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FORUM

Submitted 01.08.2017. Approved 05.11.2017.

Evaluated by double blind review process.

Scientific Editors: Cristiane Biazzin, Elyn L. Solano Charris, and Jairo Alberto Jarrín Quintero

DOI: <http://dx.doi/10.12660/joscmv10n2p56-70>

THE “INDY WAY”: LESSONS FROM BRAZILIAN SUGAR-CANE BIOFUEL SUPPLY CHAIN

ABSTRACT

This paper explores how the Brazilian sugar-energetic processors used Indycar racing to increase exports to the United States and create value by transforming the Brazilian ethanol from a commodity fuel to an advanced biofuel, between 2009 to 2012. This case study uses the relationship between Brazilian Sugar-cane Industry Association (UNICA), Brazilian Trade and Investment Promotion Agency (APEX-Brazil), and the IndyCar Racing League (IRL), to show the ability to learn and perform in a competitive scenario. Absorptive Capacity (ACAP) theory is used to understand how the Brazilian sugar-energetic processors identified, assimilated, transformed, and exploited knowledge from this relationship, as well as how this experience could be used in other industries. As a trading result, Brazilian biofuel exports to the United States increased 758.22% during the studied period and the Volumetric Ethanol Excise Tax Credit (VEETC), an American tax act in vigor since the 1970's, was extinguished at the end of 2011. The main contribution of this study: Identify how the Absorptive Capacity Theory can explain such impacts in the Brazilian Biofuel exports through the relationship between partners in the U.S. and Brazil.

KEYWORDS | Absorptive capacity, Indy car racing, Brazilian ethanol biofuel, case study, sugar-cane biofuel.

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INTRODUCTION

All that we don't know is astonishing. Even more astonishing is what passes for knowing.
- Philip Roth

Many firms seek international markets as an alternative for value creation in its supply chain networks and global value chains (Chiarvesio & Di Maria, 2009; Gereffi, Humphrey, & Sturgeon, 2005). Not just firms, but entire countries had based the development of their economies in the internationalization as a source of its competitive advantage (Gereffi & Lee, 2012)). Increasing exports was accepted as one of the earliest processes for a firm seeking internationalization as part of its long-term strategy (Guillouzo & Ruffio, 2005). Paiva and Vieira (2009) argues that internationalization as an operations strategy is the most significant challenge for the Brazilian industries.

Different arguments explain why Brazil did not break through this barrier. Including logistics, infrastructure obsolescence, and challenges in the governance mechanisms (Bittencourt, Fontes, & Campos, 2012; Gereffi et al., 2005; Humphrey & Schmitz, 2001; Paiva & Vieira, 2011). Thus, evidences have indicated that managers from different industries in Brazil have tried to internationalize its operations. However, there is lack understanding how accurately manage operations and also understand the best way to do business with that specific target market.

The relationship between UNICA, APEX-Brazil and IndyCar Racing League (IRL) in the U.S. through an official sponsorship agreement, made Brazil the exclusive fuel supplier for racing teams between the years 2009 to 2012. During this period all racing teams used, in 16 of 17 races including the Indianapolis 500, Brazilian sugarcane biofuel was the only supplier. More than US\$ 40 million dollars was invested in this relationship. UNICA spend more than US\$ 500,000 dollars to lobby for the end of VEETC ethanol tariffs, as well as various other ethanol amendments in the U.S. Senate (Schroeder, 2011).

The primary idea to APEX-Brazil was to use the Indy 500 Race as a showcase, learn how to do business with the U.S. and introduce Brazilian biofuel to the world. Also, increase Brazilian ethanol exports and other products to the U.S. Considering this scenario, the present study proposes the following research question: How being an Indy Car supplier impact the

company's ability to learn and perform on in an competitive scenario?

ACAP was selected as a theoretical construct to understand how the Brazilian biofuel companies absorbed, assimilated, and applied knowledge from this relationship. Also contributes to enlighten us how to generate new business, improve and even exploit their own operational and financial performance. This knowledge can be applied to other productive sectors, whether in the sucro-energetic supply chain or other production chains.

This case study has as the unit of analysis the relationship formed by UNICA, APEX-Brazil, and IndyCar between 2009 and 2012. UNICA is a representative association of sugar, biofuel, and energy mill processors in the Southeast region of Brazil. APEX-Brazil is a government agency that promotes Brazilian products and services, while aims to attract foreign investors to the country. IndyCar is the body responsible for managing the Indianapolis 500, also known as the Indy 500. Indy 500, with more than 100 years of existence, is considered the most magnificent racecar spectacle in the world, with about 300,000 people attending race-day and millions of dollars in prizes for the winners.

Data collection used primary and secondary data. The primary sources were participant observations and interviews. Participant observations occurred between 2008 and 2012 when two of the researchers had different opportunities to reach participants in the investigated case. Examples of these observations include three site visits on sugar-cane mills in Brazil, participation in 25 IndyCar Races all over the U.S. Interviews were conducted to guarantee reliability and avoid bias. Twelve interviews were conducted with different representatives of this case between April 2016 and July 2017. As secondary sources of data, historical archives were considered to analyze the evolution of Brazilian ethanol exports during the period. Also, 121 newsletters from UNICA between 2009 and 2013 were investigated. Interviews were recorded and transcribed. When two or more of the researchers were present during the interview, one of them was responsible for taking notes. Data analysis was performed independently and then discussed afterward by all the researchers.

The paper is structured in the following way: first, we provide a brief literature review with particular emphasis in ACAP. Then, we present the methodology based on qualitative approach followed by results

presentation of the actors pertaining the case study selected, with focus on different phases of ACAP and analysis section. At last, we discuss the consequences of ACAP in the context of the supply chain and period studied, and provide final considerations with theoretical and practical implications.

RESEARCH BACKGROUND

The concept of ACAP originated in macroeconomics, where it refers to the ability of an economy to utilize and absorb external information and resources (Adler, 1965; Tu, Vonderembse, & Ragu-Nathan, 2006). In the organizational management, the origins of ACAP are found in organizational learning literature of the 1980s, when researchers first started to explain the process through which firms learn, develop, and assimilate new knowledge for competitive advantage (Revilla, Sáenz, & Knoppen, 2013). The ACAP construct was defined as the ability to recognize the value of new, external information (knowledge), assimilate it, and apply it to commercial ends (Cohen & Levinthal, 1989, 1990).

R&D investments could create Firm's absorptive capacity according to seminal model, operations management, and direct investments and they intended to comprehend the impact of learning environment characteristics in R&D costs. In this sense, R&D is responsible for generate new knowledge and contribute to firm's ACAP (Oliveira, Vasconcelos Neto, & Malachias, 2014), and this process could be pointed as a specific-asset.

The ACAP concept has been expanded over the last three decades. Zahra and George (2002) identified the key dimensions offering a reconceptualization of the construct proposed by Cohen and Levinthal (1990), introduced as a specific-asset to an organization's capability (or set of capabilities) required to manage knowledge with an objective of value creation.

Roberts, Galluch, Dinger, and Grover (2012) highlighted that is necessary to note the difference between these views (Cohen & Levinthal, 1990; Zahra & George, 2002) of conceptualizing as a specific-asset or as a capability or a set of capabilities. An asset is defined as anything tangible or intangible that a firm owns, controls, or has access to on a semi-permanent basis (Helfat & Peteraf, 2003). When viewed as an asset, ACAP is conceptualized as the level of relevant prior knowledge possessed by the focal firm (Roberts, Galluch, Dinger, & Grover, 2012).

As a capability, absorptive capacity considers the routines and processes that firms use to identify, assimilate, transform, and apply external knowledge. Roberts et al. (2012) recommended that researchers conceptualize as a capability rather than an asset. They affirm that researchers who wish to investigate only the level of prior related knowledge should be clear that they are not examining ACAP. Furthermore, the concept is a multidimensional construct with several interrelated capabilities (e.g., knowledge identification, assimilation, and application). As so, it could not be understood only as an asset. ACAP should be empirically investigated using metrics that fully capture each of its dimension and considering as a collective construct (Roberts et al., 2012).

The proposed dimensions for ACAP after Zahra and George (2002) reconceptualization as a capability (or a set of capabilities) were an acquisition, assimilation, transformation, and exploitation. Acquisition refers to the firm's capability for identifying and acquiring knowledge (Zahra & George, 2002). Assimilation relates to how the company understands and uses the new knowledge on its processes and routines (Szulanski, 1996). Transformation refers to the development and refinement of methods, combining existing knowledge with the acquired and assimilated knowledge (Zahra & George, 2002), and finally exploitation refers to the organizational ability to expand its capacity based on and process it improved with the new knowledge eventually generating operations and or operational performance (Cohen & Levinthal, 1990).

According to Roberts et al. (2012) there is more significant agreement in conceptualizing ACAP as a capability, there are several measurement problems: (1) researchers often define ACAP as a capability, yet operationalize it as an asset; (2) researchers have attempted to adapt measures of organizational ACAP to the individual level; and (3) researchers often do not use established measures of ACAP in a similar context.

Measurement problems also arise regarding field domains. For example, a firm may have high ACAP in new product development yet have low ACAP in supply chain operations (Roberts et al., 2012). In this sense, where possible, researchers should avoid general measures of ACAP and attempt to specific knowledge domains.

Research on ACAP had taken place in the context of R&D or innovation activities (Cohen & Levinthal, 1990; Lane & Lubatkin, 1998) and kept this atten

tion (Volberda, Foss, & Lyles, 2010). However, has been applied in a diverse range of research streams, such as knowledge management (Alavi & Leidner, 2001) and information systems (IS) (Fichman & Kemerer, 1997; Roberts et al., 2012).

Yet, despite a critical mass of research that draws upon ACAP, there has been few studies focused on Operations Management (OM) (Tu et al., 2006), in the specific context of buyer-supplier relationships (Dobrzykowski, Leuschner, Hong, & Roh, 2015; Rebollo, Halley, & Nagati, 2009; Revilla et al., 2013; Sáenz, Revilla, & Knoppen, 2014), or supply chain management research (Azadegan, 2011; Meinlschmidt, Foerstl, & Kirchoff, 2016; Oliveira et al., 2014).

A large majority of IS research investigates ACAP at the firm level (64 papers, or 65 percent of all studies) (Roberts et al., 2012). Only 35 percent of the firm-level studies conceptualize ACAP as a capability. Roberts et al. (2012) identified just two studies of ACAP at the group level (Pavlou & El Sawy, 2006; Tiwana & McLean, 2005) and relatively few studies (seven papers, or less than eight percent) that investigate ACAP at the inter-organizational level.

Comparing IS research's literature review with OM literature review from a narrow perspective, a major part of articles on OM chose the capability point of view, avoiding measurement problems highlighted by seen the ACAP only as an asset (Roberts et al., 2012). One reason to explain these multiple capabilities for analysis is that researchers have invoked different theories and perspectives in studying ACAP, such as organizational learning, industrial economics, and the resource-based and dynamic capabilities perspectives (Zahra & George, 2002). The emergence of the ACAP constructs coincided with the develop-

ment of the resource-based view of the firm (RBV) and its offshoot the knowledge-based view of the firm (Lane, Koka, & Pathak, 2002).

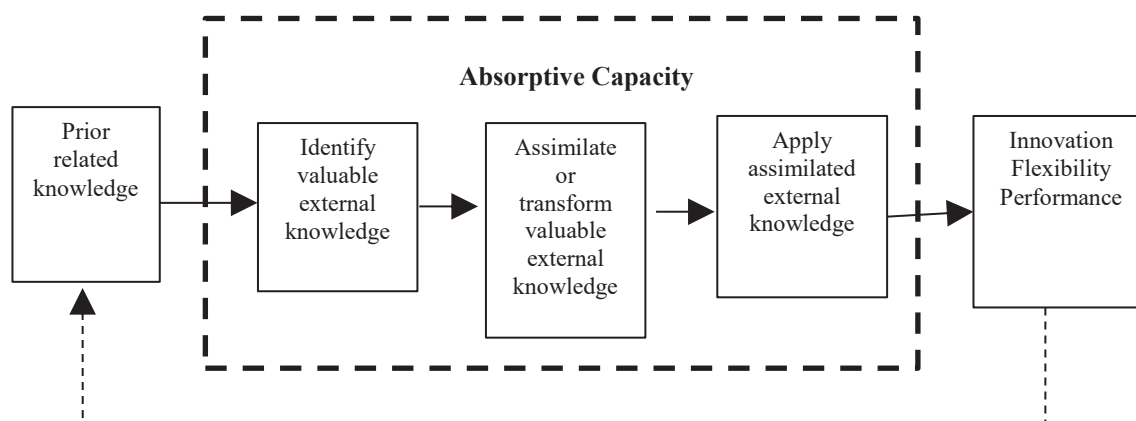
Zahra and George (2002) suggest that ACAP has two general states: potential and realized. Potential ACAP makes the firm receptive to acquire and assimilate external knowledge developed elsewhere and is related to firm's ability to recognize and assimilate knowledge from a specific collaboration, such as routines promoting social interactions and inter-organizational knowledge bases (Dyer & Singh, 1998).

While the realized ACAP centers on converting, exploiting the same knowledge, and is linked to the possession of prior related knowledge, communication mechanisms, and governance mechanisms (Cohen & Levinthal, 1990; Zahra & George, 2002). In this sense, ACAP could be seen from two general perspectives: as an "ability" to absorb knowledge or as a "stock" of prior related knowledge (Roberts et al., 2012).

ACAP capacity depends on prior related knowledge because, without some previous relevant knowledge, a firm will not be able to determine the potential value of external knowledge accurately. It is also important to note that an organization's ACAP depends on its individuals. As such, a firm's ACAP is formed from an overlap in individual members' knowledge structures. These overlaps imply that ACAP is firm-specific and therefore cannot be bought and quickly integrated into the firm (Roberts et al., 2012).

Finally, ACAP is path-dependent. Accumulating absorptive capacity in one period will permit its more efficient accumulation in the next (Roberts et al., 2012). These two features of ACAP - cumulativeness and its effect on expectation formation - imply that its development is path-dependent

Figure 1: Absorptive Capacity, Prior Related Knowledge, and Outcomes



METHODS

This study starts from an inductive approach, and it was not intended to generate hypotheses, but to explain a phenomenon in-depth (Yin, 2013). It begins with a theoretical sample that allows understanding the capabilities applied to a single case study based on sugar energetic supply chain for ethanol biofuel. There is a growing number of empirical studies in OM centered on the use of qualitative research techniques through the case study method (Yin, 2013) to provide initial information to generate better constructs (Eisenhardt, 1989; Eisenhardt & Graebner, 2007) such as problem definition and construct validation, are similar to hypothesis-testing research. Others, such as within-case analysis and replication logic, are unique to the inductive, case-oriented process. Overall, the process described here is highly iterative and tightly linked to data. This research approach is especially appropriate in new topic areas. The resultant theory is often novel, testable, and empirically valid. Finally, framebreaking insights, the tests of good theory (e.g., parsimony, logical coherence).

This research follows this approach through a case study because it understands that when the interest of research is to study in a contextualized and in-depth a unique phenomenon in organizations. Instead of using techniques of quantification and measurement of variables, the case study is recommended (Eisenhardt, 1989; Miles, Huberman, & Saldaña, 2014; Yin, 2013). According to Yin (2013), three important situations are necessary to determine the research method, in which any study fits, which is: (1) form of the research question, (2) required control of behavioral events and (3) focuses on contemporary events. Thus, case study design is the appropriate method to conduct this research, to answer the question: How being an Indy Car supplier impact the company's ability to learn and perform on in an competitive scenario? The unit of analysis is the relationship formed by UNICA, APEX-Brazil,

and IndyCar between 2009 and 2012. Figure 3 represents how the supply chain is organized with the main members that act in the commercial use of biofuel for purposes of this study. The illustration considers that the Brazilian biofuel producers follow a supply chain similar to that described by (Neves, Waack, & Marino, 1998). Thus, for simplifying effect, it does reproduce it again.

The case presented, the agreement between UNICA, representing sugar mill processors, Apex-Brazil and IRL to make the Brazilian sugarcane the sole fuel supplier for the Indy Car Races between 2009 and 2012. Represented a unique event and opportunity to better understand the relationship between organizations from different countries. Responsible for research, developed, and commercialized new biofuel technology. That directly impacted in the learning capabilities and supply chain performance (include exports performance).

This case study was selected to collect evidence from a recent period between 2009 and 2012, the period that maintained the relationship between the IRL (U.S.) and UNICA and APEX (Brazil). Thus, the empirical context used was the Formula Indy car racing. There is no need to carry out any control of the behavior of the events, and we are in search of answers of how the facts influenced the results of the firms involved.

This study relies on qualitative analysis of data obtained from multiple sources. Part of the evidence was obtained by action participation research in the sense that one researcher had actively participated in exploring knowledge and creating value to develop new projects for Brazilian products, in this case, biofuel from sugar energetic industry. Another researcher could be made site visits on three biofuel sugar mills, and also on UNICA office in São Paulo. A protocol guideline was built, discussed and pre-tested by specialists before fieldwork. Protocol research questions are presented in Exhibit 1.

Exhibit 1: Research protocol guidelines

Research Question	Possible Data or Evidence to Support Discussion	Specific Study Research Questions	Protocol Questions
Why and how being an Indycar provider impacts on the company's performance?	√Interview quotations √Secondary data √Site visits √Observations	1. Which factors led your company to become an Indycar Supplier?	1. Please tell me about your company. 2. Could you tell me about your partnership with Indycar? 3. How long your company is an Indycar Supplier? 4. Was a planned decision or an opportunity that arose for your company became a Indicar supplier? 5. How did you choose the products that would be part of this partnership?
		2. How is the company prepared to take advantage of this partnership?	6. Let's talk about how your company prepared for this partnership: a. Does company has / or is required to have a system or some quality certification? b. During the partnership your company had to hire other employees? Or used the current team. c. Do you use any internal policy to manage this partnership? d. Does company knows how to use the data produced in this partnership? e. Did you keep the same suppliers? Did you change suppliers? f. How this partnership contributed to your company? Give some objective examples.
		3. How do this partnership influence the company performance? (both operational and financial?)	7. Let's talk about which improvements comes from this partnership: a. Can you evaluate results in the industrial process of this partnership? Give some examples. b. Was there any impact on operational performance (quality, flexibility, delivery and cost)? And about financial costs? Any other impact? c. How do you consider the partnership with Indycar have influenced your company on the last couple years? What and how has influenced it? d. Were there sales increasing as a result of this partnership? e. There was some marketing gain for your company during the partnership? Explain how and why. f. Is there anything you think that should have been done differently?

These actions improve research reliability because researchers were aligned to use specific questions and terminologies, avoiding probably bias and helping analysis.

This role has given us access to valuable empirical data for scientific analysis. Several sources of information were collected and analyzed to describe the case with substantive issues connected to our theoretical lens: financial data; historical archive analysis, public use files (Brazilian and United States export

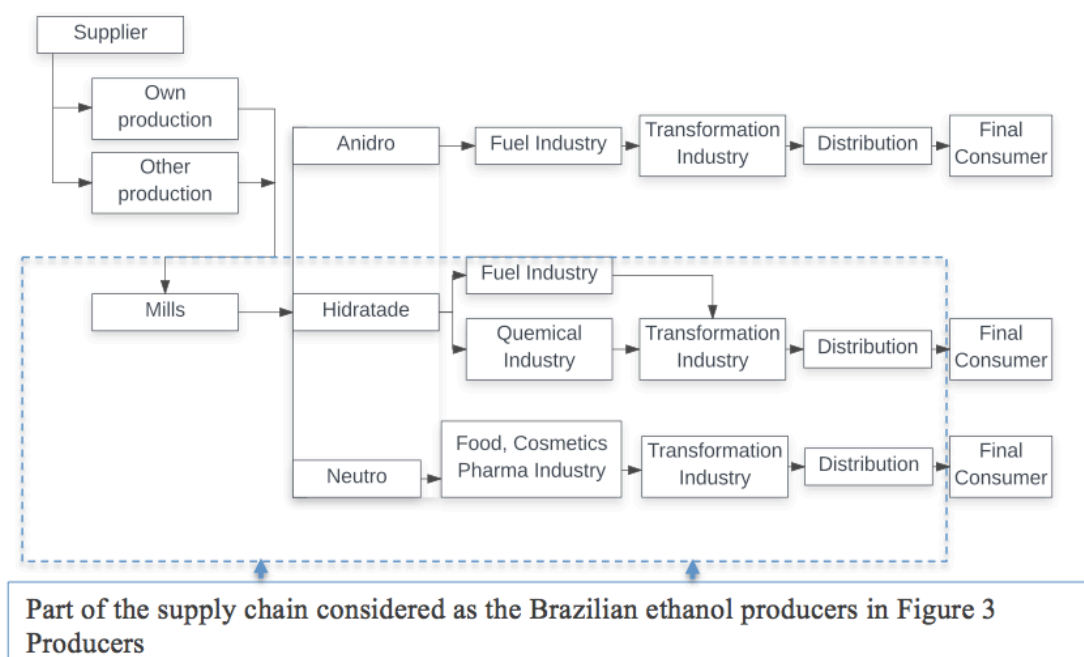
statistics), secondary data, participant observation in 25 races (2009-2012), outside observation (2008-2015), 12 interviews (2016-2017); newsletters from sugarcane industry association during 2009-2013 (54.698 words compiled in 121 newsletters); information accumulated during field notes in site visits (six times between 2013-2014). Performance data about racing teams were used covering IndyCar races during the years from 2009 to 2013.

RESULTS PRESENTATION

For the biofuel supply chain, the main uses are related to the consumption of anhydrous alcohol, in addition to the hydrated fuel industry for the chemical industry, and neutral, for the food,

cosmetics and pharmaceutical chemical industry (Neves et al., 1998). Neves et al. (1998) present the detailed mapping on the agro-industrial system of sugarcane according to figure 2 considering the three types of configurations for sales and operations planning (S&OP).

Figure 2: Agroindustry System in Brazil for Sugarcane



Source: Neves et al. (1998)

Brazilian Biofuel and IndyCar Supply Chain Case Main Actors

The Brazilian Sugarcane Industry Association (UNICA)

The Brazilian Sugarcane Industry Association (UNICA) is the organization in Brazil representing sugar, ethanol and bioelectricity producers. It was created in 1997, following a consolidation process involving regional agencies in the State of São Paulo after government deregulation of the sugar and ethanol sectors. UNICA members answer for more than 50% of all ethanol produced in Brazil and 60% of overall sugar production. As part of its mission, UNICA seeks to play a leading role in “consolidation of the Brazilian sugarcane industry as a modern agroindustry complex equipped to compete sustainably, in Brazil and around the world, as suppliers of ethanol, sugar, and bioelectricity” (UNICA,

2017). UNICA is very politically active with international presence, in Washington and Brussels, to engage in constructive dialogue about the use of fuels from renewable sources.

The Brazilian Trade and Investment Promotion Agency (APEX-BRAZIL)

APEX-Brazil works to promote Brazilian products and services abroad, and to attract foreign investment to strategic sectors of the Brazilian economy. Apex-Brazil organizes several initiatives aiming to promote Brazilian exports abroad. The Agency’s efforts comprise trade and prospective missions, business rounds, support for the participation of Brazilian companies in major international trade fairs. Also, the agency arranges technical visits of foreign buyers and opinion makers to learn about the productive Brazilian structure, and other select activi-

ties designed to strengthen the country's branding abroad (Lewandowski, 2012).

IndyCar Racing League (IRL)

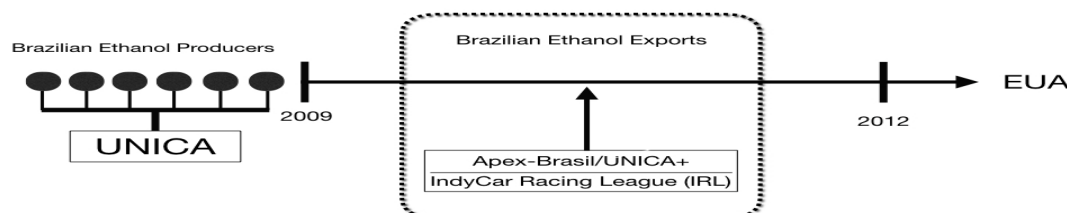
IRL is an American-based auto racing sanctioning body for championship auto racing. The organization sanctions four racing series: the premier IndyCar Series (often abbreviated ICS) with its centerpiece Indianapolis 500, and developmental series Indy Lights, the Pro Mazda Championship and the U.S. F2000 National Championship, which is all a part of The Road to Indy. IndyCar is also known to be inno-

vative. In 1964, it introduced the methanol fuel, and in 2006 it started to use a blend of 90% of Ethanol and 10% methanol. By 2007, the league announced that all Indy cars would race the entire season using 100% of ethanol (Clarke, 2007).

Brazilian sugar-cane biofuel providers

UNICA had to organize more than 110 Ethanol producers in Brazil to become the official biofuel supplier for the IRL. Together this companies represents around 60% of all ethanol and sugar production in Brazil.

Figure 3: Investigated Case



Note that in this representation, the sugar mill processors are at the same time connected to UNICA, in Brazil, and to the biofuel distributor, in the United States. Inside the square, represent the unit of analysis, that connects the links: UNICA, APEX-Brazil, and IRL. Without this connection, there would be no agreement, and per consequence, no physical movement of goods would be needed. Once the agreement is established, the biofuel then follows its physical, logistical path to go from the producers up to the be able to fill the IRL race tracks in the U.S.

ANALYSIS

The categories of analysis from the ACAP originated after the literature review were the acquisition, assimilation, transformation, and exploitation. Analysis started by interviews with the main actors within the Brazilian part of the supply chain. In this process, began codified the transcriptions texts from interviews records and other gathered sources (newsletters, observations, secondary data, etc.).

Were consolidated findings and classified each part of the supply chain according to its evidence towards a better understanding about how firms capture knowledge from relationship focused on the development of new technologies to answer the question how being an Indy Car supplier may impact the company's ability to learn and perform.

Potential Absorptive Capacity (Acquisition) 2007-2008

In 2007, the IRL decided that cars should run using a blend of more than 90% ethanol instead of methanol, a non-renewable alcohol-based fuel. This fact made the Indy Car Series a potential partner for Brazil's biofuel sugar mill processors to initiate the approach with American distributors, also present the use of sugarcane ethanol for all final consumers.

In this scenario, the Brazilian biofuel processors visualized the potential access to the most disputed market in the world. The primary objective of Brazilian biofuel processors was to establish con-

nections to 1) understand how to do business in the U.S. and 2) access and increase the biofuel supply chain of this market.

To achieve maximum results, the Brazilian biofuel processors worked in a unified manner, through UNICA, in charge to design the plan to reach the main objectives proposed. The following steps were considered: (1) become a sponsor and supplier of the biofuel used in the IRL; (2) encourage the U.S. Environmental Protection Agency (U.S. EPA) to approve the decision on Brazilian position in advanced fuels; (3) carry out the search and connect the Brazilian sugar mill processors and the main biofuel distributors in U.S. and (4) carry out a national publicity campaign presenting Brazilian biofuel to potential distributors and consumers.

Potential Absorptive Capacity (Assimilation) 2009

In 2008, UNICA signed an agreement with IRL and became the official supplier of ethanol for 2009's, on 16 of that season's 17 races, including the Indy 500. The goal was to demonstrate to U.S. distributors that Brazil could be a potential biofuel supplier. This is the way the Brazilian biofuel processors found to build awareness of the Brazilian production, its sustainability, and energetic power efficiency.

Several different actions were carried on to support this goal. Between 2009 and 2010, UNICA and APEX-Brazil promoted specific events, such as a particular event during the Miami-Florida race, with a gas station to sell the same biofuel that was being used in the IRL. It was a way to get closer to the final customer (Thomaz, 2016). Also, to promote the energetic power efficiency of the Brazilian biofuel, UNICA also used this action to build awareness of the protectionist measures used by the American government.

During that weekend, we offered a special discount on the pump, to the final customer of US\$ 0.85 dollar per gallon, which was by then equivalent of how much Americans could be paying less per a much cleaner and more efficient fuel if it wasn't per the tariffs. It was crazy, there were large lines in the gas station, and I almost freaked out when I saw helicopters flying above us, to learn then they were from TV stations broadcasting the event – that was cool! (UNICA, Interviewee 03, 2017).

Similar action was planned to May 2010 in Washington-DC, but this time offering a discount of US\$ 0.54 dollar, equivalent to an additional amendment on the VEETC. This promotion, however, was canceled at the last minute by the Capitol Petroleum Group, which did not prevent a 500% increase in the visitation at UNICA's website that encourages the use of sugarcane biofuel rather than corn biofuel (TOMAZ, 2016). Brazil's biofuel exports to the U.S. increased 15% by the end of this year.

Realized Absorptive Capacity (Transformation) 2010-2011

Since 2010, U.S. EPA considered Brazilian sugar-cane ethanol as an advanced biofuel (Low-carbon fuel standard). A biofuel is advanced when it has its ability to reduce greenhouse gas emissions (GHG) by at least 50% compared to gasoline. Brazilian biofuel produced from sugar-cane meets the Renewable Fuel Standard (RFS) requirement, emitting up to 61% less GHGs in relation to fossil fuel, having a great advantage over corn ethanol produced in the U.S., which reduces GHG emissions by only 38%, which does not meet the requirements of RFS to qualify as advanced biofuel.

Short TV ads spotting IRL drivers proudly talking about the sugar-cane biofuel were transmitted all over the internet and many TV stations. They were released in May 2010, close to the date of the Indy 500 of that year. During this period, a very important link was established in this supply chain. Sunoco became the official distributor. “Sunoco will supply 100 percent fuel-grade ethanol to the IZOD IRL beginning in 2011 in partnership with UNICA”, said the chief representative for UNICA in North America Joel Velasco. This is a great opportunity to partner at their retail locations on the IZOD IRL circuit to get the word out to consumers about the many benefits of ethanol fuel” (Konrath, 2010). Sunoco added Brazilian biofuel to 4.700 gas stations, expanding the partnership. Brazil's biofuel exports to the United States increased 112% by the end of 2011.

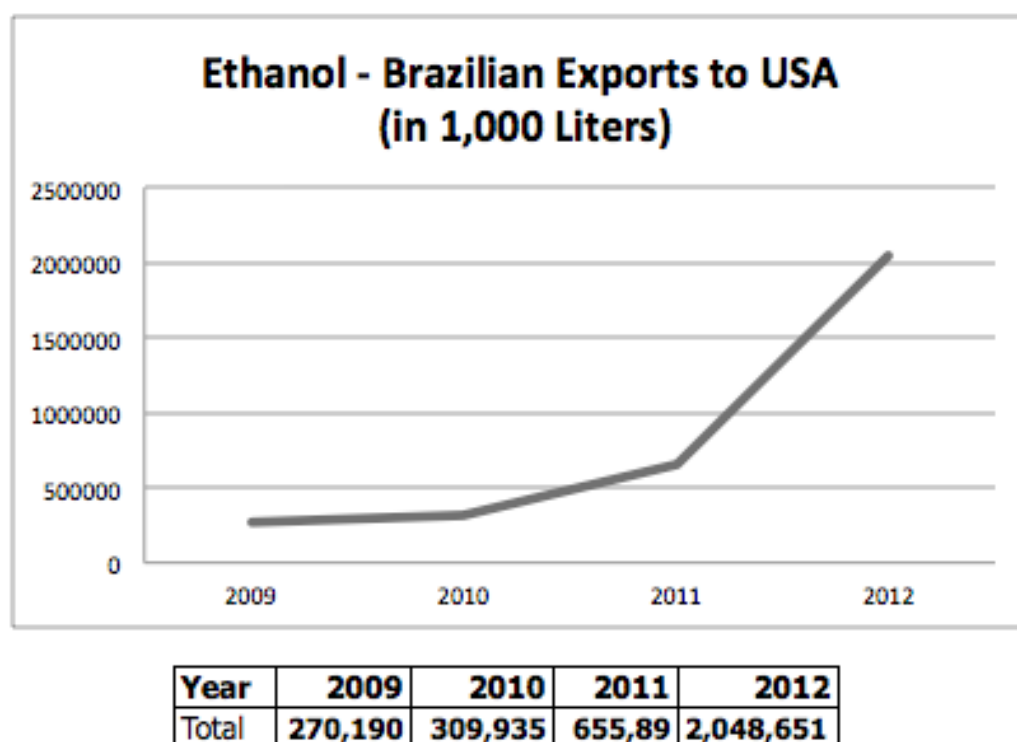
Realized Absorptive Capacity (Exploitation) 2012

At the end of 2011 the VEETC, an American tax act since the 1970's was extinguished. The Brazil biofuel exports to the U.S. reach very high numbers. In this study were used data from exports total amount as the benchmark of the outcome measure.

Exports before the partnership in 2009 were 270,190 (1,000 liters) and continued to grow in 2012 to the total of 2,048,651 (1,000 liters). This shows a growth of 758.22% in the period studied. Also, in 2011 the Brazilian biofuel sugar-cane producers expanded their relationship and started to provide biofuel to Sunoco to added Brazilian ethanol to 4,700 gas stations.

Brazil's sugar-cane biofuel receives a very low 'carbon intensity' (CI) score by the California Low Carbon Fuel Standards, which gave it a tremendous competitive advantage. Brazilian biofuel exports to the U.S. increased 212% (2011 to 2012) and reached its record. The evolution of the Brazilian sugar-cane biofuel exports from 2009 to 2012 is illustrated in Figure 4.

Figure 4: Ethanol – Brazilian Exports to US (in 1.000 liters)



Source: www.unicadata.com.br

The Brazilian sugar-cane biofuel is known and respected by its efficiency and sustainability. But APEX-Brazil interviewees mention that they have learned much more than they have initially anticipated.

“We learned much more than we thought we would in the beginning. The Indy [Car] partnership helped us to open our mind, and I mean not just APEX-Brazil, but many business people, even CEO from large Brazilian firms have never seen the America market as such exports opportunities as we were able to create through this partnership.”

APEX-Brazil mentions that one of the greatest and very unexpected learning was actually to understand how to use large sports events to promote an environment for fruitful B2B network and business opportunities. While being an IRL's customer APEX-Brazil mentioned that learned the “science of good hospitality”. IRL would make sure they would have everything they needed to create a good business environment. “We felt so much support, and so comfortable in that environment, that we wanted to recreate this kind of the same feeling to our customers in Brazil”, APEX-Brazil mentions that everything

B2B related they did during the 2014 World Soccer Cup that happened in Brazil was inspired by what they learned from being an IRL partner.

Despite the German 7 and Brazil 1, we were very successful during the [2014 World Soccer] Cup. We were able to successfully organize more than 2,000 buyers from all kind of industries, from all over the world. We prepared the events in the same manner as the IndyCar

does with its partners. We have nothing to complain, everything was great, lots of business were generated, and more will keep being generated during the years to come. We feel honored to have had the opportunity to learn a little bit of the Indy way to host events and do business.

Exhibit 2 brings some of the main evidences of ACAP in the investigated case.

Exhibit 2: Types of Absorptive Capacity Evidences

	Absorptive Capacity types			
	Potential AC		Realized AC	
	Acquisition	Assimilation	Transformation	Exploitation
	2007-2008	2009	2010-2011	2012
IndyCar (IRL)	-Indy Car starts to explore running on Ethanol			-Last year of the official relationship
UNICA	-Brazil reaches the agreement to become the sole ethanol supplier for the IndyCar races	-16 out of 17 of the Indy Car races on Brazilian ethanol -Ethanol Exports to the U.S. increases 15%	-U.S. Environmental Protection Agency (U.S. EPA) designated Brazilian Ethanol as an advanced biofuel by the Renewable Fuel Standard (low-carbon) -Sunoco added Brazilian Ethanol to 4.700 gas stations, expanding the partnership -Exports to the U.S. increases 112%	-Brazilian Ethanol receives very low score for carbon intensity (CI) by the California Low Carbon Standards, which gave it an important competitive advantage -Exports to the U.S. increases 212% (record)
Apex-Brasil				-Apex launch a program for 2,000 buyers from all different industries to happen during Brazil's World 2014 Soccer Cup based on what they learn from their experience with IndyCar – “How to host as Indy, the Indyway”

DISCUSSION AND FINAL CONSIDERATIONS

This research investigated the case of the relationship between UNICA, APEX-Brazil, and the IRL in the U.S. between the years 2009 to 2012. During that time, Brazil became the official biofuel supplier for the IRL and all Indy cars ran 95% of all those races on of Brazilian sugar-cane biofuel.

The initial idea of sponsoring the race was to better understand the American market and how to better do business in this market, help raise awareness of the Brazilian sugar-cane biofuel, its efficiency, and sustainability-related merits, and eventually help increase the biofuel exports to the U.S. A lot of companies want to internationalize their operations, but the reality is that a lot of them do not know exactly what to do. Few of them have the humbleness to ad-

mit this, and even fewer are willing to pay their future customers to teach them.

This was the case for APEX-UNICA-IRL relationship to establish biofuel supply chain. Using it, looking at primary data and secondary data, theoretically based on the ACAP concept, this research wanted to understand how being an Indy Car supplier might impact the company's ability to learn and perform.

During the four years of the relationship, the Brazilian sugar-cane biofuel exports to the U.S. increased 758.22%, besides being recognized as an advanced biofuel by EPA and the VEETC, was extinguished in the end of 2011.

The convergence of evidence provides the following discussion: 1 - Participation as a supplier of the IRL generate results of financial gains for its participants. 2 - The relationship reaches a favorable environment for the development of the ACAP, between the participants, involving the firms and all phases of the process, from the acquisition, assimilation, transformation, and exploitation participation in this action, placed the sector in envy with the local buyers (distributors).

The results are shown in the increase in the volume of exports (government state data) and the beginning of new commercial relationships, opening the doors to begin commercial relations. The combination of the resources allowed not just the fulfillment of the proposed goals but also learning of unexpected possibilities that allowed new business. Taking advantage of a current supply structure and established business relationships are part of the ACAP objec-

tives, enabling participants to accelerate the capture of knowledge and apply it for commercial purposes.

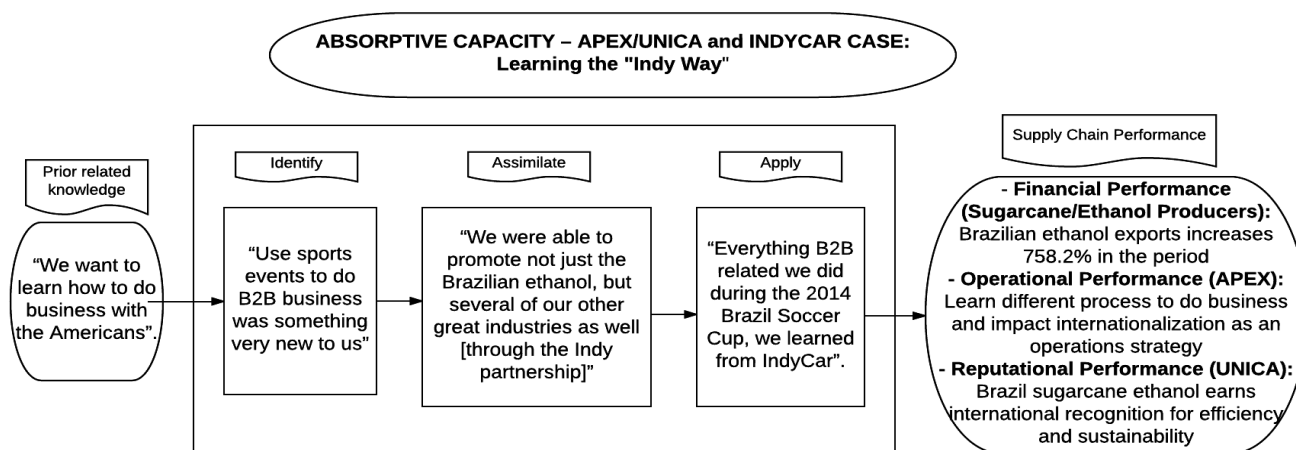
In this case study, UNICA and its associates made the most of it and were able to identify these results during the relationship. In general, were found evidence on the phases of ACAP, as well as on its path-dependent process, and finally manifestation in operational, financial, and reputational performance for different players in this supply chain.

Financial performance is evidenced by an increase in the Brazilian biofuel exports by 758.2% during the period of the partnership. It impacted directly sugar-cane and biofuel sugar mill processors. Operational performance could be evaluated by the several different processes created by APEX-Brazil who not just opened different and important opportunities for Brazilian industries in the U.S., but also learned the "Indy Way" to do business and continue to increase their relationship with their customers at home.

The learning inspired an entire set of B2B events related during the Brazil 2014 World Soccer Cup from the Indy Way. This impacted and will continue to affect internationalization as an operations strategy of different industries in Brazil who are connected with APEX-Brazil, not just the sugar-cane industry.

And finally, a reputational benefit was also perceived. Due to UNICA efforts, Brazil's sugar-cane biofuel sales and operations planning earns international recognition for efficiency and sustainability. Figure 5 brings some interviews quotes from the data that help to illustrate the evidence of ACAP development in the researched case.

Figure 5: Absorptive Capacity path dependence evidences in the investigated supply chain



As limitations of this study, a sample of interviews looked in the supply chain from a perspective of the impacts to the Brazilian players. This research did not further investigate how this partnership had (if it did) impact in the IRL supply chain members. Regarding methods, the richness of the context created by the exploratory qualitative approach used could be complemented with further quantitative research to measure the impact of this learning in the different members of the supply chains involved.

Furthermore, currently research recognize that it certainly was not just the single fact that of APEX-Brazil and UNICA relationship with IRL that supposedly caused the almost 758.2% increase in the Brazil’s exports of sugar-cane biofuel to the U.S. As mentioned by one interviewee from UNICA, the Indy relationship “was a piece of a big puzzle that we, [UNICA], we’re trying to assemble”.

In parallel to the relationship with IRL, it is necessary to highlight the amount of time, money, and effort dedicated in the political scene as well. UNICA played and plays a relevant role in guaranteeing the seriousness and credibility of the Brazilian sugar-cane biofuel in the U.S. through its engagement in Washington D.C.

UNICA played a significant part in making sure that, at the same time that the benefits of the Bra-

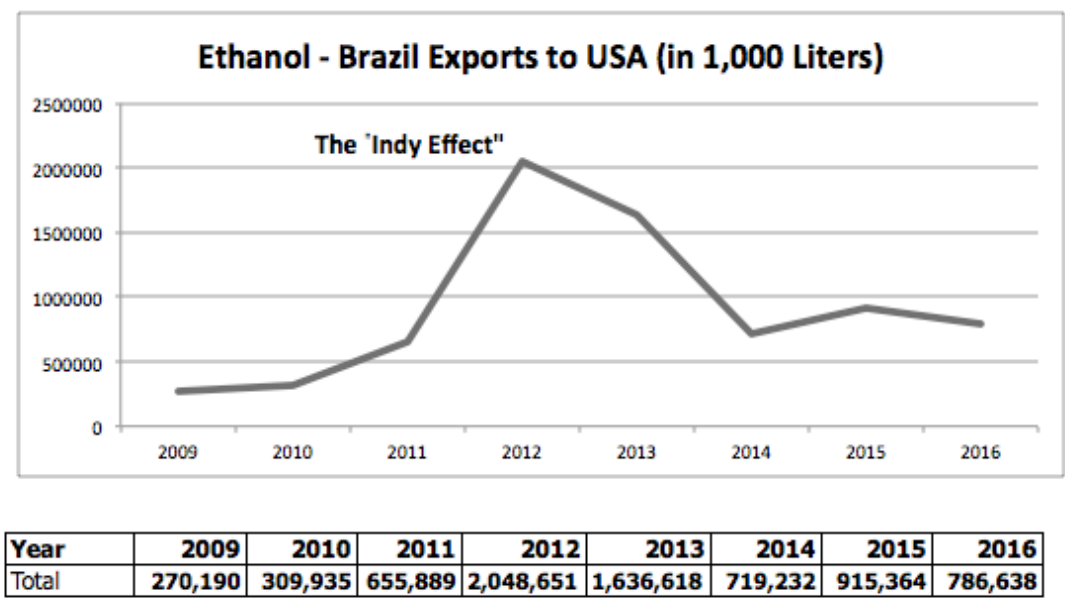
zilian sugar-cane were well known by a significant portion of the American population; they also made sure to highlight the harm that VEETC was doing to U.S. taxpayers (Bridges, 2012; Hanna, 2011).

Overall, present research contributes with empirical and real-world data from ACAP and enlighten how crucial it was for APEX-Brazil and UNICA to learn the “Indy Way” and how they were able to exploit this learning in different performances for different players in their supply chain.

Also, it brings a different perspective to answer what was driving the surge in sugar-cane ethanol imports from Brazil. Previous answer for the phenomena were related to the fact that Brazilian ethanol, classified as an advanced biofuel by the U.S. RFS made it the best economic option to fulfill obligations to reach this goal (Irwin & Good, 2012).

Although these facts make a lot of sense, especially if added to the end of the VEECT tariffs against imported biofuel in the U.S. at the end of 2011, it was expected that the imports of Brazilian biofuel in the U.S. would continue to grow over the following years. Interesting enough, it did not. The Brazilian biofuel imports in the U.S. fell drastically over the next years and is still trying to catch up.

Figure 6: Ethanol – Brazilian Exports to US - The “IndyEffect”



Source: www.unicadata.com.br

Finally, further research is necessary to look into possible causes and effects of this fact. For now, this research calls attention for the significant period of growing exports of Brazilian sugar-cane ethanol to the U.S., which coincides precisely with the APEX-Brazil/UNICA relationship with IRL, as the “IndyCar Effect” was perceived, and invite further research upon it.

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