

# Actions for Managing Risk in the Context of Academic Entrepreneurship

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## 1.0 Introduction

Startups are new firms, created to profit from an unexploited market opportunity. The process of developing a new startup is characterized by significant risk, such that most startups fail. Academic entrepreneurship is the field that studies startups that are created to commercialize technology developed at a university, also referred to as university spin-offs (USOs). The end goal for a USO is to develop a sustainable business model (Vohora, Wright, & Lockett, 2004). We still, however, don't fully understand the actions that USOs undertake to actually develop their business models despite this risk (Mathisen & Rasmussen, 2019). The purpose of this paper is to deepen our understanding of what USOs do to manage risk. Using emergent results from an ongoing systematic literature review, I will identify and categorize these actions using a risk management framework.

## 2.0 Theory

### 2.1 Risk Management Framework

There are two major schools of thought about uncertainty. Epistemic risk is caused by a lack of knowledge about a phenomenon. Aleatoric risk is caused by randomness. Phenomena can combine both types of risk (Fox & Ulkumen, 2011).

Standard risk management processes contain three steps: 1) risk identification, 2) risk assessment, and 3) risk treatment (Oehmen, Guenther, Herrmann, Schulte, & Willumsen, 2020). Risk identification refers to identifying the sources of risk. Risk assessment is the quantification of risk by determining the probability and magnitude of the effect, and thus only applies to aleatoric risk. Risk treatment refers to strategies or analysis done to minimize the exposure to losses from risk (Oehmen et al., 2020; Tegeltija, Oehmen, Kozine, & Geraldi, 2016). Traditional risk treatments are primarily aimed at managing aleatoric risk and poorly suited for contexts with epistemic risk (Tegeltija et al., 2016). Epistemic risk, on the other hand, is generally reduced by collecting additional information about the phenomenon (Fox & Ulkumen, 2011).

The literature has explored the application of risk management processes to product development (Oehmen et al., 2020) and innovation. While these processes are elements of entrepreneurship (and thus academic entrepreneurship), risk management has not been explored for all elements of entrepreneurship or for academic entrepreneurship specifically.

### 2.1 The Phenomenon of Academic Entrepreneurship

Academic entrepreneurship is a specific context of entrepreneurship, characterized by high uncertainty, long development timelines and a need to acquire additional resources (Mathisen & Rasmussen, 2019). The uncertainty faced by USOs is represented by a non-linear commercialization path: USOs may need to revisit earlier decisions with new information that is gained later on in the process (Aguirre, Parellada, & Campos, 2006). A USO's early analyses are often based off partial or inaccurate information. A primary goal of the USO development process is thus to collect additional information about the market (Vohora et al., 2004). The challenge for the USO is to use existing resources to further develop the business opportunity. USOs can fail because of a failure to: 1) develop their technology, 2) develop a product based on that technology, 3) develop a market for that product, or 4) develop a business organization that can deliver value utilizing that product (Meyer, Aten, Krause, Metzger, & Holloway, 2011).

The literature is dominated by studies that look at the phenomenon at the level of individual entrepreneurs, or the larger university organization. Relatively few studies look at the firm level, and those that do are often focused on the antecedents or outcomes of academic entrepreneurship. While there are some studies on the development process of USOs, they are mainly descriptive and do not address how firms actually advance through the process (Mathisen & Rasmussen, 2019). Although some studies have identified this research gap, they have failed to close it (Rasmussen, Mosey, & Wright, 2011).

## 3.0 Methodology

### 3.1 Data Sources

The data for this paper is the result of a systematic literature review of the firm level commercialization and entrepreneurship process literature. The actual literature search is still underway so the exact search terms and databases to be used have not yet been finalized.

Citations will be excluded based on relevance to the research question, first through a review of abstracts and keywords, and then through a full reading of the text. The practitioner literature will also be included in order to capture a broad range of actions.

### 3.2 Data Analysis

The final collection of citations will be analyzed using document analysis to identify actions that USOs can implement to mitigate risk. I will evaluate these actions for their contribution to risk management in academic entrepreneurship by evaluating whether they address epistemic or aleatoric risk, as well as their contribution to risk identification, risk assessment, or risk mitigation.

## 4.0 Preliminary Findings

My partial review of the literature has identified several entrepreneurship strategies, frameworks and methods that contribute to the risk management of a venture such as a USO. These include frameworks and approaches such as The Lean Startup, Business Planning, Design Thinking, Agile Development, Effectuation and Bricolage. Presently, only The Lean Startup has been partially analyzed.

#### 4.1 Risk Identification

The market opportunity navigator and business model canvas are two tools from the lean startup that help to identify risk. The market opportunity navigator is a worksheet to help evaluate and compare different applications or markets that the USO's technology can serve. Part of the evaluation includes an identification of aleatoric risks at a very high level, including implementation challenges and external risks. The business model canvas is a worksheet for mapping out the elements of a business model. From the perspective of the lean startup, the business model elements are hypotheses that need to be validated through experimentation. These hypotheses are examples of epistemic risk.

#### 4.2 Risk Assessment

In addition to identifying risks, the market opportunity navigator instructs the user to qualitatively rank the severity of the risk on a four level scale: Low, Medium, High and Super-High.

#### 4.3 Risk Mitigation

The lean startup instructs practitioners to follow a process of validated learning. The hypotheses contained in the business model are validated through a series of business experiments. These experiments are a mitigation strategy for epistemic risk, as they seek to collect additional information in order to validate the uncertain hypotheses. Experiments can be conducted through several methods. In the earlier stages of the venture, customer development instructs practitioners to "get out of the building" and speak to customers. In later stages, a minimum viable product is used and tested by customers, generating additional knowledge.

Aleatoric risk is mitigated through pivoting. If the results of the tests are unfavorable, the USO or venture is instructed to revisit an earlier decision (such as the design of the MVP or business model, or choice of market opportunity) and go through another round of validated learning.

## 5.0 Discussion and Research Contribution

Academic entrepreneurship is a useful context for studying the larger phenomenon of entrepreneurship because of its unique characteristics (Mathisen & Rasmussen, 2019). USOs develop uncertain technology in uncertain markets, which is not necessarily the case for other types of startups (Clarysse, Moray, & Heirman, 2002). USOs are also a type of New Technology Based Firm (NTBF) (Aguirre et al., 2006). However, studies have further

differentiated USOs from NTBFs and concluded that USOs start out with fewer capabilities (Ortín-Ángel & Vendrell-Herrero, 2014). This is potentially due to the fact that academic entrepreneurs generally come from a technical background and lack business experience (Vohora et al., 2004). A basic premise of risk management is that the context of the risk must be understood in order for it to be managed. This study will contribute to the literature on academic entrepreneurship by providing that context and contributing to the major gap in firm level studies. It will contribute to the risk management literature by extending existing risk management frameworks into a new context. Finally, and perhaps most importantly, it will contribute to the practice of academic entrepreneurship by providing more context as to what actions to take, when, and why to take them, for USOs that want to manage their risk in order to increase their chances of survival.

## 6.0 References

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