10.5465/AMBPP.2016.132

# LEARNING TO CREATE VALUE UNDER CONDITIONS OF UNCERTAINTY

RYAN W. ANGUS
Eccles School of Business
University of Utah
Salt Lake City, UT 84112

MATTHEW A. BARLOW
University of Utah

## INTRODUCTION

There is increasing interest in understanding how organizations learn under the uncertain conditions that characterize value creating activities such as entrepreneurship and new product introductions (Alvarez, Barney, & Anderson, 2013). Organizational learning theory suggests that efforts to learn from uncertain and ambiguous experiences are not likely to yield performance improvements because, under such conditions, it is particularly difficult to correctly specify the linkages between causes and effects (Levinthal & March, 1993; Levitt & March, 1988; March & Olsen, 1975). This position seems to reconcile with observational data on the perpetually high failure rate of value creating activities (Brown & Eisenhardt, 1995; Dunne, Roberts, & Samuelson, 1988; Rothaermel, 2001; Shepherd, 2003; Singh, Corner, & Pavlovich, 2015; Stevens & Burley, 1997).

However, recent theoretical work on value creation from the field of entrepreneurship takes a very different position. According to opportunity creation theory, an organization's ability to learn from experience under conditions of uncertainty is an important determinant of success when attempting to create value (Alvarez & Barney, 2007, 2010). This theory suggests that, under uncertain conditions, organizational decision makers cannot infer the information they need from preexisting data sources (Dequech, 1999, 2003; Knight, 1921) and must instead learn from new, opportunity-specific data generated through endogenous action and experimentation (Alvarez & Barney, 2007, 2010; Alvarez et al., 2013; Eisenhardt & Martin, 2000). Given the different positions of organizational learning and opportunity creation theories, it remains unclear whether organizations can learn to create value under conditions of uncertainty.

The purpose of this paper is to empirically examine the causes and consequences of organizational attempts to learn from value creating experiences under conditions of uncertainty. In order to perform this analysis, the paper separates the effects of present (within-opportunity) experiential learning behaviors from past (between-opportunity) value creating experiences. In addition, past (between-opportunity) value creating experience is further broken down to account for the differential effects of past successes and failures.

The paper finds that the greater the level of an organization's present (within-opportunity) efforts to learn about a value creating opportunity, the higher the performance of that opportunity. However, the paper also finds that unsuccessful past (between-opportunity) value creating experience negatively impacts the performance of an organization's subsequent value creation efforts. This finding is particularly important given the high failure rate of organizational attempts to create value. These findings suggest that within-opportunity learning is important to the creation of value under conditions of uncertainty – but that organizations tend

10.5465/AMBPP.2016.132

not to learn this lesson as a result of their past value creating experiences. Put another way, past value creating experience may be a poor substitute for within-opportunity learning under conditions of uncertainty.

## THEORY AND HYPOTHESES

The creation of new economic value is a key strategic goal of many organizations (Mahoney & McGahan, 2007). One way organizations can create value is to introduce new products and services for which customers are willing to pay (Mahoney & Qian, 2013). Both entrepreneurial and existing firms can engage in value creating activities by forming and exploiting opportunities (Alvarez & Barney, 2007; Brown & Eisenhardt, 1995; Shane, 2003). Compared to exploitative activities associated with value capture and cost minimization, the creation of new value through the introduction of new products and services is a comparatively more uncertain, exploratory process (Alvarez & Barney, 2005, 2007, 2010; Alvarez et al., 2013; Eisenhardt & Martin, 2000; Knight, 1921; March, 1991).

This paper draws on two theoretical literatures, organizational learning and opportunity creation, to develop hypotheses that relate organizational attempts to learn from uncertain value creating experiences to the performance of the opportunities that these organizations attempt to form and exploit.

### Organizational Learning

A growing body of work on organizational learning has shown that organizations can apply the lessons of cumulative experience (Argote, 2012; Arrow, 1962; March & Olsen, 1975) to minimize costs and capture value as they exploit known opportunities (Argote, Beckman, & Epple, 1990; Hatch & Dyer, 2004; Li & Rajagopalan, 1997; March, 1991; Pisano, Bohmer, & Edmondson, 2001). In addition to simple cumulative experience, past failures have been shown to stimulate even greater learning that past successes as organizations exploit known opportunities (Baum & Dahlin, 2007; Haunschild & Sullivan, 2002; KC, Staats, & Gino, 2013; Li & Rajagopalan, 1997; Madsen & Desai, 2010).

However, it is less clear if organizations can learn to create new value through the exploration of new opportunities (Katila & Ahuja, 2002; March, 1991). Indeed, the perpetually high failure rate of value creating activities such as entrepreneurial startups and new product introductions (Brown & Eisenhardt, 1995; Dunne et al., 1988; Rothaermel, 2001; Shepherd, 2003; Singh et al., 2015; Stevens & Burley, 1997) suggests that learning to create value may be more difficult than learning to minimize costs and capture value.

Thus, experience may actually be a poor teacher under the ambiguous and uncertain conditions that characterize value creating activities (Levinthal & March, 1993). Under uncertain conditions, what has happened is not always obvious and causality is difficult to untangle due to the presence of noisy, ambiguous signals (Levinthal, 1997; March & Olsen, 1975). As a result, organizations may believe that learning has occurred when they have, in fact, misspecified the connections between actions and outcomes (Levitt & March, 1988). Some work even suggests that organizations may fall prey to ‘failure traps’ which cause an organization’s future value creation performance to decrease over time as the organization fruitlessly strives to learn from its failed past attempts to introduce value creating innovations (Levinthal & March, 1993).

10.5465/AMBPP.2016.132

In summary, the organizational learning literature suggests that organizational efforts to extract meaningful learning under conditions of uncertainty are not likely to improve future performance. According to this view, neither greater levels of present (within-opportunity) learning behaviors nor past (between-opportunity) value creating experience are likely to positively impact the performance outcome of a subsequent value creating opportunity. Thus, the organizational learning literature suggests a plausible null hypothesis for an insignificant effect of learning on performance for organizations attempting to create value under conditions of uncertainty.

**Opportunity Creation**

In contrast, a body of theoretical work emerging from the entrepreneurship literature suggests that experiential learning will have a positive effect on value creation performance outcomes – particularly under conditions of uncertainty (Alvarez & Barney, 2007, 2010; Alvarez et al., 2013). According to opportunity creation theory, an organization's ability to learn from experience under conditions of uncertainty is an important determinant of success when attempting to create value (Alvarez & Barney, 2007, 2010; Alvarez et al., 2013).

Opportunity creation theory argues that value creating opportunities are formed and exploited through the endogenous actions and decisions of entrepreneurs and organizational decision makers operating under uncertainty (Alvarez & Barney, 2007). Because of the uncertainty associated with introducing new products and services, decision makers cannot obtain or infer the information they require from pre-existing data sets or past experiences, ex ante (Dequech, 1999, 2003; Knight, 1921). Therefore, when acting in the presence of uncertainty, organizations must either learn from new information they endogenously generate about an opportunity or get lucky if they hope to successfully create new value (Alvarez & Barney, 2007, 2010; Alvarez et al., 2013; Eisenhardt & Martin, 2000). This process of learning from newly generated information and knowledge, specific to a single opportunity, is argued to have particularly important positive performance implications for organizations striving to create new value (Alvarez & Barney, 2010). Therefore,

*Hypothesis 1: The greater the level of an organization's present (within-opportunity) experiential learning behaviors, the higher the performance of the value creating opportunity.*

Opportunity creation theory also suggests that past (between-opportunity) value creating experience should be particularly valuable when organizations pursue subsequent value creating opportunities (Alvarez & Barney, 2007, 2010; Alvarez et al., 2013). This is because the ability to create new value by forming and exploiting opportunities under conditions of uncertainty is a path dependent, socially complex, causally ambiguous ability that is best learned through direct experience (Alvarez & Barney, 2010).

Although opportunity creation theory suggests that both past successes and failures should benefit future efforts, it may be the case that past successes and failures impact learning processes and future performance outcomes differently (Baum & Dahlin, 2007; Haunschild & Sullivan, 2002; KC et al., 2013; Li & Rajagopalan, 1997; Madsen & Desai, 2010).

However, it can be difficult to untangle learning effects from sociological effects such as the legitimacy, reputational, and network advantages that accrue to organizations which have

10.5465/AMBPP.2016.132

successfully formed and exploited value creating opportunities in the past. For example, a new app developer that happens to obtain a high number of installs on its first app is likely to also obtain a high number of installs on its second app – simply because it can easily communicate the release of the second app to the users of the first app. This positive effect of past (between-opportunity) experience can potentially occur even if the developer did not learn from its experience with the first app.

However, these sociological effects and benefits seem less likely to accrue to organizations that are unsuccessful in their efforts to form and exploit value creating opportunities. Thus, examining the effect of past value creation failures may better facilitate the isolation of learning effects. Therefore, the effects of past (between-opportunity) value creation experience are separated into two hypotheses:

*Hypothesis 2a: The greater the level of an organization's successful past (between-opportunity) value creating experience, the higher the performance of a value creating opportunity.*

*Hypothesis 2b: The greater the level of an organization's unsuccessful past (between-opportunity) value creating experience, the higher the performance of a value creating opportunity.*

The theorized benefits of past (between-opportunity) experience imply that, through a process of learning-by-doing, entrepreneurs and organizations can learn to endogenously generate the new information and knowledge needed to successfully form and exploit value creating opportunities under conditions of uncertainty. In other words, organizations should learn the importance of maximizing within-opportunity learning as a result of their past value creating experiences. Therefore,

*Hypothesis 3a: The greater the level of an organization's successful past (between-opportunity) experience, the higher the level of that organization's present (within-opportunity) experiential learning behaviors.*

*Hypothesis 3b: The greater the level of an organization's unsuccessful past (between-opportunity) experience, the higher the level of that organization's present (within-opportunity) experiential learning behaviors.*

## METHODS

### Data

The data source for this study is the Google Play App Store (play.google.com/store/apps), the official mobile application store for phones and tablets running the Android operating system. Google Play is the world's largest app store in terms of number of apps offered and number of developers, generating billions of dollars in revenues annually (Perez, 2015). This data source is ideal for testing the effects of experiential learning on new value creation for a number of reasons.

10.5465/AMBPP.2016.132

First, Google Play publicly provides rich data for each app, including a complete text description of the app, average review score, version history, app category, an indicator of whether the app costs money to download or offers in-app purchases, and —perhaps most importantly— an ordered categorical indicator of the number of times each app has been installed by users. Second, if each app is thought of as an individual value creating opportunity, then the entire history of an organization's past and present value creating efforts can easily be identified and tracked over time using an objective performance measure (number of app installs). Third, because barriers to entry are so low in this setting, concerns of the survivor bias that plagues entrepreneurship research (Aldrich & Fiol, 1994; Aldrich & Kenworthy, 1999; Kalleberg & Leicht, 1991; Mathias, Williams, & Smith, 2015) are substantially reduced. Fourth, because these app development organizations tend to be small in size and because they all compete in the same marketplace, the effects of past and present value creating experience may be easier to isolate from other confounding effects compared to datasets that include larger, more complex organizations competing in a variety of markets. Finally, this setting is conducive to quasi-experimental research designs as apps and app development organizations enter and exit the data source on a daily basis.

However, this empirical data setting is not without limitations. The lessons learned from experience in this rapid, dynamic product market that does not require organizations to amass large amounts of capital to launch new products and services may not be generalizable to other settings where barriers to entry and the cost of failure are much higher (e.g., medical devices, hardware, biotechnology).

### Sample & Research Design

This study employs a cohort research design that tracks all of the apps that were listed on Google Play's categorical lists of new aps on June 10, 2015. It is important to note that this sample only includes the apps that either charge a price up-front to install or apps that offer in-app purchases. This was done to screen out the 7,881 free apps in the sample that may have been published for purposes other than economic value creation (although the results presented in this paper are robust to the inclusion of these free apps). Additionally, the 89 apps that had been on the market for more than 30 days on June 10, 2015 were eliminated from the sample to ensure that only very recently launched apps were included in the cohort.

As a result, the final sample consists of a cohort of 1,451 app development organizations that recently launched a new app to create economic value in the Google Play App Store. Panel data for this cohort of apps have been obtained on an approximately weekly basis. In total, data have been obtained for this cohort of apps 26 times between June 10, 2015 and December 31, 2015. In addition to collecting data on this cohort of 1,451 recently launched apps, data have also been collected each week for all of the additional apps (approximately 10,500) released by these same developers both prior to, and after, June 10, 2015.

## RESULTS

A combination of ordered logistic regression, difference-in-differences, fixed-effects panel regression, and negative binomial count models was used to test the hypotheses developed in this paper. A full description of the results as well as the associated tables and figures are available upon request from the authors. In summary, the results of this analysis provide strong

10.5465/AMBPP.2016.132

support for Hypothesis 1 and weak support for Hypothesis 2a. Hypothesis 3a is not supported. Hypotheses 2b and 3b are rejected.

## DISCUSSION AND CONCLUSION

This paper uses the Google Play App Store as an empirical setting to test whether organizations can learn to create value under conditions of uncertainty. Drawing on organizational learning and opportunity creation theories to develop testable hypotheses, the paper finds that present (within-opportunity) learning behaviors are likely to benefit organizations striving to create new value under uncertain conditions. Organizations can improve their chances of successfully forming and exploiting value creating opportunities by engaging in behaviors to persistently learn about a particular opportunity over time.

However, the paper also finds that past (between-opportunity) value creating experience does not necessarily improve organizations' odds of successfully forming and exploiting an opportunity. Moreover, the paper finds that increasing levels of past value creating experience do not make organizations more likely to engage in beneficial within-opportunity learning behaviors.

These findings help explain and predict when an organization will be more, or less, likely to create value (Mahoney & McGahan, 2007; Mahoney & Qian, 2013). Organizations that engage in persistent, within-opportunity learning behaviors may be more likely to create value than organizations that rely on past value creating experience and organizations that choose not to persist in their efforts to learn about the value creating opportunity they are currently pursuing. This logic cautions against the recommendation that entrepreneurs should fail fast and fail often (Aldrich & Kenworthy, 1999; Sarasvathy, 2001). Entrepreneurs who give up too quickly on a value creation opportunity may learn more about how to fail rather than how to succeed. Learning from a failed experiment may be beneficial – but giving up too quickly on efforts to form and exploit one opportunity in order to focus on a new opportunity may be harmful to an organization's future value creation efforts. Developing a better understanding of the difference between a failed experiment and a failed effort to form and exploit an opportunity is another potentially fruitful avenue for future research.

In conclusion, this paper suggests that within-opportunity learning is important to the creation of value under conditions of uncertainty – but that organizations tend not to learn this lesson as a result of their past value creating experiences. Past value creating experience may be a poor substitute for within-opportunity learning under conditions of uncertainty – especially when that past experience resulted in failure.

## REFERENCES AVAILABLE FROM THE AUTHORS