

Applying the Theory of the Firm to Examine a Technology Startup at the Investment Stage

Michael Ayukawa

“ There is nothing more practical than a good theory. ”

Kurt Lewin

Psychologist and author

The investment stage of a new technology firm is when resources, opportunities, investors, and early customers first converge. Currently, technology entrepreneurs make many expensive mistakes. They invest in assets and develop capabilities that prove to have limited value. They take too long to discover and validate the product-market fit for their firms during the investment stage and run out of time and money. Understanding how theory can help entrepreneurs make decisions during the investment stage is important to accelerate new-firm formation and growth as well as to reduce the uncertainty of founders and stakeholders of technology firms.

This article introduces a model developed to examine deal making during the investment stage of a new technology firm. It is an extension of a model of lateral firm scope proposed by Oliver Hart and Bengt Holmstrom. The extensions come from considering a technology firm as being both a deal-making entity and a pool of resources during the investment stage. A deal is the result of a decision the entrepreneur and others make to coordinate (i.e., work together to achieve a common objective). Benefits from a deal include cash profits for the firm and private benefits for the entrepreneur.

This extended model is then applied to examine the author's firm which is still in the investment stage. Application of the extended model to a real-life situation generated two important insights: i) when private benefits include learning from experimentation, the number of deals increases and ii) at the start of the investment stage, private benefits drive deal-making, whereas at the end of the investment stage, cash profits derived from asset ownership drive deal-making.

Introduction

To avoid making costly mistakes, reduce the cost and time of engaging stakeholders, help overcome blind spots and biases, and focus attention, we need a much better understanding of what causes what – and why – during the investment stage of a technology firm. The investment stage is when a new technology firm must assemble and invest resources to execute on the prototypes of their value proposition to customers. This stage corresponds to the second of the three stages described by Cason and Wadson (2007; tinyurl.com/869g49o).

Today, too many entrepreneurs are making important decisions based on guesswork, wrong data, unfounded opinions, poor analogies, and faulty logic. A theory that has predictive power and can help interpret what happens during the investment stage of a technology firm is needed.

This article makes three contributions. First, it links the theory of the firm, through the use of the Hart and Holmstrom model (2010; tinyurl.com/bver2xy), with the theory of entrepreneurship during the investment stage of a new technology firm. Second, the article uses deals, not assets or contracts, as reference points to better as-

Applying the Theory of the Firm to a Technology Startup at the Investment Stage

Michael Ayukawa

sess new technology firms. Third, it provides two interesting insights about new firm behaviour during the investment stage.

The following section of the article describes the model used to examine a technology firm at the investment stage. Next, the data on the deals closed by a new technology firm over a three-year period are provided and then the insights of using the model to examine the data are discussed. The last section provides conclusions.

The Model

To examine a technology firm during the investment stage, we use and extend the model that Hart and Holmstrom (2010; tinyurl.com/bver2xy) developed to examine the relationship between two units inside a firm. The original model examined the cases of coordination (i.e., working together on a common objective) under different circumstances of management control. It modeled the behaviour of two inside managers who lead two separate units in a lateral relationship. These two inside managers may have a boss who coordinates (integrated) or may not (non-integrated).

The Hart and Holmstrom model has two key ingredients. First, each unit generates two kinds of benefit: profit for the unit and private benefits for the people in the unit. The unit's profits are transferable with ownership. Private benefits represent job satisfaction and are not transferable. However, private benefits can be assigned a monetary value. Second, coordination between two units results when their managers agree on a decision that affects each other (e.g., decide to visit the same customer, share space, adopt a standard). If the managers disagree, there is no coordination. The benefits are modeled using the framework of incomplete contracts as reference points developed by Hart and Moore (2008; tinyurl.com/c56xtnb).

We have developed an extension to their model that focuses on the deals of a firm during the investment stage, instead of assets or contracts. We propose that a deal is the reference point based on the belief that the sequence of deals a new firm makes and executes during the investment stage provides a better view of the firm's capabilities than an inventory of its assets and contracts.

In our model, we examine firms in the investment stage; two players who agree to work together do so

around a deal. Each interprets the deal in the way that is most favourable to the player. A player who does not derive the most-favoured outcome from a deal feels wronged, offended, or unhappy. The player then performs in a perfunctory way – the player completes their side of the deal merely as a routine duty, hastily executed and superficial. Perfunctory performance causes economic inefficiencies.

The Hart and Holmstrom model examines three cases of cooperation:

1. Non-integration without cooperation
2. Non-integration with cooperation
3. Integration with cooperation

Integration reflects whether the parties have a coordinating boss. Cooperation distinguishes between two relationship patterns among the players. A transient or transactional relationship is where performance in a perfunctory way due to non-coordination does not apply (i.e., it is just business). An ongoing relationship is where perfunctory performance due to non-coordination may apply. For example, there is a cost for non-coordination if a friend asks for your help and you say “no”. For example, the cost affects the friend's motivation to respond to your request for help at a future date. Note that players within a firm are assumed to have an ongoing relationship and therefore always operate under case three.

Deals generate two kinds of benefits:

1. Monetary profits that are transferrable with ownership
2. Private benefits, which are non-transferable. For example, skills.

Monetary profits can be generated by the sale of products or services or by the sale of company equity. Compared to an established firm, the monetary profit that a startup generates through sales of products or services may be small or zero.

Private benefits capture the notion of skills and training: elements that correlate to some future value (e.g., billing rate, wages, and career prospects) but also relate to reputation (e.g., commitment, honesty, and fairness).

Applying the Theory of the Firm to a Technology Startup at the Investment Stage

Michael Ayukawa

In the Hart and Holmstrom model, coordination between managers was conceptualized as always reducing private benefits. The rationale for this was that “job satisfaction stems from the ability to pursue an independent course or agenda.” Any coordination compromised this pursuit and therefore was seen as a negative.

In the case of a new technology firm in the investment stage, we observe something different than what is in the Hart and Holmstrom model. Coordination has the prospect of increasing the net private benefits for the players. There is a prospect for a high net value of private benefits in contributing to the foundational learning in a growth-oriented startup that is greater than that of any loss of pursuing an independent course or agenda.

What this means for a new firm is that the motivation for early coordination can be expected to be more heavily weighted towards private benefits, rather than immediate profit. It pays off to coordinate with others for the purpose of learning.

However, as the need to generate cash profits increases, the firm is compelled to shift its focus from private benefits to monetary profit benefits (i.e., revenues). The work of Hart and Holmstrom suggests that this coordination is more likely to occur through integrated resources (i.e., within the firm) since it effectively discounts the value of private benefits.

A Real-Life Technology Firm

The author examined the deals of the company he founded with his partner in early 2009. Presently, the company is in the investment stage. Table 1 provides information on the deals that required a commitment of at least 20% of the founder’s company resources in time or money from March 2009 to May 2012. For each of the 18 deals, Table 1 provides the month and year when the deal was agreed to, the type of the deal, the ratio of profits to private benefits estimated by the author, and the number of players involved in the deal.

Of the 18 deals, six were profit centric (i.e., the value was in selling goods or services), two were training deals (i.e., the value was in education), five were community deals (i.e., the value was in building relationships), three were grants, and two were investments.

Table 1 illustrates that:

1. The number of deals and the number of players engaged in a deal increased with time.
2. Commercial activity increased with time.
3. Deals shifted with time from providing private benefits to providing profit benefits.

Many cooperative relationships were formed in the community projects and the training programs and this created a network of potential partners and opportunities. From this network of partners came many players in the later deals.

With the exception of one, all the community projects and training were deals without a formal contract. They were without compensation and driven by private benefits of learning and relationship building.

The one training program with a contract was a struggle at the end as the original proposal deliveries no longer fit the business direction but had to be completed. Somewhat similarly, a grant program with a fixed deliverable was eventually abandoned as the original objective no longer fit with the company direction. In both these cases, a longer-term contract (both were 6 to 9 months in length) with fixed deliverables became difficult to manage for the startup. This might signal that connecting grants and contracts to an emerging firm may have unintended consequences of handcuffing the startup to early thinking and restricting their ability to embrace new learning. Note that this startup did not generate significant services revenue.

In contrast to defined contracts, investment capital provided freedom to create prototypes strictly for learning and largely without regard to third parties. This began to change as the firm engaged with clients and projects that were public facing. Changes “on the fly” also became more difficult to negotiate when many players were involved. Now that the firm engages primarily with profit-centric deals, delivery is tied to a fixed specification and timeline.

Insights

There are two insights that emerge from the model used to examine a technology company at the invest-

Applying the Theory of the Firm to a Technology Startup at the Investment Stage

Michael Ayukawa

Table 1. Analysis of deals from March 2009 to May 2012

Year	Deal	Month	Deal Type	Profit/ Private	Players in Deal
2009	1	Mar	Profit	0.3	2
	2	Jun	Training	0	2
	3	Sep	Grant	0.7	2
2010	1	Jan	Training	0.5	2
	2	Mar	Profit	0.5	2
	3	Jun	Community	0.3	2
	4	Jun	Community	0	4
	5	Oct	Community	0.4	4
	6	Nov	Grant	0.5	2
2011	1	Jan	Investment	2.3	4
	2	Aug	Profit	0.4	6
	3	Oct	Community	0.3	4
	4	Oct	Grant	1.0	2
	5	Nov	Profit	2.5	2
2012 (up to May)	1	Mar	Community	0.2	7
	2	May	Profit	0.8	4
	3	May	Profit	1.5	5
	4	May	Investment	1.3	5

ment stage. First, when private benefits are positive (vs. negative) under coordination, the total number of deals increases. Hart and Holmstrom relate private benefits to job satisfaction. They conclude that coordination will decrease job satisfaction because individuals are no longer free to decide as they wish. While this conclusion makes sense in the context of an existing firm with employees and an operational history, it makes less sense when a technology firm is at the investment stage. Coordination results in increased learning for an entrepreneur. This increased learning is a private benefit for an entrepreneur.

The second insight is that at the start of the investment stage, private benefits drive deal-making while cash benefits derived from asset ownership drive deal-making towards the end of the investment stage.

The investment stage is where the entrepreneurial firm assembles the assets that will later become operationalized. At the beginning of this stage, the focus is on learning by experimenting. Profits are important but largely as a matter of validating support for the firm's emerging value proposition. In such an environment, investing too early in operational assets can effectively reduce

Applying the Theory of the Firm to a Technology Startup at the Investment Stage

Michael Ayukawa

the degrees of freedom to experiment because of the need to justify the investment. The flip side is that the investment shortens the time to operationalize and generate a meaningful revenue stream.

Conclusions

This work extends the model proposed by Hart and Holmstrom in two ways. First, the model used in this article focuses on deals, not on assets or contracts that the firm owns. Deals are different because they include both profit and private benefits. Second, private benefits in the model used in this article include benefits from learning by experimentation and cooperation and they increase with coordination. Hart and Holmstrom assume that private benefits refer to job satisfaction and that they decrease with coordination.

This extended model was examined in a single case and was consistent with the expected behavior. More work is obviously in order but there is some indication that this effort may help connect entrepreneurship to the formal theory of the firm and thus help create a theoretical foundation for the study of entrepreneurship.

About the Author

Michael Ayukawa is the co-founder of Cornerportal Inc., a company that is committed to bring economic opportunity to more individuals in more communities worldwide. He is also a master's student in the Technology Innovation Management program at Carleton University and plays an active in several emerging business ecosystem projects.

Citation: Ayukawa, M. 2012. Applying the Theory of the Firm to Examine a Technology Startup at the Investment Stage. *Technology Innovation Management Review*. May 2012: 23-27.

