

An Experiential Supply Chain Management Field Study: Effectively Bridging the Gap Between Classroom and Practice

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Employers want new college graduates to relate theory to practice when they begin their careers. Experiential learning opportunities provide occasions to develop such skills. However, internships and single factory tours rarely provide more generalizable insights about the competitive nature of business across a range of firms. We conceptually explore an experiential field study that addresses this shortcoming: a supply chain management course of the brewing industry. We describe the development of our course, its execution, its learning outcomes, advantages of our approach in the brewing industry, and suggestions to replicate it at other schools and with other industries.

INTRODUCTION

Every third grader knows that when they ask the meaning of a new word that they encounter while reading, then a common Socratic response from a teacher or parent is to ask “how is it used?” Similarly, the understanding of a recently defined word is reinforced by suggesting its use in a new sentence. Context is key. A great example leveraging context from an adult perspective can be found in Goldratt (1984). His book “The Goal”, a bestselling business book of all time, is based in a hypothetical factory where a manager named Alex Rogo works through a variety of operational issues with the help of suggestions from a management “guru” name Jonah. Readers could appreciate the value of Goldratt’s concepts (through Jonah) within the context of Rogo’s firm as well as identify parallels and contrasts to their own contexts. Even the understanding of concepts beyond those of Goldratt’s introduced later would be enhanced by the common understanding of Rogo’s world. The book’s popularity is underlined by its successful use of context to effectively communicate concepts and provide learning opportunities.

Commonly understood context can be particularly powerful. In this vein, taking students on a working factory tour is a tried and true way for students to add the experiential aspect to real world contexts. Experientially leveraging that contextual understanding is widely accepted as a great way to reinforce concepts that you have previously or subsequently will introduce in class (Bloom, 1964, Parker, et al. 1995). The ideal situation is to have a commonly shared understanding, such as getting your entire class to see the same contexts together (Kolb & Kolb, 2005). The greater the percentage of your class that share those contextual experiences, the easier it is to effectively utilize that common understanding into better learning outcomes for every student when teaching related concepts, as they can reinforce ideas

amongst each other (Kolb, 2014). However, getting your entire class to a remote single location can be a logistical nightmare with other classes, work schedules, and other commitments.

In-class client based projects also offer an experiential opportunity to address real problems in a business context. However, managing multiple projects and stakeholders involved with in-class client based experiential pedagogies can be very complex and resource intensive.

INTERNSHIPS ARE GREAT, BUT...

Internships are traditionally an effective way for students to gain contextual perspective (Clark, 2003, Hegert, 2009). In fact, Gartner (2014) gave a heavy weight to the requirement of a formal internship within the supply chain management (SCM) programs when they ranked the top supply chain programs in the US. Internships have their own resource and logistical issues. Managing and certifying what criteria constitute an acceptable internship, where academic credit is given, and the real possibility of extended graduation time are just two among many. Within our own program, we do not currently require internships for all our graduates, though informal classroom surveys show that almost 90% of our graduates gain one or more internship experiences prior to graduation. Internships do give students an in depth understanding but it is typically restricted to a single company. That one company is typically working with its own unique set of competencies, in a particular market niche, with an idiosyncratic set of competitive priorities. While context is present in this singular setting, more generalizable principles and important variations between organizations are opaque to students.

Contrasting Contexts Add to the Experiential Aspect

Seeing multiple facilities firsthand within a supply chain (e.g. seeing something made in one factory then seeing it used in the next) would be even more valuable. By strategically choosing a cross section of businesses with contrasting priorities, scopes, and scales we exponentially grow the contextual richness of our student's experiences. As a textbook equivalent to this approach, one SCM textbook (Hanna & Newman, 2007) creates an ongoing storyline to introduce each chapter. Four managers from strategically chosen businesses (contrasting manufacturing versus service based contexts as well as high volume price sensitive outputs versus custom design and quality outputs) meet in a hypothetical social setting (a local gym) and discuss work experiences. These contexts are described early on and leverage to introduce each chapter. Efficient and effective as the book is in contrasting the various contrast between the priorities of each business, it still lacks the experiential component that we feel our approach adds. Our field study approach intentionally produces many stark contrasts by visiting a wide variety of firms competing in virtually all the market segments with a wide variety of core competencies and with a wide scope of competitive priorities. Yet, the commonality of a single industry was held throughout, allowing students to a gain perspective of a much richer set of inter-firm and intra-firm distinctions. Such in depth, experiential learning across these multiple yet similar contexts provides a fruitful platform for ideals of the liberal education.

Supporting Liberal Education

Many universities are struggling to find the best approach to creating graduates that are successful in an ever changing work place environment. At our university, we build our curriculum and pedagogy around four pillars of effective learning and a liberal education that prepares the student for a successful career. Table 1 describes the four constructs of Critical Thinking, Engaging with other Learners, Understanding of Contexts, as well as Reflecting and Acting. Stressing these constructs in our curriculum, especially in our foundation requirements common to all majors and minors, had resulted in positive sustained feedback over many decades from graduates and employers alike. The experiential approach described here is designed around the same constructs and provides synergy to those foundation courses.

TABLE 1
PILLARS OF A LIBERAL EDUCATION

Liberal Education Pillar (Construct)	Definition
Critical Thinking	<i>“Skills that enable students to carefully identify problems worth studying; to examine pros and cons about issues; to examine evidence and counter-arguments; to analyze research and other information; to explore underlying assumptions about multiple positions and arguments; and to draw solid conclusions after examining all sides of an issue or problem.”</i>
Engaging With Other Learners	<i>“Skill sets for working effectively in group settings, how to listen actively to the ideas of others, and how to negotiate a shared understanding of complex issues and tasks.”</i>
Understanding Contexts	<i>“Learning how to understand contexts that inform how we make meaning out of issues and events. Students may explore political, social, economic, historical, or other contexts that surround problems or issues confronted.”</i>
Reflecting And Acting	<i>“Skills and abilities to reflect upon and act on the new knowledge, understanding, and commitments made. Students learn how to make decisions about complex intellectual, ethical and personal issues; to think about the meaning of coursework for them, and to commit to informed action as global citizens.”</i>

WHAT INDUSTRY TO CHOOSE?

Finding the right industry can be a challenge. The attributes of industries that align with the multiple context, single theme include 1) the ability to generalize lessons learned to other industries, 2) holding the interest of the student by its relevance to their perspective and that of their peers, 3) and industry robust and transparent enough to demonstrate a variety of issues and learning moments, and most pragmatically 4) accessibility where engagement with the consumer is highly consistent with their competitive priorities. These attributes are all essential for an industry to make a program successful and its logistical difficulties worthwhile.

We chose the US brewing industry because it is especially fertile for illustrative SCM issues and because it meets the above criteria quite well. While other industries might offer an equally effective opportunity, the brewing industry was an ideal choice for our circumstances because of its rapidly evolving landscape, high level transferability to many other industries, large variety of competitive priorities and strategies, accessibility, and brand awareness.

Characteristics of the US Brewing Industry

The overall aggregate demand for beer in the US has not grown much in the past few years. The mix of market segments within industry is, however, very rapidly changing and evolving. Even though the industry has remained very oligopolistic, the number of breweries is growing exponentially. As recently as the late 1970s, less than 90 breweries were in operation within the US. Today over 4200 breweries are producing a wide array of beer styles and varieties. The top two brewing companies, MillerCoors and Anheuser-Busch (AB), supply about 72% of the market with numbers three and four (Papst Brewing Co. and D.G. Yuengling and Son, Inc.) sharing the next 8%. Imports not controlled by the MillerCoors or AB make up 7% of the market. The overwhelming majority of the new entrants to the industry competes in the craft beer market and sells to more regional or local markets. The 4000+ craft breweries divide up the last 13% of the market, yet are the highest growth segment of the industry.

While the overall market for beer has stagnated recently (0.2% decline in volume sold in 2015), the market share for craft beer, produced primarily by the smaller microbreweries, has increased by 12.8 % in 2015 alone (BrewersAssociation.org, 2016). In response to this changing industry landscape, macro-breweries have turned to acquiring smaller craft breweries in an effort to compete in these more regional or local market niches. Similarly, independent craft brewers like New Belgium, Sierra Nevada, Oskar Blues, Stone, and Deschutes have moved beyond local or regional distribution to compete nationally and internationally.

US brewing is robust in scale. Smaller craft brewers can operate at volumes well below 10,000 barrels (31 gallons per barrel, or two standard keg volumes) per year while MillerCoors and Anheuser-Busch combine for well over 100 million barrels annually. By contrast, smaller craft facilities will produce a wide variety of beer styles, not just package variations, on a single line. From the perspective of product market breadth, order winning criteria range from heavy emphasis on price, with limited variety and overall design quality, to creative design quality and variety of offering being the primary order winner, with cost only a loose qualifying issue. From a vertical perspective, macro breweries tend to be very highly integrated, or enter into long term exclusive partnerships with partners. Larger breweries own or have exclusive sourcing contracts with hop farms, malt their own grain, either make or enter into joint ventures to produce cans and bottles, and secure exclusive partnerships with distributors nationwide. Most craft brewers outsource the vast majority of their raw materials and often their packaging, though they often distribute locally themselves due to entrepreneurship-friendly legal provisions.

Many of the specific aspects of the brewing industry listed above are not significantly unique or different from most industries in the packaged food and beverage industry – and many issues that face breweries cut across most manufacturing businesses. What makes the brewing industry so well suited for the field study is the combination of high transparency of the industry, the homogeneity of the basic processes, the brand relevance to the students, and the openness by which the industry encourages a close relationship with its customer base. It is an extraordinary accessible context for illustrating SCM and strategy principles across a broad spectrum of competitive situations.

As a result of these factors, brewing is an industry full of contextual richness from a SCM perspective. While we focus on SCM in this article, the U.S. brewing industry could also illustrate a number of other functional areas well such as operations, strategy, or marketing.

HOW TO GET A SINGLE INDUSTRY EXPERIENTIAL CLASS STARTED

Recently, our university set aside a month long scheduling period in January (locally referred to as the “J-term”). By delaying the start of our traditional spring semester until the end of January, students can use this time to stay on campus focusing on a single intensively taught course, take a course online from any location, or participate in one of many experiential field study program domestically or abroad. The compressed timing of the course is similar to other short, between semester terms, most commonly summer terms.

To guide a professor attempting to develop an experiential single industry class, we next turn to the major planning actions, considerations, and decisions to undertake.

Course Timing

Single industry experiential courses are effective in short “sprint” courses. Ours lasts three weeks in a winter term between traditional 15-week fall and spring semesters. We meet with students for approximately 6 hours over three evenings in the fall semester prior to the course and then meeting for 14-16 hours over 3 days in January prior to travel. This helps prepare the student and gives them a technical, historical, and competitive landscape overview of the industry. Our travel runs 17 days consecutively, and besides three days dedicated to travel, we average two company tours per day for approximately 25-30 tours.

Industry Setting

While the beer industry offers many advantages, the single industry experiential pedagogical approach could be done with any number of industries. Access to factory tours and managers that will take time to explain the business for enough companies are paramount. Leveraging alumni ties, professor outreach and specialization in particular industries, and cold-calling several months in advance all work well to fill out a schedule.

Locations

Where the experiential portions of your course take place is a function of the course timing, the chosen industry, and student demand. Our course is comprised of 25 students who each pay roughly \$2700 above tuition for the 17-day trip. This covers airfare, hotel stays, ground transportation, and a number of meals. Fortunately, cities with heavy brewing activity are also desirable destinations in January when the winter term occurs. We travel to Denver, several locations in Oregon, and Asheville, North Carolina from our Midwestern university.

Five Generalizable Supply Chain Management Principles

Prior to the trip, we identified industry-specific resources as primers for the experiential learning. Specifically, we assigned readings from books and websites detailing the history, styles, and processes of brewing (e.g., BeerAdvocate, 2016). *Beer Wars* (Baron, 2009) is an excellent documentary shown to the class to give them insight on the competitive landscape of U.S. beer. The Harvard Business Review (2012) has a series of five cases specific to the US beer industry. Students are tested on this content before leaving for the trip.

During pre-departure classroom time, we organized our discussion of these readings content around five general SCM principles. Examining these critical issues, ones we knew would be well demonstrated on the tour, can form the basis of a *very generalizable set of principles* that, while experienced within the context of the brewing industry, would be applicable across a wide variety of SCM situations. This would be especially valuable to students' learning outcomes anticipated in later classes and in their subsequent career paths.

At the end of the pre-departure period, students self-select into teams addressing each of the five critical principles. In addition to an overall exposure to each facility, each team then is tasked to investigate a specific principle and present their results to all teams at the conclusion of the trip. The five principles were:

- **Sourcing:** What are in the incoming streams of raw material within the brewing industry (hops, barley, cans, bottles, etc.)? What sourcing strategies are used across different situations? Issues included make/buy decisions, buyer/supplier clout, contract buys, and hedging to name a few.
- **Capacity strategies and economies of scale:** How does scale affect operational decisions? How are these decisions different in small brew pubs versus rapidly expanding regional breweries to the largest and most integrated breweries? The economics of technology choices (especially the extent to which automation was employed) were a big part of this analysis.
- **Distribution:** The brewing industry is complicated by series of state and federal regulations known as the "three tier system". Post prohibition laws restrict channel participation between brewers, distributors, and retailers – they cannot vertically integrate, generally speaking. The varying exceptions made from state to state create an intriguing set of business problems for the industry, particularly as growing breweries seek to grow their business to other states.
- **Location analysis:** As macro breweries choose to rearrange their pieces on the board or craft brewers choose to expand to a second or third brewery, where they choose to locate has significant supply chain implications. For example, when three growing craft breweries from the west – New Belgium (Colorado), Oskar Blues (Colorado), and Sierra Nevada (California) – all decided to announce plans for a second brewing site somewhere in the eastern half of the US,

what were the decision criteria that would result in them all choosing a site just a few miles from each other in Asheville, NC?

- **Sustainable operations and the environment:** A major concern not just for supply chain students but for society in general is the impact that industry has on the natural environment. Concern within the brewing industry is paramount, as brewing processes tend to be very water and energy intensive. Virtually every firm in the industry puts environmental issues on their short list of strategic concerns, in large part because of the visibility of their practices to their consumers.

Additionally, while in Portland, OR and Asheville, NC (two cities with a large number of brewpubs and microbreweries in their downtown areas), we give students the afternoon to explore in groups and find two more microbreweries or brewpubs on their own. They are instructed to find someone working in each and simply ask questions about their business and supply chains. Not only do what they find become a significant part of each team's subsequent report, these exploratory exercises turn out to be some of the trip's most cherished experiences.

The day after we return to campus, the student teams present their observations, analysis, and takeaways related to the five critical supply chain principles. A final assignment involves students individually writing a reflection paper integrating five team presentations as well as their personal experiences. They are tasked to summarize the brewing industry supply chain as they saw it. In doing so, they are encouraged to reflect on how generalizable their observations would be to other industries.

Learning Outcomes

Student reactions to the course are extraordinarily positive. By the questions asked during the later tours, it is clear students gain a firm grasp on the industry – so much so that later trip tour guides often cannot answer the questions adequately themselves due to the complexity and insightfulness of the inquiries. On several occasions, experienced tour guides have brought brewers and other operations workers off the line to address the students' questions and observations. Discussions at class dinners begins by comparing and contrasting the various strategic and operational situations arising from the tours they have seen to date. Faculty have numerous opportunities to link comments and observations of one sub-group to the attention of the whole, many times placing them in contrast or support of comments and observations from other sub-groups. In essence, the multi facility aspect of the program is being used to leverage student learning in a very seamless and natural process.

The learning and critical thinking that we have witnessed in students as a result of this experiential field study is truly transformative – the students think more critically, engage other learners, and have insightful reflections about the contexts they were immersed within (see Table 1). Some examples of these outcomes include:

- **Critical thinking** –By the second day students take note of the cultural contrasts between the large macro breweries and the smaller craft breweries. The more detached business-like perspective of the more automated macro breweries is quickly noted and compared to a much more hands on and personal sense of attachment in the craft breweries. They are able to evaluate the niches that each brewery occupied through the proper lenses and put into proper perspective the important decisions for each business.
- **Engaging with other learners-** Our students spend almost three weeks in close confines with a large group of others motivated to learn from a common set of experiences and also as smaller teams looking at specific critical issues. Most evenings are spent discussing what they had observed or experienced that day. The tours also provide a chance for the brewers to engage. Virtually all are excited to participate and seemed to seek the students' opinions and inputs as well. Near the end of the trip, students become very familiar with the basics of the brewing process and the engagements between them and the brewery tour guides (who in many of the smaller craft or microbrewery firms would be the brew masters or owners themselves) became much more interactive and involved.

- **Understanding Contexts-** In some ways the tours can be somewhat repetitive. However, having been prepped with a research agenda, the students seek out the unique aspects of each tour and about how each business approaches particular issues. The students tend to steer the conversations away from the common aspects of the tour that they were already familiar with and toward the more unique aspects of the specific context in which they found themselves.
- **Reflecting and acting-** This is where we witness the biggest benefit. The vast majority (21/25) of the students in the course were subsequently enrolled in the lead author’s SCM capstone course the following semester. Primarily a small section size discussion course, it became very apparent how much the students in the course had learned because they were able to easily relate the general topics discussed to specific experiences from the field study and vice versa. Having a significant number in each section sharing the common experience enhances the author’s ability to share that connection with the remainder of the section.

The class had the pedagogical depth of a typical internship experience (Clark, 2003, Hegert, 2009) yet was layered with a multitude of organizations, each with their business models, strategies, and supply chain tactics – all ripe with contrast to one another.

Table 2 expands the five generalizable SCM principles the students investigated from some of the specific questions to include some of the other industries where students made comparisons. What started in the brewing industry quickly found applicability in an even broader cross section of industries.

**TABLE 2
FIVE GENERALIZABLE SUPPLY CHAIN PRINCIPLES**

Supply Chain / Operational Issue	Generalizable Questions Addressed	Examples of Other Industries With High Transferable Application
Sourcing	<p>What were in the incoming streams of raw material within the brewing industry (hops, barley, cans, bottles, etc.)?</p> <p>What sourcing strategies are used across different situations? Issues included make/buy decisions, buyer/supplier clout, contract buys, and hedging to name a few.</p>	<p>Packaged Foods, Soft Drinks, Mass Merchandising, Automotive, Consumer Electronics, Personal Computing, Petroleum, Pharmaceuticals, Defense Industry, Construction/Building Materials, Restaurants/Dining, Cosmetics, Pet Foods, Fast Food</p>
Supply Chain / Operational Issue	Generalizable Questions Addressed	Examples of Other Industries With High Transferable Application
Capacity and Economies of Scale	<p>How does scale affect operational decisions? (e.g. How are these decisions different in small brew pubs versus rapidly expanding regional breweries to the largest and most integrated breweries?)</p> <p>How does automation become used as scale increases?</p>	<p>Automotive, Consumer Electronics, Personal Computing, Petroleum Pharmaceuticals, Defense Industry, Construction/Building Materials, Restaurants/Dining, Cosmetics, Commercial Air Travel, Health Care, Petroleum, Paper, Consumer Products</p>
Distribution	<p>How does the nature of distribution change as a firm seeks to grow its market?</p> <p>How does varying state regulation affect this?</p> <p>When distributing across state lines, what is the impact of the federally imposed “three tier system” that prohibits vertical integration between brewers, distributors, and retailers.</p>	<p>Food/Grocery Retail, Department Store Apparel, Consumer Electronics Retail, Personal Computing, Health Care, Pharmaceuticals, Defense Industry, Cosmetics, Health Care, Petroleum, Paper, Consumer Products</p>

Location Analysis	<p>What are the supply chain implications for locating a firm's initial brewery location?</p> <p>What are the supply chain implications for locating a firm's subsequent brewery locations?</p>	<p>Soft Drinks, Mass Merchandising, Automotive, Food/Grocery Retail, Department Store Apparel, Consumer Electronics Retail, Personal Computing, Health Care, Pharmaceuticals, Defense Industry, Construction/Building Materials, Restaurants/Dining, Cosmetics, Commercial Air Travel, Health Care, Petroleum, Paper, Consumer Products</p>
Sustainable Operations and the Environment	<p>What are industry definitions and supply chain concerns for sustainability operations?</p> <p>What are the supply chain implications for social responsibility in the brewing industry?</p>	<p>Packaged Foods, Agriculture, Mass Merchandising, Automotive, Food/Grocery Retail, Clothing /Apparel, Consumer Electronics, Defense Industry, Construction/Building Materials, Commercial Air Travel, Tourism, Petroleum, Consumer Products, Higher Education, Restaurants/Dining</p>

Conclusion and Take-Aways

Our plan is to repeat this class several more times. The learning and critical thinking that we witness in students as a result of this field study is truly transformative. The deep dive into a single industry, with the variety of business models, strategies, and supply chain tactics – all ripe with contrast to one another – allowed our students, and us, to see more sharply the complex and dynamic world of today's businesses. Our next trip is full with 25 more students for January, 2017, and we plan on offering more courses in future Januaries and summers, and expanding the scope of courses taught.

Given the nature of our J-Term opportunity, we focus on a shortened beer industry course, though other alternatives could be utilized to offer flexibility in industry focus, student majors, course timing, or student travel budgets.

We feel strongly that while the five SCM principles are very generalizable across industry settings, that that other functional areas of business (Marketing, Finance, Accounting, etc.) would lend themselves to a similar set of generalizable set of principles. Accordingly we feel our model is a great learning approach that could leverage a variety of industries to look at SCM as well as many other majors within the typical Business school.

Alternatively to our J-Term, a 4-6 week summer course could easily be used to offer a similar program. We are currently planning a 4 week version of our course to start as soon as the spring is completed. With most of our first three versions of the course comprised mostly of seniors in the middle of their final year, a summer version would draw mostly from rising seniors now old enough (21 years of age) to take the course before coming back in time for a typical summer internship prior to entering their last year. This should leave students much better prepared to leverage the learning potential of both their internship as well as their senior year of coursework.

Finally, even a traditional semester or quarter could also follow this approach with multiple tours from an industry more proximal to the university location. Though obviously not limited to the brewing industry, with over 4200 brewing companies nationwide, the beer industry has 25-30 companies in short driving range of many U.S. cities. Regardless of industry, finding areas of high concentrations within a particular industry reduces the logistics of budgetary issues getting the class from site to site for a set portion of the course.

Experiential learning, especially experiences that utilize a cross section of business strategies and operations, offers a set of contrasts and perspectives to a student that makes them very valuable to employers upon graduation. Many employers reading this routinely partner with business schools from a recruiting perspective. Suggesting and offering support for this type of curriculum can greatly influence the quality of graduate available to your firm.

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