risk of project success is borne by others, not by the innovating firm. Again, this is a very Lean result. It may be particularly helpful when potential GPTs are being developed.

Using Lean Startup to improve Open Innovation exercises

However, the innovator must think carefully about the business side of the collaboration as well as the technical side. The old but famous example is how IBM's PC business was eventually hollowed out by its collaborations with Intel on the CPU and Microsoft on the operating system. It is necessary to share some portion of the gains from the collaboration with one's partner, but it is equally necessary to think through how you will sustain your position over time. This requires designing a business model of some sort. Lean Startup provides a novel way to design, develop, and test a business model.

These elements make Lean Startup an important addition to the Open Innovation concept. Previously, the inside-out branch of open innovation posited a number of mechanisms for enabling internal ideas to go outside the organization, through spin-offs, outlicensing, or donations. But there was no process offered to build a specific business model for these inside-out initiatives. Lean Startup offers such a process.

In the case of Threadless, there is a further beautiful implementation of the very Lean concept of "make only what people will buy." The Threadless users vote for their favorite T-shirt designs, and the company produces the top 10 designs voted each week. What is really clever—and Lean—is that these 10 designs already have pre-selected customers for them, namely the people who voted for them originally! This is sometimes termed "pre-sourcing demand." It actually goes one step beyond the classic Lean Startup approach because in the case of Threadless, the customer community designs and selects the initial MVPs to be tested.

This ability to share risk is of particular value in precisely those cases where the Lean Startup process is also helpful, namely when the customer does not know exactly what they want or what their real needs are. In the Lean Startup process, this will be most typical of the Horizon 2 and 3 projects of large companies. Involving partners, customers, and other third parties (such as contestants in a crowdsourcing process) in these cases is a powerful way to induce useful knowledge and feedback, and expands the range of possibilities that the innovating firm might offer to its customers. Sharing the project risks and using "Other People's Money" reduces the financial risk to the innovator, and aligns incentives with other involved parties to the innovation. It even provides a kind of validation to the venture, in that the ability to attract external collaborators to the initiative (who invest their own time, money, and resources) is a positive indication that others see potential value as well.

What Open Innovation Contributes to Lean Startup

Outside-In Open Innovation and Lean Startup

As noted above, there are critical tensions that can arise between a Lean Startup venture inside a large established company, and the overall company itself. Outside-in open innovation can actually be used to help ameliorate these tensions. If we consider the creation of the MVP as an artifact for learning, for example, the internal venture could choose to collaborate externally with outside providers, including prototyping, manufacturing, marketing, and procurement. To supply the initial units, for example, which are likely to change quickly in response to customer feedback, a flexible source such as a job-shop might be an excellent partner. The higher expense for the job-shop (vs. using an internal manufacturing process built

for high volume and low cost) can easily be offset by the faster rate of learning, and the ability to iterate quickly. And these items are being built in very small quantities, making the cost penalty insignificant.

Obtaining early customer input follows a similar pattern. The existing company sales force is focused on high volume orders and maximizing their sales commissions. Using an independent resource such as a consultant or manufacturer's representative bypasses the existing sales force, and allows meetings to be scheduled more quickly, and for iterative follow-up sessions to happen more rapidly.[10] It also reduces the distraction of having the sales team invest significant time in selling minute quantities of a product or service that may never be scaled, instead of supporting sales in the established business.

This approach would also suggest allowing the innovation team to bypass Procurement in the early stages of a new venture, and enter into small volume supply relationships directly. Speed, flexibility and responsiveness will be critically important in the early phases of a new internal venture. Procurement should be invited into the process once product-market fit has been established by the venture, and it is now time to scale.

A hidden benefit of using outside-in open innovation to reduce resource conflicts between nascent ventures and already-scaled internal resources is that it reduces the number of times an internal venture leader must "get upstairs in the building" to ask for political support to overcome the many frictions encountered between the venture and the established business. The resource and process managers of the established business are powerful actors in the company, and every time a venture manager comes with a request to "pivot" to a new business model, that creates an opening for that established manager to torpedo the initiative.

Using more outside-in open innovation reduces the number of times that these requests must be made. Equivalently, outside-in open innovation allows more market and technical validation to be realized before making a request to change, strengthening the venture's case in an internal disagreement with the established process and resource managers.

Inside-Out Open Innovation and Lean Startup processes

The other branch of open innovation is the Inside-Out branch, where unused and under-used ideas and technologies are allowed to go outside the firm. This branch of Open Innovation is often overlooked or ignored in academic scholarship on open innovation, but it could be particularly important for Lean Startup processes in a corporate context, either to *simulate* the results of Lean Startup, or to help *stimulate* Lean Startup processes in a partner organization. The Outside-In branch of open innovation presumes that the business model is already known, whereas the Inside-Out branch expressly seeks to test alternative business model possibilities for a given project or technology.

One way to utilize Inside-Out Open Innovation to share risk is to open up the out-licensing of one's unused and under-used technologies. Any revenue received from such licensing can offset some of the costs of innovating new products and services—also a Lean result. More subtly, licensing to key suppliers and/or key customers can also be used in negotiations to yield better prices, terms and conditions in your established business, across multiple products. It can even reduce support costs, to the extent that licensees help pay for ongoing maintenance and support of technologies you use and now share with them as well.

Many technologies can be licensed selectively, so that you can retain the intellectual property protection that you want for your own use, while still obtaining additional revenues

from non-competing uses of that IP. This is known as *licensing out by field-of-use*. A pharmaceutical company could, for example, license out agricultural uses of its compound, while retaining exclusivity for all medical uses of that compound. Or a trademark could be offered for a consumer product use, while retaining exclusive use of that mark for an enterprise application. Media content is often packaged this way, where different distribution channels have access to that content under different terms and conditions in different geographies.

Inside-Out Open Innovation goes even further, however. When you allow another organization to employ your idea or technology, you can observe what the licensee does with it. Of course, to maximize learning, it would be helpful to have some transparency on what the licensee is doing with the technology. This could be built into the agreement itself, for example, an occasional summary of application areas that the partner is exploiting and possibly even employee secondments from the firm. In most cases, the partner will deploy the idea in a new market, with a different business model, in ways quite distinct from what your firm is currently doing. This can be seen as free business model research, to show you what other possible applications, markets, and business models might be for your ideas and technologies (and recall that these inside-out projects are unused or under-utilized in your company currently). Thus Inside-Out Open Innovation combined with the resulting free business model research could be an important element in business model reconfiguration, depending on how the firm treats the information and the relation the firm has with the organization commercializing the new technology, project, product, or service.

The argument can be made that this Inside-Out business model research cuts through many of the different forms of inertia identified in Challenge 1 (business model reconfiguration

above) and Challenge 2 (tight integration in the corporate context). It helps to understand the complexity of the new business model, and it greatly reduces internal interference with the new business model until such point that it is established. One option is for the firm to re-integrate the project by buying out the partner or even acquiring the partner once it evident that the new business model is valuable and scalable. Another is to work on an internal version, once the major complexities (e.g., the interactions between business model components) of the new business model are evident. And a third is to help the partner grow but maintain a financial stake in the partnership. Because this Inside-Out process involved real companies selling to real customers who pay real money, you get the same validation that is achieved with Lean Startup. Only in this case, that research is done with Other People's Money. This is a very Lean result indeed!

This can be particularly helpful for Horizon 3 projects, where the best applications, markets and business models may be quite unclear to the innovating firm. Similarly, they are well-suited to GPTs, where the best use of the technology is unknown. At best, you can test only a small number of possible business models internally on your own. With Inside-Out Open Innovation techniques, you can augment your internal testing with observing additional business models tested and deployed by third-party licensees. Table 1 summarizes the challenges and some of the main ways Open Innovation can mitigate them.

[insert Table 1 about here]

Conclusion

Eric Ries and Steve Blank have made a fundamental contribution to the study and practice of entrepreneurship with the concept of Lean Startup. One could argue that they have done more to advance this field in the past nine years than an army of entrepreneurship academics have generated over the past two decades. As they have taught us, a startup is not a smaller version of a large company. The business plan process that governs the operations of large companies, in turn, is a poor way for an entrepreneur to launch her new business.

In this paper, we have argued for a corollary concept: A large company is not simply a larger version of a startup. And it is an error simply to tell large companies to "be like a lean startup." This advice ignores the fact that large companies have existing businesses, have already scaled up their business models, and created processes to execute those businesses at a scale most startups can only dream of. The presence of these existing businesses and their associated processes create an entirely different context for doing lean startups inside a company. Business model recombination is different from an initial business model design or pivot.

Deborah Dougherty and Trudy Heller (1994) once pointed out that successful product innovation is often "illegitimate" and described a whole host of small problems that innovators often experience when trying to create something new. We think we have added several items to their list that might be more specific to Lean Startup, such as business model reconfiguration, integration with the corporate context, and contrasting roles of startup and corporate stakeholders, although many of the other illegitimacies will also hold for Lean Startup projects as well.

Future research could take several directions based on the above discussion, centering in many cases on the development of General Purpose Technologies and their subsequent commercialization via Inside-Out Open Innovation or other processes, although the interplay between Open Innovation and Lean Startup may be applicable to non-technological innovations as well. We have a hunch that GPTs might be excellent candidates for Inside-Out Open Innovation, but have no systematic evidence that this is the case. One discipline that holds much promise is in Technology & Innovation Management research, specifically the role of technological maturity embodied in the various products, services, processes, or projects that are envisioned to be developed using Lean Startup approaches. A more mature technology may need to include a greater degree of market validation, so that the mature form of the technology properly conforms to a known, validated market. This may require a different balance between Outside-In and Inside-Out processes in combination with Lean Startup techniques, although as we discussed above, there is scant research on Inside-Out processes in general, so perhaps part of this new stream could be the moderating influence of technological maturity on Inside-Out innovation.

Another interesting area is in the area of business model research, specifically business model reconfiguration. Massa and Tucci (2014) draw a distinction between business model innovation in the context of reconfiguration, and adoption of business models from elsewhere in business model reconfiguration, or in other words, the role of completely new business models vs. business models existing elsewhere. Internal decision processes to advance technologies may need to be contingent on whether they are aimed at known or unknown

business models. Our analysis here suggests that different decision criteria and evidence will be needed to advance technologies under these differing circumstances, and that Lean Startup may be even more difficult on truly novel business models as part of a business model reconfiguration process.

A third area would focus on empirical work that attempts to understand causality. Obviously, this essay is at a conceptual level and proposes several possible interplays between Open Innovation and Lean Startup processes that might be beneficial to large corporations. Future research that operationalizes our arguments and tests them in larger data sets or using some kind of corporate randomized experiments would greatly help to validate (or disconfirm) our arguments. One challenge here is to develop credible counterfactual cases, for business models that could have been pursued, to compare to the business model actually chosen. Unfortunately, most companies are not keen to publicize their failures, so this is a very difficult challenge to overcome.

One final opportunity for future research is in strategic management. The strategy literature should strengthen its theories about GPTs, both in their inception and especially in their subsequent deployment. Of course, there is some research in this area, pioneered by Alfonso Gambardella and colleagues (e.g., Gambardella and McGahan, 2010; Thoma, 2008; Goldfarb, 2005; Conti et al., 2019) and quite some work in economics, but our paper suggests that a process model for understanding GPT commercialization and its role in corporate innovation and diversification more systematically would be both privately and socially desirable.

To conclude, there is a rich interplay between Lean Startup and Open Innovation. Lean Startup offers a process model for pursuing Inside-out open innovation. Yet Lean Startup processes must be adapted if they are to work inside large companies. These changes must be made on multiple levels, from innovation processes, to recombination of the business model, to the culture of the large organization, and even the very mindset used by the organization towards its current and possible future business models. Open innovation embodies some very Lean attributes itself, and can alleviate some of the internal tensions in launching a new business model experiment inside a large firm – at least at the early stages. With a suitably Open Innovation-informed Lean Startup approach, innovation units in large firms can find the early customers they need to engage their internal business units, and get their projects through the Valley of Death inside the company to achieve new growth in new areas for the company.

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Figures

Figure 1: Horizons 1, 2, and 3 (Baghai, Coley, & White 2000)

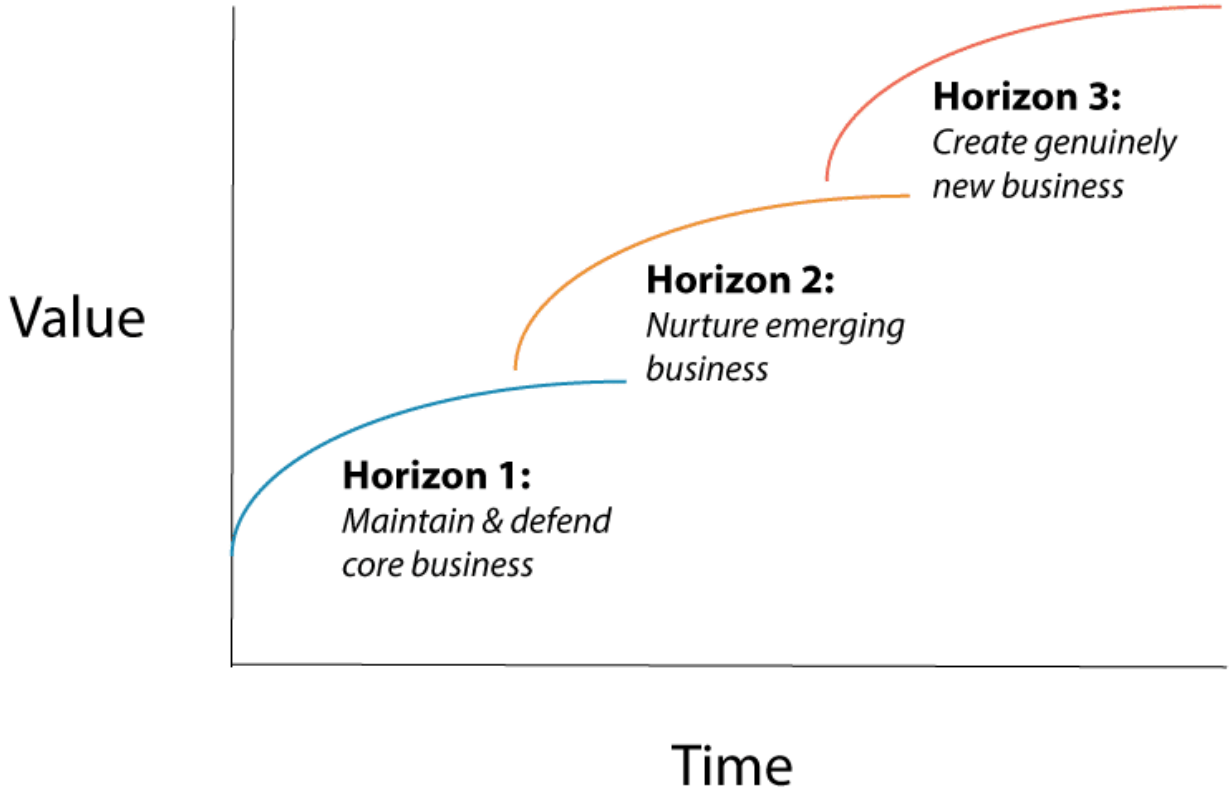
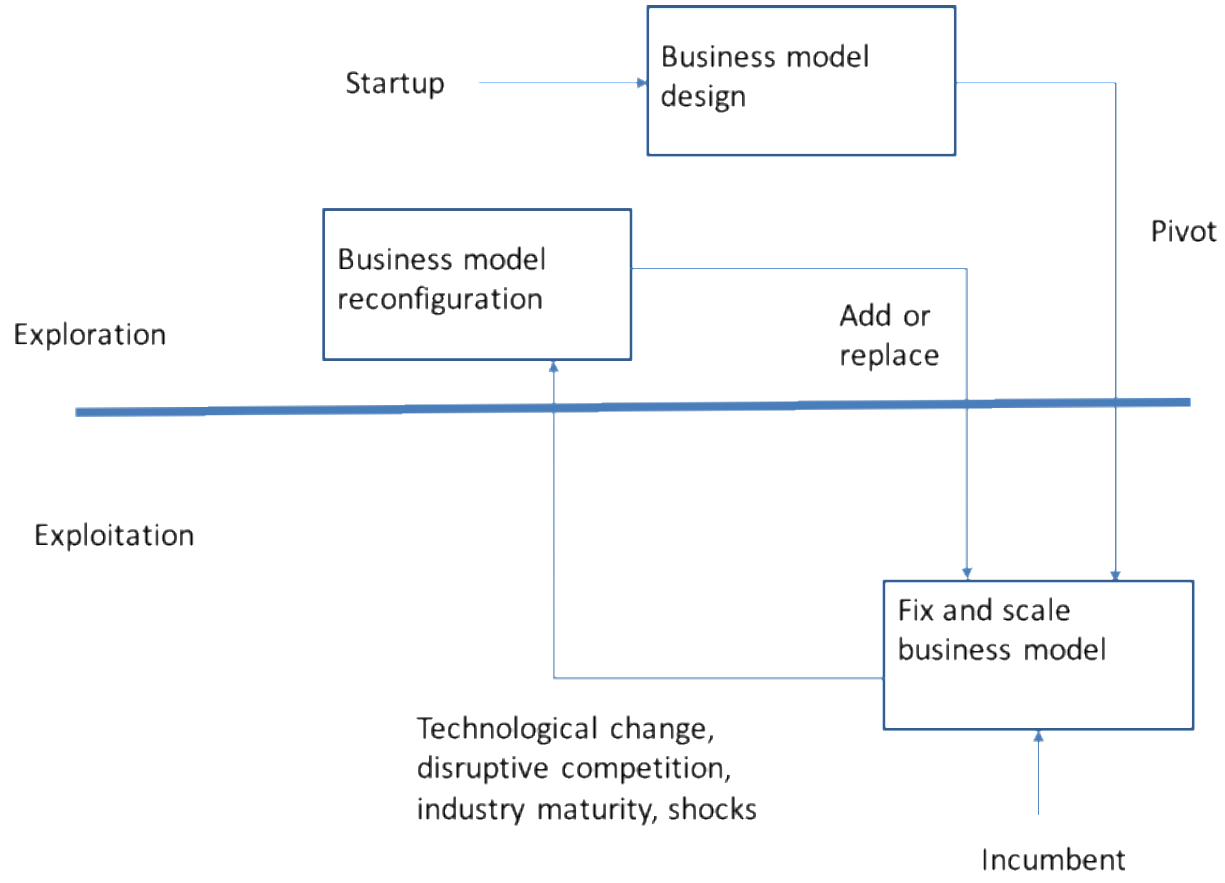


Figure 2: Exploration, exploitation, and business model innovation



Challenge	Description	Possible Outside-in Open Innovation remedies
Business model reconfiguration	Conflicts with current business model or inability to understand new business model	• Use external partners to minimize internal resource conflicts until better validation is achieved • Note that willingness of third parties to participate is itself a validation of the prospective business model
Tight integration with the corporate context	Internal processes are scaled up / rigid and while Lean Startup processes are small and flexible, creating conflicts between established processes and new venture processes	• Measure learning in the new venture process, do not impose established company metrics • Outside-in collaboration with external partners including prototyping, manufacturing, customer feedback, etc. • Defer tight integration, rather than forcing the use of internal processes, until better data are available
Existing corporate roles	Corporate roles in established businesses differ from those needed in Lean Startup roles.	• New venture requires generalist managers, vs. specialists, until venture is ready to scale • Rate of adaptation and "pivoting" is much higher in new venture, making management roles necessarily more fluid • Managers of existing large businesses must prioritize those businesses ahead of any fledgling venture, so new ventures need separate, focused management and resources
Challenge	**Description**	**Possible Inside-out Open Innovation remedies**
Identifying possible new business model	Inside-out open innovation assumes that best business model is not known ex ante, must be discovered ex post	• Simulate or stimulate search for alternative business models • Observe business models of collaborating/partner organizations – these may inform your own search for better business models
Open up unused internal ideas and technologies	Ideas and technologies not going forward internally are shared outside	• Allow outsiders to evaluate these unused ideas • Be prepared for insiders to reverse their lack of interest if and when external interest appears – ironically, external sharing can stimulate greater internal use of the ideas
License selectively and strategically	Retain the IP protection for your own business, but allow others to use that IP in new and different businesses	• Licensing by field of use • Package content for different channels, geographies where you are not active • Observe the business models adopted by the licensees – these may be viable business models for your other IP

Table 1: Challenges of Lean Startup in a corporate environment and mitigation by Outside-in and Inside-out Open Innovation initiatives

ENDNOTES

[1] Eric Ries was a student of Steve Blank, and also was involved in a company that Steve Blank invested in. Steve conditioned his investment on Eric taking his class, and exposed Eric to Steve's radically different thinking about startups. Eric then developed his own thinking about Lean, and Lean Startup emerged. So both Eric Ries and Steve Blank have made fundamental contributions to lean startup concepts, and it is hard to disentangle who started that ball rolling first!

[2] In this essay, we focus on the difficulties that large companies have with business model reconfiguration or business model innovation. However, there are several other explanations for corporate inertia that have been discussed at length in the innovation management literature over the years. In fact, we reference Abernathy and Clark (1985) as one of the first works to think carefully about business model innovation, but they actually go beyond it to incorporate both technological and market "disruption" to incumbents and why responses may be difficult in such cases. Even Schumpeter puzzled over whether entrepreneurs or large R&D labs were the source of major innovations that could provoke "creative destruction" (Freeman 1982). Over the years, many nuances to technological and market disruption have been developed, including by Tushman and Anderson (1986), who discussed whether incumbents could develop technological breakthroughs that could "destroy" their competences; Henderson and Clark (1990), who discussed how incremental technological changes might lead to the loss of architectural knowledge of the system by incumbent firms; and Christensen and Bower (1996), who discussed how incumbents' relying on current customers might restrict the technological trajectory necessary to attack new markets. This latter article is arguably more about business model innovation (discussed further below) than radical technological innovation, and there are several competing explanations as to the role that prior experience may or may not play in corporate inertia (cf. King and Tucci, 2002). However, in what follows, we focus more on some of the barriers to adoption of new business models per se rather than technological trajectories or technology-created niches.

[3] While the Lean project leader might want to use the corporate brand to strengthen the value proposition of the new project to a prospective customer, the Chief Marketing Officer of the corporation will rightly resist. Brands take years or decades to build, and can be damaged quickly. Some flaky MVP might create a huge headache for the brand if something goes wrong. (Again, a startup doesn't worry about this). One solution is to create sub-brands (e.g., Google Beta, or Google Labs) that signal the different character of the MVP prototype, while conveying the corporate backing of the brand. Another is to create a "white box" brand, used for testing new ideas, while keeping separate the corporate brand.

[4] For more information, visit this link: http://steveblank.com/2014/03/26/why-internal-ventures-are-different-from-external-startups/

[5] Levinthal made this observation at the Academy of Management meeting in Chicago in August, 2018, in the session on Lean startup that was organized by Robert Seamans.

[6] Virtually all representations of business models, from Afuah and Tucci (2000), to Amit and Zott (2000), to Chesbrough and Rosenbloom (2002), to Osterwalder and Pigneur (2009), include multiple functional units in their representations. Business model innovation is therefore inevitably a cross-functional process.

[7] One proof of these differences is the high frequency of Directors and Officers insurance in established companies' Boards of Directors. These are insurance products that protect Board members from individual liability for their decisions as a Board member. Such insurance is typically not offered to Boards of startup ventures.

[8] See Weiblen and Chesbrough (2014).

[9] See Piller (2010).

[10] In one case we know (Lean Elephants, at Telefonica), the company chose to have its R&D staff directly engage with prospective customers. This not only provided direct feedback to the technical staff, but it broadened the staff's understanding of the market requirements for the projects they were pursuing. Previously, these requirements were provided by the marketing function, and the underlying discussions with customers were unobservable by the technical staff. See Jurado Apruzzese and Olano Mata (2014); Chesbrough et al. (2016); Flores et al. (2017b) for more information.