

# Sharing competences in strategic alliances: a case study of the Cosan and Shell biofuel venture

Luciana Florêncio de Almeida  
Cláudio Antonio Pinheiro Machado Filho

## RESUMO

### Competências compartilhadas em alianças estratégicas: um estudo da aliança Cosan e Shell no mercado de biocombustíveis

Em um mundo competitivo, a maneira como uma firma estabelece seus arranjos organizacionais pode determinar sua capacidade de ampliar suas competências essenciais, bem como a possibilidade de atingir novos mercados. Empresas que atuam em apenas um mercado encontram obstáculos para se expandir e por meio de alianças elas encontram uma forma competitiva de criar valor. Formas híbridas apresentam-se primeiramente como alternativas de capturar valor e gerenciar ativos quando o mercado e a hierarquia organizacional não apresentam ganhos para a competitividade da firma. Como resultado, essa forma apresenta desafios como a alocação de direitos e os problemas de agência. O mercado de biocombustíveis tem apresentado mudanças contínuas nos últimos dez anos. Novos arranjos intra-firmas apareceram como um caminho para participar ou sobreviver no cenário de competição global. Dada a necessidade de capital para atingir melhores resultados, tem havido um movimento consistente de fusões e aquisições no setor de biocombustíveis, principalmente desde a crise financeira de 2008. Em 2011 existiam cinco grandes grupos no Brasil com capacidade de moagem de mais de 15 milhões de toneladas por ano: Raízen (*joint venture* entre Cosan e Shell), Louis Dreyfus, Tereos Petrobras, ETH e Bunge. Grandes companhias de petróleo têm adotado uma estratégia de diversificação como forma de proteção contra os crescentes custos do petróleo. Por meio da análise da aliança entre Cosan e Shell no mercado de biocombustíveis brasileiros, neste artigo avalia-se o modo de governança e os desafios que surgem quando as firmas buscam atingir novos mercados pelo compartilhamento de competências essenciais com empresas locais. Neste artigo tem-se por base pesquisa documental e entrevistas com analistas do departamento de Relações com Investidores da Cosan e examinam-se as questões centrais que permeiam as formas híbridas por meio de Teoria dos Custos de Transação, Teoria da Agência, Visão Baseada em Recursos e da abordagem das capacidades dinâmicas. Um ponto focal neste estudo é a apropriação do conhecimento e os ativos específicos gerados com a aliança estratégica. Uma vez que a aliança é formada espera-se que as competências sejam compartilhadas e novas capacidades expandam os limites da firma. Cosan e Shell compartilham uma série de recursos estratégicos relacionados às suas competências. A Raízen foi formada com base em incentivos econômicos, bem como na melhoria dos recursos internos que aumentassem a presença da empresa no setor de energia mundial. Entretanto, alguns desafios podem estar relacionados ao controle e ao monitoramento dos agentes, considerando que a empresa Raízen é composta por duas partes com culturas organizacionais, conhecimentos tácitos e incentivos de longo prazo distintos. O caso estudado ilustra um arranjo híbrido como forma alternativa de organizar as transações entre firmas: nem mercado nem hierarquia, mas sim uma forma mais flexível de arranjo com uma autoridade central. Os mecanismos de governança corporativa são igualmente um desafio, uma vez que o alinhamento entre companhias parentes em *joint ventures* é bastante complexo. Essas características conduzem a um organismo com dependência bilateral, oferecendo condições favoráveis para desenvolver capacidades dinâmicas. Entretanto, essas condições dependem dos interesses de longo prazo de cada participante da aliança estratégica.

**Palavras-chave:** biocombustível, *joint venture*, aliança estratégica, governança corporativa.

Recebido em 25/maio/2012  
Aprovado em 30/janeiro/2013

Sistema de Avaliação: *Double Blind Review*  
Editor Científico: Nicolau Reinhard

DOI: 10.5700/rausp1093

Luciana Florêncio de Almeida, Doutora em Administração pela Faculdade de Economia, Administração e Contabilidade da Universidade de São Paulo, é Professora da Escola Superior de Propaganda e Marketing (CEP 04018-010 – São Paulo/SP, Brasil) e Pesquisadora Associada do PENSA – Programa de Estudos dos Negócios do Sistema Agroindustrial da Fundação Instituto de Administração.  
E-mail: lflorencio@espm.br  
Endereço:  
Escola Superior de Propaganda e Marketing  
Rua Dr. Alvaro Alvim, 123  
04018-010 – São Paulo – SP

Cláudio Antonio Pinheiro Machado Filho, Graduado em Engenharia Agrônoma pela Escola Superior de Agricultura "Luiz de Queiróz", Mestre e Doutor em Administração de Empresas pela Faculdade de Economia, Administração e Contabilidade da Universidade de São Paulo, é Professor da Faculdade de Economia, Administração e Contabilidade da Universidade de São Paulo (CEP 05508-010 – São Paulo/SP, Brasil).  
E-mail: capfilho@usp.br

## 1. INTRODUCTION

The ProÁlcool Governmental Program changed the history of fuel in Brazil. Created as a fuel alternative during the oil crisis in the 70's, the sugar/ethanol agribusiness chain peaked in the period 1980-1986, subsequently losing ground to petroleum due to a drop in prices for the latter of between US\$12 to US\$20/barrel from 1986 to 1995 (BIODIESEL.BR, 2011). However, the new context of climate change presented a fresh challenge to the automotive chain. A new era for renewable fuels in the world was marked in Brazil, represented by the creation and launch of the Flex Fuel technology in March 2003: hybrid engines powered by gasoline and ethanol.

Ethanol comes from several sources, but one offers a demonstrable superiority in efficiency: sugar cane, due to its higher concentration of biomass per hectare and higher degree of fermentation. Currently there are 7 million hectares planted in the Southeast, Midwest, South, and Northeast regions of Brazil by more than 70,000 sugar cane producers, placing the country as the world's largest producer, with industrial processing of sugar and ethanol carried out in 397 plants across the country. This sector has been growing by 10% annually since 2003. The Brazilian automobile fleet is composed of 92% Flex Fuel cars (UNICA, 2010).

Given the need for capital to achieve better results, there has been a consistent movement of mergers and acquisitions in the Biofuel sector, especially after the 2008 financial crisis. In 2012 there were five major groups with a grinding capacity of more than 15 million tons per year: Raízen (joint venture formed by Cosan and Shell), Louis Dreyfus, Tereos Petrobras, ETH, and Bunge. Moreover, major oil companies have implemented the strategy of diversification in their business as a hedge against the rising cost of oil. The spot price of a barrel of Brent crude oil crossed the US\$100 threshold in January 2011, generating meaningful impacts in supply chains worldwide. There are several alternatives to oil being tested and marketed, but none has been as successful on a large scale as the extraction of ethanol from sugar cane.

Aware of the need to diversify their business, Royal Dutch Shell undertook a survey on the market for renewable sources in order to invest in promising businesses. The result was the establishment of a joint venture with the Brazilian market leader in ethanol production, Cosan. The strategic alliance established in February 2011 began operations on a grand scale: 23 sugar mill units, 16 billion gallons of ethanol, 4,500 jobs, and \$26 billion net revenue (COSAN RI, 2009). Joint venture (JV) arrangements are low-risk alternatives compared with acquisitions and greenfield strategies for internationalization or diversification, and these incentives were central for both Cosan and Shell. At the center of this alliance is the sharing of knowledge between two market leaders, with their respective focus on technology for exploiting biomass fuel and on fuel distribution. From the standpoint of incentives, the resulting joint

venture appears logical and promising, but presents important governance challenges. The central question of this paper is to discuss how JVs involving knowledge transfer should be governed in order to seek value for their parental companies. This paper analyzes the case of Raízen, the resulting joint venture between Royal Dutch Shell and Cosan, based on documentary research and interviews with Cosan's Investor Relations staff.

This article has five sections including this introduction. In the second, the theoretical framework is presented, discussing the origins of the alliances as a source for value seeking and the governance challenges of hybrid forms. The third section provides a panorama of the ethanol market in Brazil and worldwide. The fourth section addresses the case in focus (Cosan and Shell joint venture). Conclusions are presented in the fifth section.

## 2. GOVERNANCE MODES, CORE COMPETENCES, AND STRATEGIC ALLIANCES

This article seeks to frame a theoretical discussion around Transaction Cost Economics (TCE) and related literature that poses predictions for strategic alliances in a knowledge-sharing relationship.

This first section brings to light fundamental concepts of TCE and its relationship with other theoretical frameworks, such as Resource Based View (RBV) and Porter's positioning theory (1996). The second section presents the TCE and RBV approach for alliances, in special joint ventures. The challenges related to governance mechanisms are discussed in the final section.

### 2.1. Strategizing, economizing, and the dynamic capabilities of the firm

In the modern strategic management literature, Transaction Cost Economics plays a pre-eminent role in explaining the existence and boundaries of the firm and derived issues such as the institutional environment, allocation of rights, governance mechanisms, and firm growth. Grounded in Coase's seminal paper, "The Nature of the Firm", the theory highlights Coase's concerns about the Economics tradition:

"Mainstream economics, as one sees it in the journals and the textbooks and in the courses taught in economics departments, has become more and more abstract over time, and although it purports otherwise, it is in fact little concerned with what happens in the real world" (COASE, 1998, p.72)

Searching for answers about the real nature of the firm, Coase (1937) concluded that mainstream economics' concept of the firm as a production function was not able to broadly explain the limits of a firm. Coase's theory proposed that resources are not allocated only by price mechanisms; instead, they are dependent on the entrepreneur-coordinator.

Williamson's version of TCE makes a link between TCE and firm strategy by demonstrating that economizing on transaction costs is the best strategy (WILLIAMSON, 1993). His theory is grounded in the alignment principle between transaction attributes and modes of governance. Williamson (1996) further states that some sources of transaction costs are the transaction's attributes – the degree of specific investment, the level of uncertainty, and frequency, as well as the behavioral hypothesis of limited rationality and potential opportunism. In order to minimize those contractual hazards and coordination problems, agents may seek a mode of governance in order to reduce transaction costs.

Foss (2003, p.141) affirms that

“TCE had very little to say about competitive strategy, that is, issues relating to positioning in an industry and defending such a position”.

Nickerson (1997, p.9) points out that TCE approaches the transaction as the foundational element to determine a firm's choice of structure, but

“has little to say about which strategy, which accompanying transactions, and which investments a firm should undertake”.

Williamson (1996) defines two perspectives to approach business strategy: strategizing and economizing. He argues that economizing is much more fundamental than strategizing, since the second

“will rarely prevail if a program is burdened by significant cost excesses in production, distribution, or organization” (WILLIAMSON, 1996, p.307).

In his understanding, however, both are complementary.

Along these lines, Nickerson (1997) proposes a positioning-economizing theory of strategy that portends integration of three approaches: Transaction Cost Economics, the Resource-Based View, and Porter's strategic positioning analysis (1996). The contribution of the papers consists in stimulating researchers and managers to think outside the box, aggregating concepts that are proved mixable.

The RBV pays close attention to the interaction of a firm's value creation and value appropriation. Foss (2003) argues that in a world of positive transaction costs it is costly to capture and protect value, and sustaining a competitive advantage implies *ex ante* and *ex post* costs related to developing and protecting resources that are valuable, rare, and costly to imitate and substitute.

According to Teece (1998), a competitive advantage can be assigned not only to the ownership of knowledge assets, but also to the ability to combine those with other assets needed to

create value. This assumption is one of the central arguments of the dynamic capabilities view of the firm. Combining may implicitly mean developing alliances in order to achieve competences needed to expand the firm's profits. The firm's knowledge encompasses all tangible and non-tangible resources it may hold, including all firm-specific assets related to its technological competences, knowledge of customer needs, and supplier capabilities.

Teece (1998, p.141) also points out that

“assets can be the source of competitive advantage only if they are supported by a regime of strong appropriability or are non-tradable or ‘sticky’”.

The competitive advantage might appear when those assets are not easily purchased or sold on the market like standard commodities. Knowledge, locational assets, and competences fall into this category. The main assumption is that those assets are difficult to replicate, which implies a source of competitive advantage.

“When it is inherently easy to replicate and intellectual property protection is either unavailable or ineffectual, then appropriability is weak.” (TEECE, 1998, p.141)

Williamson (1996) presents specific assets as a source of integration. When an asset can be redeployable for a second use, it might be sold easily. However, when the specific asset cannot be redeployable, it may generate a hold-up situation, and in order to minimize the transaction costs for *ex post* disputes, the firm might prefer to integrate the holder of the specific asset. Several empirical works have showed the validity of this argument, notably the seminal article about General Motors' 1926 acquisition of Fisher Body by Klein, Crawford, and Alchian (1978). In this case, the authors highlight an example of opportunistic behavior by contracting parties due to the presence of firm-specific investments. Moreover, the authors point out that a firm may choose to seek advantages by creating assets that are specialized in conjunction with the assets of an alliance partner.

Besides physical assets, Williamson (1996) always indicates five other classes of distinct asset specificity: site specificity, human specificity, dedicated assets, brand name capital, and temporal specificity. Together with uncertainty and frequency, these transaction dimensions are the fundamental milestones along the TCE approach to a make or buy decision.

If markets and hierarchies are polar modes, the hybrid mode – various forms of long-term contracting, reciprocal trading, franchising and the like – presents intermediate values in four features compared to the other modes. It preserves autonomy, there is bilateral dependence, and also the flexibility to adapt to the other firm, but the mode may present incentive problems.

The next section looks at the hybrid form, especially strategic alliances, as a path to access specific assets.

## 2.2. The strategy for seeking new markets: the role of alliances

For Penrose (1995), the firm is a collection of productive resources, human and non-human. This concept goes beyond the mainstream economic theory of the firm, which considers the firm as a set of supply and demand functions. Together with Coase (1937), Penrose (1995, p.25) is concerned with the real world and draws the distinction between the firm and the market:

“firms and markets are both, in their different ways, networks of activity, but the difference between them is crucial to an understanding of the nature of the economy as a whole”.

The key difference is primarily related to the “central managerial direction” presented in firms. Administrative coordination and “authoritative communication” are not available in the market, being firm-specific resources.

The boundaries of the firm for Penrose (1995) are more closely related to internal resources than exogenous causes of growth such as conditions of demand condition or raising capital. In fact, a firm is defined more by its resources than its products. If the resources can be potentially employed, demand cannot limit a firm’s expansion.

Penrose (1960, p.1) does not ignore the exogenous impacts on a firm’s growth, stating that:

“[...] growth is governed by a creative and dynamic interaction between a firm’s productive resources and its market opportunities. Available resources limit expansion; unused resources (including technological and entrepreneurial) stimulate and largely determine the direction of expansion. While product demand may exert a predominant short-term influence, over the long term any distinction between ‘supply’ and demand’ determinants of growth becomes arbitrary”.

The firm may use its managerial capabilities in order to capture the external environment opportunities in such a manner that its growth will be determined by the rate at which experienced managerial staff can plan and implement plans.

For a firm seeking growth, several strategies that can be adopted which are not necessarily focused on the pursuit of monopoly power. The modern firm uses strategic alliances in order to capture the capabilities and resources of other companies that can lead to sustainable competitive advantages, with the possible consequence of increasing market power. According to Penrose (1995, p.172), these consist of:

“[...] corporate alliances or cooperative arrangements, as driven ‘not necessarily by monopolistic intent but as a means of gaining mutual access to resources such as technology, regional markets and information services’”.

The dynamic capabilities view of the firm proposes the acquisition of new competences through organizational learning, and an important tactic employed in achieving this is the strategic alliance. What are the incentives for this approach?

Mowery, Oxley, and Silverman (1996) point out that joint ventures were originally formed primarily to exploit natural resources, and only after the 1970s did these alliances become widespread in technology-intensive industries. There are several incentives for the formation of alliances: access to capital markets, internationalization, and acquisition of technological and other complex capabilities from partner companies. This last incentive is the most cited in studies in this field.

The relational view literature based on Mowery, Oxley, and Silverman (1996) asserts that the source of the competitive advantages within partnerships might rest on four conditions (DYER and SINGH, 1998): relation-specific assets as source of competitive advantage; knowledge-sharing routines based on collaborative actions with different stakeholders; complementary resources and capabilities generated by the partnership; and effective governance that minimizes transaction costs. All these factors might generate relation rents (quasi-rents) for both partners.

In the TCE literature, the economizing incentive will determine the contracting level of an alliance. Considering the asset specificity argument made by Williamson (1996), the hybrid forms can be strongly tied as joint ventures when firms are seeking to combine specificities and seize economizing advantages from hierarchy or market modes. Therefore, Williamson (1996) views hybrid forms primarily as a contracting mode, and uses franchising as an example. In this case, the franchising contract creates a coordination incentive in order to protect the specific investments in processes and brand. Although there will be more cost control and local adaptation compared to the hierarchy mode, cost-effective procurements will be reduced compared to the market mode.

Addressing equity joint ventures – meaning those formed whenever two or more sponsors bring given assets to an independent authority company and receive contributions from the profits earned – Hennart (1988) distinguishes two types: scale JV – when two or more firms embark together on similar actions such as forward or backward vertical integration, horizontal expansion, or diversification; and link JV – constituting a vertical investment for one of the parties and a diversification for the other. These forms suggest that the hierarchical coordination presented by the equity option is preferable to spot markets or contracts, and distinguishes from the hierarchy mode once control over the JV is shared with other firms.

Hennart (1988) also argues that the presence of inefficiencies in the intermediate market is a necessary condition for JVs to emerge. These can include access to raw materials or components, knowledge, distribution, and loan capital. As Teece (1998) argues, the author also asserts the difficulty of trading knowledge in the market. For example, link JVs arise to combine different types of knowledge. But is this knowledge transfer effective? Mowery, Oxley, and Silverman (1996) find that equity joint ventures appear to be more effective vehicles for transferring complex capabilities than are contract-based alliances due to the hierarchical coordination. Their results are based on empirical research and econometric models testing the causal relationship between technological overlap, R&D intensity and size, and the citation of a firm's patents by the alliance partner.

Although prior studies have extensively reported JVs as successful hybrid forms for economizing purposes such as knowledge transfer, a range of issues arise when it comes to governance mechanisms, which will be theme of the next section.

### 2.3. Hybrid forms and their corporate governance challenges

The concept of corporate governance, based on the principles of transparency, equity, accountability, and ethics, is increasingly widespread in the Brazilian market. The Brazilian Institute of Corporate Governance (IBGC, 2010) defines the concept as follows:

“These are the practices and relationships between investors / shareholders, board of directors, officers, independent auditors and the supervisory board, in order to optimize performance of the company and facilitate access to capital”.

The issue of separation of ownership and control in modern organizations was raised by Berle and Means (1933), and now occupies a central position in developing the theory of the firm, as highlighted by Demsetz and Lehn (1985). Beginning with the seminal work of Spence and Zeckhauser (1971) and Ross (1974), scholars of the science of organizations began to pay attention to the development of the so-called “Agency Theory”, later elaborated by Jensen and Meckling (1976) and Fama and Jensen (1983). The agency problem is an essential element within the contractual view of the firm as presented by Coase (1937). The “Agency Theory” is central to the issue of corporate governance. The principal-agent relationship is always conflicted when a particular individual (agent) acts on behalf of another (principal) and the goals of both do not fully coincide. Thus, whether employer / employee or shareholder / executives, the “principal” seeks to implement a structure of incentives and monitoring in order to align the interests of the agent to his or her own.

In essence, the practice of good corporate governance is the need to economize on “agency costs”, searching for long-term

interests. Organizational models that emerge from partnerships like JVs are very sensitive to conflicts of governance. On one hand, this kind of alliance can provide lower costs of scale and scope, but on the other, additional agency costs can be decisive for the stability of the alliance. McCahery and Vermeulen (2009) point to studies that highlight JV rupture not only in cases of societal arrangements with majority and minority parties, but also in situations of shared control such as fifty-fifty ownership structure.

Menard and Raynaud (2010) define JVs as complex hybrid forms where some rights and some assets are assigned with associated payoffs to a “Strategic Center”, while parent firms hold main assets and rights. In this case, the authors explain (assuming two firms),

“1 and 2, and four assets (A,a, B,b), with A and B highly specific assets related to the core activity of 1 and 2, respectively and remaining with their boundaries, while a and b are assets valuable only if used jointly. Each firm holds full decision rights,  $D_a$  and  $D_b$ , while rights  $d_a$  and  $d_b$  require coordination” (MENARD and RAYNAUD, 2010, p.8).

It is expected that the agents sharing control will be prepared to privately monitor the conflicts and ambiguities revealed *ex post*, and that this will require renegotiations and adaptations. Therefore, Menard and Raynaud (2010) identified that in cases where authority is shared by members of collective ventures, they might as well endorse a voting procedure to exercise their control rights. Costs will emerge from collective decision-making, but they might be lower than *ex post* enforcement/monitoring costs or public ordering (judicial system) for disputes.

Efficiency in agency relationships (better alignment) emerges when some assumptions are presented:

- Agents have no hidden information (absence of information asymmetry). The principal knows what constitutes effective action and what product is expected.
- The principal has complete information about actions and results.
- The agents act at low risk (and are aware that the payment received is a result of the alignment with principal interests).

On this basis, the challenges for the JV may be motivated by the unlikely symmetry of information between the parties. Additionally, the principals in a JV can be “agents” in their respective parent companies, characterized by McCahery and Vermeulen (2009) as a double agency problem: often the conduct of these officers is guided by the hidden agendas of their companies, to the detriment of the common agenda of the JV in which they act as principals.

A balanced relationship should mitigate, through private ordering, possible risks of contract breaches. In practice, the “shareholder agreements” in JV alliances constitute an essential

mechanism for reducing agency conflicts. These agreements should encourage ways to create a relationship of mutual interdependence, sustained by self-regulating norms and reputational issues that align the interests of the parties in the alliance.

As to other challenges in knowledge transfer alliances, Mowery, Oxley, and Silverman (1996) argue that cultural differences and distance might be obstacles for the governance effectiveness of the JV.

### 3. THE BIOFUEL PANORAMA

Biofuel is the name used to describe fuels that are formed by biomass. Among the most common sources are ethanol, biodiesel, and methane.

Worldwide, the production of biofuels has been motivated by the continuous increase in oil prices, which exceeded the US\$100/barrel mark in 2008 and have continued to rise (EIA, 2012). One reason for this increase is the unstable political environment of the Middle East region. The Organization of Petroleum Exporting Countries (OPEC) decided to increase oil prices by 70% in order to embargo the United States after the Yom Kippur conflicts in the 1970s. The primary effect of this measure was the support for programs focused on diversification of energy sources. Among the new options for fuel use, biofuels emerged for energy security in affected countries (GORREN, 2009).

After this episode many countries began to seek renewable energy sources to replace fossil fuels. According to Sillas Filho (2007), global demand for energy will grow 40% by 2020. The author argues that among the factors that should further enhance the production of biofuels are:

“deficit between supply and energy demand growth, declining reserves of fossil fuels, uncertainty in supply, increasing environmental pressures, demand for sustainable and economically viable energy sources” (SILLAS FILHO, 2007, p.16).

The trend of growth in the biofuels industry is already manifest in consumption levels. Data released by the Brazilian Ministry of Mines and Energy (MME) show that global consumption will increase from the current 1.1 million barrels per day (63.8 billion liters / year) to 4.4 million barrels per day (255.3 billion liters / year) by 2035. In 2012, the ethanol was the second most widely-used energy source, behind oil and ahead of hydroelectricity.

Several countries around the world are implementing policies for biofuels production. The United States, through the Energy Policy Act, and the European Union, through the Plan of Action of bio-fuels, have set targets to increase the use of bio-fuels. These initiatives were especially motivated by the context of high oil prices, increased risks in the supply of oil, and especially environmental problems.

In the United States, ethanol from maize is the major investment in biofuels. To meet the growing demand for ethanol, an extensive investment program aims to increase the production of the fuel. The production structure, as well as new investments, have been consolidated in the “corn belt”. The result has been an increase in ethanol production from approximately 12.9 billion liters in 2004 to more than \$18 billion in 2012 (FIGUEIRA and BURNQUIST, 2006).

Greater production capacity led to a stimulus in the use of biofuel in the USA. The mixture of ethanol (by volume) in gasoline rose from 1.5 percent in 2002 to 3.8 percent in 2006, representing a consumption of 20.4 billion liters. In January 2011, the Environmental Protection Agency of the United States raised the mixture cap from 10% to 15% ethanol. In Europe, the mixing rate is 10% with a prospective increase to 15% (KUTAS and AMARAL, 2007).

According to Oliva (2007), biodiesel production in Europe represents more than 3.6 billion liters per year, the main sources being canola, sunflower, and soybean. Alcohol fuel has a much smaller market than biodiesel in the European Union, valued at US\$2 billion a year but growing. Total demand is expected to reach 12.3 billion liters in 2010 (WSJ, 2011).

The United States and Brazil remain the largest producers and consumers of biofuels. The USA will account for 38% of global consumption of biofuels in 2035 – a decrease from the current 45% – while Brazil will be responsible for 20% of global consumption of biofuels in 2035 – a reduction from 28% now. The drop is due to the expected entry of new biofuel-consuming countries in this period (MME, 2010).

Just as new countries are projected to enter the biofuel production chain, there is also the expectation that new products will be introduced, known as non-conventional biofuels or biofuel-edge.

Unconventional biofuel products will enter the market from 2020, primarily in Organization for Economic Co-operation and Development (OECD) countries. These unconventional fuels will account for 36% of the total use of biofuels in OECD countries in 2035, but only 5% of total use of biofuels in countries outside the OECD (MME, 2010). In Brazil, the so-called second generation will come from sugar cane bagasse.

Biofuel production in Brazil dates to the 1920s, when vegetable oils were introduced in industry. In 1938, the first Brazilian biofuel subsidy was launched by Law No. 737, which determined the ethanol blend in all gasoline in the country. Today, Brazil is the largest ethanol producer in the world. For Cetrulo (2010), current investments in the sector might place the country in a strategic position. The potential for ethanol production in Brazil has led to reduced dependence on the international oil market, reaping benefits from energy autonomy which are clear in light of the economic crises caused by periods of high fluctuations in oil prices and the ambiguity of petroleum availability in the medium and long term (CETRULO, 2010, p.13).

The Brazilian government is aware of the potential that biofuels represent in terms of growth. Currently, 7.5% of the country's arable land is covered by sugar cane farming, and a zoning program has mapped and delineated the area in which the crop can be expanded.

The current scenario can be explained in part by recognition of the quality / sustainability of ethanol. Sugarcane ethanol in Brazil produces 7,000 liters per hectare, while maize produces 3,800, and wheat only 2,500 liters.

UNICA (2010) estimates that in 2015/2016 the production cycle of cane sugar will surpass 829 million tons, reaching 1,038 billion in 2020/2021. This growth has a direct impact on the volume of biofuel produced in the country, but also represents gains in renewable energy.

As Table 1 shows, Brazil will increase production from 46.9 billion liters of ethanol in 2015/2016 to 65.3 billion in 2020/2021. This represents a 39% increase in production in a five-year period. Investments in the sector should also represent gains in bioenergy. In 2012, ethanol represented the second largest source in the Brazilian energy matrix.

**Table 1**

**Brazilian Ethanol Production Estimates**

Alcohol (Billions of Liters)	2015/2016	2020/2021
Domestic Demand	34.6	49.6
Exporting Surplus	12.3	15.7
Bioenergy (MW Average)	11.500	14.400
Share in the Brazilian energy matrix (%)	15%	15%

Source: MME (2010).

The Brazilian scenario demonstrates that the commitment of the government in agro and biofuels chains is based mainly on the growing importance assigned to the fuel by the US and European Union governments. Brazil should not lose sight of the opportunity to remain a leader in this segment, contributing actively to the technical and political debate, with proposals and initiatives to overcome the challenges.

Considered one of the most competitive sectors in the world, the ethanol business is undergoing an important merger and acquisition movement.

Oil companies have made acquisitions or alliances with equity stakes in the ethanol market. In 2008 Petrobras Biofuels was formed as an arm of the industry group Petrobras. Its market share of ethanol began in late 2009 with the purchase of 40% of Total Sugarcane Industry in Minas Gerais. In 2010,

Petrobras Biofuels and Tereos Group, the third largest sugar producer in Europe, announced a strategic alliance to jointly invest in Guarani, the fourth largest processor of sugarcane in Brazil, forming Tereos International, the fourth largest producer of ethanol in the world, producing 490 million liters (AGÊNCIA PETROBRAS, 2010).

Beyond Petroleum (formerly British Petroleum), the third largest oil producer worldwide, began its investments in renewable energy in 2000. In 2008, it acquired 50% of the Tropical plant located in Goiás, and in March 2011, took control of the CNAA plant, moving from 32<sup>nd</sup> to 21<sup>st</sup> place among the largest producers of sugar and ethanol. The focus of this study is the largest of all these operations, led by two major players, Cosan and Shell, which will be described in the next section.

## 4. THE CASE IN FOCUS

### 4.1. Cosan and Shell joint venture: the emergence of Raizen

Cosan, one of the largest producers / exporters of sugar and ethanol in the world, and the largest producer of electricity from sugar cane bagasse, was founded in 1936 with the construction of the Usina Costa Pinto in Piracicaba, São Paulo.

The 1980s saw the beginning of an expansion process based primarily on acquisitions. By 2005, Cosan shares were being traded in the *Novo Mercado da Bolsa de Valores de São Paulo* (Bovespa). In 2007, the group was listed on the New York Stock Exchange, which made the firm the first Brazilian company to control securities traded directly on the NYSE. A year later, in 2008, it completed the acquisition of Esso Brasileira de Petróleo SA, acquiring its assets and fuel distribution business as well as the manufacturing and distribution of lubricants and aviation fuels businesses, including the license to use the Esso and Mobil brands.

Nowadays Cosan holdings participates in nine economic segments: sugar and ethanol production, fuel distribution, gas distribution, power generation, lubricants, logistics, and land.

The company defines its field of operation as follows:

“It is part of the solution in this new context of sustainable development. Invests in technology, plant, harvest, produces and distributes power to the people (food) for cars (fuel) and houses (electricity). Produces energy for life” (COSAN RI, 2009).

Shell is a leading oil and gas company worldwide. It also holds businesses in producing liquefied natural gas, products for converting gas into liquids, development of sustainable biofuels, and wind power projects.

The group's history began about 200 years ago, when Marcus Samuel opened a business to import and export sea shells from the Far East. The trade was then assumed by Samuel's sons, Mark and Sam Junior.

It was in 1886 that the format of the old business began to change. With the arrival of the internal combustion engine came an increase in demand for transport fuel. Leveraging their expertise in shipping, the brothers Samuel hired a fleet of ships powered by steam to carry crude oil. They revolutionized the transportation of oil with the maiden voyage of the first tanker, the *Murex*, which in 1892 was the first ship to transit the Suez Canal. In 1897, the company was named Shell Transport and Trading Company, and adopted a mussel shell as its logo. In 1907, Shell Transport in the East merged with Royal Dutch Petroleum, forming the Royal Dutch Shell Group. Currently the company operates in over 90 countries, with over 101,000 employees. In Brazil, Shell has had subsidiaries since 1913, and currently operates in the fuel retail, aviation, lubricants, marine, chemicals, supplies, and fuel distribution sectors.

In February 2011, Cosan SA and Royal Dutch Shell announced an equity joint venture operation called Raízen. The resultant joint venture is one of the five largest companies in Brazil by revenue, with a market value estimated at US\$12 billion, approximately 40,000 employees, 23 sugar plants (São Paulo, Mato Grosso do Sul, and Goiás), 4,500 service stations, more than 500 convenience stores, 53 distribution terminals, and a presence in 54 airports in the aviation fuel business. It will occupy a position among the most competitive companies in the area of sustainable energy in the world.

## 4.2. Raízen

Raízen will be responsible for the production of more than 2.2 billion gallons of ethanol per year to serve domestic and foreign markets. Besides ethanol, the 23 existing mills produce 4 million tons of sugar and have 900 MW of installed electric power production capacity from sugarcane bagasse. In the fuel area, the joint venture will market approximately 20 billion liters to the transportation and industry sectors and its network of 4,500 service stations.

Shareholders expect to see a production mix of 50% from sugar and 50% from ethanol until 2016, and after that reach 60% ethanol production. The growth strategy is based on expansion of the group's plants and acquisition of others.

In the distribution sector, Raízen was born as the third-largest player, behind Ultra Group and Petrobras. In two years, Raízen intends to convert all Esso service stations into Shell-branded units, which will move Raízen to second rank in the downstream business ranking.

### 4.2.1. The background: what were the incentives?

Shell's interest in a possible alliance with Cosan was initiated in mid-2005 by Peter Voser, then Chief Financial Officer (CFO) of Royal Dutch Shell. However, at that time, Cosan saw no reason for a partnership. Discussions did not begin until 2007, when Cosan had already begun the process of purchasing

the fuel distribution operations of Exxon Mobil in Brazil. The negotiations had advanced significantly when Peter Voser was appointed as Shell's Chief Executive Officer (CEO) in 2009.

Shell's incentives for the alliance were aligned with a strategic goal: to expand its activities in renewable fuel with high efficiency. The choice for Cosan was based on its leadership position in the sugar and ethanol market, and its focus on sugar cane as raw material.

Since 2002 Shell has had a stake in Iogen Corporation, in line with its strategy of amplifying its presence in the biofuel market. Shell and Iogen are cooperating on the commercialization of cellulosic ethanol; Iogen is a manufacturer and marketer of enzyme products for application in processes that hydrolyze or modify natural fiber, and these products can be used in the pulp and paper, grain, brewing, textile, and animal feed industries (IOGEN, 2010). Shell has also owned around 50% of the capital of the Codexis company since 2007. Through a research program, Shell aimed to shorten the timeline for deployment of the Iogen biofuel technology on a commercial scale.

On the other hand, for Cosan, the JV was driven primarily by four factors:

- generate scale in the distribution of fuel, increasing its network that began with the acquisition of Exxon's operations;
- gain access to international markets;
- obtain financial leverage;
- acquire knowledge of new technologies for 2nd generation ethanol.

Because its net debt amounted to US\$ 2.5 billion, Raízen received an injection of US\$ 1.6 billion in the form of royalties relating to the Shell brand licensing for Cosan over 10 years. Internationalization will be made possible through the sale of ethanol in countries where Shell operates. Shell is a major fuel producer and trader in the world, and the world's largest integrated oil company.

Shell also contributed its participation in Iogen and Codexis to Raízen, which allows the JV access to 2nd generation technologies for extracting ethanol from high performance biomass such as sugarcane bagasse. Figure 1 describes the assets contributed and not contributed by Cosan and Shell for the Raízen joint venture.

In five years, the JV intends to increase its crushing capacity by 65%, amplify cogeneration by 44%, launch the 2<sup>nd</sup> generation of ethanol, and grow its ethanol trading by 136%.

Both firms expand their competences through the JV. The growth of the two parent firms was motivated not only by exogenous factors such as climate pressure and rising oil prices, which affected other players as well, but rather the apparent commitment of internal resources as a starting point to their competitive advantages. As a result, the JVs market power arises due to the strength of both companies.

The main incentive relies on the assessment of new competences by the two firms. Indeed, the exchange of knowledge



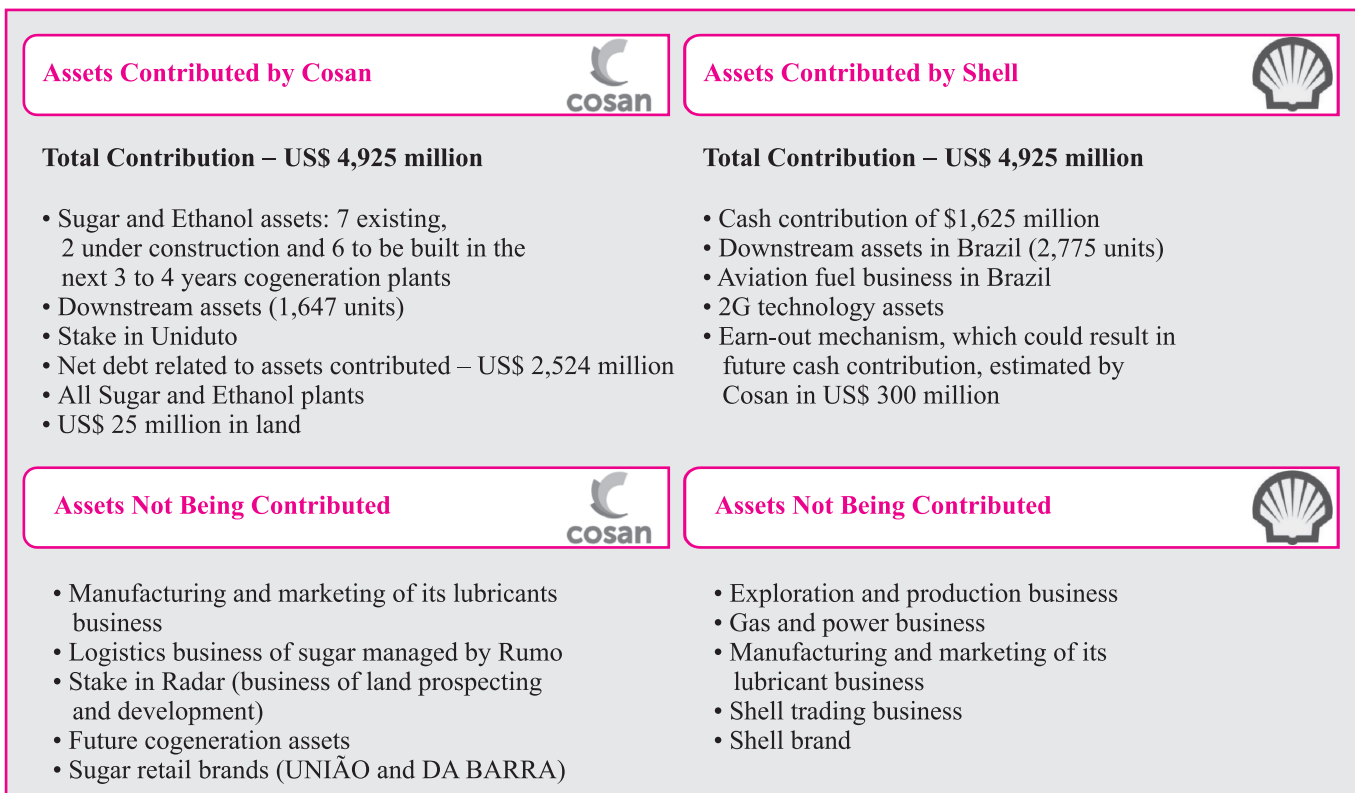


Figure 1: Transaction Overview

Source: Cosan RI (2009).

emerging from the alliance reflects the sharing of each firm’s core competences. The JV will benefit from Cosan’s knowledge of ethanol production and distribution throughout the country, as well as Shell’s knowledge of fuel production, trade, and retailing, and also Iogen’s and Codexis’ 2<sup>nd</sup> generation biofuel technology.

Raízen can be considered a Link type of JV as described by Hennart (1988), since it constitutes a vertical investment for Cosan and a diversification for Shell. The decision for the JV over other governance modes, such as hierarchy or market, can be understood as a way to economize on transaction costs and also to jointly protect specific investments in process and brand. Figure 2 illustrates the full integration of the ethanol

chain in the JV creation, resulting in cost-effective procurement, as stated by Williamson (1996).

**4.2.2. Sharing competences: the resultant competitive advantages**

Although it is a new organization, Raízen carries the experience of its shareholders. It is a national organization that benefits from having the products and solutions portfolio of a global leader in fuel production and distribution, and a global player in the ethanol and sugar market.

For the investor, Cosan RI (2009) highlights the alliance benefits:



Figure 2: Fully Integrated Chain

Source: Cosan RI (2009).

- increased competitiveness in the biofuels and fuels distribution businesses;
- broader access to ethanol consumer markets;
- substantial growth perspectives;
- building of a unique platform to develop second-generation technology;
- improvement of debt ratios through capital injection and potential increase of cash generation;
- improved business intelligence;
- access to the highest standards in corporate management.

Some synergies are emphasized:

- Internationalization – Cosan can take advantage of Shell’s downstream structure around the world in order to trade premium ethanol products, already sold in Brazil as V-Power Ethanol and aviation fuels.
- Scale from the integrated structure – Raízen amplifies Shell’s and Cosan’s downstream network, and can trade ethanol to competitors, as well as buy fuel from other oil companies, in search of the best bargain. Figure 3 illustrates Raízen’s market share and volume sold.
- Knowledge and technology transfer – from land development for farming, technology, crushing, production, and cogeneration to trading and fuel retailing, Raízen benefits from the knowledge of the core competences of both parent companies. In particular, Raízen will have an R&D core dedicated to the development of and access to new generation technologies in biofuel production and extraction.
- Brand equity – in 2014 all Brazil’s Esso service stations (1700) will be converted into Shell brand stations, account-

ing for an investment of US\$50 million. The Shell brand is licensed to Raízen for a 10-year period.

According to Cosan’s investor documents, the net present value of all synergies amounts to US\$2 billion, earned from: commercial synergies for greater volume, unified pricing policy, and sale of premium products (US\$700 million); financial synergies with improvement in credit rating, refinancing of contributed debt, and reduction in the average cost of debt (US\$200 million); logistics, distribution, and trading synergies from reduction of freight costs, optimization of distribution terminals, and centralized commercialization of ethanol (US\$850 million); and synergies from the conversion of service stations (US\$50 million).

The observable competitive advantage arises from the combination of several specific assets from the parent firms that are not efficiently redeployable without losing value for their specific use. As Teece (1998) states, competitive advantage can be assigned to the ability to combine knowledge assets needed to create value. Besides knowledge, the JV holds other specific assets as a source of value creation:

- Dedicated assets and site specificity – ethanol production from sugarcane has specificity, and Brazilian producers have shown their superiority in productivity and biomass exploitation, which captured the attention of Shell and other players. Those assets are dynamic capabilities since they are constantly evaluated, and in the JV’s case will grow further based on 2<sup>nd</sup> generation technology.
- Brand name – Shell has built a reputation that is staked on its fully-integrated chain for oil production, trading, and retailing. The JV will benefit from this reputation in order to economize in transaction costs over having to establish

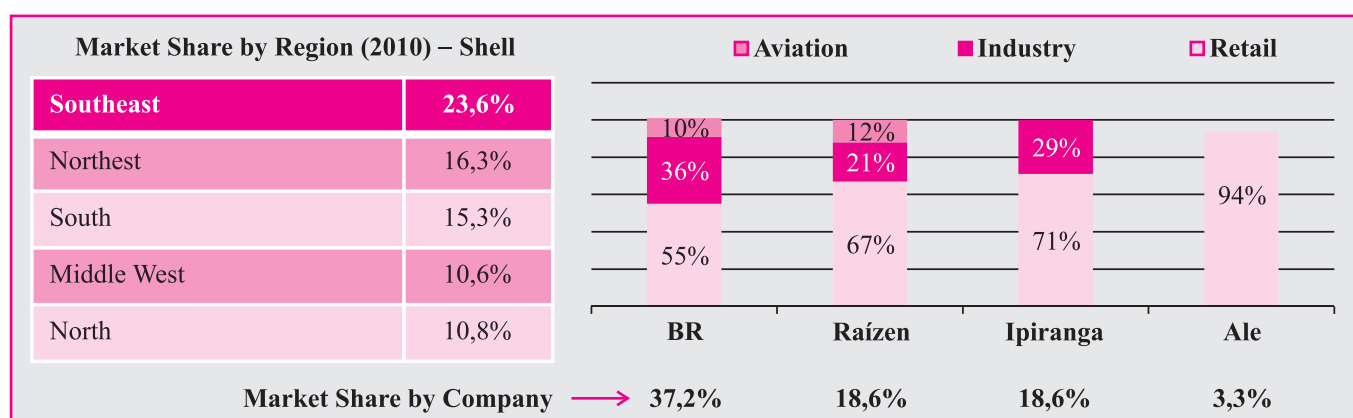


Figure 3: Market Share and Volume Sold

Source: Cosan RI (2009).

contracts by itself. The JV might take advantage of relational contracts and all the explicit and tacit knowledge embedded in the downstream processes and routines.

4.2.3. Governance mechanisms and their challenges

As analyzed in the two previous sections, Raízen represents a hybrid form based on bilateral dependence and a central strategic authority. The economizing incentives also revealed other costs, such as monitoring and controlling costs to avoid agency problems.

Figure 4 shows the equal sharing of authority, both in the formation of the management board, with equal numbers of members from each partner company, and in the constitution of the new business areas that are now headed by former employees of partner companies in their respective knowledge areas.

Raízen is a closed company, with control shared by the two parent companies (50%/50%). The governance mechanism is

based on a shareholder agreement, which intends to minimize hold-up risks by both parties. The main issue is related to the **Lock up and Buy Options**: after 10 years, Shell can exercise the right to buy half or all of Cosan’s shares in the JV. In the 15th year, the two parties can mutually exercise their options, which are: Cosan has the right to buy the totality of Shell’s share, or only Shell’s participation in the sugar, ethanol, and power business, if Shell intends to keep the downstream business in the JV. The lock-up period will be extended for six years after the JV’s creation, which means that neither Cosan, nor Rubens Ometto (Cosan’s controlling shareholder), nor Shell can transfer their shares in the JV. The knowledge transfer issues arising from the establishment of these agreements cry out for analysis.

During the ten-year first period of the JV, both companies can benefit from economies of scope and scale, as well as the competences developed (dynamic capabilities). After that, Shell has the option to buy Cosan’s part in the JV. This might point out different incentives for each company. In this arrangement,

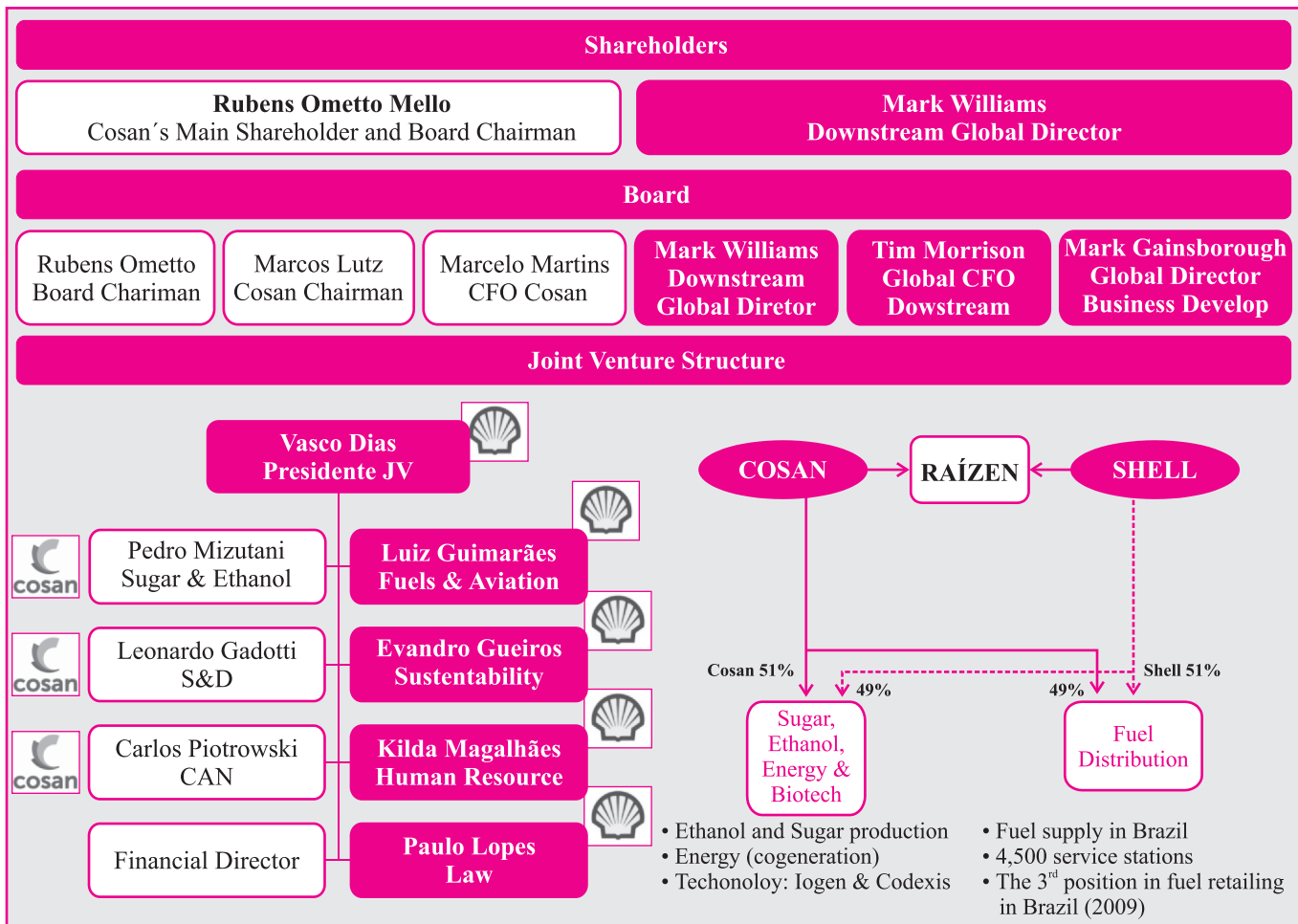


Figura 4: The Governance Structure

Source: Cosan RI (2009).

Shell has more interest in appropriating and developing new technologies for biofuels than Cosan appears to. If Shell exercises its buy option in the tenth year, the company will become the world's largest producer and retailer of biofuels (ethanol or other biomass sources). On other hand, Cosan will be transformed into a diversified company with business in the areas of lubricants, lands, sugar trading, logistics, gas, and electricity. As an evidence of its diversification strategy, in April 2012 Cosan announced the acquisition of a controlling share of COMGAS, one of the major players in gas distribution in Brazil.

As is common in joint ventures, the agents of Raízen may face some governance challenges related to the decision rights allocation mechanisms, and even the coordination of the assets used jointly. Some challenges are discussed below:

- The double agency problem – the board might decide on matters related to the parent companies more than those related to the JV. This can happen when the members are agents of the parent firms and their main incentives are linked to those firms more than the JV.
- Agent and principal as shareholders – Rubens Ometto Mello is the main individual shareholder of Raízen and chairman of Cosan's Board, and is based in Brazil. The possible asymmetry of information between the two parent companies might be mitigated by the presence of a former Shell executive as JV chairman. It is expected that he will monitor and control the other partner's influence and knowledge of the Brazilian market that Shell lacks. As pointed out by Mowery, Oxley, and Silverman (1996), cultural differences and distance should be taken into account as an obstacle for governance effectiveness.
- Transactions with related parties – Raízen's supply chain is based on contracts with sugar cane producers, among them the company Radar, which is controlled by Cosan. Also, some operations between Raízen and logistics companies controlled by Cosan might become conflicted. Will some potentially morally hazardous behavior emerge, despite the safeguards in the JV shareholder agreement? Will these issues be properly controlled and monitored for both companies in order to avoid future disputes?

Although facing important challenges based on some perceptions in the marketplace, the joint venture is positively evaluated by market analysts and some of Cosan's other key stakeholders, such as sugar cane suppliers and the internal staff of Raízen. Despite the clear strategic synergies, the agreement with Shell has enhanced the reputation of Cosan and increased the perception that a higher level of corporate governance standards will be put in place, both in the parent company (Cosan) and the JV (Raízen).

Table 2 presents the key concepts of the theories used to analyze the case and subsequent expected challenges for the enterprise.

## 5. CONCLUSION

In this paper, a joint venture between two major players in the fuels market, Cosan and Royal Dutch Shell, was analyzed through the lens of the TCE and dynamic capabilities theoretical frameworks. The central point for the merger was the partners' incentives to reach new markets, capture value through economies of scope and scale, and jointly use specific and valuable assets. These elements characterize a hybrid form that temporarily appears to be the more effective governance mode for appropriating and continuously developing knowledge and economizing in transaction costs, compared to market and hierarchy modes.

Although the issues discussed here are abstractions for the future based on theoretical and prior empirical research, Raízen has taken a leadership position in the world ethanol market, demonstrating the planning and vision of both partners. Raízen was born an important player in the world energy sector: as a result, it might use its competitive advantages to continue to enlarge and accumulate more valuable resources. As Penrose (1995) states, the firm's growth will be determined by the rate at which experienced managerial staff can devise and implement plans. In hybrid forms, the managerial staff corresponds to a central authority shared by the two partners. And at this point, governance mechanisms for better rights allocation should be undertaken.

Raízen faces some challenges ahead related to controlling and monitoring agents' behavior, considering that it is a two-part organism formed by distinctive organizational cultures, tacit knowledge, and long-term incentives. As this is an open case, and based on the literature visited, some hypotheses might be further proposed for this case in order to evaluate the value creation effect for both partners:

- The greater the volume of exchange between the alliance partners, the greater the potential will be to generate relational rents (quasi rents) through relation-specific assets.
- The greater the alignment of incentives by alliance partners to encourage transparency and reciprocity and to discourage free riding, the greater the potential will be to generate relational rents through knowledge sharing.
- The greater the alliance partners' ability to align transactions with governance structures for transaction cost minimizing and value maximizing, the greater the potential will be for relational rents.
- The greater the alliance partners' ability to employ informal self-enforcing safeguards (e.g. trust) rather than formal self-enforcing safeguards (e.g. financial hostages), the greater the potential will be for relational rent, owing to lower marginal costs and difficulty of imitation.

Table 2

## Theoretical Framework Analysis

Theoretical Assumptions	Raizen Implications	Challenges
Hybrid Forms preserve autonomy: there is bilateral dependence, and also the flexibility to adapt to the other firm, but it may face incentive problems (TCE).	Raizen is clearly a hybrid form since it is composed of the equity of two partner companies seeking to combine resources. The bilateral dependence appears strong in order to reach scope and scale economies and to transfer knowledge between partners.	<ul style="list-style-type: none"> <li>• The incentives of both partners must be aligned to ensure the effective resource combining.</li> <li>• A trust relationship must be central to the JV in the long term.</li> </ul>
Strategic alliances as a way of capturing capabilities and resources of other companies that can lead to sustainable competitive advantages (RBV).	Raizen benefits from Shell's downstream competences and assets that amplify its market power in oil distribution. On the other hand, Cosan's competence in ethanol production and distribution will diversify Shell's knowledge and the role it plays in the biodiesel market.	<ul style="list-style-type: none"> <li>• The combining and interchanging competences represent a crucial challenge for both companies.</li> <li>• Investments in specific assets should be shared and remain within the JV's scope.</li> </ul>
Incentives to alliances being formed: <ul style="list-style-type: none"> <li>• access to capital markets;</li> <li>• internationalization;</li> <li>• acquisition of technological and other complex capabilities from partner companies (Relational View).</li> </ul>	Through the JV Cosan has reached new markets for ethanol distribution, and also received funding for plant expansion. Technology sharing is possible considering Shell's stake in logen and Codexis. For Shell, the main incentive remains in the sharing of all knowledge and assets of the largest producer of ethanol in the Brazilian market.	<ul style="list-style-type: none"> <li>• Monitoring and agency costs may arise in order to safeguard the interests of both partners.</li> <li>• logen and Codexis might not have efficient incentives to share their knowledge with the JV.</li> </ul>
Additional agency costs can be decisive for stability in Joint Venture arrangements (Agency Cost Theory).	Raizen is exposed to the double agency problem: the principals in the JV can be "agents" in their respective parent companies (e.g. in transactions with related parties). Asymmetry of information among parent companies with specific knowledge in upstream (Cosan) and downstream (Shell) markets.	<ul style="list-style-type: none"> <li>• Shareholder agreement: buy options.</li> <li>• Governance mechanisms that reduce asymmetric information.</li> <li>• Governance mechanisms to mitigate ex post opportunistic behavior (hold up) and creation of bilateral dependence devices.</li> <li>• Clear rules regarding transactions with related parties.</li> </ul>

Some further questions should also be addressed: are hybrids the dominant form of organizing transactions in a market economy, due to their efficiency in minimizing conventional transaction frictions more evident in the polar modes? Despite the higher standards of corporate governance, will the important

cultural differences between a global multinational company (Shell) and an emergent and until recently family-owned group (Cosan) become a threat to the stability of the JV? These can form the central questions for further studies on this complex theme. ◆

## REFERENCES

AGÊNCIA PETROBRAS. Petrobras firma parceria no setor de cana-de-açúcar. Available at: <[www.agenciapetrobras.com.br/materia.asp?id\\_editoria=33&id\\_noticia=8377](http://www.agenciapetrobras.com.br/materia.asp?id_editoria=33&id_noticia=8377)>. Accessed on: Nov. 2010.

BERLE, A.; MEANS, G. *The modern corporation and private property*. New York: McMillan, 1933.

BODIESEL.BR. *A história do ProÁlcool*. 2011. Available at: <[www.biodieselbr.com/proalcool/pro-alcool.htm](http://www.biodieselbr.com/proalcool/pro-alcool.htm)>. Accessed on: Apr. 2011.

CETRULO, Tiago B. *Instrumentos de intervenção governamental e postura ambiental empresarial: uma análise da agroindústria canavieira do Estado de São Paulo*. Dissertação (Mestrado) – Ciências da Engenharia Ambiental da Universidade Federal de São Carlos, São Carlos, São Paulo, Brasil, 2010.

COASE, R.H. The nature of the firm. *Economica*, New Series, New Jersey, v.4, n.16, p.386-405, Nov. 1937. [DOI: 10.1111/j.1468-0335.1937.tb00002.x].

- COASE, R.H. The new institutional economics. *American Economic Review*, Pittsburgh, v.2, n.88, p.72-74, May 1998.
- COSAN RI. *Investor relations-presentations and conference calls*. 2009. Available at: <[www.cosan.com.br/cosan2009/web/index\\_pt.html](http://www.cosan.com.br/cosan2009/web/index_pt.html)>. Accessed on: Apr. 2011.
- DEMSETZ H.; LEHN, K. The structure of corporate ownership: causes and consequences. *Journal of Political Economy*, The Chicago University Press, v.93, n.6, p.1155-1177, Dec. 1985. [DOI: 10.1086/261354].
- DYER, Jeffrey; SINGH, Harbir. The relational view: cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review*, Pennsylvania, v.23, n.4, p.660-679, Oct. 1998
- ENERGY INFORMATION ADMINISTRATION – US (EIA). *Monthly brent crude oil prices*. Available at: <[www.eia.gov/todayinenergy/detail.cfm?id=8170](http://www.eia.gov/todayinenergy/detail.cfm?id=8170)>. Accessed on: Sept. 2012.
- FAMA, Eugene F.; JENSEN, M. Separation of ownership and control. *Journal of Law and Economics*, The Chicago University Press, v.26, n.2, p.301-325, June 1983.
- FIGUEIRA, S.R.; BURNQUIST, H.L. Programas para álcool combustível nos Estados Unidos e possibilidade de exportação do Brasil. *Agricultura em São Paulo*, v.53, n.2, p.5-18, 2006.
- FOSS, Nicolai J. The strategic management and transaction cost nexus: past debates, central questions, and future research possibilities of strategic organization. *Strategic Organization*, Thousand Oaks, v.1, n.2, p.139-169, May 2003.
- GORREN, Regiane Catarina Ribeiro. *Biocombustíveis – aspectos sociais e econômicos: comparação entre Brasil, Estados Unidos e Alemanha*. São Paulo, 2009. 132p. Dissertação (Mestrado) – Programa de Pós-Graduação em Energia – Escola Politécnica, Faculdade de Economia, Administração e Contabilidade, Instituto de Eletrotécnica e Energia, e Instituto de Física da Universidade de São Paulo, São Paulo, São Paulo, Brasil, 2009.
- HENNART, Jean-Francois. A transaction costs theory of equity joint ventures. *Strategic Management Journal*, New Jersey, v.9, n.4, p.361-374, July/Aug. 1988.
- INSTITUTO BRASILEIRO DE GOVERNANÇA CORPORATIVA (IBGC). Available at: <[www.ibgc.org.br](http://www.ibgc.org.br)>. Accessed on: Nov. 2010.
- IOPEN. *Cellulosic ethanol*. 2010. Available at: <[www.iopen.ca/cellulosic\\_ethanol/what\\_is\\_ethanol/index.html](http://www.iopen.ca/cellulosic_ethanol/what_is_ethanol/index.html)>. Accessed on: Apr. 2011.
- JENSEN, Michael; MECKLING, W. Theory of the firm: managerial behaviour, agency costs and ownership structure. *Journal of Financial Economics*, Chicago, v.4, n.3, p.305-360, Oct. 1976.
- KLEIN, Benjamin; CRAWFORD, Robert G.; ALCHIAN, Armen A. Vertical integration, appropriable rents, and the competitive contracting process. *Journal of Law and Economics*, Chicago, v.21, n.2, p.297-326, Oct. 1978. [DOI: 10.1086/466922].
- KUTAS, Géraldine; AMARAL, Luiz Fernando. *Ethanol boom in the U.S.: an export opportunity for the Caribbean and Central American Countries?* In: EU and U.S. Policies on biofuels potential impacts on developing countries. 2007. Available at: <[www.gmfus.org/publications/index.cfm](http://www.gmfus.org/publications/index.cfm)>. Accessed on: Apr. 2011.
- MCCAHERY, J.; VERMEULEN, E. Corporate governance and innovation – venture capital, joint ventures, and family businesses. 2009. Available at: <[papers.ssm.com/sol3/papers.cfm?abstract\\_id=133991](http://papers.ssm.com/sol3/papers.cfm?abstract_id=133991)>. Accessed on: Apr. 2011.
- MENARD, Claude; RAYNAUD, Emmanuel. *Ulysses and sirens: hands-tying governance in hybrid organizations*. Working Paper Presented at ISNIE, 2010.
- MINISTÉRIO DE MINAS E ENERGIA (MME). *Boletim Mensal dos Combustíveis Renováveis*, Brasília, n.35, Nov. 2010. Available at: <[www.ubrabo.com.br/sites/1700/1729/00000270.pdf](http://www.ubrabo.com.br/sites/1700/1729/00000270.pdf)>. Accessed on: Feb. 2011.
- MOWERY, David; OXLEY, Joanne; SILVERMAN, Brian. Strategic alliances and interfirm knowledge transfer. *Strategic Management Journal*, New York, v.17, Special Issue, p.77-91, Winter 1996.
- NICKERSON, Jackson A. *Toward and economizing theory of strategy: the choice of strategic position, assets, and organizational form*. 1997. Ph.D (Dissertation) – The United States, University of California, Berkeley, 1997.
- OLIVA, Felipe Cardoso. *O desafio das energias renováveis na OMC: commodity agrícola ou bem ambiental*. Piracicaba: Universidade de São Paulo, 2007.
- PENROSE, Edith. The growth of the firm: a case study the Hercules Powder Company. *Business History Review*, Harvard University, v.34, n.1, p.1-23, Spring 1960.

## REFERENCES

- PENROSE, Edith. *The theory of the growth of the firm*. 3<sup>rd</sup> ed. Oxford: Basil Blackwell, 1995.
- PORTER, M. *Estratégia competitiva*. Rio de Janeiro: Campus, 1996.
- ROSS, Stephen A. On the economic theory of agency and the principle of similarity. In: BALCH, M.; McFADDEN, D.; WU, S. (Ed.). *Essays on economic behavior under uncertainty*. North-Holland, 1974.
- SILLAS FILHO, Oliva. *Perspectivas mundiais dos biocombustíveis*. Maio 2007. Available at: <[www.senado.gov.br/sf/comissoes/CRA/CRABIO/AP/AP\\_20070509\\_Petrobras.pdf](http://www.senado.gov.br/sf/comissoes/CRA/CRABIO/AP/AP_20070509_Petrobras.pdf)>. Accessed on: Feb. 2011.
- SPENCE, M.; ZECKHAUSER, R. Insurance, information and individual action. *American Economic Review*, Pittsburgh, v.LXI, n.2, p.380-387, May 1971.
- TEECE, David. Knowledge and competences as strategic assets. In: FOSS, Nicolai. *Resources, firms and strategies: a reader in the resource-based perspective*. New York: Oxford University Press, 1998.
- UNIÃO DA INDÚSTRIA DE CANA-DE-AÇÚCAR (UNICA). *Dados e cotações – estatísticas*. 2010. Available at: <[www.unica.com.br/dadosCotacao/estatistica/](http://www.unica.com.br/dadosCotacao/estatistica/)>. Accessed on: Apr. 2011
- WILLIAMSON, Oliver. Transaction costs and organization theory. *Industrial and Corporate Change*, Oxford, v.2, n.2, p.107-156, Fall 1993.
- WILLIAMSON, Oliver. *The mechanisms of governance*. Oxford, New York, USA: Oxford University, 1996. 429p.
- WALL STREET JOURNAL (WSJ). *Houston. Brasil perde participação em mercado de etanol para Estados Unidos*. Published Feb. 9, 2011. Available at: <[online.wsj.com/article/SB129729728770684903.html](http://online.wsj.com/article/SB129729728770684903.html)>. Accessed on: Feb. 2011.

## ABSTRACT

### Sharing competences in strategic alliances: a case study of the Cosan and Shell biofuel venture

In a competitive world, the way a firm establishes its organizational arrangements may determine the enhancement of its core competences and the possibility of reaching new markets. Firms that find their skills to be applicable in just one type of market encounter constraints in expanding their markets, and through alliances may find a competitive form of value capture. Hybrid forms of organization appear primarily as an alternative to capturing value and managing joint assets when the market and hierarchy modes do not present any yields for the firm's competitiveness. As a result, this form may present other challenging issues, such as the allocation of rights and principal-agent problems. The biofuel market has presented a strong pattern of changes over the last 10 years. New intra-firm arrangements have appeared as a path to participate or survive among global competition. Given the need for capital to achieve better results, there has been a consistent movement of mergers and acquisitions in the Biofuel sector, especially since the 2008 financial crisis. In 2011 there were five major groups in Brazil with a grinding capacity of more than 15 million tons per year: Raízen (joint venture formed by Cosan and Shell), Louis Dreyfus, Tereos Petrobras, ETH, and Bunge. Major oil companies have implemented the strategy of diversification as a hedge against the rising cost of oil. Using the alliance of Cosan and Shell in the Brazilian biofuel market as a case study, this paper analyses the governance mode and challenging issues raised by strategic alliances when firms aim to reach new markets through the sharing of core competences with local firms. The article is based on documentary research and interviews with Cosan's Investor Relations staff, and examines the main questions involving hybrid forms through the lens of the Transaction Cost Economics (TCE), Agency Theory, Resource Based View (RBV), and dynamic capabilities theoretical approaches. One focal point is knowledge "appropriability" and the specific assets originated by the joint venture. Once the alliance is formed, it is expected that competences will be shared and new capabilities will expand the limits of the firm. In the case studied, Cosan and Shell shared a number of strategic assets related to their competences. Raízen was formed with economizing incentives, as well to continue marshalling internal resources to enhance the company's presence in the world energy sector. Therefore, some challenges might be related to the control and monitoring agents' behavior, considering the two-part organism formed by distinctive organizational culture, tacit knowledge, and long-term incentives. The case study analyzed illustrates the hybrid arrangement as a middle form for organizing the transaction: neither in the market nor in the hierarchy mode, but rather a more flexible commitment agreement with a strategic

ABSTRACT

central authority. The corporate governance devices are also a challenge, since the alignment between the parent companies in the joint ventures is far more complex. These characteristics have led to an organism with bilateral dependence, offering favorable conditions for developing dynamic capabilities. However, these conditions might rely on the partners' long-term interest in the joint venture.

**Keywords:** biofuel, joint venture, governance, hybrids forms.

RESUMEN

**Competencias compartidas en alianzas estratégicas: un estudio de la asociación entre Cosan y Shell en el mercado de biocombustibles**

En un mundo competitivo, la manera como una empresa establece sus disposiciones organizacionales puede determinar la mejora de sus competencias esenciales y la posibilidad de alcanzar nuevos mercados. Empresas que actúan en un solo tipo de mercado encuentran restricciones para expandirse, no obstante, pueden encontrar una forma competitiva de crear valor por medio de alianzas estratégicas. Las formas híbridas de organización aparecen principalmente como una alternativa a la hora de capturar valor y administrar activos, cuando el mercado y la jerarquía organizacional no presentan rendimientos para la competitividad de la empresa. Como resultado, esta forma presenta desafíos, tales como la asignación de derechos y problemas de agencia. El mercado de biocombustibles ha presentado cambios continuos a lo largo de los últimos diez años. Nuevos acuerdos entre empresas aparecieron como un medio de participar o sobrevivir en el escenario de la competencia global. Dada la necesidad de capital para lograr mejores resultados, se ha producido un movimiento constante de fusiones y adquisiciones en el sector de los biocombustibles, especialmente desde la crisis financiera de 2008. En 2011 existían cinco grandes grupos en Brasil, con una capacidad de molienda de más de 15 millones de toneladas al año: Raízen (*joint venture* formada por Cosan y Shell), Louis Dreyfus, Tereos Petrobras, ETH, y Bunge. Las principales empresas petroleras han puesto en práctica una estrategia de diversificación como forma de protección contra el aumento del costo del petróleo. Por medio del estudio de la alianza entre Cosan y Shell en el mercado brasileño de biocombustibles, se analizan en este trabajo el modo de gobernanza y los desafíos que se plantean cuando las empresas intentan conquistar nuevos mercados compartiendo competencias básicas con las empresas locales. Este artículo se basa en investigación documental y entrevistas con profesionales del departamento de Relaciones con Inversores de Cosan. Se examinan las principales cuestiones que involucran formas híbridas por medio de la Teoría de los Costos de Transacción, Teoría de la Agencia, Teoría de Recursos y Capacidades (RBV) y el estudio teórico de las Capacidades Dinámicas. Un punto central es la apropiación del conocimiento y los activos específicos generados por la alianza estratégica. Una vez que se forme la alianza, se espera que las competencias sean compartidas y que las nuevas capacidades amplíen los límites de la empresa. En el caso estudiado, Cosan y Shell comparten una serie de recursos estratégicos relacionados con sus competencias. Raízen se formó a partir de incentivos económicos y siguió reuniendo recursos internos para mejorar la presencia de la compañía en el sector energético mundial. Sin embargo, algunos problemas podrían relacionarse con el control y el monitoreo o seguimiento de los agentes, teniéndose en cuenta que la empresa Raízen está formada por dos partes que presentan cultura organizacional, conocimiento tácito e incentivos de largo plazo distintos. El caso en estudio ilustra un acuerdo híbrido como una forma alternativa de organizar las transacciones entre empresas: ni de mercado ni de jerarquía, sino más bien un término de compromiso más flexible con una autoridad central. Los dispositivos de gobernanza corporativa son asimismo un desafío, ya que la alineación entre empresas semejantes en *joint ventures* es mucho más compleja. Estas características dan lugar a un organismo con dependencia bilateral, lo que ofrece condiciones favorables al desarrollo de capacidades dinámicas. Sin embargo, tales condiciones dependen de los intereses a largo plazo de cada parte de la alianza estratégica.

**Palabras clave:** biocombustible, *joint venture*, alianza estratégica, gobierno corporativo.