



# Key control points in the internationalization process of firms in the energy sector

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## **Abstract**

The global energy transition has led to major changes in the operational environment of firms in the energy sector. The transition has been supported by several new technologies that contributed to the dynamic of changing market conditions, introducing a great amount of data and shifting energy companies into digital ecosystems. Projects like the European Union (EU) have led to the liberalization of markets allowing new entrants and increasing international competition. Thus, firms in this sector, that have been previously shielded by state ownership, are faced with new circumstances and are required to consider adaptations of their business models (BMs). This setting provides a good opportunity to study the impacts of digital ecosystems, data, and internationalization endeavors through a BM perspective. To assess a firm's positioning and competitive advantage in novel market settings this study introduces the notion of control points. Based on eight expert interviews, insights on BMs, digital ecosystems, data, and internationalization are presented and connected to existing literature. The study finds eight control points, classified into strategic and technical control points, relevant for securing competitive advantage in new market environments and the internationalization process of firms in the energy sector.

**Keywords:** Business models, internationalization, digital ecosystems, data, control points, energy sector

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## **Resumo**

A transição global de energia levou a grandes mudanças no ambiente operacional das empresas no setor de energia. A transição tem sido apoiada por várias novas tecnologias que contribuíram para a dinâmica de mudança das condições de mercado, introduzindo uma grande quantidade de dados e passando as empresas de energia para ecossistemas digitais. Projetos como a UE levaram à liberalização dos mercados, permitindo a entrada de novas empresas e aumentando a concorrência internacional. Assim, as empresas deste setor, que anteriormente eram protegidas pela propriedade estatal, enfrentam novas circunstâncias e são obrigadas a considerar adaptações dos seus modelos de negócio. Este cenário oferece uma excelente oportunidade para estudar o impacto dos ecossistemas digitais, de dados e esforços de internacionalização através da perspectiva de modelos de negócio. Para avaliar o posicionamento de uma empresa e a vantagem competitiva em novos contextos de mercado, este estudo introduz a noção de pontos de controlo. Com base em oito entrevistas com especialistas, são apresentadas percepções sobre modelos de negócio, ecossistemas digitais, dados e internacionalização, e são conectadas à literatura já existente. O estudo identifica oito pontos de controlo, classificados em pontos de controlo estratégicos e técnicos, relevantes para assegurar a vantagem competitiva em novos ambientes de mercado e no processo de internacionalização das empresas no setor de energia.

**Palavras-chave:** Modelo empresarial, internacionalização, ecossistemas digitais, dados, pontos de control, Sector da energia

**Título:** Pontos-chave de controlo no processo de internacionalização das empresas do sector energético

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## List of abbreviations

BM	Business Model
EU	European Union
FSAs	Firm-specific advantages
BMSAs	Business model-related specific advantages
PV	Photovoltaic
SME	Small and medium-sized enterprise

## 1. Introduction

The global energy transition has significantly altered the operational landscape for firms in the energy sector, driving a need for adaptive strategies and innovative business models (BMs) (Hancher & Winters, 2017). This transition is characterized by the introduction of new technologies and great amounts of data, which foster the development of digital ecosystems within the industry (Hanelt et al., 2021). Major projects, such as those led by the European Union (EU), have further led to the liberalization of markets, thus increasing international competition. As a result, energy firms that were once protected by state ownership now face new market dynamics and must strategically evolve to maintain their competitive edge (Kolk et al., 2014).

The intersection of these trends provides a fertile ground for examining the internationalization processes of energy firms from a BM perspective. Prior research highlights the crucial role of acquiring in-depth knowledge about target markets and understanding the persisting regulatory frameworks (Eriksson et al., 1997; Johanson & Vahlne, 2009). Moreover, the ongoing digital transformation imposes additional layers of complexity and opportunity, as firms must navigate compliance with data regulations while leveraging vast amounts of data generated by novel technologies (Correani et al., 2020; Dutra et al., 2018; Hanelt et al., 2021).

Despite the extensive literature on international business and BMs, there remains a gap in integrating these perspectives specifically within the context of the internationalization and digital ecosystems of firms in the energy sector. Given these circumstances, this thesis aims to answer the following research question: *What are the key control points in the internationalization process of firms in the energy sector?*

To address this question, the concept of control points is introduced as a strategic framework to assess competitive advantage and market positioning in new environments (Bohnsack et al., 2024; Pagani, 2013). Control points, traditionally studied within digital ecosystems, are pivotal for understanding how firms can influence market dynamics and secure strategic positions (Dattée et al., 2017; Trossen & Fine, 2005). Through qualitative analysis based on eight expert interviews, this study identifies the key control points that are critical for the internationalization process. These insights not only extend the understanding of data's role in BMs but also highlight strategic

and technical control points essential for maintaining competitive advantage in the internationalization process of firms.

The structure of this thesis is as follows: Chapter 2 introduces the BM perspective and various internationalization theories, followed by an overview of digital ecosystems, institutional boundaries, and the role of data. Chapter 3 details the methodology, including sample selection, data collection, and analysis procedures. The results are presented in Chapter 4, followed by a discussion in Chapter 5 that interprets the findings. Finally, Chapter 6 concludes the thesis, summarizing key insights and outlining limitations and implications for future research.

## **2. Literature review**

### **2.1 Business models**

#### *2.1.1 The business model perspective*

Even though there is plenty of research on the domain of BMs, consensus on a standardized definition remains elusive (Morris et al., 2005). In simple words, the BM can be explained as a concept of a firm's functionalities that deals with the architecture of essential components of the firm's business (Teece, 2010). BMs provide a framework for how the firm aims to generate profit through the value it creates (Magretta, 2002; Morris et al., 2005). This value is captured and defined in the value proposition, which is one core component of the BM (Teece, 2010). The BM further enlightens economic aspects, such as strategies regarding prices and volumes and the juxtaposition of costs and revenues (Morris et al., 2005).

According to Morris et al. (2005, p. 727) a BM is "*a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantage in defined markets.*" This competitive advantage is particularly important nowadays since firms are required to navigate through an always-changing landscape of new competitors and technologies (Alcácer et al., 2016). Businesses rely on their competitive advantage to survive in those complex market environments (Alcácer et al., 2016). New technologies and solutions allow new entrants, which in turn diversifies the product and service landscape (Cesaroni, 2004). The customer has a much wider range of products and services, leaving firms with greater competition among each other (Cesaroni, 2004). Additionally, the customer is an active part of the value creation and product development process for goods and

services that they are going to use (Demil et al., 2015). Thus, firms are required more than ever to align their business to their customers to optimally serve their needs and stand out from their competitors (Demil et al., 2015). In this context, the BM lens provides the reasoning behind value creation and value delivery for customers and the respective architecture (Teece, 2010). The value proposition is an identified key component in every BM, which directly links the product development and delivery process to the given demand in the respective market (Bohnsack et al., 2021).

### *2.1.2 Internationalization from a business model perspective*

As mentioned above, the BM perspective helps firms to consider their relevant components to obtain competitive advantages (Morris et al., 2005). Especially when entering new markets, competitive advantage is crucial for firms to survive (Morris et al., 2005). Considering a globalized world, market borders are lowered allowing more competition across countries and forcing firms to internationalize (Porter, 2011). With these novel challenges, the BM perspective can help to understand what is required in changing environments and new markets (Bohnsack et al., 2021).

To date, there has been limited research that integrates the perspective of BMs with international business studies (Bohnsack et al., 2021). Indeed, businesses' success is not solely contingent upon the possession of a significant market share in foreign markets but rather is determined by the efficacy of their BM (Rugman & Verbeke, 2004).

When discussing internationalization, a firm's home country is typically defined as the business's legal residence it originates from. In the process of global expansion, firms venture into foreign markets, referred to as host countries, as part of their internationalization endeavors (e.g., Calof & Beamish, 1995). In existing literature, several streams aim to explain the internationalization process of firms (Narula et al., 2019). One stream in the enhanced internalization theory explains the internationalization of firms with the notion of firm-specific advantages (FSAs), which will be explained in more detail in the following chapter (Narula et al., 2019).

## **2.2 Internationalization of firms**

### *2.2.1 Firm-specific advantages & business model-specific advantages*

Building upon the introduced concepts relevant to the studies of internationalization, enhanced internalization theory posits a successful internationalization of firms to be dependent on FSAs (Narula et al., 2019). Those advantages refer to the unique strengths compared to competitors that

enable a company to survive, generate profit, and expand (Verbeke and Kano, 2016). When entering foreign markets managers need to incorporate those FSAs in their strategic decision-making process (Narula et al., 2019). To better assess required initiatives in subsidiary enterprises, Rugman and Verbeke (2001) differentiate FSAs in terms of their location-boundedness. In this sense, advantages that are not tied to a specific geographic location are classified as non-location-bound FSAs. They can be leveraged across various markets at reduced marginal expenses, thereby facilitating effective expansion on an international scale. Location-bound FSAs, on the other hand, are strongly tied to local expertise, limiting benefits to the home country, and thus requiring transformation to non-location-bound FSAs (Rugman & Verbeke, 2001).

In that regard, the notion of recombining FSAs has been introduced in internalization theory, referring to the ability to combine non-location bound FSAs with the location-specific assets in the target market (Grøgaard et al., 2019). According to Hennart (2009), firms rely on the merger of their FSAs with complementary assets in the foreign market they entered, to effectively respond to altering local demands (Grøgaard et al., 2019). Thus, an adaptation of products or services is required since the firms are faced with different customer needs (Calantone et al., 2004). The degree of variety in customer needs and the resulting adaptations may differ depending on the host country. For instance, firms expanding within the EU may encounter fewer product adaptations compared to firms that aim for overseas expansion, where a more substantial degree of change might be necessary (Bohnsack et al., 2021).

However, regardless of the degree of variety in customer preferences, firms should consider product adaptations. Offering a standardized product or service may be the solution with the lowest costs, however, it will most likely not meet customer needs. Due to the lack of customer connection, standardization is seen to be unfeasible (e.g., Douglas & Wind, 1987; Kotler, 1986). Thus, firms should consider market environments in terms of technology as well as cultural aspects for their product adaptations to increase their profits in foreign markets (Calantone et al., 2004).

Those product adjustments could potentially trigger modifications in firms' BMs, which invited discussions to illuminate FSAs through a BM perspective (Calantone et al., 2004). Bohnsack et al. (2021) enter this discussion by linking FSAs to the BM concept, more precisely business model-related specific advantages (BMSAs). This view allows it to study necessary configurations of BMs in the internationalization process. As for global expansion efforts caused by technology-

dominated developments, new technologies can be embedded as components in the BM for the value-creation process of newly generated output (Massa et al., 2017). It enables the effective international implementation and exploitation of those technologies which in turn permits the identification of location-bound components that require adaptation in the target markets (Massa et al., 2017). In this process, external actors play a significant role in the competitive position of the entering firm leading attention to ecosystems and networks (Bohnsack et al., 2021). Coviello et al. (2017) posit networks in firms' internationalization as crucial platforms for value creation and capture in the sense of a collaborative pursuit, namely co-creation. The perspective of BMSAs adopted by Bohnsack et al. (2021) allows a detailed examination of BM components that need to be configured in a firm's internationalization process.

### *2.2.2 Competitive advantage in new environments*

When entering new markets, firms are faced with uncertainties and are required to adapt their operations to new environments (Calof & Beamish, 1995). Those changes are tied to the firm's commitments, such as investments, about the establishment of their positions within the new market in alignment with a firm's accessible resources (Johanson & Vahlne, 2009). According to Eriksson et al. (1997), the success of a firm's internationalization is dependent on the cumulation of knowledge that evolves through experiential learning.

In this process, they are required to strategically position themselves relative to incumbents in a novel landscape of competitors, amplifying the prevalence of competitive advantage in the international context (Rugman & Verbeke, 2004). But the construct of competitive advantages of firms and places as well as the governance structure in a global setting are subject to constant change (Alcácer et al., 2016). This is due to the emergence of information and communication technologies and their resulting impact on international business activities (Alcácer et al., 2016). Besides the assessment of FSAs, Alcácer et al. (2016) posit that the success of internationalization evolves around ownership (O), location (L), and internationalization (I) advantages. Firms need to manage these pivot points to survive global expansion (Cabral & Pfaffinger, 2015). This requires for instance the reconsideration of organizational structures and the formation of partnerships to secure access to scattered knowledge in network settings (Meyer et al., 2023). When entering foreign markets, the degree of the advantages exploited by firms is determined by the firm's

connection to business networks (Alcácer et al., 2016). These reconfigurations have a direct impact on the firm's BM (Bohnsack et al., 2021).

The BM perspective illuminates mainly a firm's internal processes which helps to answer the questions on how to obtain a competitive advantage (e.g., Morris et al., 2005). However, BM components can be subject to change and influenced by external factors, such as new technologies (Bohnsack et al., 2021).

### **2.3 New technologies & digital ecosystems**

As discussed in the chapter above, new technologies drive changes in market environments, leading to digital transformation. Digital transformation can be defined as “*organizational change that is triggered and shaped by the widespread diffusion of digital technologies*” (Hanelt et al., 2021, p. 1160). To remain competitive, firms must carefully evaluate and select the technologies crucial for their business. Consequently, an adaptation and transformation of their BM is necessary (Correani et al., 2020). This transformation, in turn, can facilitate the international expansion of businesses (Hervé et al., 2020). In the internationalization process, digital technologies can support businesses in their global expansion if implemented successfully (Neubert, 2018). For instance, production-related costs can be utilized by the usage of IoT (Strange & Zucchella, 2017).

Furthermore, the emergence of such new technologies leads firms to operate in digital ecosystems (Hanelt et al., 2021), which are defined as “*business environments shaped by a network of interdependencies specifically generated through digital technologies*” (Kopalle et al., 2020, p.114-115). Additionally, the changes in the operational environment must be considered when discussing internationalization.

Beyond the internal organizational structure of a firm and the external ecosystem, it is imperative to acknowledge the substantial impact of other external factors (Calantone et al., 2004), such as the varying regulatory frameworks and legal environments across countries, on a firm's BM. Those external influences add another layer of complexity to the internationalization process and increase the interest in the topic from a researcher's perspective (Coeurderoy & Murray, 2008).

### **2.4 Institutional boundaries**

Research on internationalization theory has emphasized the significance of the prior collection of relevant business and institutional knowledge regarding the target market (Eriksson et al., 1997).

Acquiring knowledge of institutional conditions – such as laws and regulations – is more challenging due to the presence of psychic distance. Business knowledge in this context refers to the degree a firm is familiar with the competitive landscape and the relationships between the businesses in the new environment (Eriksson et al., 1997). Johanson and Vahlne (2009) complement this view, shedding light on the importance of resources and knowledge for the internationalization process.

Upon entering new markets firms encounter regulations and legal landscapes that may differ from those in their home country. Framework conditions, like EU regulations, have considerable influence over a firm's product or service, particularly in cases where the firm's output is dependent on customer data (Bohnsack et al., 2024). Those regulations also affect the usage of data. For instance, European firms operate under GDPR guidelines, whereas overseas companies adhere to different regulatory frameworks (Movius & Krup, 2009). This insight underscores the necessity of firms to consider regulations as external factors in their decision-making framework for market entries (Johanson & Vahlne, 2009). For instance, if a firm in its home country possesses the control authority over setting prices, regulations within the host country may constrain this autonomy (Moreno et al., 2012).

## **2.5 Role of data**

As mentioned above, before assessing all the impacts the international expansion might have, a firm needs to collect as much information as possible to assess its market entry strategy. In this sense, accumulating sufficient market knowledge and resources is crucial for successful internationalization (Johanson & Vahlne, 2009).

Considering a widely connected world, where data flows increased by almost 50 times compared to the decade before (Hirt et al., 2017), it makes sense to consider data in the sense of internationalization as a helpful asset to gather knowledge about the target market.

In the decision-making process for global expansion, a firm may consider various market entry strategies when entering new markets (Agarwal & Ramaswami, 1992). However, selecting a suitable strategy tailored to the specific market characteristics of the target market is imperative for achieving success (Koch & Meckl, 2014). In this context the company requires the ability to collect and evaluate pertinent data and information on the target market (Koch and Meckl, 2014) to be able to adapt accordingly.

To support this process, data in the form of experiences can provide empirical knowledge and competencies for internationalization. For example, in terms of investments and selection for resource allocations, which are crucial for international activities, accurate data on financial conditions in the target market can support firms' decisions (Koch & Meckl, 2014).

Adding another perspective, the data that a firm produces can be seen as a valuable asset (Strange & Zucchella, 2017). For instance, given the facilitated connections between customers and firms through big data and analytics, customers can be actively engaged in the product creation process. This carries the opportunity to test new products and services independent of the location of the customer, thus providing the opportunity to collect feedback across borders and in various markets, reducing costs of adaptations (Strange & Zucchella, 2017).

However, within dynamic contexts, the efficacy of data collected from historical periods may be constrained. Operational data gathered daily tends to hold greater relevance and significance in contemporary decision-making processes for firms (Harvard Business Review Press, 2019).

The successful use of data is indicated to provide a firm with the opportunity to outperform its competitors (e.g. LaValle et al., 2010; McAfee & Brynjolfsson, 2012; Pauleen & Wang, 2017). Given its multifaceted utility across various operational objectives, firms should consider collecting and processing data (LaValle et al., 2010). To maximize the benefits of data, firms must integrate robust data collection and assessment processes into their BMs (Correani et al., 2020). However, it is noteworthy to mention that the processing and collection of data is challenged by the construct of data privacy. As mentioned in the previous chapter firms need to consider different data guidelines, which might constrain the degree of data usage (Movius & Krup, 2009).

The presented complexity of the internationalization process emphasizes the importance of a firm's ability to occupy specific advantages or positions within the market it operates (Alcácer et al., 2016). In this context, this paper introduces the notion of control points to study the internationalization process.

## **2.6 Control points**

### *2.6.1 Definition of control points*

Literature studying a firm's position within a market from multiple perspectives has brought up the concept of control points. In general, control points in this sense are defined as enclosed functional

components of a system in which management execution can take place (Trossen & Fine, 2005). Bohnsack et al. (2024, p. 14) define control points as “[...] *features in a digital business ecosystem – such as customer access, a unique solution, or an orchestration position – that competitors must navigate*”. In this context, Piller et al. (2021) introduce a classification of strategic and technical control points. Strategic control points comprise the possession of control over institutional and sociological features (Thomas et al., 2014). For instance, having a strong customer relationship allows firms to occupy a powerful position in a market setting. The firm’s bond with its customers can be classified as a strategic control point (Bohnsack et al., 2024). Conventionally, established sales and service relationships can be seen as specialized incumbent’s assets which are more challenging for new entrants to capture (Mitchell, 1989). From a control point perspective, incumbents dominate this customer-market linkage, a position that new market participants endeavor to attain (Tripsas, 1997). Furthermore, a robust brand or financial resources can be classified as important strategic control points (Bohnsack et al., 2024).

However, with the rise of digital transformation and emerging digital ecosystems, researchers have found control points to be not only strategic but also technical (Piller et al., 2021). Those technical control points evolve around components of technology-dominated environments and respective access rights, regulations, and laws (Baldwin, 2014).

Since data is called the “*new oil*”, it is reasonable that the possession of data provides a firm with a valuable asset (Bhageshpur, 2019). In digital ecosystems, technical control points, such as owning customer data, are crucial in the value-creation process for firms to extract value and profit from innovation (Bohnsack et al., 2024). Firms that own data can use data for different strategic purposes. On the one hand, they can enhance their products and services while refining their target strategies. Moreover, the monetization of data, through methods like licensing, offers the potential to create supplementary revenue streams, thereby enhancing a firm’s competitive positioning within the market (Palandrani, 2020). To exploit these potential revenues, firms need to identify the control points in this context and manage them strategically (Trossen & Fine, 2005). For instance, in the broadcasting industry, firms with the ability to control content stand a greater chance of realizing the benefits within the ecosystem and obtaining bargaining power (Pagani, 2013). Moreover, control points play a pivotal role in innovation, since profits from innovations are shifted to those maneuvering modularity in their product development (Bohnsack et al., 2024).

Additional cases in the service system environment demonstrate that firms with power over boundary resources found themselves in the position to frame the actions of the less-powerful actors (Eaton et al., 2015).

Especially in the context of digital ecosystems, firms rely on the implementation of digital infrastructures to reach possession of technical control points (Hanelt et al., 2021). Only businesses that put a functional and agile digital infrastructure in place can react to changes and adapt their strategies (Sia et al., 2016). A competitive advantage is often realized by firms with specific know-how that can secure their positions. Especially in a digital context, firms' complementary assets are not just meant for capturing value but might even be required for the functioning of the technology (Teece, 2018).

Bohnsack et al. (2024) further discovered that - in the specific case of smart farming firms - modularity and scalability can be defined as generic control points, as the possession of these control points is necessary to take part in the digital business ecosystem. Detached from a specific industry, generic control points evolve around knowledge or expertise a firm endeavors to accumulate.

### *2.6.2 Importance of control points for competitive advantage*

The possession of control points is a crucial factor that determines a firm's positioning in the market and its respective market share (Dattée et al., 2017). In the past, researchers have focused on the role of control points for the value creation and capture process. In terms of profits, controlling points of value capture for obtaining current market shares is essential (Dattée et al., 2017; Piller et al., 2021). To safeguard their resources, firms are required to manage the interdependencies of the ecosystems they operate in. Control points can serve as mediators to decrease the hazards caused by new entrants and help established firms manage and strengthen their competitive position (Piller et al., 2021).

Complementing this view, (Pagani, 2013) studied different control point constellations for value capturing and value creation and found that enterprises that possess control points have a great deal of supremacy over network operations, thus experiencing greater profits due to their ability to shape the network to their advantage. For instance, firms with power over content can control access and target it to its users, thus being in the position of the most attractive provider for customers (Pagani, 2013). Additionally, in the studied context of the broadcasting industry, innovations come in the

form of new attractive content, indicating that firms profit from the opportunity of providing attractive content for their subscriber as first-movers (Pagani, 2013).

Whether for customized or completely new products, companies are dependent on innovations that are strongly tied to the process of value capture and value creation (Bohnsack et al., 2024). However, there has been a notable change in how profits arising from innovation are being realized (Bohnsack et al., 2024). According to Teece (2018), the way businesses profit from innovation has altered as a result of technologically changing business environments that have led to the convergence and disruption of many industries. Where companies could previously benefit more easily from complementary goods, nowadays increased coordination and control are required. In addition, new underlying market structures lead to further challenges in managing the complementarity of technology and innovation (Teece, 2018).

These circumstances investigated by Teece (2018) can also be examined from a control point perspective. Bohnsack et al. (2024) identified strategic, technical, and generic control points a firm needs to occupy to be able to sustainably profit from innovations. Since innovations are a crucial factor for a firm's profitability and growth, the occupation of these control points is vital (Bohnsack et al., 2024). Especially in the light of uncertainty in the future firms ought to maneuver critical control points for value capture and creation, which may be subject to change, and adapt them in line with the firm's strategy and respective capabilities (Dattée et al., 2017).

So far, research has focused on studying control points in the context of digital ecosystems (e.g., Dattée et al., 2017; Piller et al., 2021). In a broader context, the mentioned aspects above hold relevance for a firm's survival, irrespective of whether it operates within dynamic digital ecosystems and contends with new market entrants or assumes the role of an entrant itself (Subramaniam et al., 2019; Yu et al., 2013). Nonetheless, distinct regulatory frameworks and unfamiliarity with the operational environment introduce additional challenges for companies (Elaluf-Calderwood et al., 2011; Movius & Krup, 2009). As a logical extension to this reasoning, the application of a control point perspective can provide a suitable framework to analyze the internationalization process of firms (Trossen & Fine, 2005).

### *2.6.3 Control points and regulations*

Building upon the preceding discourse concerning regulatory considerations from the sections above, Elaluf-Calderwood et al. (2011) hint at the impact of regulations on control points.

Regardless of the type, control points are possessed in the framework of institutional boundaries. Those institutional boundaries come as external factors that have a significant impact on the architecture of the industry and its products, thus shaping control points (Elaluf-Calderwood et al., 2011). The design of the market in the sense of competition law includes factors that determine a market's framework conditions (Mitchell, 1989; Subramaniam et al., 2019), such as regulations and policies concerning data protection or data traffic (Movius & Krup, 2009). In addition to the market design, the degree of state involvement in the form of active interventions is another external factor that impacts firms' activities (Eriksson et al., 1997). In digital business ecosystems, the accessibility to data and provision of software and digital technologies is provided by the state (Eriksson et al., 1997).

Studying the role of tussles and control points in the convergence of mobile platforms (Elaluf-Calderwood et al., 2011) denote control points as a useful tool to comprehend difficulties posed by environments that are characterized by rapid innovations and new technologies. In the context of mobile platforms, regulations constrain actors to the degree of limiting or disabling their power over specific control points (Elaluf-Calderwood et al., 2011). Institutional boundaries have a direct impact on the value capture and creation process and as such can either limit or stimulate innovation (Bohnsack et al., 2024).

This perspective can be projected to the internationalization endeavors of firms. Upon entering new markets firms encounter regulations and legal landscapes that may differ from those in their home country (Eriksson et al., 1997; Movius & Krup, 2009). Framework conditions, like EU regulations, have considerable influence over a firm's product or service, particularly in cases where the firm's output is dependent on customer data (Bohnsack et al., 2024).

For example, firms in the energy sector, are participating in one of the most regulated industries. However, due to the global energy transition, the market has significantly changed affecting the businesses operating in this industry (Kolk et al., 2014).

## **2.7 The energy context**

Kolk et al. (2014) pointed out that political and economic regional integration projects, like the EU, have led to changes in regulatory settings, which in turn stimulated market liberalization and intensified international competition. In the energy sector, firms used to be shielded from competition due to state ownership. Nowadays those firms are frequently privately owned and

operate within increasingly competitive environments characterized by less stringent regulations (Kolk et al., 2014). Those market conditions in turn impact a firm’s profitability and growth and challenge their ability to expand (Kolk et al., 2014). In addition to lower borders and more competition that stretches across countries, energy firms face new environments characterized by a landscape of innovations and technologies requiring new BMs (Hancher & Winters, 2017). For instance, in the case of electricity firms that generate their electricity from fossil fuels, the development of new technologies is necessary to enable the production and consumption of renewable energy (Bohnsack et al., 2021).

### 3. Methodology

To study the internationalization process of firms in the energy sector concerning critical control points and effects on BMs in the context of digital ecosystems, eight interviews were conducted with several experts in the energy sector.

#### 3.1 Sample and data collection

For examining critical control points in the context of internationalization eight experts who either work for firms operating in the energy sector or have specific knowledge of the energy sector or data were selected. The interview participants are either involved in foundations or research centers (Interviewees 1 and 2) with extensive experience in the energy sector or work for various firms (Interviewees A-E) within the energy industry, operating in different locations, most of them engaging in international activities, see Table 1.

The interviews were conducted in the period from 07.05.2024 to 21.05.2024 via Microsoft Teams with a duration between 45 min and 1 hour.

*Table 1: Overview of interviewees and their (company) background*

<b>Interviewees (Pseudonym)</b>	<b>Company description</b>	<b>Initial scope and type of activities</b>	<b>HQ &amp; other markets the company operates in</b>	<b>Founding year</b>	<b>Number of employees</b>
Former executive manager of networks for distribution and transmission & chairman of research centre for sustainable energy  (Interviewee 1)	Electricity supply company & Research Center for Sustainable Energy	Research of clean energy solutions and systems	-	-	-

<b>Interviewees (Pseudonym)</b>	<b>Company description</b>	<b>Initial scope and type of activities</b>	<b>HQ &amp; other markets the company operates in</b>	<b>Founding year</b>	<b>Number of employees</b>
Former head of innovation unit specialized in energy & lead in an open-source foundation  (Interviewee 2)	Digital transformation company / IT service provider & open-source foundation	Digital transformation in artificial intelligence, hybrid cloud, infrastructure management, decarbonization and employee experience in different sectors & open global community of individuals and organizations with a mature, scalable, and vendor-neutral environment for open-source software collaboration and innovation	-	-	-
CEO / Founder of SME  (Interviewee A)	Small and medium-sized enterprise (SME)	Custom IoT cloud platform, that provides Internet of Things management and efficiency services to commercial & residential buildings, smart cities & agriculture and the energy & industrial sectors	Greece	2013	~ 10-12
Consultant / Digital Delivery Team-Leader  (Interviewee B)	Consultancy	Europe's leading design, engineering, environment and regulatory consultancy	Sweden (HQ), Norway, Finland, Denmark, Estonia, Lithuania, the Czech Republic, Germany, Belgium, the Netherlands, the UK & Poland	1889	~ 22,000
Team-Lead of data spaces team in energy unit  (Interviewee C)	IT service provider	Sub-brand of an international IT service provider & next-gen technology leader in data-driven, trusted and sustainable digital transformation	France (HQ) & 46 other countries	2023	~ 47,000

<b>Interviewees (Pseudonym)</b>	<b>Company description</b>	<b>Initial scope and type of activities</b>	<b>HQ &amp; other markets the company operates in</b>	<b>Founding year</b>	<b>Number of employees</b>
Research & Innovation Manager (Interviewee D)	Software solutions & service provider	Design & creation of software solutions and services in several business and application areas	Great Britain (HQ) & other countries in europe, middle east & asia	1989	~ 130
Sales Manager (Interviewee E)	Solar Start-up	Sale & rental of photovoltaic systems and heat pumps	Germany	2017	~ 400
Team-Lead R&D (Interviewee F)	Solar Start-up	Sale & rental of photovoltaic systems and heat pumps	Germany	2017	~ 400

### 3.2 Data analysis

The data from the interviews was analyzed with a qualitative inductive research approach proposed by Gioia et al. (2013). This approach allows the allocation of the insights from the interview data to the internationalization process of firms, possible resulting adaptations in the BMs, and the concept of control points. Following a process based on (Strauss & Corbin, 1998), the goal is to present new implications for the internationalization process of firms, trying to prevent the sole extension of already existing knowledge in presented concepts (Gioia et al., 2013).

The interview questions revolved around the themes and concepts of BMs, internationalization, digital ecosystems, and control points, which have been defined and discussed in the thesis so far. Also, the interviewees were presented with a list of control points derived from previous literature (Bohnsack et al., 2024; Dattée et al., 2017; Pagani, 2013; Piller et al., 2021), see figure 1, and asked to rate them regarding their impact on internationalization endeavors. This form of data analysis aims to develop theoretical insights from the interviewees' experiences, connecting theoretical concepts to practical realities (Gioia et al., 2013).

Strategic control points	Technical control points
Customer access / relationship	Owning (customer) data
Complementary assets	Digital infrastructure
Network / networking ability	Modularity
Brand / branding	Content
Know-how	
Financial resources	

*Figure 1: Classification of control points derived from theory*

The first-order analysis allows a wide number of categories to exert relevant information from the interviews (Gioia et al., 2013), see figure 2. The keywords on the left-hand side that can be directly linked to the concepts of BMs, digital ecosystems, data, and internationalization are highlighted in bold. The forming of second-order categories refers to the definition of more overarching themes, thus structuring the qualitative interview data (Gioia et al., 2013; Weber et al., 2019). The second-order analysis reveals the control points considered as critical for the internationalization of firms in the energy sector from the interviewees' perspective and are visualized in figure 3.

#### 4. Results

Following the methodology analysis procedure, the interviewees were introduced to the principal concepts outlined in this thesis. The experts were invited to provide their perspectives on these concepts and assess their relevance for their enterprises or businesses operating in the energy sector. The results are summarized in figure 2, where the highlighted aspects on the left-hand side posit the link between the interview results to the concepts of BM, digital ecosystem, data, and internationalization.

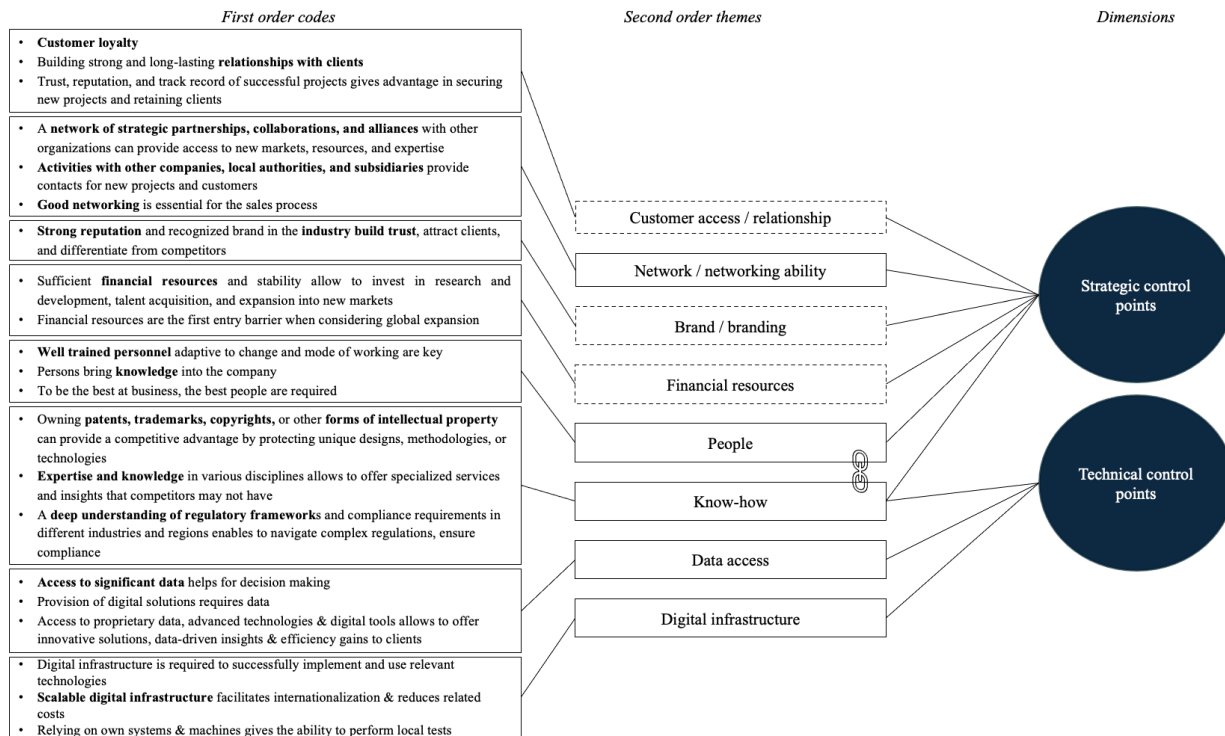


Figure 2: Derivation of key control points in internationalization

## On BMs

*“In the energy sector, we experience great change through the energy transition. We moved from a static system to an active system, in the distribution of energy as well as in the sense of digitalization.”* (Interviewee 1)

Those changes consequently have an impact on the firms’ BMs. Interviewee 1 states that especially new technologies that serve the energy transition in cost-effective ways have an immense impact on firms’ BMs.

*“A few years ago, no one was talking about PV (photovoltaic). Now PV is one technology that substantially has changed businesses.”* (Interviewee 1)

From an energy expert perspective, Interviewee 2 highlights the importance of the implementation of such technologies in firms’ BMs to stay competitive, even for those firms that are not selling digital solutions in the first place: *“In cases where AI may not be a firm’s legacy business, firms do not necessarily have data scientists, so they need to outsource it.”* (Interviewee 2). In the context of an ever-changing landscape of new technologies and innovations *“the business model needs to be flexible or else you will go out of business.”* (Interviewee A)

Besides of the sole need to incorporate new technologies to stay competitive, those new technologies are indeed able to support the business:

*“We harness digital technologies and innovative technologies so that we can make our lives better, and this way increase value and produce a better outcome for our clients. It helps to improve efficiency, productivity, and client services, by saving time and costs, e.g., through robotic process automation, artificial intelligence, data analytics, digitalization.”*

(Interviewee B)

Interviewee A presents a good method to assess the impacts of the mentioned technologies:

*“We ran an exercise, looking at let's say all the services that we provide on a personal level. Then we ask ourselves how AI could transform this, which is a very interesting exercise for all of us. We found that the only thing that in theory would not be affected by AI would be the work that we have to do in the field with the electricians that actually put the physical meters and sensors in place.”*

Even though a lot can be replaced, it does not necessarily mean that customers want everything to be replaced. From a CEO perspective, Interviewee A of states:

*„The business model in our part of the world is derived by the needs of the market and not actually by what we want to do. So, for the business model to be viable, it has to scale the business and for the business to scale, you have to find a service that the customer is willing to pay for monthly.”*

Thereby he stresses the importance of customer-centricity within the BM.

*“It is not about incorporating every technology and going with every trend, you need to find the right things for your business. So how you in your business react to the changing landscape will have an impact on how the technologies change the industry not the other way around.”* (Interviewee E)

The interviewees agree that the utilization of such technologies is inherently linked with the generation and use of data. Furthermore, there is a common acknowledgment of the significant amount of data present within the energy sector.

To create value, firms can leverage data to gain insights and make informed decisions. By analyzing data from various sources such as sensors, surveys, and historical records, they can identify patterns, trends, and potential issues. This allows them to develop innovative solutions, optimize processes, and improve overall performance. According to Interviewee A, this sort of data is of critical importance for protection systems: *“For instance, circuit breaker: They sense a fault, evaluate it, give necessary instructions and eliminate the fault within 50 milliseconds.”*

In the case of the IoT platform provider, data is an essential part of the value creation process in the BM. The data from commercial buildings ranges from information on the monthly payments of each tenant to data from deployed metering systems on electricity or water and is collected and visualized in form of reports on the platform solution.

*“In the case of our industrial customers, more sophisticated environmental meters and alerting systems are deployed, that have to do with, let's say, not spoiling the product, or cameras for the safety of workers. This data needs to be more immediate. For instance, we have an alerting system with a rule engine, to control for temperature rises above 10 degrees or humidity increases above 20%. Other than that, we provide them with data for energy consumption since they have compliance guidelines with how efficiently they consume energy.”* (Interviewee A)

To capture value, Interviewee B describes that firms use data to demonstrate the effectiveness and impact of their services. By collecting and analyzing data on project outcomes, cost savings, environmental impact, and other key metrics, firms showcase the value they provide to clients and stakeholders.

To deliver value, the interviewees disclose that data is used to enhance the quality and efficiency of products or services. By integrating data-driven technologies such as digital modeling, simulation, and virtual reality, firms improve the accuracy of their designs, optimize project timelines, and reduce risks. This allows them to deliver projects that meet client requirements, are cost-effective, and are sustainable.

However, from energy expert perspective, there are still a lot of companies that have underutilized data. Presently, while data is an integral component of most BMs, its utilization primarily revolves around operational functions, such as customer billing, rather than leveraging its full potential.

Interviewee 2 describes:

*“In most cases, we would ask the companies if they have data. And they would say yes. The following question would be: Do you use this data for something in particular? And they would say, in our business, we just use the data for billing our customers. To the question of why they don't open the data to third parties, they would always say that they do not want it because the data includes business-critical information, and they are afraid to give this data to their competitors.”*

Interviewee 1 states that this mindset traces its origins from more conventional modes of operation, where data was considered an in-house commodity that is critical for the security of the system and

is completely generated and owned by the utilities and is very restrictive in wider use. However, nowadays a drastic shift is noticed:

*“Today, data can be seen as a public good. Of course, the owner of data still influences how to use and offer the data, but information is much more shifted to the network.”*

(Interviewee 1)

To make companies share their data and use its potential, they need to be comfortable with sharing it. The company Interviewee B used to work for provides a platform for data sharing where companies can work on new BMs around the monetization of data. Such platforms can be considered one component of the digital ecosystem the firms in the energy sector operate in.

### ***On digital ecosystems***

As previously stated, data and mentioned digital ecosystems are becoming a public good. Traditionally, the energy sector considered the digital ecosystems as a communication service for telephony and wider data transfer for external communication. Companies developed their own internal digital ecosystem, *“for operational needs, including metering, protection and fault”* (Interviewee 1). Interviewee 2 speaks of two waves of digitalization:

*“10 years ago, we started talking about digital smart grids. We had big efforts on the utility side to implement and combine the physical security of their systems with digital security. This was the start, providing the means for utilities to start capturing data securely.”*

At present, *“the digital ecosystem is becoming more public through smart meters, smart grids that serve energy communities, aggregators, independent retailers, etc.”* (Interviewee D). In the second wave, it is about using the data properly and efficiently to extract value from it. According to Interviewee 2, a data-sharing platform is beneficial for this process. Such a platform is a vital component of the digital ecosystem enabling organizations to securely exchange data of their choosing while profiting from the insights provided by other actors.

Especially in the case of companies that provide digital solutions, there are strong interdependencies between those actors in the digital ecosystem. According to Interviewee D, the partnerships are low in risk since the actors are dependent on each other. In the case of Interviewee A’s company, cloud hosts and hardware providers are the main partners in their digital ecosystem.

But also, larger corporations rely on software vendors under enterprise agreements that provide them access to the latest tools and technologies. According to Interviewee B such partnerships help to persist at the forefront of technology trends.

### ***On the internationalization process***

To analyze the internalization process of firms in the energy sector, the interviewees were presented with the concept of FSAs. From Interviewee 1's point of view: "*FSAs are related to the qualities of the technical team supporting the processes, but also the related discipline supporting core businesses.*" The interviewees agree that people and their knowledge are a key advantage when internationalizing: "*You need well educated, well trained, well-disciplined people that know how to handle processes, generate new data and utilize it correctly and efficiently.*" (Interviewee D). Having expertise and specialized knowledge allows a firm to provide high-quality and innovative solutions independent of the location. This is especially the case if a firm has experience in the industry. This experience enables them to understand industry-specific challenges and deliver tailored solutions.

Besides, what seems to benefit firms when considering internationalization is the work in different international projects, such as EU horizon projects. "*The insights generated from such projects help to understand different realities and accommodate the solution.*" (Interviewee C). Interviewee A agrees with this point and says that even though they do not operate internationally, such international projects help them to connect with other actors in different countries, allowing networking and keeping up with the latest technologies and trends. Through the knowledge and insights gained from such projects, firms can refer to lessons learned and access best practices, which is an FSA according to Interviewee C.

Addressing the role of data in the context of global expansion, the question of whether data can be seen as an asset in internationalization, reveals different opinions. Interviewee B states that data can play a crucial role in supporting internationalization efforts by providing insights, enabling efficient decision-making, and improving project outcomes. In the case of Interviewee B's company data is used for market analysis, project planning, knowledge transfer, and performance evaluation. Interviewees agree that having access to such data can be considered an FSA since not all firms can benefit from existing subsidiaries.

In this context, Interviewee B posits the scalability of digital systems to be a key factor in internationalization:

*“Having digital solutions that are flexible and scalable is key if you want to internationalize. Especially in the case where you work with data, you would need to change formats but not change the core of your solution.”*

However, Interviewee A points out that *“data as such is not an asset. It is more about how the data is used”*.

The access to either knowledge or data is perceived to be dependent on a firm’s network. Interviewee C perceives a firm’s network as an FSA when internationalizing. Establishing a network of clients, partners, and stakeholders in operating markets provides access to a deeper understanding of local market dynamics. Besides external knowledge, big companies benefit from internal expertise from different teams and subsidiaries to create final products or services or to prepare market entrance, profiting from best practices.

Especially in the context of entering new markets, the interviewees agree that agility is an FSA. *“Our FSA is how we are trying to accommodate to the real needs of the world and not sticking to old ways and trying to force things.”* (Interviewee C). The energy experts highlight the importance of developing a culture within the firm for adaption to change and evaluation of new working environments, as well as the respective system that allows and engages change.

However, when it comes to the FSAs itself, all experts agree that most FSAs are not location-bound. They might require adaptation in some cases, but a firm should be able to profit from its strengths in new markets.

### ***On institutional boundaries***

In the context of internationalization, firms are faced with new surroundings and institutional boundaries. Although the surroundings may be new, Interviewee A states:

*“We live in a world which is highly internationalized. Successful companies have learned how to operate with international standards and a best-practice approach. Most companies will find themselves operating in a known environment. The way technologies evolve, how markets operate etc.”*

Institutional boundaries, from the expert’s view, are not seen as obstacles. Rather than that, they are information a firm can access before entering the new market: *“The legal framework and*

*institutional conditions are known, and a firm can prepare for it, it is easier to capture and understand than the market dynamics in other countries.*“ (Interviewee D). Interviewee B adds: *“This is not going to take you into untested waters”*.

However, *“when entering new markets, you offer your product that’s addressing different realities”* (Interviewee C). Those different realities are often correlated with the persistent culture within the country. Therefore, experts highlight the importance of examining boundaries such as cultural dynamics, that are not as obvious as the legal frameworks and regulations. Interviewee 1 states: *“Of course, one might think that those boundaries are of lesser importance for Europe, but still cultural norms should not be underestimated.”*

### ***On control points***

To assess critical aspects that help to overcome the mentioned institutional boundaries and maneuver through different settings and market environment changes, the study introduces the concept of control points. The concept as such is not known by any of the experts, however, they all agreed that presented control points can indeed support establishing and maintaining a competitive advantage in the industry, influence market dynamics, and obstruct competitors. *“Firms may not know it, but they indeed rely on obtaining control points.”* (Interviewee 1)

### ***Strategic control points***

Regarding the first strategic control point, experts agree that maintaining a strong customer relationship is crucial. Interviewee B states: *“Trust, reputation, and a track record of successful projects can give us an advantage in securing new projects and retaining clients.”* This control point is especially powerful in the home market where the company is well-known and established. However, trust is accompanied by effective branding, or more critically, a strong reputation associated with the brand, which can also have cross-border effects:

*“It is important to establish a strong customer relationship in the new market. Your brand can support you in this process.”* (Interviewee D)

Further, there is a strong agreement on the significance of networking ability as a control point. A network of strategic partnerships, collaborations, and alliances with other organizations provides firms access to new markets, resources, and expertise. The networking ability extends beyond external partnerships to include the utilization of internal knowledge resources: *“Part of the beauty*

*of the decentralized organization is the fact that, for example, I do have the ability to speak with Finland, Sweden, Norway and understand how they work.*” (Interviewee B). Especially for smaller companies, networking is seen as a key control point. In the case of companies that do not operate internationally yet, Interviewee A considers this control point as crucial to be able to reach a standing in new markets.

Even though firms can extract many insights from networks, knowledge within the company is considered one of the most significant control point. In the case of consultancies, expertise, and knowledge in various disciplines, such as engineering, architecture, environmental sciences, and urban planning, serve as a control point allowing them to offer specialized services and insights that competitors may not have. In addition to the presented list, Interviewee B highlights that owning patents, trademarks, copyrights, or other forms of intellectual property can provide a competitive advantage by protecting unique designs, methodologies, or technologies developed by the firm. In the conversation about specific knowledge the consultant also mentions regulatory and compliance knowledge. A deep understanding of regulatory frameworks and compliance requirements in different industries does not only help to navigate complex regulations and ensure compliance, but also to provide valuable guidance to their clients.

Complementing the view on FSAs, experts agree that know-how as a control point is directly linked to the people in a company:

*“This knowledge is dependent on the employees and experts you have within your company. So, people in your organization, that is actually the competitive advantage you have.”*  
(Interviewee 1)

Employing good people within your company needs to be considered and added as a control point to the presented list, that has strategic as well as technical relevance. Knowledge and expertise that already exists within an organization give the company an edge.

*“Having to train people to use and work with different technologies will take some time. If you already have people with this expertise, you are able to share the knowledge fast within your organization.”* (Interviewee C)

Further, in terms of internationalization endeavors, Interviewee F states that financial resources play an important role. *“Financial resources are something you require to survive in the first place.”* Interviewee A agrees and sees the resources as the main entry barrier. *“Cash is king. If you*

*don't have the resources, you are excluded from the beginning*". With sufficient financial resources, a firm can invest for instance in research and development or talent acquisition.

### *Technical control points*

Regarding technical control points technical expertise is mentioned to be of high significance. Interviewee 2 states: *"Having access to significant data can help for decision making by guiding educated guesses about how the internationalization process would go."*

Interviewee C adds that the know-how, classified as a strategic control point in the presented list, should also be included as a technical control point:

*"If you don't have technical expertise in your team you would need to put means into place for the team to use technologies. And then by the time that you want to be considered kind of an expert, you will already be behind your competitors. Because if you lack that kind of expertise on the technical side, you're lagging behind."*

This technical expertise allows firms to leverage new technologies, which in turn requires a working digital infrastructure. In the context of digital infrastructures, there is a strong agreement on the importance of data:

*"Access to proprietary data, advanced technologies, and digital tools can be a control point. This allows us to offer innovative solutions, data-driven insights, and efficiency gains to clients."* (Interviewee B)

Noteworthy to mention is that having cutting-edge technologies and adapting to new trends in business operations does not necessarily provide a competitive advantage. Interviewee A states that in the case of smaller firms, where adaption to new technologies is faster and possible at lower costs due to more agility than in larger corporations, having the best technologies is not always the key. When cooperating with larger enterprises, the price is still an important factor that influences the decisions: *"We have never been selected because you know we have adopted and enhanced our service with machine learning and AI instead of old school math."* (Interviewee A).

*"Companies compete based on technologies, however, due to the constant change of technologies agility is not something you can call a control point. Rather it is the bear minimum you need in your business to survive in the first place."* (Interviewee D).

Modularity and complementary assets are considered to be good possibilities for profits, however, none of the interviewees brought special attention to those control points. The control point *content* was omitted due to its lack of relevance for the energy sector.

Lastly, the experts believe that control points – similar to FSAs – persist in new environments and are not location-bound:

*“Control points are independent from the internationalization process, because those are things that you would like to have in place regardless if you are trying to internationalize or not, because that is something that is good for your business. Even though you might not be willing to expand to another country the regulations in your country might change overnight. And the way your customers are behaving might change or there might be another competitor entering the market and you will need to change again. Control points are wise to have if you want to survive in the long term.”* (Interviewee 2)

## **5. Discussion**

The internationalization process of firms in the energy sector, driven by the global energy transition, necessitates a strategic approach to secure competitive advantage in new market environments. The linkage between the research that revolves around the presented concepts in this thesis and the collected results in the form of interview insights provides significant acumen about the internationalization process of firms in the energy sector.

Theoretical frameworks suggest that adopting a BM perspective helps in aligning with external influences, thereby enhancing the understanding of value creation and value delivery processes (Bohnsack et al., 2021). This alignment ensures that the business is centered on the needs and preferences of its customers (Teece, 2010). In alignment with theory, the results from the interviews show a strong emphasis on adapting BMs to customers' needs. The businesses' activities are structured around the single components of the BM, interacting in a manner to secure a firm's competitive advantage (Morris et al., 2005). The results indicate that adapting to external influences is crucial for maintaining a competitive position in the market and that the BM perspective in this case can serve as a useful framework.

Especially with the energy transition, the interviewees state that firms in this industry are experiencing great changes in how the business operates. Trends, such as PV in the past or IoT in the present, which are also highlighted in the research (Strange & Zucchella, 2017), significantly impact the BM and require firms to incorporate those technologies. Due to the prevalence of new technologies, contemporary energy firms operate within a digital ecosystem characterized by essential interdependencies (Hanelt et al., 2021), such as those with digital service providers and cloud hosts. Another result of digitalization is the prominence of data (Correani et al., 2020). The

results from the interviews confirm that data is important for the BM and can be used in terms of value creation, capture, and delivery. However, research posits that companies need to be cautious with the usage of data in terms of guidelines (Movius & Krup, 2009). The results support this view, showing that concerns regarding regulations are one reason for the underutilization of data in the energy sector. Further, the interviewees stress the untapped potential of the existing data. Especially, considering international operations, regulations regarding the usage of customer data, vary across countries making it indispensable to consider such guidelines (Movius & Krup, 2009). In this context, the results highlight that assessing different regulations requires the firm and its BM to stay flexible.

Further, the results indicate that agility and the ability to adapt to new environments is an FSA. In theory, FSAs are described as strengths that can secure a firm's position within a market as well as across borders (Verbeke & Kano, 2016). According to the interviewees, implementing such FSAs will strengthen the BM, thus making it easier for firms to internationalize. The theory distinguishes FSAs according to their location boundness (Grøgaard et al., 2019; Rugman & Verbeke, 2001). Conversely, experts agree that the FSAs beneficial for expansion are non-location bound.

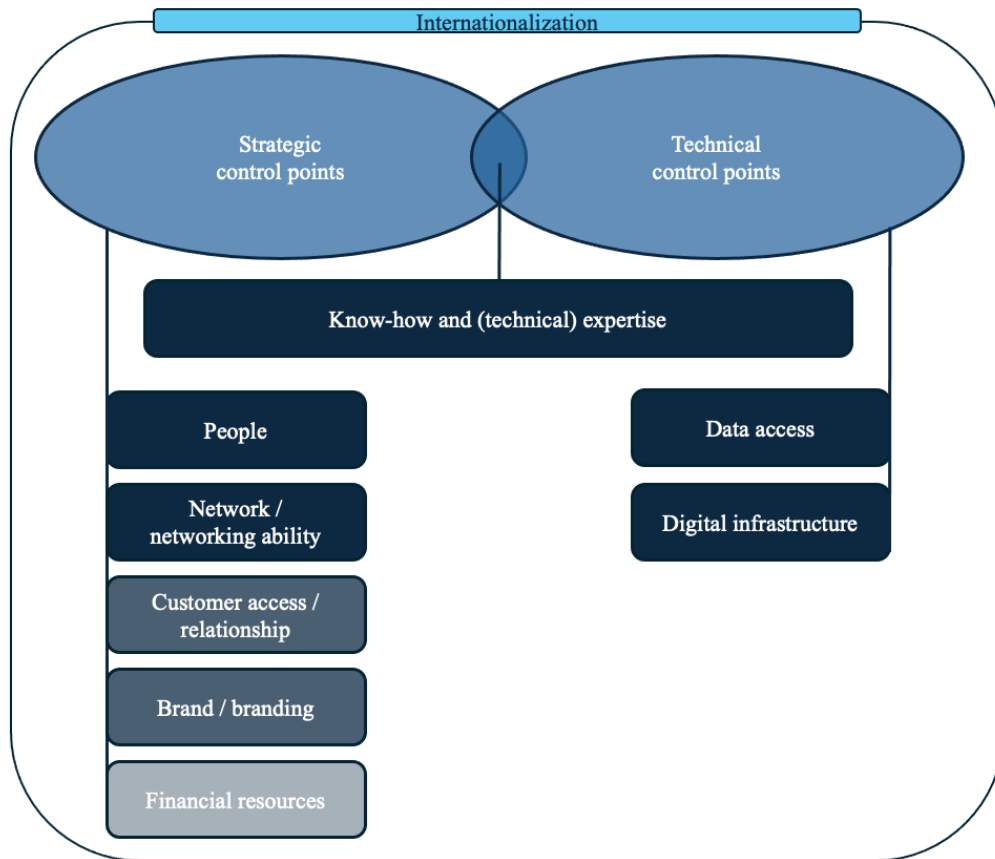
Besides agility, results reveal that the know-how within a company provides the firm with another non-location-bound FSA. Following existing theory (Herling & Provo, 2000; Sveiby, 1997), the experts stress that this know-how is directly linked to the people the company employs since they bring the expertise to the business. In terms of know-how, the interview insights point to the significance of knowledge in the form of best practices and lessons learned (Eriksson et al., 1997). Prior research stresses the importance of a network of partnerships (Hervé et al., 2020). The results in this study support these findings by stating that a good network of partnerships is considered an FSA, complementing that participation in international projects can enhance this advantage. Such projects provide firms for instance with valuable insights in different markets and access to crucial data that can be used for market analysis and knowledge collection for market entry strategies (Schellenberg et al., 2018). In addition to external resources, the results indicate that internal assets, particularly financial resources, are crucial, supporting prior findings (Lloyd-Reason et al., 2009). These resources represent the primary barrier to engaging in internationalization efforts.

As already mentioned in the context of the usage of data as an asset, firms need to consider data protection laws and the whole legal framework of a country when entering new markets (Eriksson

et al., 1997; Movius & Krup, 2009). The results support the theory that prior knowledge of given conditions in new markets is essential when entering new markets (Koch & Meckl, 2014; Strange & Zucchella, 2017). The interviewees highlight institutional boundaries in the sense of legal frameworks and persisting regulations as predictable elements that a firm can investigate and prepare for in advance. Mentioning the high degree of globalization of business practices, the interviewees observe that firms do not venture into completely unfamiliar territory. Therefore, experts stress the importance of assessing and evaluating less apparent factors, such as cultural dynamics within individual countries (Calantone et al., 2004).

Theory (e.g., Alcácer et al., 2016) as well as the results obtained, reveal that a firm's competitive advantage needs to be secured independently from whether the firm enters new markets or not. The theoretical framework of control points (Bohnsack et al., 2024; Trossen & Fine, 2005), which studies the competitive advantage, is reflected in the insights generated from the experts in the energy sector. Although previous research has introduced the concept of control points, these studies have mostly examined control points in the context of digital ecosystems (Bohnsack et al., 2024; Piller et al., 2021) or networks (Pagani, 2013). This study applies the control point lens to examine the internationalization process from another perspective. The results reveal, that even though the sole definition of a leveraging strength is not consciously defined as a control point, businesses do rely on their occupation.

Combining previous literature and insights from the interviews results, the diagram in figure 3 was derived, presenting the key control points for internationalization of firms in the energy sector. The control points are highlighted regarding their perceived importance for internationalization in the energy sector from darker blue (most important) to lighter blue.



*Figure 3: Key control points in internationalization*

Following existing literature (Bohnsack et al., 2024), the results from the interviews consider know-how as one of the most important control points in internationalization. Technical expertise facilitates the understanding, implementation, and proper utilization of new technologies. Additionally, industry knowledge enables a comprehensive understanding of market dynamics and customer needs, thereby allowing firms to offer solutions in the form of products or services that meet the specific demands of the market (Bohnsack et al., 2024). The experts stress that knowledge and expertise are directly linked and depend on the people within the company (Herling & Provo, 2000), which reveals another control point that needs to be added to the list of control points that were derived from previous studies (Bohnsack et al., 2024; Dattée et al., 2017; Pagani, 2013; Piller et al., 2021).

Furthermore, experts stress the importance of networks in the energy sector. Complementing theory (Hervé et al., 2020), the experts state, especially when internationalizing networks of partnerships and collaboration can provide valuable market insights, such as best practices or lessons learned.

Access to such market insights, especially in the form of data is considered to be another control point allowing firms to outperform their competitors (Bohnsack et al., 2024). The results from the interviews provide the example of data in the form of customer behavior and preferences as valuable insights. To effectively leverage this data and maximize its utility, firms must establish a robust digital infrastructure (Pagani, 2013; Hanelt et al., 2021). Particularly in the context of internationalization, experts emphasize the significance of the scalability of the digital infrastructure that facilitates adaptations to new environments, thus supporting global expansion at reduced costs.

Although adaptations are necessary, experts suggest that if a firm occupies a specific control point, this control point, similar to an FSA, will likely be non-location-bound. For example, significant expertise, which is directly linked to and dependent on the individuals within the company (Herling & Provo, 2000), is not constrained by geographical locations.

#### *Managerial implications*

Based on the insights gathered from theoretical concepts, previous studies, and expert interviews, several managerial implications emerge for the internationalization process of firms in the energy sector.

Managers should ensure that their BM is robust enough to persist across various environments, yet flexible enough to adapt to specific circumstances. This is crucial whether the company operates solely in its home country or expands into host countries. This includes continuously evaluating current digital trends and incorporating relevant technologies while maintaining a strong customer centricity. Given the great amount of data in this particular sector, managers should seek ways to utilize data by incorporating it into their BMs for value creation, capture, and delivery. To maximize the utility of data a robust digital infrastructure is required. Further, this infrastructure should be scalable to support global expansion and reduce costs associated with internationalization. To comply with the varying data protection laws in different countries it is recommended to establish effective data management, as part of understanding the whole legal framework in the target country to prepare for market entry. In this context, managers should also give attention to less apparent factors, such as cultural dynamics.

To secure a competitive advantage, firms should leverage on their FSAs and identify control points within their BMs. In this context, it is recommended to invest in training and retaining skilled personnel, as their know-how is a critical non-location-bound control point. Further, building and maintaining strong networks of partnerships can provide valuable insights into new markets. Participating in collaborative projects can enhance knowledge and market entry strategies.

## 6. Conclusion

The global energy transition has profoundly transformed the operational landscape for firms in the energy sector, necessitating adaptive strategies and innovative BMs (Hancher & Winters, 2017). This transition, driven by new technologies and the prominence of data, has fostered the development of digital ecosystems within the industry (Hanelt et al., 2021). Market liberalization initiatives, such as those led by the EU, have intensified international competition, compelling energy firms, once shielded by state ownership, to strategically evolve to maintain their competitive edge (Kolk et al., 2014).

This dissertation examined the internationalization processes of energy firms from a BM perspective, highlighting the crucial role of control points in securing competitive advantage in new market environments (Bohnsack et al., 2024; Pagani, 2013). Based on qualitative analysis from eight expert interviews, the study identified key control points essential for the internationalization process (Dattée et al., 2017; Trossen & Fine, 2005). *Know-how* is seen to be a technical as well as strategic control point (Bohnsack et al., 2024) and is directly linked to *people* within the company (Herling & Provo, 2000), which posits a strategic control point. Besides, *network abilities*, *customer access/relationships*, *brand/branding*, and *financial resources* are important control points from a strategic point of view. From a technical perspective *digital infrastructure* and *access to data* are considered most relevant (Bohnsack et al., 2024).

The findings emphasize the importance of adapting BMs to the dynamic market conditions introduced by digitalization and regulatory changes (Correani et al., 2020). Firms need to leverage their FSAs, such as specialized knowledge and technical expertise, to navigate the complexities of international expansion (Narula et al., 2019; Verbeke & Kano, 2016). The study also underscores

the significance of robust digital infrastructures and scalable systems to support global operations and compliance with varying data regulations (Johanson & Vahlne, 2009; Movius & Krup, 2009).

Furthermore, the research highlights that institutional boundaries are predictable and manageable with proper preparation and understanding of local market dynamics and cultural nuances (Eriksson et al., 1997; Johanson & Vahlne, 2009). The concept of control points, both strategic and technical, provides a valuable framework for firms to maneuver through different market settings, securing their competitive positions and enhancing their ability to profit from innovations (Pagani, 2013; Trossen & Fine, 2005).

In conclusion, the internationalization of firms in the energy sector requires an approach that integrates BM adaptations, strategic control point management, and a deep understanding of regulatory and cultural landscapes (Bohnsack et al., 2021; Eriksson et al., 1997). This dissertation contributes to the existing literature by bridging the gap between business model theory and international business studies, offering practical insights for energy firms aiming to thrive in the global market (Coviello et al., 2017).

### *Limitations*

Of course, this study comes with some limitations. The data in this study reveals exclusive insights from experts who work for firms in the energy sector or are somehow related to the energy sector. Future research could apply the same methodology to other industries to validate the findings. Furthermore, most firms in this study have a strong focus on providing digital solutions for their customer, thus the impact data has can significantly differ for other companies or different industries. The application of control points in other industries and further examination of the long-term impacts of digital ecosystems on international business strategies provide possibilities to expand on the findings. Furthermore, the limited number of interviewees leaves room for other perspectives or opinions on the respective areas of research. Thus, conducting larger studies and including for instance strategic managers or data experts could give more substance to the results.

## 7. References

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