

Process Ambidexterity for Entrepreneurial Firms

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“ How wonderful that we have met with a paradox. ”
Now we have some hope of making progress.

Niels Bohr (1885–1962)
Physicist and Nobel Laureate (1922)

Technology-based entrepreneurial firms must effectively support both mainstream exploitation and new-stream exploration in order to remain competitive for the long term. The processes that support exploitation and exploration initiatives are different in terms of logistics, payoff horizons, and capabilities. Few firms are able to strike a balance between the two, where mainstream exploitation usually trumps new-stream exploration. The ultimate goal is for the firm to operate effectively in a repeatable, scalable, and systematic manner, rather than relying on good luck and hoping either to come up with the next innovation or for the product to function according to its requirements.

This article builds on the author's years of experience in building businesses and transforming medium and large-sized, entrepreneurial technology firms, leading large-scale breakthrough and sustained performance improvements by using and evolving Lean Six Sigma methodologies, and reviews of technology innovation management and entrepreneurship literature. This article provides a process-based perspective to understanding and addressing the issues on balancing mainstream exploitation and new-stream exploration in medium and large-sized entrepreneurial firms and extending it to startups. The resulting capability is known as process ambidexterity and requires disciplined, agile, and lean business management.

Introduction

Most leading firms are proficient at continuously evolving their mainstream business, namely through innovations in technology that add incremental value in order to remain competitive in a particular market space. In contrast, these same companies may find themselves struggling to achieve disruptive innovations that create new markets and value networks. Processes, and the underlying organizational structures and culture that support them, are a key component to this struggle.

Building upon the definition proposed by Lee and colleagues (2009, tinyurl.com/7socnp3), *process ambidexterity* is the firm's capability for utilizing both process align-

ment and process adaptability, from the top level of the business through to the lower levels for each function. *Process alignment* deals with rigour, discipline, consistency, and maturity of the processes. *Process adaptability* deals with agility, responsiveness, flexibility, and customization of the processes.

This article describes the characteristics of mainstream exploitation and new-stream exploration. A description of sequential and simultaneous implementation approaches follows, where their lack of alignment and poor adaptation are identified as intrinsic sources of imbalance. The capability of process ambidexterity is introduced along with supporting mechanisms as a means to achieve balance.

Process Ambidexterity for Entrepreneurial Firms

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Characteristics of Mainstream Exploitation and New-stream Exploration

Mainstream exploitation focuses on initiatives that deliver payoffs in the near term (for example, within 12 months). Their mandates are associated with maintaining business strength as they relate to the firm's current market position. This includes incremental improvements to the existing product portfolio or solution such as adding new features, improving performance of existing functionality, improving quality, and reducing cost. The processes must support efficiency, productivity, and product quality to ensure the firm "does things right".

Conversely, *new-stream exploration* focuses on initiatives that deliver payoffs in the intermediate or long term. Their mandates are associated with the evolution of the firm to create new markets and options for growth. This includes breakthrough innovations, paradigm shifts, new products or solutions, and adapting to very strong competitive and market forces. The processes must support freethinking and experimentation while in an environment of very high uncertainty to ensure the firm "does the right thing".

Table 1 describes the dimensions where each approach operates and the demands they each need to address.

Table 1. Characteristics of mainstream exploitative business and new-stream exploratory business*

Dimension	Mainstream Exploitative Business	New-Stream Exploratory Business
Strategic Intent	Cost, profit, generate revenue from current operations	Growth, innovations that will provide revenue in the future
Competitors	Responding to current competitors	Anticipating future competitors
Investment Focus	Advancing current technologies, serving current customers	Exploring new, emerging technologies, creating new markets
Critical Tasks	Operations, efficiency, incremental innovation, refinement	Adaptability, new products, breakthrough innovation
Competencies	Operational	Entrepreneurial
Structure	Formal, mechanistic	Adaptive, loose
Controls & Rewards	Margins, productivity	Milestones, growth
Culture	Efficiency, low risk, quality, customers	Risk taking, speed, flexibility, experimentation
Employee Skills	Refine current skills and capabilities	Develop entirely new skills
Leadership role	Authoritative	Visionary, involved

*Adapted from O'Reilly and Tushman (2004; tinyurl.com/cj6arty) and Morris et al. (2010; tinyurl.com/cesk9iz).

Process Ambidexterity for Entrepreneurial Firms

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Very few firms are able to strike a balance between new-stream exploration and mainstream exploitation, especially with the increasing complexity and pressure to stay competitive. Typically, firms are prone to over-rotate on the tactical mainstream support at the expense of strategic innovation. This is particularly true for firms that are struggling to deliver on their mainstream business when they are caught short on time, funds, product functionality, and quality. The exploration of new-streams is often seen as a risky venture into the unknown, rather than a move that strengthens the business.

Implementation Approaches: Sequential and Simultaneous

Chen and Katila (2009, tinyurl.com/7vdzaud) pulled together a comprehensive summary of sequential and simultaneous implementations of mainstream exploitation and new-stream exploration, and then coupled each approach with the most suitable business environment. Although each approach may seem opposite in nature, they actually represent ends of a continuum, where implementations can reside within these boundaries.

In the *sequential approach*, mainstream exploration and new-stream exploitation are viewed as fundamentally conflicting activities. Exploration is viewed as an inefficient process, whereas exploitation is basically efficient. With the sequential approach, there are back-to-back periods of exploration followed by exploitation. The exploratory process, having lots of experimentation, precedes the replication process of exploitation. The sequential approach is more suited to stable and established environments that are characterized by significant periods of stability before having to address major change. For example, the semiconductor industry resonates with the sequential approach with its long and predictable product technology lifecycles, and by conditions that are relatively stable with the rare exception of disruptive events.

In the *simultaneous approach*, mainstream exploration and new-stream exploitation are viewed as activities that reinforce each other, and therefore must occur simultaneously. This reinforcement is based on mutual learning between the two, thereby more readily growing a learning organization. The simultaneous approach is more appropriate for dynamic environments. As conditions are constantly changing, firms that compete in these markets do not have the time to switch from exploration to exploitation because the window of opportunity is very short. For example, the smart-

phone, superphone, and tablet industries favour the simultaneous approach in which competing devices are steadily being introduced by a wide number of firms.

Lack of alignment and poor adaptation of these approaches are intrinsic sources of the imbalance between mainstream exploitation and new-stream exploration, where exploitation often trumps exploration in the continuum. Process ambidexterity is a fundamental capability underlying the effectiveness of execution of these approaches and determining when one approach outperforms the other in the continuum of the business. The next section of this article provides the mechanisms for achieving the balance between mainstream exploitation and new-stream exploration that is appropriate to the particular firm's environment.

Process Ambidexterity Mechanisms to Achieve Balance

Process ambidexterity requires disciplined, agile, and lean business management. This section presents an approach that supports process ambidexterity and is based on the following mechanisms:

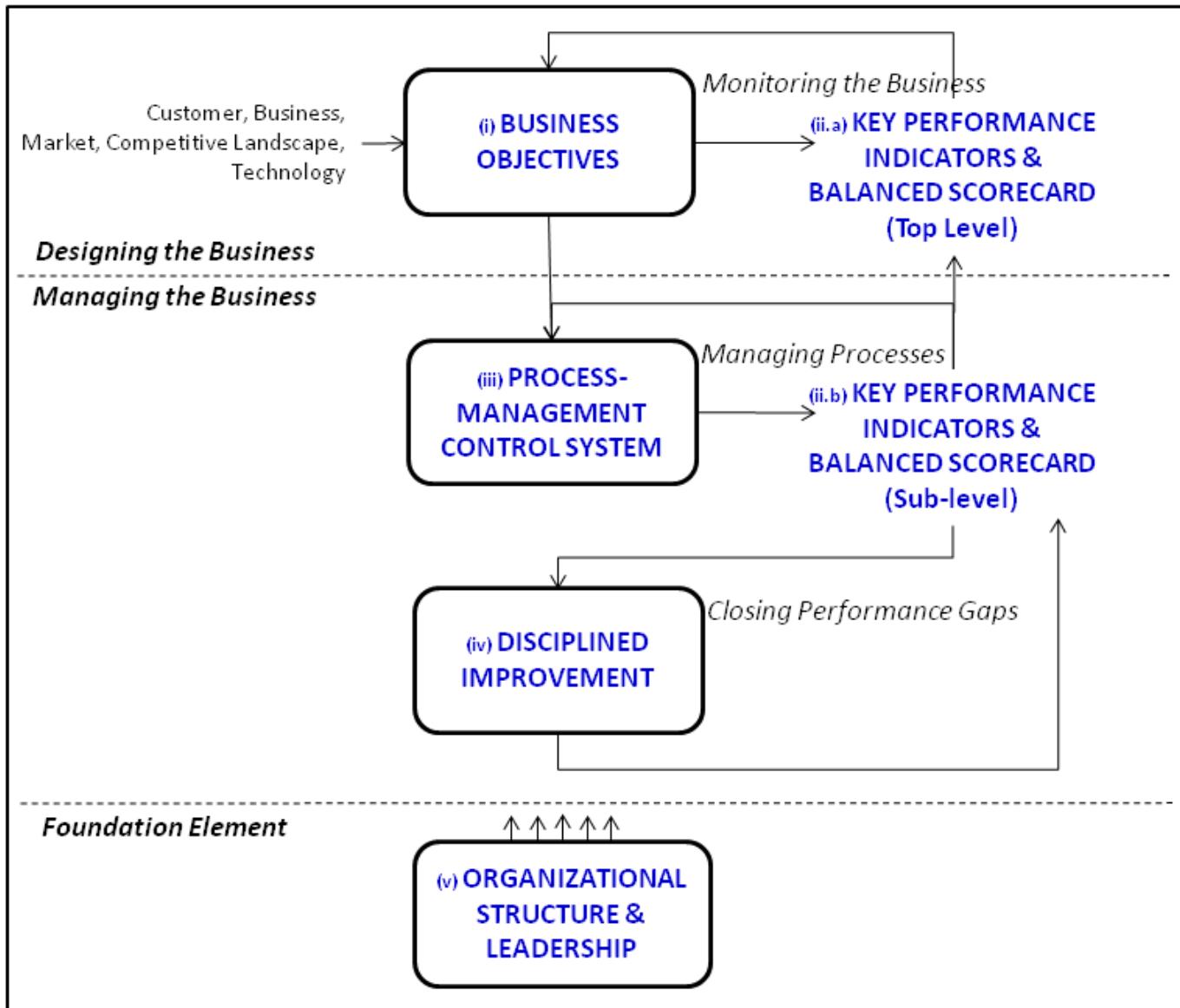
- i. Business objectives
- ii. Key performance indicators and balanced scorecard
- iii. Process-management control system
- iv. Disciplined improvement
- v. Organizational structure and leadership

At a high level, this systematic approach breaks out into *designing the business* and *managing the business*. In designing the business, the business objectives are developed. These objectives are measured by using "key performance indicators" and "balanced scorecards" at the top level. The indicators provide focus on what is important. In managing the business, process-management control systems are set up, and they signal what is not working. Performance gaps are identified, which can then be prioritized into disciplined improvement initiatives. The outcomes of the improvement initiatives are measureable and inherently reflected in the key performance indicators and balanced scorecards. Figure 1 illustrates that, throughout this cycle, organizational structure and leadership play a role with accountability based on clear ownership and commitment.

Process Ambidexterity for Entrepreneurial Firms

Sonia D. Bot

Figure 1. Process ambidexterity mechanisms



Business objectives

Well-defined business objectives set the stage for what the firm needs to achieve and the parameters within which it needs to operate. This includes a synthesis of customer, shareholder, and employee feedback, ethnographic studies, market research, and competitive analysis. These objectives are cascaded top-down, where top-level leadership, management, staff, and partners are aware and aligned.

Key performance indicators and balanced scorecard

Key performance indicators are measures that are used to evaluate the current health of an organization over time. At the top level of the firm, the indicators quantify the firm's strategy in terms of revenue, expenses, cash flow, and customer satisfaction. They provide a business-wide view at the highest level. The indicators at the top-level cascade and align with the hierarchy of sub-processes within the firm. At the sub-process level,

Process Ambidexterity for Entrepreneurial Firms

Sonia D. Bot

indicators provide the state of health in the context of the sub-process. For example, a key performance indicator for the sub-process of new-stream exploration could be the number of patents filed over time. For the mainstream exploitation sub-process, indicators can include measures of quality, time-to-market, and budget adherence. Balanced scorecards present the key performance indicators in a concise report compared to the target value for each indicator. Balanced scorecards are tailored to the various levels in the organization. This helps set priorities, diagnose and solve problems, and plan for the future.

These key performance indicators are based on process, rather than function. They identify key business drivers. Through ongoing measurement, these key drivers can be controlled and improved. The indicators reveal how well critical requirements are met and predict future performance. Since these indicators are linked at all process levels, it becomes easier for employees throughout the firm to understand where the business is headed, understand what they need to do, and how each process contributes to achieving the business objectives.

Key performance indicators typically measure outcomes, as in the example above, the number of patents filed over time. However, more mature implementations include predictive indicators (i.e., ones that have been statistically proven to predict the outcomes). For example, the number of new ideas in the research funnel over time could be a predictive indicator for the outcome of the number of patents filed over time. Another example would be the defect density in software during integration testing as a predictive indicator of the volume of customer returns in the field.

When developing key performance indicators, and their associated balanced scorecards, one should focus on the vital few. The vital few, and not the trivial many, are only those indicators that are required to make sound decisions quickly. They are few in number (for example, from a couple to no more than a handful) and are different for every firm. Typical trigger questions to identify the vital few include: What do you really need to know to run your business? What issues use up most of the firm's resources? What do your customers care most about?

Implementing indicators in an ad hoc fashion and confusing them with diagnostic metrics used for analysis leads to indicators that are poorly designed and rarely

used, misleads the decision-making, and bogs down the tools and systems that support them. Instead, indicators should be treated in a similar way as product requirements. They must have a structured definition, be analyzed, designed, validated, and documented, and evolve as appropriate over time. A popular approach to achieve this is GQM+Strategies (tinyurl.com/6q3elrp), which is based on the "Goal Question Metric" paradigm. Furthermore, all indicators must be mapped to a specific step in the process.

Process-management control system

A process-management control system is the foundation for managing processes (such as alignment, adaptability, and performance to targets), focusing improvements, and sustaining the gains realized from improvement efforts. This is based on the continual measurement of process performance (using the key performance indicators and balanced scorecard) against critical business and customer requirements. The key processes in the firm should be documented from the top level though to the lower levels. For example, the top-level processes for a firm could be: "define strategy, develop products, acquire customers, deploy products, and support products and customers". Lower-level processes would expand on the higher level processes. For example: "develop products" would break down into the product development process steps (and most likely different ones for mainstream exploitation and new-stream exploration); "acquire customers" would break down into marketing and sales process steps.

Disciplined improvement

For improvement initiatives to succeed, they must be approached in a systematic and disciplined manner. Otherwise organizations get stuck in a vicious cycle, also known as a capability trap (Repenning et al., 2001; tinyurl.com/bcr6cw), where they can go on for years with ample goodwill to improve, yet not achieve, performance results. Typically, these efforts are not successful because they fail to both look at the dynamics of the end-to-end system and identify true root causes. Common methodologies that support disciplined improvement are Lean, Six Sigma, Design for Six Sigma, and Kaizen.

The Lean methodology focuses on the systematic removal of waste and reduction of cycle time in a process. Six Sigma deals with the reduction of operational variation and defects in a process. Design for Six Sigma, a newer methodology, is all about helping the organiza-

Process Ambidexterity for Entrepreneurial Firms

Sonia D. Bot

tion create new products and services in the spirit of systematic innovation. Kaizen is a continuous improvement approach that is typically used for achieving *incremental* improvements. Lean and Six Sigma are tailored for achieving *breakthrough* improvements. Design for Six Sigma is used to create new defect-free processes, products, and services.

Although Lean and Six Sigma originated in the manufacturing area, their application to technology innovation management is in its infancy and continues to evolve, taking into account the characteristics of knowledge-based work, need for creativity, and the velocity of the business. Nonetheless, fundamental principles still apply: clearly defining the problem or opportunity; measuring the defects and waste and where they occur in the process; prioritizing customer requirements; analyzing the true root cause of defects and waste; analyzing alternative high-level process designs according to critical indicators; identifying and implementing solutions; validating solutions; and monitoring performance to ensure objectives are met and sustain.

Organizational structure and leadership

Organizational structure, including how the senior team manages it and the resulting culture, is critical to ensuring accountability that is based on the clear ownership and commitment that is necessary to systematically support the mechanisms presented above for process ambidexterity, which in turn affects the ability of a firm to foster and balance both mainstream exploitative and new-stream exploratory initiatives.

According to O'Reilly and Tushman (2004; tinyurl.com/cj6arfy), traditional organizational structures and their management are at high risk for impeding the balanced flow between these initiatives. For example, in a functional organizational structure, employees are grouped into departments according to their function (such as R&D, marketing, sales, manufacturing, and finance). The management is hierarchical, with clear lines of authority and reporting that lead ultimately to one top person. The new-stream exploitative teams are fully integrated into the organizational and management structure for the mainstream exploitative business.

O'Reilly and Tushman (2004) describe the structure and management of an ambidextrous organization where the mainstream exploitative and new-stream exploratory teams are organized as structurally independ-

ent units. Each team has its own processes, structures, and cultures. However, they are integrated into the same senior-management hierarchy. The structure and management of an ambidextrous organization is far superior in supporting both exploratory and exploitative projects. For example, in their study, O'Reilly and Tushman (2004) found that, when it came to launching breakthrough products or services, more than 90% of ambidextrous organizations achieved their goals, while none of the cross-functional or unsupported teams and a quarter of the functional designs produced real innovations. In the cases where breakthrough innovations were solely to replace existing products, ambidextrous organizations performed as well as functional designs. Furthermore, when traditional organizations moved to an ambidextrous structure, their performance increased substantially, and conversely, when ambidextrous organizations migrated to traditional structures, their performance decreased markedly.

O'Reilly and Tushman (2004) learned that ambidextrous organizations must have senior teams and managers who have the ability to understand and be sensitive to the needs of the very different types of businesses, and adapt appropriately. The firm's senior team must be committed to operating ambidextrously, even if the members are not ambidextrous themselves. Resistance to ambidexterity at the top level of the organization cannot be tolerated. Lastly, it is crucial that the senior team relentlessly communicate a clear and compelling vision.

Implementing the mechanisms

Depending on the nature of the firm, these mechanisms can be implemented using agile, waterfall, or hybrid methodologies. The key is to do this in a systematic and disciplined manner. Keep this as simple and lightweight as possible. Focus on the vital few indicators and processes (quality over quantity) and prioritize improvement initiatives and interventions with a focus the Pareto Principle, that is, the 80:20 rule.

Since process ambidexterity is pervasive throughout the entire organization, buy-in, commitment, and consistency is critical throughout all the levels of the organization, from top-level executives to managers to staff. The top-level leadership must be fully engaged and actively support this. They must champion, lead by example, and remove roadblocks when required. Otherwise the risk of remaining stuck in the capability trap is high.

Process Ambidexterity for Entrepreneurial Firms

Sonia D. Bot

Conclusion

A process-based perspective to understanding and addressing the issues on balancing mainstream exploitation and new-stream exploration in medium and large-sized, entrepreneurial technology firms has been presented. This article makes at least two contributions. First, it identifies process alignment and adaptation as intrinsic sources to balance mainstream exploitation and new-stream exploration. The second contribution is that this article provides a practical and real-world framework for enabling the continuous development of the capability for process ambidexterity. By building the capability of process ambidexterity through the proposed mechanisms, disciplined, agile, and lean business management occurs. This gives rise to alignment and adaptability, and then a shift to balanced mainstream exploitation and new-stream exploration.

The challenge for achieving exploration and exploitation balance is not restricted to medium and large-sized entrepreneurial firms. Startups are also faced with this challenge and often focus on new-stream exploration at the expense of mainstream exploitation. Over time, many will hit the wall, get stuck in a capability trap, and make no forward progress. Ideally, firms need to build the capability of process ambidexterity from the start and evolve it as the firm grows. This sets up the firm to scale more readily. Overall, process ambidexterity is a key capability that enables competitive advantage.

About the Author

Sonia Bot is a business executive that specializes in strategy and business execution for technology innovation and corporate entrepreneurship ventures. She has extensive experience in the high-tech industry, including business transformation and strategy, product management and delivery, and new venture creation within multinational technology companies. Her work experience includes Research In Motion, Nortel, Bell-Northern Research, IBM, and TransCanada Pipelines. She holds degrees in Computer Science with Systems Design / Electrical Engineering (BMath) from the University of Waterloo and Biomedical Engineering (MSc) from the University of Toronto, and she is a certified Lean Six Sigma Master Black Belt.

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