The Impact of the Lean Startup in Advancing Innovative Products and Business Models: an Organizational Learning Perspective

John M. York, PharmD, MBA 1,2

1 The Institute for the Global Entrepreneur at the Jacobs School of Engineering and the Rady School of Management, University of California, San Diego, San Diego, California, United States.

2 Cranfield School of Management. Cranfield University. Cranfield, United Kingdom.

Abstract – The lean startup is a practitioner-based, hypothesis-driven process for developing new enterprises. This approach identifies and validates scalable products and business models. This paper examines the existing lean startup, business model/business model innovation, and organizational learning literature. Of specific interest are the impact (defined as to the organizational and performance effects that occur within the startup) using lean startup practices on an entrepreneurial venture and its efforts to advance product and business model innovations through the adjacent ecosystem.

This review identifies several essential themes. First, the empiric lean startup literature is evolving and presents opportunities to contribute to its academic (and practitioner) dialogue. Scholarly works examining its impact is nascent, with mixed observations. Second, the business model and business model innovation are critical to the process, and experimentation plays a role. Third, organizational learning runs through these streams, and notable are single- and double-loop learning, exploration vs. exploitation, adaptation, failure, and experimentation practices.

Organizational learning, specifically Crossan’s 4Is framework (intuiting, interpreting, integrating, and institutionalizing) and its “feed-forward”/“feedback” processes, provides a unique lens to study the impact of the lean startup practices in entrepreneurial ventures, particularly in the life sciences space. This work aims to address the overarching research question—how do life science entrepreneurs view the impact of using lean startup practices in advancing their product and business model innovations—an organizational learning perspective? Emerging from this question is a model that considers the use of lean startup practices as part of the “feed-forward” and “feedback” processes at each stage of Crossan’s 4Is model. This work sets the stage for the next phase. This effort will involve a systematic literature review to refine this initial question and model and develop relevant hypotheses or propositions.

Keywords: Business model, Business model canvas, Business model innovation, Double-loop learning, Experimentation, Exploration, Feed-forward, Feedback, 4 Is Framework, Hypothesis-driven entrepreneurship, Lean startup, Minimum viable product, Organizational learning, Reflection, Scientific-driven entrepreneurship, Validated learning, Venture experimentation

1.0 Introduction

A fundamental question in determining the viability of a strategy is—does it produces an impact? More significant, what is that impact, and from what vantage or lens should one view its effects? Such considerations underly this doctoral research that focuses on the lean startup (LS) methodology’s impact on an entrepreneurial venture and its efforts to advance product and business model innovations through the adjacent venture ecosystem by achieving specific economic and/or organizational benefits and outcomes.

The term impact involves multiple characterizations. The Merriam Webster Dictionary defines it as a force of impression of one thing on another or a significant or major effect (Anon., 2020). In the literature, the definition can involve an economic (Litvin, 2013; Martelli et al., 2017), environmental (Ragavendran, 2015); societal (Woerrlein and Scheck., 2016), organizational (Dezdar and Ainin, 2011; Martelli et al., 2017), or technological (Martelli et al., 2017) connotation. For example, one common definition involves the long-term changes (positive/negative, primary/secondary, direct/indirect, intended/unintended) that occur during and/or after a project and beyond the target group (OECD/DAC, 2002). Other descriptions consider the term as (1) the portion
of the outcome (above and beyond what would have occurred) due to a venture’s activity (Bono, 2010); (2) the change at the level of the target group; (Bono, 2006); (3) the same as the outcome (Osborne, 1995); (4) the perception of improved decision making, organizational communication, business process rationalization, customer satisfaction, cost reduction, and the firm’s overall productivity and performance (Dezdar and Ainin, 2011); and (5) the risks and benefits that the inferred knowledge exert on an information producer (Tang et al., 2015). Specific to this research endeavor, the last four definitions (2-5) resonate concerning the impact (collectively defined as to the organizational and performance effects that occur within the startup) of the LS methodology.

The LS is a popular practitioner-based methodology, which Erich Ries defines through his blog and bestselling book, “The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses” (Ries, 2011). Its purpose is to help ventures navigate uncertainty and improve their odds of success rapidly and efficiently (Ries, 2011). This methodology embraces a hypothesis-driven process for developing successful new enterprises by identifying and validating scalable products and business models. LS consists of several essential practices, including entrepreneurial vision, hypotheses generation, experiments using a minimum viable product (MVP), and learning that de/validates the original assumptions and drives action (iterate, pivot, pursue, or exit) (Eisenmann, Ries, and Dillard, 2013). Individuals utilize this specific methodology and customer discovery (Blank, 2005) and the business model canvas (Osterwalder, Pigneur and Tucci, 2005). To this end, some scholars group these together, labeling them as LS activities (LSAs) (Camuffo et al., 2019; Ghezzi et al., 2015).

This methodology enjoys a tremendous following. Tech startups in Silicon Valley, entrepreneurial ventures throughout the world, schools of business, accelerators, and government programs (e.g., National Science Foundation Innovation CORPS™) utilize LSAs as part of their entrepreneurship and commercialization training programs (Blank, 2013; Bortolini et al., 2018; Eisenmann, Ries, and Dillard, 2013; Ghezzi, 2018; Mansoori, 2016; Semcow and Morrison, 2018). Corporations (e.g., Dropbox, General Electric, Intuit, and Proctor & Gamble) employ LS (Blank, 2013; Frederiksen and Brem, 2017; Lashinsky, 2018). LS meetups globally engage 20,000 regular participants (Roush, 2011).

While these examples indicate that the methodology exerts some impact, the LS’s challenge is that most of its published experience is anecdotal (Frederiksen and Brem, 2017). Such is a result of its genesis as a practitioner-based methodology, which offers insight into tensions that exist between academia and practice regarding LS (Felin et al., 2019a; Shepherd and Gruber, 2020). Contigiani and Levinthal (2018) note that the LS literature is nascent concerning impact and performance. Thus, this limited scholarly empirical evaluation of LS and its impact presents an issue and opportunity.

It is against this background that this doctoral research emerges. This positioning paper aims to define a unique place for this doctor of business administration research involving LS. To properly explore LS and define an overarching research question around this methodology's impact, this effort entails examining three literature streams (Figure 1).

![Figure 1. Three Core Literature Streams for This Review](image)

This review of the extant literature leads to three overarching themes. The first is that the LS literature is evolving and presents opportunities to contribute to its academic (and practitioner) dialogue. The second is that while LS
focuses on a product by using the MVP, the business model (BM) and business model innovation (BMI) are essential components of the LS process, and experimentation is a critical activity necessary to solidify a sustainable form that an enterprise can scale. Third, learning, and particularly organizational learning (OL), emerges as a common thread that runs through each of these three streams.

Emanating from this research is an opportunity area involving OL. Several activities emanating from the OL literature (e.g., exploration, experimentation, theory-in-use single- and double-loop learning processes) underlie LS. Furthermore, Contigiani and Levinthal (2018) note this domain and suggest that researchers use this lens to view LS in posing questions and moving forward a research agenda.

In considering the OL literature, the work of Crossan et al. (1999), utilizing the 4Is framework (intuiting, interpreting, integrating, and institutionalizing) and its “feed-forward”/”feedback” process, offers a unique lens with which to examine the impact of LS within the entrepreneurial space. Dutta and Crossan (2005) extend this work into entrepreneurship, seeing that the entrepreneur can intuit, and then “feed-forward” through 3Is both within the firm and across the broader ecosystem of customers, partners, and investors to “feedback” on as they embrace new ideas, knowledge, and their byproducts. These scholars posit several propositions (Dutta and Crossan, 2005) but fail to test them empirically (personal communication D. Dutta).

In many ways, the 4Is pattern Roger’s diffusion of innovation theory (Rogers, 2010) and Teece’s dynamic capabilities framework of sense, seize, and transform business models (Teece, 2018). Furthermore, evidence from the empirical (Ghezzi, 2018; Mansoori, Karlsson and Lundqvist, 2019a) and practitioner (Ng, 2014) literature indicate that startup founders, their teams, and mentors grapple with the LS methodology. Of concern are issues with the MVP, experimentation, and reconciling customer learning’s in “feeding-forward” the entrepreneurial vision (the intuiting) with mentor coaching as “feedback,” representative of the subsequent 3Is within the firm and beyond.

Hence, this paper aims to chart a path through three literature streams. Ultimately, it arrives at an intriguing endpoint that offers a potentially valuable contribution to the LS and OL literature. Specifically, it seeks to review these streams to identify essential themes, common threads, opportunity areas for unique contributions, pertinent questions, and a model characterizing the dynamic of the lean startup activities with the 4Is to explore that will set the foundation for the next phase of this research.

The structure of this narrative begins with a summary of each literature stream. These set up a discussion that homes in on organizational learning as a common theme. This section then proposes that OL, and, particularly the 4Is, as the lens to view LS's impact on entrepreneurial ventures. Furthermore, it submits that the life science entrepreneurial space as a domain to represent the “institution” in which a startup can “feed-forward” new ideas and knowledge (and their byproducts) as the other lens to examine the impact of LS. The discussion transitions to positing an overarching research question and model that engages the 4Is and the lean startup activities to provide a basis for positioning the proposed research direction within a unique space. The paper then offers theoretical and practice contributions to highlight the benefits offered through this research direction. This piece closes with relevant learning’s and proposes a subsequent path for advancing this research to its next phase involving a systematic literature review.

2.0 Lean Startup (LS)

2.1 Defining the Methodology

LS describes a practitioner-based, hypothesis-driven, scientific approach for developing new products and businesses (Eisenmann, Ries, and Dillard, 2013; Ries, 2011). Ries (2011) situates LS around the principles that entrepreneurs are ubiquitous; entrepreneurship is management; validate learning; build-measure-learn; and innovation accounting.

This methodology (Eisenmann, Ries, and Dillard, 2013; Ries, 2011) involves several essential elements. The process begins with an entrepreneurial vision, which defines the venture’s focus and involves ideation (Eisenmann, Ries, and Dillard, 2013; Ries, 2011). The next step involves translation to falsifiable hypotheses around a product/service (Eisenmann, Ries, and Dillard, 2013) and a BM (Blank S, 2012).

The centerpiece of the methodology is experimentation, which flows from the setting of hypotheses (Figure 2) (Eisenmann, Ries, and Dillard, 2013). Experimentation embraces the scientific approach using a “build-measure-learn” (BML) cycle to test hypotheses involving a minimum viable product (MVP) (Eisenmann, Ries, and Dillard,
2013; Kerr et al., 2017) and a BM (Blank S, 2012). The MVP (Figure 3) describes a product, consisting of a “bare-bones” set of features and capabilities to measure market traction, that reaches early customers (Rancic Moogk, 2012) and drives one BML cycle turn with minimal effort and time (Ries, 2011). A part of the experimentation process is that of customer discovery (Figure 4), which employs direct interviews to identify the customer, his/her needs, and to test (and validate) MVP and BM assumptions (Blank, 2005). The final part of experimentation engages that of measurement, with actionable quantitative metrics with defined thresholds to test hypotheses (Croll, A., Yoskovitz, 2013; Ries, 2011).

Figure 2. Lean Startup’s BML Cycle and Learning Actions (Light Gray: BML, Dark Gray: Resultant Learning Actions) (Adapted from Bortolini et al., 2018; Eisenmann, Ries and Dillard, 2013)

Figure 3. Drop box Landing Page and Explainer Video as an Example MVP (Nesmiyanova, no date)
The next significant step involves the practice of validated learning (Eisenmann, Ries, and Dillard, 2013; Ries, 2011). This step engages the reflection on experiment results (hypothesis de/confirmation) and considers resultant actions (pivot, iterate, move forward, or exit) (Eisenmann, Ries and Dillard, 2013; Ries, 2011). Such actions, which characterize LS as an adaptive strategy (Bortolini et al., 2018; Eesley and Wu, 2015), include iterations (minor changes) and pivots (substantial corrections) around the MVP and/or the BM (Eisenmann, Ries and Dillard, 2013). The outcomes of the experiments and the ability to validate product traction and a sustainable business model lead to a state of product/market fit (P/MF), or having the right product for an attractive market with a demonstrated early-adopter demand (Blank S, 2012; Eisenmann, Ries, and Dillard, 2013).

2.2 Antecedents

The LS approach emerges from several antecedent approaches. The most notable antecedent involves lean manufacturing, which centers on efficiency and waste minimization (Krafcik, 1988; Ohno, 1988; Womack and Jones, 1997). Eisenmann et al. (2013) observe that lean provides feedback-based learning through experimentation, rapid iteration, small batches, short cycles, and an MVP to improve processes.

In addition to lean manufacturing, three other antecedents are noteworthy. McGrath et al. (1995, 2010) describe discovery-driven planning as an approach that promotes plan adaptation for areas of uncertainty as the firm obtains new information. Blank (2005) credits this work as a foundation for customer discovery. Lynn et al. (1996) characterize “probe and learn” as an approach that relies on feedback to reinforce success-based actions and avoid failure-based ones. Sull (2004) introduces disciplined entrepreneurship, which involves formulating hypotheses, staging experiments, and iteration to manage uncertainty.

2.3 Theoretical Foundations

Several academic theories provide foundational support for LS. Two of the most noteworthy are effectuation and bricolage.

2.3.1 Effectuation

Effectuation posits that entrepreneurs engage in uncertain and dynamic environments and shape their future outcomes (Sarasvathy, 2001). This theory rests on affordable loss, strategic alliances, exploiting contingencies, and controlling an unpredictable future (Sarasvathy 2001). It is also associated with “search” activities (Yang, Sun, and Zhao, 2019). Two reviews (Bortolini et al., 2018; Frederiksen and Brem, 2017) and a mixed-methods study involving startups (Ghezzi, 2018) support effectuation as underpinning.

2.3.2 Bricolage

Bricolage describes resource-constrained firms’ behavioral and organizational processes in their creative use of limited resources (Baker and Nelson, 2005). It involves making do in actively engaging a problem, relying on utilizing current resources (internal and external) “at hand,” and combining resources for new purposes (Baker and Nelson, 2005). This approach to problems and opportunities creates value that establishes or grows a

### 2.33 Creation Theory

Creation theory specifies that opportunities are constructs created by the entrepreneur's actions, reactions, and enactments to develop a value proposition in an uncertain environment (Alvarez, Barney, and Anderson, 2013). Creation fits with the Schumpeterian economic view of entrepreneurial enactments (Schumpeter, 1934). Alvarez and Busenitz (2007) explain that creation involves an iterative, inductive, and incremental process, as entrepreneurs act, then observe consumer and market responses. Ghezzi (2018) offers supportive evidence for creation as a theoretical root for LS.

### 2.34 Organizational Learning

Another foundation area of interest is organizational Learning (OL), which represents a broad area that this paper covers later as a separate literature stream. OL offers a few unique foundational elements. Huber (1991) includes experimentation as a subprocess of experience component within the knowledge acquisition construct. Argyris and Schon (1978) introduce single- and double-loop learning. Crossan et al. (1999) provide the 4Is framework, which facilitates strategic renewal and competitive advantage via its “feed-forward” and “feedback” mechanisms. Bortolini et al. (2018) note in their historical literature review that LS shares commonalities with the Learning School of Strategy. Finally, Mansoori (2017) finds that LS aligns with “theory-in-use” Model 2 practices.

### 2.35 Dynamic Capabilities

The concept of dynamic capabilities describes a firm's ability to integrate, build, and reconfigure endogenous and exogenous competencies to address a rapidly-changing environment and provide for competitive advantage (Teece, Pisano and Shuen, 1997). Teece (2018) explains that dynamic capabilities influence a defensible BM as a firm progress from sensing opportunities to seizing a construct to transforming the organization. Ladd et al. (2015), who extends this work into the entrepreneurial space, supports LS from a study in a cleantech accelerator study.

### 2.35 Real Options

Finally, real options describe an approach to investments when the future is uncertain due to dynamic economic, technological, or market conditions (McGrath, 1997). They entail investing in an endeavor that will provide access to a future opportunity (Trigeorgis and Reuer, 2017) and involve time-bound rights to take action (e.g., defer/stage, grow, alter the scale, switch, or abandon/exit) (Harvey, 1999). Camuffo et al. (2019). Report results from a randomized trial, which support the view that LS experiments align with “real options” theory.

### 2.4 Empirical Experience

The LS literature is nascent but evolving this past decade. Early studies describe practitioner experiences. Lalic et al. (2012) find from a survey of 23 Croatian startups that while firms are familiar with and implement LS, they do not change their BM. Dewobroto and Siagian (2016) report from an Indonesian case study inconclusive results concerning a tourism bus venture's feasibility. Juréen (2014) reports the lack of early-stage applicability from 53 interviews in a self-managed Swedish post-stroke rehabilitation program. Dorina Racolț a-Paina et al. (2017) find from 13 interviews that most Romanian entrepreneurs embrace traditional approaches. Those receptive possess more experience and education or are involved in the information technology sector.

Further, based on observing four small firms, interviewing five serial entrepreneurs, and surveying eighteen startups, Gbadegeshin and Heinonen (2014) report that the users from different industries (e.g., mobile applications, sport management, cleantech, and consulting) can apply the methodology in developing, testing, and introducing product (and service) ideas. However, they find that users differ in applying LS depending on the firm's development stage, product/service, and founder makeup (e.g., number and experience of the entrepreneur) (Gbadegeshin and Heinonen, 2014). These authors also proffer a modified LS model that considers a restart of the ideation process when the startup encounters negative feedback through its testing efforts (Gbadegeshin and Heinonen, 2014).

Several of these studies describe limits. Nirwan and Dhewanto (2015), from a business-to-business startup case study, identify barriers including accessing customers to interview, finding big problems, pivoting, addressing regulatory and administrative boundaries, and discovering incremental solutions. Gustafsson and Qvillberg (2012),
in a study involving 59 semistructured interviews and diary data from early-stage manufacturers, identify challenges with accessing customers, developing an MVP, gaining feedback, and pivoting. Blomberg (2012) finds personal biases as a problem in a Danish study consisting of focus groups and field research. Rao (2014) cites, from an action research study of Indian software startups, multiple MVP issues. Warberg and Thorup (2016) observe in their study of software development that the MVP devalues the proper architecture requiring rework and hinders innovation due to incrementalism. York and Danes (2014) and Chen et al. (2015) raise concerns about customer discovery and interview process biases.

Other publications highlight LS’s role in learning. Mansoori (2016, 2017) reports, from a study of 22 semistructured interviews within a “prescriptive accelerator,” that entrepreneurs modify governing variables and action strategies and engage in “double-loop” learning consistent with “theory-in-use” Model 2. In another study, these researchers find that the methodology positively influences the entrepreneur-coach dynamic and leads to tensions due to a mismatch of interview findings with mentor guidance (Mansoori, Karlsson, and Lundqvist, 2019). Finally, Ladd and Kendall (2017) report that the LS enhanced entrepreneurial intent and self-efficacy during idea search and risk-averseness around the venture from a study involving a class of 99 graduate business students.

Finally, other works consider boundaries and whether the LS can apply to a broad swath of industries. Multiple authors point to software and application-based businesses, particularly uncertain markets and in the business-to-consumer sectors (Croll, A., Yoskovitz, 2013; Frederiksen and Brem, 2017; Dorina Racolț a-Paina et al., 2017; Ghezzi et al., 2015; Lalic, Calopa, and Horvat, 2012; Leoveanu, 2018; Ries, 2011). However, some business sectors may not fit well. Harms et al. (2015) argue that LS may not be ideal for materials and science-based ventures due to technological, legal/regulatory, financial, and operational risk and industries where both market and technological uncertainties are low or high. In an analysis of 117 new ventures, Andries and Debackere (2007) find that less mature, capital-intensive, and high-velocity enterprises, along with new business units in established firms, do not realize the adaptive strategy’s survival benefit. Finally, Eisenmann et al. (2013) cites three “poor fit” sectors—industries involving long lead time and high demand, an unacceptable tolerance for mistakes, or low unmet demand

2.5 Impact, Performance, and Success

One of the outstanding issues with LS involves assessing its impact, specifically the ability to achieve specific organizational and/or performance effects and outcomes. Because this methodology is one driven by practitioners such as Eric Ries and Steve Blank, much of the evidence is anecdotal (e.g., books, periodicals, or practitioner-oriented journals) (Frederiksen and Brem, 2017).

Concerning the empiric literature around impact and performance with LS, Contigiani and Levinthal (2018) observe that it is nascent. Several studies specific to LS or an adaptative strategy exist and provide a mix of experiences and findings (Figure 5).
Figure 5. Analysis of Evidence Supporting Success with Lean Startup (Adaptive Strategy or Search Strategies)

Note: LS: lean startup. The number of studies that evaluates LS (n=5), makes a comparison (n=3), includes over 100 teams (n=2), and involves a randomized control trial (n=1).

The most notable is by Camuffo et al. (2019). In a year-long, randomized control trial involving 116 early-stage startups, these investigators report that ventures in the rigorous LS cohort (n=59) experience increases in “Exits” (i.e., identifying and discarding poor ideas), pivots, revenue, and time to revenue (P<0.05).

Ladd et al. (2015) evaluate a cleantech accelerator program involving self-selected users of an LS web program (n=185). They find that those teams who validate hypotheses; confirm customer segment, value proposition, and channel sectors hypotheses; or conduct customer discovery achieve greater pitch competition success (award/no award) versus those who do not (n=86) (P<0.05) (Ladd, Lyytinen, and Gemmell, 2015). However, these teams fail to display any superiority in overall performance (within or across groups) or advantages due to an increased number of validated hypotheses or the concurrent use of testing and customer discovery (Ladd, Lyytinen, and Gemmell, 2015).

Ghezzi and colleagues (2015, 2018) offer further insight. In an action research study, Ghezzi et al. (2015) report that teams using the methodology (n=2) versus those using planning (n=2) experience shorter times to a developed product, formalized business, and first customer, and funding success. In a second study involving 227 mobile startups, Ghezzi (2018) identifies decreasing time and cost for testing (74%), aligning customer and business idea (68%), (3) verifying and pivoting the BM (52%), and obtaining financing (39%) as advantages; however, he notes a poor overall satisfaction score of 2.8 (mean) on a 4-point scale. Furthermore, this scholar does identify issues with the MVP, experimentation, and agreement between the founder and his/her team on prioritizing, conducting, and interpreting these tests and their results (Ghezzi, 2018).

Finally, from a study of 47 Norwegian tech startups, Nilsen and Ramm (2015) find that the LS’s use fails to translate to success. They fail to observe any correlation between knowledge and use (r=0.093, p=0.535, Pierson’s r) or application and a composite success score (r=0.091, p=0.542, Pierson’s r) (Nilsen & Ramm, 2015).

Concerning adaptation, Eesley and Wu (2015) report, from a study of students participating in an entrepreneurship MOOC, that at the two-year follow-up point, teams using an adaptive strategy, versus planning, fare better concerning revenue (P<0.1) and funding (P<0.05). Andreies & Debakkere (2007) report, from an analysis involving 117 entities, that enterprises were making one significant BM change during the 15 mo. evaluation period, versus those who do not, experience superior survival (P=0.0892, Log-Rank test; P=0.0656,
2.6 Academic Discussion

Closing this discussion on the LS literature are a few papers that capture the recent academic conversation. The first, by Felin et al. (2019), reflects a divide between academics and practitioners concerning this methodology. In this essay, these scholars raise multiple concerns about this practitioner-driven methodology, its rigor, and its use (Felin et al., 2019b). They proffer three critiques—mismatch of the principals with lean manufacturing, issues around experimentation, customer discovery, learning, and validation processes, and concerns around the BM and its early role in the process (Felin et al., 2019b). Further, these academics argue that the methodology incorrectly characterizes hypothesis generation, overlooks problems with organizational learning, and fosters experiments that generate incremental value, and advocate, instead, an approach involved focused commitment and theory development (Felin et al., 2019b).

The second illuminates the academic-practitioner divide that exists with LS (Shepherd and Gruber, 2020). To bridge this gap, the authors propose a discovery-focused model consisting of five core building blocks—(1) finding and prioritizing opportunities; (2) designing business models; (3) validated learning; (4) building minimum viable products; and (5) persevere or pivot (Shepherd and Gruber, 2020). They explain that these building blocks engage with each other and several boundaries and modifying factors that influence the framework—(1) community of inquiry; environmental context: natural environment; and society (Shepherd and Gruber, 2020). These scholars use these building blocks to propose a research agenda, which draws on the antecedent literature and blends practitioner knowledge with current and future academic research (Shepherd and Gruber, 2020).

Finally, Contigiani and Levinthal (2018) examine several theoretical foundations (e.g., organizational learning, “real options,” new product development, and technology evolution), the influence of tech and economic drivers, and the boundary conditions related to experimentation. In this narrative, they advocate an organizational learning lens and propose several research considerations around proper P/MF, MVP, performance, thresholds, setting (e.g., startup, established), and corporate applications (Contigiani and Levinthal, 2018).

3.0 Business Model (BM)

3.1 Defining the BM

The BM literature reflects a diversity of management philosophies (Casadesus-Masanell and Ricart, 2010), including conceptual (e.g., activities, value) and scope (e.g., enterprise, network) perspectives (Lambert and Davidson, 2013). Several definitions provide a broad view that exists among academicians. For example, one literature review notes definitions that include a statement, a description, a representation, architecture, conceptual tool or model, a structural template, a framework, a pattern, and a set (Zott and Amit, 2010). Multiple scholars emphasize either the value creation (Afuah, 2004; Casadesus-Masanell and Ricart, 2010; Osterwalder and Pigneur, 2010; Teece, 2010) or organization architecture (Alt and Zimmermann, 2001; Chesbrough and Rosenbloom, 2002; Zott and Amit, 2010). Others add in a unit of analysis (Foss and Saebi, 2017), an attribute of the firm (Afuah, Massa, and Tucci, 2016), a linguistic or cognitive construct (Afuah, Massa, and Tucci, 2016), a conceptual representation (Afuah, Massa, and Tucci, 2016), the logic of the firm (Casadesus-Masanell and Ricart, 2010), monetization (Teece, 2010), the current business (Magretta, 2002), or a business plan schema (Osterwalder, Pigneur and Tucci, 2005) aspects. Nonetheless, none provide a unifying definition (Bortolini et al., 2018; Felin et al., 2019).

Leading scholars do offer some conceptual clarity. Amit and Zott (2001) initially specify the content, structure, and governance of transactions fashioned to create value. Subsequently, they expand it to include a new “unit of analysis,” involving the interdependence of the firm—with its activities, products, industry, and network—as a comprehensive system for doing business (Zott and Amit, 2010; Zott, Amit, and Massa, 2011). Teece (2010) reinforces these ideas by describing the BM as the firm’s value architecture and the logic in how it creates and delivers value to customers, converts revenues to profit, and apportions it to system participants.

Overall, a composite view from these varied perspectives indicates that the business model provides a picture that consists of—(1) a value proposition created for specific customers; (2) an organized system of activities and resources that a firm and its partners to deliver the value; and (3) a mechanism for value capture, profit, and apportionment (Allegretti, Seidenstricker and Kassecker, 2018; Chesbrough, 2010; Osterwalder, Pigneur and Tucci, 2005; Teece, 2010; Zott and Amit, 2010a).
3.2 BM Systematic Literature Review

Lambert and Davidson (2013) analyze the BM empiric research from 1996 to 2010 in a systematic review of 69 papers. These scholars find increased evidence for the BM as a unit of analysis (Lambert and Davidson, 2013b). They observe that BM components and their relationships are specific to industry, venture, and/or region (Lambert and Davidson, 2013b). Relative to performance, these authors report that studies identify relationships between BM (or BMI) with success; however, they caution that definitions for such outcomes vary among studies from financial metrics transferability of the model to new markets (Lambert and Davidson, 2013b). Finally, in examining BMI, they highlight that the importance of a firm’s focus, motivation, ability, and adaptability to forces (e.g., technological, market), and changing conditions (e.g., factor, conflict); however, they observe that much of the evidence emanates from case studies (Lambert and Davidson, 2013b).

3.3 BM Structure

The literature reflects multiple views on the structure of the BM. Hamel (2000) describes one consisting of four elements (strategy, strategic resources, user interaction, and a value network) that three bridges (activity configuration, benefits to customers, and enterprise restrictions) connect. Johnson et al. (2008) describe a “Four-Box” model containing proposal values, profit formula, vital resources, and essential processes. Abdelkafi et al. (2013), in their “Business Model Framework,” connects the dimensions of value proposition, communication, creation, delivery, and capture. Gassmann and colleagues (2014) introduce the “Magic Triangle” (Figure 5), consisting of the who (target customer), at the center of the triangle surrounded by what (value proposition), how (creation/delivery of the value proposition) and value (revenue) at each corner. Itami and Nishino (2010) describe a profit model and a business system (Figure 6), which includes a learning component to identify value creation and growth opportunities.
3.4 Types of Business Models


Finally, Gassmann and colleagues (2014) describe fifty-five unique, repetitive BMs: affiliation; aikido; auction; barter; cash machine; cross-selling; crowd funding; customer loyalty; crowd sourcing; digitalization; direct selling; e-commerce; experience selling; flat rate; fractional ownership; franchising; freemium; push to pull; guaranteed availability; hidden revenue; ingredient branding; integrator; layer player; leverage customer data; license lock-in; long tail; make more of it; mass customization; no-frills; open BM; open-source; orchestrator; pay per use; pay what one wants; peer-to-peer; performance-based contracting; razor/razor-blade; rent/lease; revenue share; reverse engineer; reverse innovation; robin hood; self-service; shop-in-shop; service provider; subscription; supermarket; target the poor; trash-to-cash; two-sided; ultimate luxury; user-designed; and white label.

3.5 Ties with the Lean Startup

Multiple scholars proffer various business model representations (Baden-Fuller and Haefliger, 2013; Chesbrough and Rosenbloom, 2002; Osterwalder, Pigneur, and Tucci, 2005). However, it is the business model canvas (Figure 8) that emerges as a popular framework that many lean startup or customer discovery followers use (Blank S, 2012; Ghezzi, 2018; Osterwalder and Pigneur, 2010). Osterwalder and Pigneur (2010) organize the canvas to contain nine pieces within three categories. The value proposition, or desirability section (upper right-hand side), consists of customer segments, value propositions, customer relationships, and channels (Bland and Osterwalder, 2019; Osterwalder and Pigneur, 2010). The value infrastructure, or feasibility section (upper left-hand side), comprises key resources, activities, and partners (Bland and Osterwalder, 2019; Osterwalder and Pigneur, 2010). Finally, the value formula, or the viability section (at the bottom), involves the revenue model and cost structure (Bland and Osterwalder, 2019; Osterwalder and Pigneur, 2010).

Maurya (2012) offers the lean canvas (Figure 6), an alternative that consists of nine elements within three sections. The product section (left side) consists of the existing problem, the solution, the value proposition, and key metrics (Maurya, 2012). The market section (right side) comprises the customer segments, channels, and unfair advantage (Maurya, 2012). Finally, the accounting section (the bottom) involves the cost structure and revenue streams (Maurya, 2012).
4.0 Business Model Innovation (BMI)

4.1 Characterizing BMI

The BMI literature is ambiguous, proffers a broad array of definitions, and lacks unity (Foss and Saebi, 2017). However, several scholars do offer some perspective to help define it a little more clearly. Amit and Zott (2012) indicate that it considers innovation, giving the firm the ability to embrace unnoticed opportunities or new capacities. They add reconceptualization and leveraging of the construct’s structure, content, and governance to create a novel approach (Amit and Zott, 2012). Casadesus-Masanell and Zhu (2013) characterize BMI as searching for new business logic and avenues to create and capture value. Massa and Tucci (2013) characterize it as a creation-oriented activity involving new model implementation and validation. Others observe BMI as a change process to deliver value (Abdelkafi, Makhotin, and Posselt, 2013; Bucherer, Eisert, and Gassmann, 2012; Foss and Saebi, 2017).

4.2 BMI Systematic Literature Reviews

Two reviews consolidate multiple research streams. Schneider and Spieth (2013) highlight three streams from 35 articles, including (1) BMI prerequisites (organizational cognition, knowledge domains and management, collaboration, globalization, strategic agility, and web 2.0); (2) the challenges in differentiating the process, the content, and the definition of vital elements; and (3) categorization of studies based on industry and market structures, enterprise performance, and firm capability effects.

Foss and Saebi(2017) identify from 150 articles as relevant streams— (1) conceptualizations; (2) organizational change; (3) claims for an unprecedented change in the model (but falls short of building on antecedents and in providing novelty criteria); and (4) organizational performance (with only a few rigorous studies). These scholars identify gaps, including (1) construct (e.g., unit of analysis) definition and dimensional; (2) congruence and identification of antecedents and outcomes (noting deficiencies on BMI and performance); (3) contingency and moderating variables (e.g., organization capabilities, leadership, cognition, organizational design, and strategic flexibility); and (4) industry factors as boundaries (Foss and Saebi, 2017). They do also recognize extensive coverage of learning and experimentation (Foss and Saebi, 2017).

4.3 BMI Strategies

Several strategies—such as business model design (BMD), reconfiguration (BMR), parallel play (PP), and reinventing the wheel (RIW) — define the development and innovation approaches involved with the creation of a novel BM.

4.31 BMD describes the firm’s ability to configure a construct via strategic choices concerning the value proposition, customer segments, marketing mix, organization design, cooperative networks, resources, and activities (Milovanovic, Stjepan, and Kristo, 2016; Osterwalder, Pigneur and Tucci, 2005). Specific to entrepreneurship, scholars connect this process with technology-based firms and rapidly changing, uncertain
environments (Andries and Debackere, 2007; Ghezzi et al., 2015). Others add that it focuses on commercialization, innovation, and competitive advantage (Mitchell and Coles, 2003; Teece, 2010).

McGrath (2010) describes the discovery-driven process as such a methodology. This process involves engaging in critical conversations with customers, partners, and other stakeholders to search, discover, define a business unit, and then experiment and learn (McGrath, 2010). Blank (2005) draws on this process for customer discovery—a process that involves placing hypotheses on the business model canvas, interviewing customers, and confirming/refuting the assumptions until all are validated so the firm can scale with a sustainable BM (Blank S, 2012).

Teece (2010) offers two other perspectives on the BMD process (Teece, 2010, 2018). One involves a competitive, sustainable business model. He starts with market segmentation, followed by value proposition creation for each segment and mechanisms to capture value, and finally, he starts mechanisms to block competitor imitation and eliminate intermediaries (Teece, 2010). The second approach involves dynamic capabilities and strategy in shaping the BM (Teece, 2018). This process starts with sensing (identifying opportunities), leading to seizing (the designing or refining of BMs and the commitment of resources), and ending up with transforming (involving the realigning of structure and culture) (Teece, 2018). Dynamic capabilities influence each stage of the process, while strategy affects the seizing component (Teece, 2018a).

4.32 BMR helps to identify competitive advantage in response to environmental changes by exploring new opportunities with present capabilities (Schneider and Spieth, 2013). Zott et al. (2010a, 2011) explain that BMR can add new activities, connect existing activities in a new way, or change those performing the activities. Others highlight it as involving element changes, component boundary-stretching, or full model revision (Giesen et al., 2007; Zott and Amit, 2010). Giesen (2007) characterizes such changes as industrial, revenue, or enterprise innovation models. Some scholars explain that successful reconfiguration requires agility, creativity, flexible resources, leadership, and strategic sensibilities (Doz and Kosonen, 2010; Teece, 2010). Chesbrough (2010) adds that this effort requires a firm to overcome multiple internal barriers.

4.33 PP is an alternative that challenges conventional and focused commitment strategies. It defines a process to help firms formulate approaches and business models for nascent or uncharted markets. Competitive forces are continually changing (MacDonald and Eisenhardt, 2019). Research finds that three types of PP behaviors distinguish high-performing enterprises in new or emerging markets (MacDonald and Eisenhardt, 2019). The first involves the astute borrowing of peer firms’ ideas, rather than trying to differentiate from these competitors (MacDonald and Eisenhardt, 2019). The second engages relentless experimentation with various templates to create and capture value (via the testing of hypotheses rather than an early focused commitment) and learning from these tests (MacDonald and Eisenhardt, 2019). Finally, the third practice consists of reflection—pausing, watching, and waiting (MacDonald and Eisenhardt, 2019). This behavior entails committing to a general BM template (and several essential elements) but leaves it unfinished and irresolute; such firms postpone optimizing the BM for flexibility as nascent markets are unpredictable and present surprises (MacDonald and Eisenhardt, 2019).

4.34 RIW involves the reuse of an established business model (Ghezzi, 2017). It draws on past ideas and resources to apply to future opportunities through new trends (Ghezzi, 2017). The process involves five steps—(1) survey existing capabilities, customer experience, value architecture, and BM; (2) learn which to keep and leverage; (3) disclose the reinvention by viewing the present through the past; (4) leverage current, up-to-date components that pattern previous processes with prior resources and models to minimize resistance; and (5) reinterpreting traditional models to obtain a reinvented wheel of old ideas with new shapes (Ghezzi, 2017).

4.4 BMI and Learning

A common theme with BMI involves learning. Multiple scholars highlight the importance of experimentation and learning (Andries, Debackere, and van Looy, 2013; Foss and Saebi, 2017; Sošna, Trevinyo-Rodriguez, and Velamuri, 2010). Teece (2010) and McGrath (2010) emphasize the importance of rapid experimenting, learning, and adapting to configure the initial model within the enterprise and marketplace context.

Bojovic et al. (2018) find that experimentation is essential to determining the BM’s sensibility and delineation—learning, signaling, and convincing—as three essential roles in BMI. Learning engages the environment to validate, abandon, or modify the BM, whereas signaling and convincing enact with the environment to gain strategic legitimization (Bojovic, Genet, and Sabatier, 2018). Further, engaging these roles are purposeful interactions.
(Individual, personal, ad hoc hypothesis tests) and experimental projects (extensive, purposeful, time-bound, multi-stakeholder endeavors to test multiple hypotheses) (Bojovic, Genet, and Sabatier, 2018).

Berends et al. (2016) identify two sequencing patterns that involve cognitive and action-based learning modes with BMI (Berends et al., 2016). The first, “drifting,” starts with experiential learning and progresses to cognition (Berends et al., 2016). This process involves the reconceptualization of the existing BM through reusing and modifying components (Berends et al., 2016). Operationalization starts early in the process, and the firm’s scaling effort triggers a shift to cognition to systematically evaluate the configuration (Berends et al., 2016). The second, “leaping,” begins with cognition and moves to experiential learning (Berends et al., 2016). It initiates defining a new value proposition and “off-line” development, then operationalizes to engage the experiential mode for model adaptation (Berends et al., 2016).

5.0 Organizational Learning (OL)

5.1 Defining OL

OL’s descriptions do exist due to diverse influences from multiple disciplines, particularly business management, psychology, philosophy, and sociology. Fiol and Lyles (1985) offer one of the more common definitions—changes in an organization’s knowledge from the experience it acquires. Huber (1991) characterizes OL as a process and parses it into several constructs—knowledge acquisition, information distribution, information interpretation, and organizational memory. Argote (2011, 2013) delineates the process as knowledge creation, retention, and transfer and indicates that it involves multiple levels within the firm. These academics (Argote, 2011; Fiol and Lyles, 1985; Huber, 1991) and others (De Geus, 1988; Easterby-Smith, Crossan, and Nicolini, 2000; Levitt and March, 1988) include actions, behaviors, beliefs, cognitions [and maps], improvements, and performance. Fiol and Lyles (1985), who see that OL improves the firm’s efforts, explain that firms create and maintain learnings as history, norms, and routines to influence employee behaviors and actions.

5.2 Relevant OL learning Processes

5.2.1 Exploration vs. Exploitation

Levinthal and March (1993) observe the firms apportion their focus and resources between exploratory and exploitive activities. Firms engage in exploration to remain viable and facilitate future growth (Levinthal and March 1993). This focus stresses that the firm either concentrates on research and learning processes endogenously or acquires new capabilities or outputs externally (Levinthal and March 1993). Alternatively, exploitation utilizes established learnings and enables a firm to commercialize its knowledge capabilities and byproducts (Levinthal and March 1993).

These researchers observe that firms struggle with balancing these forces (Levinthal and March, 1993) and recognize the need for ambidexterity (Raisch et al., 2009; Wilden et al., 2018). Concerns with exploration relate to
the firm’s inability to reap the rewards and maintain viability (Levinthal and March, 1993; Titus Jr, House, and Covin, 2017). Alternatively, exploitation issues focus on insufficient innovation to sustain a competitive advantage (Levinthal and March 1993). Sometimes, exploitation dominates to ensure firm survival; however, exploration leads to innovation and market primacy (Levinthal and March 1993).

5.22 Experimentation

March (1991) describes experimentation, a problem-solving method, as an essential process for exploration. Scholars explain that experimentation is necessary to test hypotheses (Cook and Campbell, 1979; Popper, 2005). Thomke(2003) and Bingham and Davis (2012) explain that organizations intentionally design the experiment, change inputs off-line, utilize comparable, controlled conditions and standard metrics, and assess results to define the cause and effect relationship. Cannon add that individuals need to objectively design and test their ideas, align incentives, and explore off-line and online modes. Miner et al. (2001) note that a post-event review translates the experimental findings into knowledge.

Interestingly, some scholars describe the need for smaller, more purposeful experiments (Bingham and Davis, 2012; Thomke, 2003). Bingham and Davis (2012) emphasize that experimental learning hinges on inexpensive initiatives with simple, easy to modify prototypes and the integrating of learnings from these tests into actions and activities for the future (Bingham and Davis, 2012). Thomke(2003) advocates rapid testing that (1) considers organizational considerations; (2) fails early and often; (3) anticipates and exploits the early learnings; and (4) coalesces both new and traditional technologies.

Bojovic et al. (2018) add that experimental projects complement smaller, more rapid purposeful efforts (Bojovic, Genet, and Sabatier, 2018; Thomke, 2003). These larger-scale, time-bound projects involve multiple hypotheses and partners (Bojovic, Genet, and Sabatier, 2018).

Other scholars discuss experimentation strategies under uncertainty (Andries, Debackere, and van Looy, 2013; Levinthal, 1997). Levinthal (1997) juxtaposes two– (1) an incremental, step-wise approach (“local search” or “focused commitment”) leading to incremental changes and a not too dissimilar end product; and (2) a radical change through the simultaneous alteration of multiple elements (“distant search”) resulting in a much different end product. Andries et al. (2013) observe that the “focused” approach translates to more significant initial growth than that with simultaneous experimentation; however, they find that the latter strategy leads to multiple products and business models that support long-term growth.

5.23 Learning from Failure

Inherent to experimentation is that of failure. Cannon and Edmundson (2005) define failure as a departure from expected results. They add that while firms espouse the importance of failure and learning from it, few reflect such aspirations in their emergent behaviors (Cannon and Edmundson, 2005).

Leading scholars observe that organizations and their leaders view success and failure differently (Cyert and March, 1963; Levinthal and March, 1993). Cyert and March (1963) explain that success stabilizes organizational knowledge. Levinthal and March (1993) add it leads to myopic, overconfident behavior. Alternatively, Cyert and March (1963) and Madsen and Desai (2010) explain that failure challenges the stability of a firm’s organizational knowledge and the status quo but leads to reflection and the desire to search for new information and insights.

Failure can be a good teacher. Bajwa et al. (2017) note that software firms embrace failure positively, as intermediate disappointments provide useful learnings that can prevent fatal outcomes. Madsen and Desai (2010) report that firms learn more effectively from failure and retain these learnings longer, with limitations (e.g., prior experience, size, internal process). Parker (2013), who finds that startups learn from failure, argues for re-entry supports. Kim and Miner (2007) find that U.S. banking firm’s learning varies with the type of institution (e.g., trust, commercial, and savings and loan firms) and can occur via vicarious learning. Cannon and Edmundson (2005) highlight proactive and timely identification, thoughtful analysis, and deliberate experimentation as three essential learning processes from failure.

5.24 Adaptation

Scholars characterize adaptation as a process by which a firm adjusts to its environment (Fiol and Lyles (1985); Levinthal and Marino, 2015). Some describe it as a defensive adjustment with some type of action/outcome links (Hedberg, Nystrom, and Starbuck, 1981; Meyer, 1982). Cyert and March (1963), who relate adaptation to a
concern’s behavior and routines, define this process in the context of a firm’s goals and rules specific to attention and search. Some scholars (Hedberg, Nystrom, and Starbuck, 1981; Meyer, 1982; Starbuck and Hedberg, 2007) do not equate adaptation with learning. However, others emphasize that these two behaviors are fundamental for intelligent and capable organizational activities and behaviors (Argote, 2013; Huber, 1991; Levinthal and Marino, 2015; Levitt and March, 1988).

Levinthal and Marino (2015) propose a framework that considers adaptation and learning, along with the internal selection of behaviors and routines (Levinthal and Marino, 2015). These scholars note the need to differentiate between the behavior foundation and the adaptation and observe that selection prevails over espoused behaviors (Levinthal and Marino, 2015). They highlight the concept of plasticity—the capability to adapt behavior or routine—which offers an opportunity that challenges selection (Levinthal and Marino, 2015).

5.25 Behavioral Theory and Psychology

Argyris and Schon (1978) provide a significant contribution to OL involving behavioral theory concepts. These ideas rationalize the disconnect between an individual’s “espoused theory,” such as values, policy, or procedures, and real actions (“theory-of-use”) (Argyris, 1995). This disconnect exists because individuals have unconscious mental maps that guide their behaviors (Argyris, 1995).

To explain “theory-in-use,” Argyris and Schon (1974) delineate a core construct (Figure 10). Within it are three essential elements. The first involves governing variables, which describe the foundational ideas that individuals attempt to maintain within acceptable bounds (Argyris and Schon, 1974). The second comprises action strategies, which delineate the plans and actions that preserve their governing variables within acceptable limits (Argyris and Schon, 1974). The final part consists of consequences, either intended or unintended (Argyris and Schon, 1974). These coincide and confirm an individual’s “theory-in-use” or a mismatch or misalignment, leading to either a course correction or significant reflection and revisiting the governing variables (Argyris and Schon, 1974).

Argyris and Schon (1978) use the mismatch and misalignment of consequences with expectations as the basis for two learning processes, single- and double-loop learning (Figure 10). Single-loop learning involves an “error detection and correction” process in which the firm does not need to change the overarching governing variable(s) (Argyris and Schon, 1978). Double-loop learning occurs when the correction requires the firm to reevaluate and address the governing variable(s) and allows for authentic growth to occur (Argyris, 1995).

![Figure 10. Core Construct For The “Theory-in-use” Construct that Sets the Basis for Single- And Double-Loop Learning (Adapted, Argyris and Schon, 1974)](image-url)
Taking these ideas further, Argyris and Schon (1978) discuss the “theory-in-use” Models I and II. The Model I behaviors involves action strategies (e.g., advocating one’s position, evaluating thoughts and actions, controlling the environment and task, protecting self [and others], and attributing causes for the outcome or mismatch) (Argyris and Schon, 1978). This model describes defensive behaviors (e.g., policies or actions that obviate embarrassment or threat and prevent the discovery of the root cause), which sacrifice governing variables to prevent inquiry and lead to negative consequences (Argyris, 1986).

Model II relies on double-loop learning, in which the inquiry and modification of the governing values generate new strategies to address the mismatches (Argyris and Schon, 1978). Its principles (e.g., valid data, free and informed choices, internal commitment, detect and correct errors, careful monitoring of selections) involves sharing control and participation in design and execution (Argyris, Putnam, and McLain Smith, 1985). They also engage behaviors (e.g., gaining others’ views, offering transparency, testing theories, providing reasoned positions with data, and surfacing conflicting views) that are essential for success (Argyris, Putnam, and McLain Smith, 1985).

5.26 4Is Learning Framework for Organizational Renewal

Crossan and colleagues (1999) introduce a framework (Figure 11) for strategic renewal based on— (1) the underlying tension between exploration with exploitation; (2) the involvement of multiple levels (Individual, group, and organization) over which learning progresses from inception to embedded constructs; and (3) 4Is framework.

The 4Is framework involves several essential steps that progress from intuiting by the individual level to interpreting and integrating by the group, and finally to institutionalizing at the organizational level (Crossan, Lane, and White, 1999). Intuiting is a uniquely human subconscious process, which occurs at the individual level and is either exploratory or exploitive (Crossan, Lane, and White, 1999). It engages in recognizing and discerning patterns and inputs of experiences and images, leading to metaphors that connect insights with interpretation (Crossan, Lane, and White, 1999).

Interpreting is a process, which bridges the individual and group levels and involves the refinement and development of insights (Crossan, Lane, and White, 1999). This activity awakens the learning process’s conscious elements and occurs in the context of a domain or environment (Crossan, Lane, and White, 1999). Cognitive maps and language play a significant role, as metaphors mark the transition to interpretations and the basis for dialogue (Crossan, Lane, and White, 1999).

Integrating, which occurs primarily at the group level but connects with the organization, engages collective conversations (Crossan, Lane, and White, 1999). The surrounding context and language play significant roles in creating, maintaining, and preserving knowledge via stories, translating to a shared understanding of the possibilities, mutual practices, and coordinated actions through mutual adjustments to achieve aspirations (Crossan, Lane, and White, 1999).

Institutionalizing is an organizational-level process, which illustrates how the firm institutionalizes and embeds as practices, policies, and routines that groups create to facilitate strategic renewal (Crossan, Lane, and White, 1999). The learning at this level is greater than the sum of those prior, and the firm leverages insights to exploit knowledge (Crossan, Lane, and White, 1999).
Crossan et al. (1999) describe a dynamic flow where the 4Is relate via “feed-forward” (up levels) and “feedback” (down levels) processes (Crossan, Lane, and White, 1999). The fundamental tensions between these two directions lead to the creation and accommodation of new learnings (“feed-forward”) and the exploitation of knowledge (“feedback”) (Crossan, Lane, and White, 1999).

Jones and Macpherson (2006) extend this work in the small-to-medium enterprise setting. Their notable contribution involves the concept of “intertwining,” the firm’s active engagement with its external knowledge network, resulting in the 5 I’s learning network (Jones and Macpherson, 2006). Furthermore, the firms they study realize multiple benefits—opening-up, exploring the knowledge environment, integrating and institutionalizing knowledge, and enhancing inter-organizational relations (Jones and Macpherson, 2006).

Dutta and Crossan (2005) provide another extension of the 4Is into the entrepreneurship space. These scholars observe that the 4Is considers both the entrepreneur’s disposition to recognize possibilities and utilize day-to-day knowledge and develop opportunities (Dutta and Crossan, 2005). Further, they view the 4Is as a process model, in which the entrepreneur can utilize one’s prior learnings and cognitions to form ideas via intuiting, and then transcends these ideas across a broader system of internal and external stakeholders via the other three I’s (Dutta and Crossan, 2005).
These scholars put forth several propositions relevant to the relationship of 4Is to discovery and enactment, “feed-forward” process, and institutionalizing reflection of entrepreneurial culture and venture success (Dutta and Crossan, 2005). The first relevant proposition (3c) involves linking the 4Is with discovery and enactment (Dutta and Crossan, 2005). The next set (4a,b; 5a,b) considers the progression from one stage (intuit to interpretation, interpretation to integration) to the next and increasing the likelihood of implementation (Dutta and Crossan, 2005). The final (6a,b) posits that Institutionalizing reflects an entrepreneurial culture and new venture success (Dutta and Crossan, 2005).

5.0 Discussion

5.1 Essential Themes

A few significant themes and insights emerge from this examination of these three literature streams (Table 1). The first is that the LS empiric literature around this practitioner-driven methodology is evolving, with several valuable contributions appearing over the last five years. The second involves BM and BMI as critical to the startup process, with experimentation and customer discovery using the BMC as critical activities. The third involves organizational learning, an overarching theme that this section will expand on due to its significance to this doctoral research’s direction.

Table 1. Significant Themes and Insights from Review of Organizational Learning, Business Model (and Innovation), and Lean Startup Literatures

<table>
<thead>
<tr>
<th>Learning is a Common Thread</th>
<th>Business Model and Business Model Innovation Are Critical</th>
<th>The Lean Startup Conversation Is Evolving</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Can apply org learning lens to entrepreneurship1,2</td>
<td>• Multiple definitions exist: Identify, create, deliver, and capture value.3</td>
<td>Defined antecedents with lean exist4</td>
</tr>
<tr>
<td>• Experimentation, culture, and embracing failure5,6,7,8</td>
<td>• Content, structure, governance.2</td>
<td>Theoretical foundation beginning to solidify9</td>
</tr>
<tr>
<td>• Model 1 Theory-in-use, Single-loop, Double-loop, Validated learning6,9,10</td>
<td>• Independent System.3</td>
<td>A mix of experiences globally6,11-15</td>
</tr>
<tr>
<td>• Exploration vs. Exploitation11</td>
<td>• Unit of analysis4</td>
<td>Issues with interviewing, experimentation, MVP, BMC, team consensus, and scaling6,13,19</td>
</tr>
<tr>
<td>• 4Is and the legitimization process2,12</td>
<td>• The overarching framework endogenous and exogenous components5</td>
<td>Boundaries exist, but the ideal area Involve the space of low technologic/high market uncertainty20</td>
</tr>
<tr>
<td>• Learning plays a role in the diffusion of innovation13</td>
<td>• Multiple types of canvases- BMC most common11,12,13,14,15</td>
<td>Impact literature is nascent and offers mixed findings20-21</td>
</tr>
<tr>
<td>• Learning part of the business model14</td>
<td>• 55+ different models. Many can reinvent the wheel10,16</td>
<td>Rigorous use makes a difference (Discard, Pivot, Revenue)10</td>
</tr>
<tr>
<td></td>
<td>• BM success- Teece’s 7 Questions, NICE, P/MI11,17, For BMI- Amit &amp; Zott’s 7 questions and P/MI19,20</td>
<td>There are opportunities to bridge the gap between practice and academia22</td>
</tr>
</tbody>
</table>


5.2 Organizational Learning as an Overarching Theme

Emerging from this review is the common theme of learning, particularly that involving OL. Several concepts stand out that the three literature streams share. These include that of experience (Huber, 1991), exploration vs. exploitation (Levinthal and March, 1993; March, 1991), and experimentation (Bingham and Davis, 2012; Bojovic, Genet, and Sabatier, 2018; March, 1991; Thornke, 2003). These activities exist as part of the LS’s hypothesis-based approach involving the build-measure-learn loop (Eisenmann, Ries and Dillard, 2013; Ries, 2011), along with the discovery-driven process (McGrath, 2010) and its progeny, customer discovery (Blank, 2005), to business model innovation.

Experiments engage single- and double-loop learning (Argyris and Schon, 1978) and learning from failure (Cannon and Edmundson, 2005). LS employs such concepts in the actions associated with validated learning, particularly iterations reflecting single-loop and pivots demonstrating double-loop processes (Eisenmann, Ries and Dillard, 2013; Ries, 2011). Mansoori (2017), who uses the “theory-in-use” model (Argyris and Schon, 1978) as the theoretical lens for his examination of experiential and vicarious learning in a “prescriptive accelerator,” finds that entrepreneurs progress through changes that modify governing variables and action strategies.

Another area involves that of learning and legitimization. Crossan et al. (1999) introduce the 4Is framework to foster organizational renewal. Here, individuals to “feed-forward” ideas and knowledge, and the institution “feedback” and exploit the learning throughout the firm (Crossan, Lane and White, 1999). Extending this work into the entrepreneurship space, Dutta and Crossan (2005) explain that the process can occur within the firm and engage the broader ecosystem.

Both Roger’s diffusion of innovation and Teece’s sense, seize, and transform the BMI process reflect the “feed-forward” approach (Rogers, 2010; Teece, 2018). Such occurs as the community (firm or ecosystem) embraces new knowledge and its byproducts (e.g., innovations in technology, product, services, and business models) (Rogers, 2010; Teece, 2018).

Finally, several works connect OL with LS. Contigiani and Levinthal (2018) situate the LS relative to several OL antecedents (e.g., exploration-exploitation trade-offs, experimentation, probe and learn, and learning from failure) and views LS from this lens. Ghezzi highlights OL as one of several theoretical underpinnings in introducing his mixed-methods study involving mobile startups (Ghezzi, 2018). Bortolini et al. (2018) discuss how OL principles and practices share those of the Learning School of Strategy.

5.3 Contribution Opportunities

5.31 Evaluating Impact from an OL Perspective

The essential purpose of this review is to identify opportunities to make a novel contribution. Most management discussions pose a fundamental question in determining a strategy’s viability—does it make an impact? Hence, one clear opportunity that exists in the literature is to assess the impact (the organizational and performance effects that occur within the startup) of LS, using the lens of OL and constructs such as Crossan’s 4Is (Crossan, Lane, and White, 1999).

Multiple arguments support the OL direction using the 4Is. First, little work exists concerning LS using the lens of OL. Only a qualitative study by Mansoori (2017), using Argyris and Schoen’s model 2 theory-in-use, provides insight that utilizes an OL lens to evaluate LS. Further, Bojovic et al. (2018) highlight the multiple roles with experimentation as part of the business model innovation process. Second, no study exists that engages the 4Is in the business model innovation role. Third, no study reflects the testing of propositions that Dutta and Crossan (2005) posit, making this area an excellent opportunity for contribution. Fourth, scholars and consultants report that one of the challenges in using LS involves the founder and the founding team’s alignment concerning what experiments to run and how to interpret results (Ghezzi, 2018; Jones and Macpherson, 2006; Ng, 2014). Fifth, such work could address the fifth I, “intertwining” (Jones and Macpherson, 2006), which characterizes the startup’s external community interactions. Finally, such research can extend into ‘Teece’s stages of sensing, seizing, and transforming in the BMI process (Teece, 2018), and Roger’s diffusion of innovation theory (Rogers, 2010).

5.32 Evaluating Impact within the Science and Technology Sector

Another opportunity to consider involves the business sector to evaluate. Most LS experience exists within the software or application-based business space (Camuffo et al., 2019; Frederiksen and Brem, 2017; Ghezzi, 2018;

Other businesses, such as industries that address technological (e.g., materials ventures), legal/regulatory, and financial risks, may not necessarily lend well to the use of LS (Harms, Marinakis, and Walsh, 2015). However, are these limits or not? Harms et al. (2015) observe that the methodology requires some customization in sectors beyond the software and applications businesses to implement effectively. Such adaptations encourage considerations beyond market “needs” and “solutions” that include the firm’s “network” (Harms, Marinakis, and Walsh, 2015), which reflects the importance of experimentation with the business model and its innovation process. To exemplify this point, programs such as the U.S. National Science Foundation’s Innovation CORPS™ series using the customer discovery process with university-based science and technology startups (Nnakwe, Cooch, and Huang-Saad, 2018).

These science and technology enterprises, particularly in the life science space, represent, in many ways, the “institution,” as the 4Is framework describes, with its ingrained beliefs, practices, and routines based on technological, scientific, or clinical development perspective, rather than a market or BM vantage. Thus, evaluating the use of LS or customer discovery practices is germane since the business model is essential for successful technology commercialization (Chesborough, 2010; Teece, 2010). Such a setting offers a unique opportunity to explore how LS experimentation can impact the “feed-forward” process within the firm and its broader ecosystem. To date, since no such work exists within such sectors, exploring the impact of LS, using the 4Is lens, represents an attractive space to explore and valuable contribution to both the OL and LS literature.

5.4 Research Question

Rigorous research begins with an overarching research question around the impact of LS practices in a life science entrepreneurial venture, along with the lens from which to view this dynamic. In this case, the LS practices include customer discovery, experimentation, validated learning, business model innovation/validation, and product validation. Further, this question specifically defines impact as the organizational and performance effects that occur within the startup.

How do life science entrepreneurs view the impact of using lean startup practices in advancing their product and business model innovations- an organizational learning perspective?

5.5 Working Model

A working model (Figure 13) describes the dynamics of a life science entrepreneurial venture using LS practices to help the founder and startup team “feed-forward” their ideas and knowledge to a sustainable product and BM. It considers this progression both at the firm and at the external ecosystem level. This depiction draws from constructs such as the modified stage-gate/agile enterprise model by Belkhir (2014), the business plans and venture performance relationship that considers internal and selection effects by Burke et al. (2010), and the multiple roles of experimentation offered by Bojovic, Genet, and Sabatier (2018).

This model consists of the three organizational stakeholders involved with the process (individual, group, and institution) and overlays the 4Is (intuiting, interpreting, integrating, and institutionalizing). The first phase of exploration and discovery involves the intuiting efforts (1) by the founder (or founding team) and the use of LS practices to engage external venture ecosystem participants, most notably the customer, to gather insights from customer development efforts (e.g., interviews, advisory boards) and in-market experiments (e.g., sign-up for clinical trials, patient recruitment). Such interaction leads to acquired insights and knowledge that allow for developing and testing hypotheses associated with the nascent MVP and minimum viable business model. These efforts occur primarily at the firm level but begin to engage and signal external venture ecosystem actors that of the firm’s intent. This phase then transitions to the second stage of refinement, where the individuals responsible for intuiting shares the learnings from the initial LS practices of exploration and testing with the group (the startup team) to interpret (2) and integrate (3) these learnings relative to the product and BM. These stages engage the firm primarily and actors (e.g., partners, investors, regulators) within the external venture ecosystem to interpret and integrate knowledge that the firm shares with these participants. At this level, the group then continues the engagement process with the external venture ecosystem, particularly customers, to refine the product and BM via further exploration and testing of updated hypotheses. The learning outputs from this round of exploration and testing feed into the interpreting and integrating stages. The insights gained lead to a refined product and business model at the group level. They also facilitate additional exploration and testing. Learnings from these phases feed
into interpreting (2), integrating (3), and, ultimately, the institutionalizing (4) stage. Actors within the enterprise pass along new knowledge internally, and outside partners (participants) within the external venture ecosystem engage with the firm’s discovery and validation processes externally.

This testing and exploration process continues until the startup team arrives at a sustainable product and BM at the institutional level based on customer and other external venture ecosystem actor feedback. Here the organization embeds the knowledge around product and BM that the team (or group) “feeds-forward.” However, the “feedback” process occurs as the venture engages the new insights gathered from lean startup activities. This “feedback” process can occur from the group level when the individual advances new knowledge for interpreting, within the group when integrating the insights gained, and from the institution to the group and the individual as this level engages and institutionalizes new learnings around the product and BM that facilitates their maturation. The “feedback” counteracts the “feed-forward” process. This interaction between the two forces produces a tension that ultimately translates to the embedding of new knowledge that the firm has tested and legitimized, leading to a more mature, sustainable product and BM.

Hence, the knowledge gained ends up setting routines, policies, and strategies around the sustainable BM and product that the firm wishes to scale. The organization embeds and shares this knowledge and its end products at the firm level. Depending on the degree of external engagement and “buy-in” at the interpreting and integrating levels, the new venture should realize the embedding of the knowledge and end products to embrace the sustainable product and BM at the external venture ecosystem level. In its experimenting processes using LS practices, the firm enacts the learning and signaling roles with customers and other external venture ecosystem actors and convincing. Hence, customer and other external venture ecosystem actor feedback and engagement will signal to the firm that it has both a product and a BM ready to scale in an attractive market. If such occurs, then the firm should achieve a state of P/MF.

Finally, the other noteworthy piece of the model involves the influence of contextual factors. These include both endogenous and exogenous influences that can influence each stage. Hence, the model needs to account for these considerations. In intuiting, the founder traits and intention (related to LS practices) are critical. Also, the business sector, environment, customer makeup, and adjacency of investment are external factors. Moving to interpreting and integrating stages, the traits, intent (related to LS practice use), and cohesiveness of the startup team represent additional internal factors to consider in the model and previously mentioned founder and external environmental influences. Finally, in transcending to the institutionalizing stage, the model needs to integrate the influences of the traits, intent (related to LS practices), and cohesiveness of the executive team and board, along with the previously identified factors.
5.6 Contributions

5.6.1 Theoretical

This discussion closes by highlighting potential contributions to the theory and practice this work would offer. The most noteworthy contribution involves that to the theoretical foundation for LS. Scholars cite issues with LS’s foundation because it is a practitioner-driven methodology (Bortolini et al., 2018; Felin et al., 2019; Shepherd and Gruber, 2020). Such contributes to the divide among academics and practitioners concerning the legitimacy of the methodology (Felin et al., 2019; Shepherd and Gruber, 2020).


However, OL offers a unique opportunity to examine the impact of LS in advancing an idea or innovation within an organization, such as an entrepreneurial venture, and beyond in the entrepreneurial ecosystem utilizing the 4Is framework (Crossan, Lane, and White, 1999; Dutta and Crossan, 2005). Interestingly, Crossan and colleagues (2011) recognize that the framework fails to fulfill criteria for theory, resulting from limited empirical testing. Also, Dutta confirms (personal communication 2020) that no empirical testing exists concerning the six propositions from his and Crossan’s 2005 paper. Hence, this effort involving LS and the 4Is represents a tremendous opportunity to add to both the LS theoretical foundation and the OL theory base concerning the 4Is by extending Crossan and colleagues (1999) and Dutta Crossan (2005). To this end, the model that describes the relationship of LS activities, along with endogenous and exogenous influences, on the “feed-forward” process provides a valuable contribution to LS and OL theory.

Finally, this work can extend the theory of dynamic capabilities and its role within LS. Teece and colleagues (1997) describe this theory in their seminal paper. Ladd and colleagues (2015) extend this work to include LS as a dynamic capability for a new venture. Teece (2018) ties this concept with BM innovation as part of the sense, seize, and transform model. The proposed work involving the LS and the 4Is would add further evidence to these
prior contributions related to dynamic capabilities.

5.62 Practice

For practice, this research presents multiple opportunities to add value. The most significant relate to addressing the question of impact within the entrepreneurial venture and beyond the ecosystem. Current contributions provide mixed findings (Camuffo et al., 2020; Ghezzi et al., 2015a; Ladd, Lytinen and Gemmell, 2015; Nilsen and Ramm, 2015). None examine the impact within the firm and the broader ecosystem in advancing an idea or innovation.

The second involves dynamics within the firm and beyond into the venture ecosystem. Scholars (Ghezzi, 2018; Mansoori, Karlsson, and Lundqvist, 2019) and consultants (Ng, 2014) recognize that issues exist with startup teams and their mentors. This work situates well to examine such considerations to dissect the inter- and intra-firm dynamics in gathering external inputs and conducting experiments to shape the MVP and innovate a minimum business model to sustainable end products using LS and customer discovery practices.

Furthermore, this work considers the influence of endogenous and exogenous contextual factors and their relative influences. Such work can translate to useful tools to help the entrepreneurs and their coaches guide (and optimize) this process within the firm and the venture ecosystem. It would also consider endogenous and exogenous influences on LS's impact on the “feed-forward” and “feedback” processes. One such example can be a BM scorecard set out on a Likert-scale with defined anchors building on work that Teece (2010) and Mateu and March-Chorda (2016). The other involves utilizing the model to create either an Internet-based software tool for entrepreneurial ventures or their coaches (e.g., teachers, mentors, program leaders) to monitor and guide their progress.

Further, Harms and colleagues (2015) observe that materials- and technological-based ventures need to modify LS methods significantly to accommodate use in such settings. Investigation within the early-stage life-science represents a unique practice contribution using the institution of a science- or product-driven orientation and LS and customer discovery's influence to shape the trajectory of the “feed-forward” and “feedback” processes within this setting. This work can lead to tools and educational efforts fashioned for this setting to guide and gauge progress in using LS in the “feed-forward” and “feedback” processes process. Such could be an incredible value add to co-working centers such as BioLabs, JLab, or the National Science Foundation Innovation CORPS™ program in the United States.

The final practice contribution relates to identifying the limits of LS in practice. Both York (2019) and Harms and colleagues (2015) recognize that boundaries exist using the methodology specific to the LS methodology, its use, its settings of use, or the specific business sector. Camuffo et al. (2019) already report that LS's rigorous use translates to an impact in internet-based application and commerce firms. Work from this research can help clarify the optimal settings for use and practices to optimize the impact of LS in its use. It can help to extend the observations from this group from Bocconi in Milan.

6.0 Conclusions

Thus, the end of every intriguing story returns to its beginning. In this case, this paper raises the fundamental question in its introduction around determining the viability of the LS methodology— does it produce a material impact? If so, what, where, and how?

The LS is a popular practice-driven methodology. It helps entrepreneurs navigate the ambiguities they encounter, particularly in higher-risk, ill-defined environments, so that these individuals can more rapidly and efficiently achieve success. LS embraces the scientific method and learning from hypothesis-driven experiments to inform MVPs and business models’ decisions to scale (Eisenmann, Ries, and Dillard, 2013). While the methodology enjoys a tremendous following, some scholars, who see issues with this methodology in its grounding and conduct, raise concerns (Felin et al., 2019b). Such reflects a divide between academia and practice that others in academia seek to close (Shepherd and Gruber, 2020).

Furthermore, much of the support around the impact of LS involves anecdotal evidence (Frederiksen and Brem, 2017b). Furthermore, scholars recognize that LS’s literature around the impact and performance is nascent and provides an assortment of experiences, but no equivocal answer (Contigiani and Levinthal, 2018). Such is akin to the surgeon who claims the procedure a success, even though the patient expires.
This positioning paper aims to define a unique place for this doctor of business administration research involving LS. This effort describes a path that arrives at an intriguing end that offers a potentially valuable contribution to the literature. This review of the extant LS, business model and business model, and organizational learning literature leads to several significant high-level themes. The LS literature is evolving, with multiple possibilities to bridge academia with practice and add to the empiric conversation. The business model and business model innovation process are essential elements, not to discount, as part of the discovery and exploration process that involves experimentation.

The most significant is that learning, particularly organization learning, a commonality that permeates each of these three literature streams. More significantly, the LS literature contains only a few contributions identify (Bortolini et al., 2018; Contigiani and Levinthal, 2018) or utilize some organizational learning grounding (Mansoori, 2017). Hence, organizational learning offers an excellent lens through which to explore the impact of LS.

To this end, this exploration into the organizational learning literature leads to a fascinating contribution by Crossan and colleagues (1999). This work relates to organizational renewal vis-à-vis the 4Is that “feed-forward” ideas, knowledge, and their byproducts from the Individual to the group and the institution, then only to have the organization “feedback” the practices and routines to exploit such learnings (Crossan, Lane, and White, 1999). Furthermore, Dutta and Crossan (2005) extend this framework into the entrepreneurship space. They posit that these processes occur within the firm and in the venture ecosystem beyond and offer six propositions to test, requiring empirical evaluation (Dutta and Crossan, 2005). The 4Is offers an even more unique lens to use. Also, the life science entrepreneurial space presents as a unique “institution” in which to examine the impact of LS via the 4Is framework and its “feed-forward” and “feedback” processes.

Such focus areas lead to several questions to explore and refine during the next stage of this research.

The most notable is the overarching research question— how do life science entrepreneurs view the impact of using lean startup practices in advancing their product and business model innovations- an organizational learning perspective?

The next phase of this research effort will involve a systematic literature review, which will help refine the research question and model put for in this positioning paper. These efforts will lead to the development of relevant hypotheses or propositions and appropriate exploratory methods. Thus, this journey continues in its search to contribute to the LS and organizational learning literature that will add value to the overall conversation and help to bridge the academic-practice chasm that exists with LS.

7.0 References


76. JURÉEN, K. (2014) The lean healthcare entrepreneur: Is the lean startup methodology applicable when facing a healthcare challenge?
111. NESMIYANOVA, A. (no date) Great Minimum Viable Product Examples and Best Practices., Steel Kiwi
115. NIRWAN, M.D. AND DHEWANTO, W. (2015) Barriers in Implementing the Lean Startup Methodology in


