

DECISION SCIENCES INSTITUTE
The Future of Supply Chain Management Education:
Developing Entrepreneurial Leaders

(Full Paper Submission)

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ABSTRACT

With the increasing complexity of supply chain management, there is a need to rethink how we educate and develop supply chain managers. It has become necessary to develop SCM who are entrepreneurial leaders who can shape social and economic opportunity and adapt to ever-changing supply chain environment. Through extensive grounded research across diverse academic disciplines and with more than 1,500 companies, we have developed a model for entrepreneurial leadership. This paper examines how this new model of leadership can be used to better educate supply chain managers and provides four lessons critical for supply chain management classes.

KEYWORDS: Supply Chain Management, Higher Education, and Entrepreneurial Leadership

INTRODUCTION

Twenty five years ago, the focus of most supply chain courses was on the numerous analytical tools for minimizing the cost of the supply chain. Ten years later, Fisher (1997) created awareness of the need to match one's product with the right type of supply chain. Supply Chain courses began to consider both efficient supply chains for functional products and responsive supply chains for innovative products. In the last decade, supply chain courses have begun to place more emphasis on sustainability, risk management and global partnerships. Slowly the content of supply chain courses has changed to reflect new supply chain environments and current best practices.

Today, our supply chains are very complex and some would say that this complexity is growing due to issues such as globalization, product proliferation, supply chain security/risk, reduced response times, and market and supply chain visibility for our stakeholders. As organizations face this uncertain and sometimes unknowable world, there is a need to adapt to frequent changes and to create innovative solutions to old and new supply chain problems. It is critical,

therefore, that we not only educate our future supply chain leaders in the tools, techniques and frameworks used for rigorous analysis and optimization of supply chains but also help prepare them to handle the complex and ever-changing supply chain environment.

We believe that today's supply chain complexity requires a new type of leader, an entrepreneurial leader, who can think and act differently based on a new world view. To educate and prepare entrepreneurial leaders, we need to reconsider how and what we teach in our supply chain courses. In this article, we will describe what we mean by an entrepreneurial leader, why entrepreneurial leadership is needed for effective supply chain management and how educators can modify supply chain courses to better prepare students for their future positions.

DEFINING ENTREPRENEURIAL LEADERSHIP

Entrepreneurial leaders (Greenberg, McKone-Sweet and Wilson, 2011) are individuals who, through an understanding of themselves and the contexts in which they work, act on and shape opportunities that create value for their organizations, their stakeholders, and the wider society. Entrepreneurial leaders are not discouraged by a lack of resources or by high levels of uncertainty and are unwilling to accept level or declining performance. Rather they:

- Tackle these situations by taking action and experimenting with new solutions to old problems, as our industry research shows (Wilson and Eisenman 2010).
- Find ways to inspire and lead others through a combination of self-reflection, social-awareness, resourcefulness, and creative thinking and action,
- Challenge, change, and create new ways to address social, environmental, and economic problems through these different organizations.

In this way, entrepreneurial leaders strive for continuous learning and improvement.

It is important to note that Entrepreneurial leadership differs from entrepreneurship, which is most commonly associated with new venture creation. Instead entrepreneurial leaders are needed in all types of organizations: (1) to build startup ventures, (2) to introduce new products, processes and services and lead expansion opportunities in established organizations, (3) to tackle complex social problems in social ventures, and (4) to create social and political change in our government and NGOs.

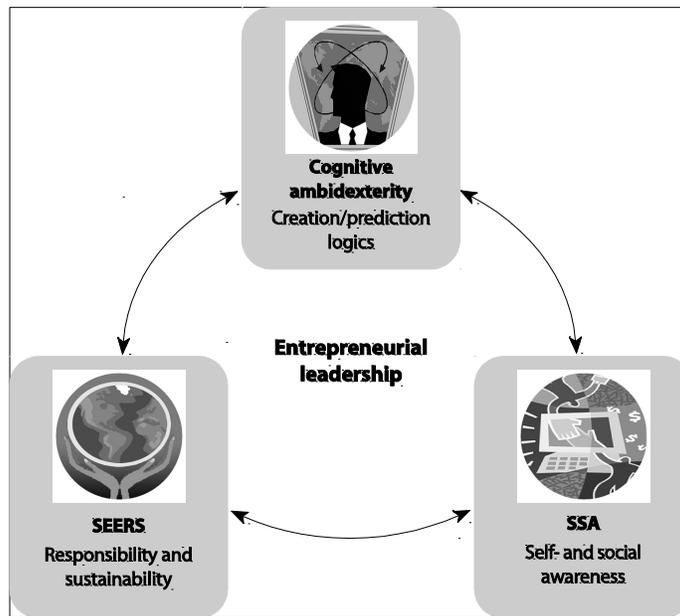
While entrepreneurial leaders may tackle dissimilar problems and work in different types of organizations, they have one thing in common—they have the ability to think and act differently to improve their organizations and the world. To illustrate this new type of leadership, we provide an example of one entrepreneurial leader who created an innovative solution to an old supply chain problem.

In 2003, Jim Poss was watching a trash vehicle on a Boston street. The truck was idling, blocking traffic, and smoke was pouring out of the exhaust. There has to be a better way, Poss thought to himself. Poss took the problem back to his team at Seahorse Power Company, a company that was initially focused on identifying innovative approaches to geothermal power plans and offshore wind energy. As they researched past innovations in trash collection, they reviewed models of improving the energy efficiency of the trucks and/or the travel route of the trucks. This problem had been tackled as many supply chain (SC) problems are--making incremental changes to an existing supply chain.

As Poss’s team considered various solutions to the environmental problems of trash collection, they began to redefine the problem to focus on how to reduce the need for trash collection (change the demand) rather than on how to improve the efficiency of the collection system (change the supply). BigBelly Solar, as the company became to be known, began to apply solar technology to the complex problem of trash collection. Specifically, they developed solar-powered trash compactors which hold up to five times as much trash as traditional receptacles. As a result, these compactors dramatically decrease the frequency of trash pickup and can cut fuel use and trash-truck emissions by up to 80 percent. With more than 12,000 compactors deployed across 30 countries, BigBelly Solar has had a significant impact on wasteful consumption of fossil fuels and has freed up local government’s financial and human resources for other activities. In talking about the company Poss states, “We are motivated in part because we care about the environment and in part because we know this can be financially successful” (Xing 2007). Poss’s organization created social and economic value by creating an innovative solution to an age-old supply chain problem.

Underlying Poss’s leadership approach are three practices that we refer to as the three principles of entrepreneurial leadership (see Figure 1): Self and Social-Awareness (SSA), Cognitive Ambidexterity and Social Environmental and Economic Responsibility and Sustainability (SEERS). To explain the three principles that underlie how entrepreneurial leaders think and act differently, we describe each practice and refer back to Poss as an illustration of the practice. Then we highlight the importance of each principle for developing supply chain leaders.

Figure 1: Three Principles of Entrepreneurial Leadership



Self and social- awareness (SSA)

Entrepreneurial leaders recognize who they are and that the passion, knowledge, and skills they bring to a situation will shape the opportunity they create. They also realize that their actions are dependent on the context of the situations they face. Also, they understand the importance of personal and professional networks and how they can be used to gain insight into a problem, bring new skills and perspectives to the table, and engage stakeholders in a solution. The leaders self-and social- awareness will influence what and how they begin to take action.

Returning to Poss, we see how his day to day experiences with trash guided his thinking about waste collection. His interest in the problem wasn't a sudden one but grew from his childhood passions and his early realization of the magnitude of the planet's environmental problems. His passion fueled him to be all-consumed with these problems, even taking pictures of trash on his honeymoon (Simpson 2007). At the same time, Poss was open to the ideas of others around him. His approach changed direction as he interacted with different experts and assembled his team. He created a team not based on specific skills but simply based on who also had passion and "wanted to help." Poss' entrepreneurial leadership stemmed from his passion for the opportunity and his awareness and responsiveness to how the opportunity could be shaped by those around him.

Today, supply chain leaders are working with a global network of suppliers and customers and need to understand the context and culture of the regions in which they operate in order to regionalize their products and services and to set reasonable performance expectations for supply chain partners. Furthermore, they need to build and utilize their network of relationships in order to create new ways of doing things. Supply chain managers are involving a variety of new stakeholders, including supply chain partners, NGOs, governments and other non-profit organizations, in their supply chain innovations. For example, the Environmental Defense Fund and World Resource Institute have worked with numerous companies on energy issues. Expanding one's network beyond traditional business connections becomes essential when creating or improving supply chains. In today's environment, self and social-awareness is critical to successful supply chain leadership.

Cognitive ambidexterity

Entrepreneurial leaders shape new opportunities by switching back and forth between two different approaches to thought and action. On one hand, they use a traditional "prediction" approach in which they use analysis and action-planning to respond to low-levels of uncertainty. On the other hand, when confronted with unknowable situations, entrepreneurial leaders engage a "creation" approach to take action and to generate data so that they can begin to act their way towards a new opportunity. One way of thinking can be used to inform and progress the other.

With Poss, we see how he engaged both prediction and creation logic as he moved towards creating BigBelly. Through interaction and experimentation with various stakeholders, such as trash collection agencies, local town leaders, engineers, designers and others, Poss used a creation approach to redefine the trash problem as a need to reduce the need for trash collection. He also used prediction logic to gather data on the trash supply chain and to develop the technology for the BigBelly trash receptacles. His product went through many phases of development, from learning from experimental placement and design of the products (for example, an early design caused some problem when people mistook it for a traditional mailbox) to leveraging technology systems (for example, to build a more intelligent receptacle

that signals when pick up is needed). By engaging cognitive ambidexterity in which he cycled between creation and prediction logic, Poss was able to act his way into a new solution.

As organizations face an uncertain and sometimes unknowable world, there is a need to adapt to frequent changes and to create innovative solutions to old and new supply chain problems. When the situation is known and data is available, a prediction approach is effective for analyzing the situation and arriving at a solution. However, when the situation is unknown, a creation approach is needed to learn more about the situation. Through action, we create a new situation, gather more data, analyze it using prediction approach (when possible) and then base the next action on the new situation. Amazon, while very data-based in many situations, has recently taken action to offer new service offerings where the profit potential was uncertain, such as cloud computing and intraday delivery for major markets. By offering new services Amazon is able to test out their feasibility, gather data about the customer response and adapt the supply chain or the service offering to meet the demand needs (Hofman and Aronow 2012). This cycle of acting and learning is what we call intentional iteration, a repeated process of experimentation that allows you to act your way into a new opportunity. Cognitive Ambidexterity, knowing how and when to engage both creation and prediction approach, is a necessary capability for supply chain managers.

Social, environmental, and economic responsibility and sustainability (SEERS)

While cognitive ambidexterity and self and social awareness both form the basis for a new way of thinking and acting, this third practice is about a different world view of business. We will refer to this as SEERS or Shared Value Creation (Porter and Kramer, 2011), to define how entrepreneurial leaders look at opportunity differently. Rather than focusing first, or only, on economic value, entrepreneurial leaders know how to consider the tensions, trade-offs, and potential synergies of building new opportunities that have multiple forms of value creation.

Poss' example shows how he developed a solution that would be financially sustainable, have a strong environmental impact by reducing fuel consumption and pollution, and have a social benefit of freeing up governmental resources for other endeavors. Approaching a problem with this mindset is not easy and entrepreneurial leaders must be committed to working through the challenges of multiple forms of value creation.

Today, supply chain managers are being held responsible not only for their own firm's social and environmental standards but also for those of their partners. As supply chain visibility increases and stakeholders, such as employees, activists and governments, continue to ask for improved performance, it is critical that supply chain managers offer social and economic value and do so throughout their supply chain. There are numerous examples of organizations that have taken a SEERS mindset. In recent years, Wal-Mart has worked with suppliers to develop green supply chain practices that have also led to cost reductions. The International Council of Toy Industry, through the ICTI Care Process, has developed a program aimed at ensuring safe and fair workplace conditions at toy factories. This program requires involvement from audit companies, factories, toy brands and retailers. As seen by these examples, it is essential that supply chain leaders take on this new SEERS world view to tackle future supply chain challenges.

Supply Chain Leaders needs to think and act differently, broaden their world view, and build and utilize larger networks of partners. These needs are directly aligned with the three principles of

entrepreneurial leadership. We need to educate future leaders to exhibit entrepreneurial leadership as they tackle the supply chain challenges of today and tomorrow.

DEVELOPING ENTREPRENEURIAL LEADERS FOR SUPPLY CHAIN MGMT

To develop supply chain leaders, there are a number of changes needed to reorient our supply chain courses towards shaping entrepreneurial leaders. To discuss these changes, we will present several underlying lessons needed for successful entrepreneurial supply chain leadership and discuss some relevant learning experiences that can be embedded into our supply chain courses. While students will still need to learn about inventory management, distribution systems, supply networks, information systems and other core concepts, supply chain courses should be modified to deliver the following lessons.

Lesson 1: To analyze but not be paralyzed

First, it is critical for our SC leaders to understand the analysis tools and models for supply chain analysis but not to be paralyzed by them. Students need to be presented with cases and scenarios that allow for analysis but also provide missing or unknown information. They need to use their analysis to inform their decision but also not hesitate to take action simply because data is not available or information is incomplete.

In many supply chain courses, a traditional case approach is used to expose students to a variety of topics and industry best practices. Most of these cases present students with a decision that needs to be made and require a detail analysis to arrive at the decision. While these cases allow students to practice a prediction approach, there is also a need to consider how to teach action and implementation, a creation approach to thought and action.

One method is to engage students in simulations, real-life prototyping experiences, and cases that are focused on executing a decision rather than just analyzing the situation. Another method is to approach case discussion in a new way. Rather than spending much of the class on analysis to arrive at a solution instead start with action by asking: What should be done next? What might be the outcomes--good or bad--and what might one learn from this action? These types of in-class learning experiences help future entrepreneurial leaders develop the ability to use both prediction and creation approaches. These types of activities provide our students with highly variable situations where they need to utilize multiple supply chain tools, bring together various stakeholders, and practice this new approach to thought and action to create, execute and learn from their action plans.

Lesson 2: To Learn from Failures

It is important for supply chain leaders to be willing to experiment and to learn from successes and failures. There are a number of situations that call for experimentation and learning. There are situations where little or no data is available (for example, demand for new or innovative products), where there is great uncertainty (for example, lead-time variability due to transportation or supplier delays), and other situations with unexpected lost resources or rapid demand needs (for example, recalls due to security violation or increased demand or decreased resources due to natural disasters). Our leaders need to be able to manage under great

uncertainty as well as adapt to events that disrupt the supply or demand. In order to do this, leaders need to experiment with new approaches and learn from their successes and failures.

In most supply chain courses, discussions tend to focus on the most successful supply chain examples and consider how to plan for uncertainty and be responsive to customer needs. Fewer courses consider how to act with limited information, how to react when supply chain designs fail or how to quickly recover from a crisis situation. Supply chain educators need to offer opportunities for experimentation and for learning from failures.

One approach to engage students in failure analysis is to include the topic of Business Impact Analysis in supply chain courses. When supply chain managers understand how to assess the risks and the consequences of failure, they begin to explore how to be responsive to “unexpected” or “unlikely” events. While it is impossible to develop plans for all scenarios, the plans that are put in place from business impact analyses help the organization and the managers to be prepared to handle crisis situations: who to get involved, how decisions will be made and how resources will be allocated. When an unknown event becomes a reality, the organization has become skilled at working together to develop a response.

Another approach to learning from failure is to bring current events—those that highlight supply chain failures—into the class discussions. Whether it be the 2012 supply shortages for the iPhone 4s, the 2011 Earthquake and Tsunami in Japan, the 2010 Icelandic Volcanic Ash Cloud that shut down airspace for 6 days, or the 2009 recall by the Peanut Corporation of America, the situations bring the supply chain lessons to life and allow students to evaluate the causes, the consequences and the responses to the unexpected environmental changes and/or supply chain failures. They can learn from the failures of others and consider what could be done differently to reduce the risks from similar situations in the future.

A third approach builds upon Lesson 1. When simulations are used, we often reward the high scoring or most profitable team. Instead, let’s consider how we can reward students for how much they learned. If upon completion of the simulation, we ask students to reflect on the experience and to develop a report on the key “take-aways”, we will find that a “low” scoring team may have learned the most and a “high” performing team may or may not know how they achieved their results. When failure is okay, students tend to experiment with options and are more creative when running the simulation. A reflection report and its associated grade can reward students for their experimentation and careful analysis of their action.

Lesson 3: To Think broadly about Value Creation

Too often, social and environmental sustainability in supply chain management courses is relegated to one or two cases within a course. Instead shared value creation needs to be discussed in cases throughout the class. This is not to say that all cases need to focus on sustainability but that the social, environmental and economic effects of supply chains can and should be reviewed.

Wal-Mart, for example, can be an excellent case for discussing shared value creation. Wal-Mart’s current and historical practices can provide a wealth of information about the tensions and potential synergies between social, environmental and economic value creation. Wal-Mart can be an exemplar of a low cost yet responsive supply chain, one that involves collaboration and synchronicity throughout the supply chain. Similarly, it can be shown that Wal-Mart’s

sustainability initiatives have led to significant cost reductions as well as increased supply of scarce resources. In contrast, the cost pressures placed on Wal-Mart's stores and suppliers have potentially led to unfavorable, and sometimes unacceptable, labor practices. A company the size of Wal-Mart has the power to drive change throughout the supply chain and the capacity to make significant improvements in social, environmental and economic conditions.

A discussion that views the inherent tensions and synergies in shaping social and economic opportunities allows students to develop a new world view. When students can see beyond the narrow view of shareholder value creation as a sole goal and understand the inter-reliance of social economic and environmental issues, they can begin to create and shape new opportunities.

Lesson 4: To Engage Stakeholders in Innovation

It is important for supply chain leaders to understand the viewpoint of and to engage stakeholders in supply chain solution. The strength of supply chains is not only dependent upon the individual capabilities and powers of each stakeholder but is also dependent on the ability of the partners to adapt to changes in the environment and to find innovative solutions to supply chain challenges. It is critical, therefore, for supply chain leaders to develop processes for partner selection, partnership maintenance and stakeholder engagement and for supply chain courses to provide exemplars of each.

Partner selection should be based not only on historical performance of the partners but also on the strategic fit between partners and the partners' ability to adapt and innovate to a changing supply chain environment. Furthermore, to support supply chain innovations, service level agreements need to (1) adapt to changes in the environment (i.e. fees change to adjust for volume, raw material costs or other cost drivers) (2) have metrics and benchmarks for performances (3) develop processes for collecting, sharing and analyzing supply chain data (4) allow for regular two-sided feedback on the partnership and (5) share the risk of failure and the rewards of successes (i.e. gain sharing). The service level agreement should foster supply chain innovation rather than constrain or limit the ability to experiment or modify existing supply chain systems and processes.

A good case for this type of discussion is *UPS and HP: Value Creation through Supply Chain Partnerships* by Lewis, Ra, Forquer and Quinter (2007). While the case is five years old now, it allows for a discussion of partner selection, service level agreements and the evolution of partner relationships. The case can also be updated by showing videos (for example, *UPS and HP Team for 'Green' Approach* (2011)) or reports (for example, *UPS and HP Deliver Instant-On Logistics through IT Innovation* (2011)) on the more recent benefits from this partnership. These updates show how HP and UPS have collaborated to create new HP products to improve the UPS package labeling and tracking system and to provide the IT infrastructure needed for UPS operations. UPS and HP have leveraged their strengths to support innovation at both companies.

It is also important to bring examples of how stakeholder engagement has benefited or impaired supply chain or business model innovations. The Goldlake / Eurocantera Honduras case by Erzurumlu and Anderson (2012) is a wonderful case about how a company engaged stakeholders to develop a more ethical gold mining supply chain in Honduras. Gold Lake's leaders have examined the local context of the supply chain and have involved a variety of supply chain stakeholders, including the local gold miners and

retailers such as Cartier. This is a case that illustrates the importance of understanding the context and engaging stakeholder in supply chain innovations.

Reinforcing these lessons through practice

To fully develop entrepreneurial leaders and reinforce these supply chain lessons, we need to go beyond in-class experiences and develop learning opportunities outside of the classroom. In all education environments, our students are involved in a range of co-curricular experiences in which they are doing and learning about leadership. Educators need to explore how to connect these experiences to the classroom so students can apply the three principles as they practice being entrepreneurial leaders. Some of these experiences may involve featured speakers, book clubs as well as other student organization events.

Another example of how to provide opportunities for practicing entrepreneurial leadership is by making connections with the school's outreach activities. Traditionally, these activities focus on raising funds, volunteering time and talents (i.e. tutoring) with stakeholders and building infrastructure (i.e. Habitat for Humanity). Our business students, however, could take a longer term view and provide supply chain consulting to not-for-profits. For example, we are currently developing an outreach activity that involves a consulting engagement with a church in Haiti. The students will identify the supply chain challenges and make recommendations to improve the availability of homes and schools in the Cap Haitien area. Providing opportunities for learning both inside and outside the classroom allows educators to reinforce the lessons and students to practice their leadership skills.

CONCLUSION

Today's complex and unknowable world requires us to develop entrepreneurial supply chain leaders. This type of leadership education will better prepare students to be successful in the complex world that they will face upon graduation and in the future. Rather than just provide our future leaders with analytical tools, we need to enable them to think and act differently. This approach allows them to continuously develop their understanding of context, their ability to respond to situations and their ability to create new social and economic opportunity.

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