“Consolidation of the energy sector, potential synergies, and realized shareholder value – survey and new insights from top managers’ perceptions”

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Consolidation of the energy sector, potential synergies, and realized shareholder value – survey and new insights from top managers' perceptions

Abstract

Synergies and resulting premiums are crucial for the success of mergers or acquisitions (M&A). Only few empirical studies upon synergies within the energy sector exist and these have partially been outdated ranging back to the 1980s. The following analysis, therefore, extends this field of research with two aspects: a new methodical component and geographical focus. The empirical, objective perspective is extended with an a supplamentary, subjective perpsective of top managers in energy firms. Moreover, the effects for Germany are analyzed. The investigation concludes that financial synergies are of minor importance for energy-related mergers. Scale and scope synergies as well as operational ones are of significance and manifest primarily in power generation and distribution functions. Subsequent synergy expectations are, however, supposed to differ from realized ones, due to the political nature of synergies, which is likely to have wealth reduction consequences for shareholders.

Keywords: mergers and acquisitions, energy industry, synergy effects.
JEL Classification: G34, L94, L95.

Introduction

In 1879 a new industry was born, the energy industry. With the invention of the light bulb, Thomas Edison initiated this development which was originally labeled as the illumination industry. In its first decades the market was highly fragmented with multiple providers for similar services as well as inefficient firm structures. This as well as other instances not surprisingly led the market to consolidation, in particular through an increased rate of mergers and acquisitions (M&A). Later developments which fostered more efficient market structures were changes in government issued regulations that were intended to also establish clear market structures (Froelich and McLagan, 2008). More recent market adjustments are targeted to deregulate the once highly regulated energy markets which proposes an increased uncertainty and an unpredictable market for utility firms. The primary objectives of the deregulation efforts are the facilitation of competition while allowing energy providers to move into all chain links of the energy value chain as well as to merge or acquire energy firms that are engaged in a different source of energy. Once the United States initiated their efforts to deregulate (Hess, 2010), the European Union followed in 2000 which led here to an increase in the energy-related M&A rate of 80% in 2004/2005 while the global energy-related M&A rate rose by solely 30% (Datamonitor, 2005). Obviously, the European market with its key players in Germany, France, and Italy appreciated the deregulatory activities as a means to grow.

A critical success factor in an M&A transaction is the bidder price, which should not exceed the expected benefits. In the light of this aspect, the transaction premium has been identified as a crucial explanatory factor for the bidders and target's revaluation (Moeller, Schlingemann, and Stulz, 2004). An M&A failure in this context is defined as the inability to generate shareholder value, while it has been conducted that especially the shareholder wealth of the bidding party is affected. In addition, a quadratic relationship is proposed between premium and bidder returns. That is, the premium has a positive influence on the shareholder value up to a certain level at which it becomes negative (Diaz Diaz et al., 2009). Thus, the value destruction does not result from the management's failure to capture the target firm's value but from the inability to not only capture, but also evaluate the potential synergies. By missing synergies at all or overstating their magnitude and thereby paying an excessive premium, an M&A transaction is set to fail (Kode et al., 2003). Madura and Ngo (2008) find evidence that premiums and thus also expected synergies are closely associated within an industry and highly depend on synergies of prior transactions. Moreover, Hambrick and Hayward (1997) conclude that the premium is primarily reflected by the bidder firm's performance, the CEO's media presence, as well as a measure of the CEO's self-importance. These findings highlight two critical incidences: being able to capture the actual synergy size is of utmost importance. However, firms apparently do not consider an operational approach for capturing synergies and thus are likely to overstate them.

Each industry with its unique characteristics has unique sources of synergies which need to be explored individually. Such a synergy investigation has for instance been done for the Taiwanese bank-

ing industry (Ting-Kun, 2010), the Indian pharmaceutical industry (Chaturvedi et al., 2007), or real estate industry (Campbell, 2002). Studies on synergies within the energy industry have either focused on deregulation effects in the US (e.g., Goto, Shang, and Sueyoshi, 2009) or on combinations of various energy sources (e.g., Fraquelli, Piacenza, and Vannoni, 2004). However, only few empirical research exists which has partially been outdated with studies ranging back to the 1980s. The following examination will initially summarize these energy-related synergy studies and thereupon extend this field of research with two additional aspects. Not only an additional data collection method is introducted to energy-related synergy research through interviews with top managers in the energy industry, but also a new geographical focus is considered. All previous studies consider an empirical, objective research perspective; thus based on quantitative capital market oriented data M&A motives and synergy drivers are inferred. Following this deductive, indirect approach vital insight potential gets lost which most likely contributes to the inconclusive evidence upon synergies in the energy sector. As such, Filippini (1998) along with Goto and Toshiyuki (2009) for instance conclude a rather small to neglectable importance of energy related synergies while Yatchew (2000) as well as Piacenza and Vannoni (2009) attribute these to obtain a high relevance. By considering a direct, interview driven research design we do not only contribute new evidence to the ongoing discussion, but also provide a novel perspective as we do not report ex post realized synergies without concrete knowledge of its sources but ex ante expected ones. This approach allows us to analyze so far unexplored aspects which additioanlly serve as both supporting and disagreeing elements regarding the existing evidence. Besides, Germany as the economic most powerful country in the EU which moreover obtains the largest electricity market in Europe (Pereira da Silva and Soares, 2008) has been neglected by prior research and hence shall be analyzed in the following. Hereby, as the majority of the existing literature is concerned with the US market, the new evidence of another highly relevant market place contributes to the diversity of this field of research and further advances the current discussion towards a more coherent perception of synergies.

On the whole, the examination thus extends the research upon synergies in general and specifically investigates a practitioners, value-chain driven perspective for the German energy sector. In this manner, empirical theory is combined with practical experience to retrieve a comprehensive analysis upon energy-related synergies. Thereupon, policy implications at the firm level are designed intended to increase the shareholder value generation.

The remainder of the paper is structured as follows. Section 1 describes recent market developments, followed by section 2 which analyzes particular synergies of energy-related M&A. Section 3 considers a practical perspective upon the German energy M&A market by conducting three expert interviews with leading utility firms which are assessed against the empirical findings in the next section. The final section summarizes the main findings and indicates further areas of research.

1. Consolidation of the energy market

Regardless of the energy source, the energy value chain is divided into three segments: upstream, midstream, and downstream. Each segment has specific characteristics which may be utilized in an M&A to generate synergies. The upstream sector requires scale to lower costs per customer. Thus, the focus is primarily laid upon commodity, low margin, and high volume aspects. The midstream segment extends the focus upon scale with physical assets, to not only reduce costs, but also to do marketing and trade capabilities, which are intended to lead to asset optimization. The downstream segment is driven by the convergence between primarily gas and electricity as well as other energy related services. It is expected that gas will increase its relevance as an energy source; the share of electricity generated by gas was 10% in 1999 and is expected to grow to 25% in 2015. The main driver for this development is its inexpensive generation and environmental benefits (Klimchuk, 1999).

Owing to this development the energy industry is in a state of transition which in the long run affects the to-be-realized synergies. In particular, the regulatory framework in Europe has changed within the recent years. It has been acknowledged that certain market segments, specifically energy generation and selling, have the potential to be liberalized which implies that multiple operators can provide similar services. Other segments, i.e., the transmission and distribution, still remain as natural monopolists. The traditionally parallel markets (open and constrained) were collapsed by the European Commission and therefore by July 1, 2007 all users had to have the possibility to negotiate their supplier, thus the price (Daim et al., 2010; Piacenza and Vannoni, 2009). Moreover, this market liberalization led to an increased M&A activity within the European energy market as large market players took over smaller ones. As for the year 2004-2005 an M&A deal increase of 80% has manifested which was substantially above the global increase of 30% (Datamonitor, 2005).

Besides, the utility market convergence with an increasing relatedness among the various networks further promotes these growth prospects (Fraquelli, et al., 2004). Various energy sources are thus bundled which changes the overall market structure by being able to package different energy sources such as gas and electricity. In Germany for instance, the merger between E.ON and Ruhrgas in 2003 significantly shaped the energy environment (Granier and Podesta, 2010). A resulting question however is, whether bundling leads to synergy effects and if so which effects are predominantly relevant. This aspect will be addressed in the next section.

With respect to diversification effects of M&A it is distinguished between four types of energy M&A: (1) focused M&A between identical energy sources (i.e., electricity and electricity M&A); (2) convergent M&A between gas and electricity firms; (3) concentric M&A between an electricity or gas firm with another energy source such as water; and (4) conglomerate M&A between an electricity or gas firm with an unrelated line of business (Bösecke, 2009). An investigation of US energy related M&A reveals that firm growth manifested, yet at the expense of profitability with the results of focused, convergent, and concentric M&A being above those of conglomerate ones (Studness, 1996). In contrast, Jandik and Makhija (2005) propose that diversified utility firms create value through investing in unrelated businesses, while focused utility firms tend to overinvest in their particular business and thereby destroy value. This finding would moreover imply that synergy effects did not manifest. Finally, Geiger and Hoffmann (1998) focusing on investor-owned utility firms conclude an inverted u-shape relationship between diversification and performance. Thus a moderate level of diversification is expected to benefit the firm performance. Hence, it is questionable to which degree diversification drives synergy effects in this industry.

Furthermore, other main influential factors within the energy market are concerns about climate changes which force governments to intervene and thus foster the reorganization of existing market structures (Flamos et al., 2010). Fossil fuels as the major source of energy consumption while providing 80% of the global energy are responsible for 60% of the greenhouse gas emission. Therefore, if the stated objective of a zero-carbon-emitting energy sector by 2050 in the developed world shall be achieved, energy production has to change dramatically driven by renewable energy sources. These are free of any fuel supply constraints, produce no or only minor emission, and are widely available (Froggatt and Levi, 2009). The European Union in particular has proposed a "20/20/20" objective forcing a 20 percent greenhouse gas reduction, saving 20 percent of the European energy costs, and consume 20 percent from renewables (Stankeviciute and Criqui, 2008). Therefore, consumption patterns are expected to change and the question to which degree this change will affect the usage of energy arises. This is in particular important for the following research since utility providers have to adopt accordingly and thus will shape their respective M&A strategy. However, only a subset of the market is sensitive to climate changes with respect to their energy consumption. For instance, gasoline and jet fuel is highly seasonal (during peak summer travelling seasons) but not reactive to climate changes while electricity and gas are. To measure the effects of climate sensitive energy demand Considine (2004) computes an elasticity measure, capturing the percentage change in consumption due to a percentage change in heating or cooling degree days. He concludes that heating degree changes have a higher elasticity for all energy sources (except natural gas) than cooling. This implies that energy consumption should shrink due to global warming since an increased fuel usage during summers is offset by a reduce usage during warmer winters.

2. Synergies in the energy market

2.1. Scale and scope synergies. On a theoretical level it is suggested that regardless of the M&A type, may it be focused, convergent, or even unrelated, scale effects manifest in the retail segment of the value chain. Through the consolidation of billing systems or call centers, costs are shared. Besides, resulting joint sales structures have the potential to lead to scale economies (Bösecke, 2009). Scope economies can result due to shared inputs such as meter reading, accounting, and engineering services. In addition, intangible assets such as management expertise or demand forecast systems have the potential to lead to economies of scope (Sing, 1987).

Sing (1987) analyzes the realization of scale and scope synergies with respect to the gas and electrical services industry in the US in the 1980's and examines whether combinations of these two utilities are more efficient than sole ventures with one source of energy. He concludes that the mean combination utility generates diseconomies of scope. Nevertheless, for certain combinations scope economies are present. Thus there is the potential to attain these synergies yet the average firm is not able to do so. Furthermore, the costs for the average gas and electrical combination unit can be decreased by 7.2% if those services are provided

separately. While investigating scale economies solely product-specific scale economies are demonstrated for electricity yet not for gas.

A similar study by Fraquelli, Piacenza, and Vannoni (2004) for the Italian market extends the utility focus towards water utilities besides gas and electricity. In contrast to Sing (1987), economies of scope are demonstrated for firms smaller than the sample median. Besides, the smaller the multi-utility firm, the higher the economies of scope; in particular, cost savings range from 33% for relatively small multi-utility firms to 12.6% for larger ones. For those firms in excess of the median size neither economies nor diseconomies could be identified. Thus resulting cost savings are not anymore offset by any factors such as Sing (1987) proposed and utility firms are able to create scope economies. Concerning economies of scale similar results are concluded. For firms smaller than the median increasing returns to scale are identified yet for larger firms they diminish. Therefore, small firms which engage in M&A have the potential to lower their overall costs. Besides, as already partially proposed by Sing (1987), for large firms none to minor cost advantages are concluded, hence recent merger waves in the EU of large multi-utility firms must be borne by aspects other than cost savings.

A detailed value chain analysis reveals additional insights. In particular the focus is laid upon the generation as well as distribution stage. A study by Christensen and Greene (1976) in 1955 measuring scale economies within the generation segment of the value chain is able to prove these, yet an identical investigation in 1970 is not able to do so as well. It is proven that the degree of scale economies diminishes with firm size and therefore it can be inferred that electricity generating firms had not exhausted their size in 1955. During the particular time frame from 1955-1970 electricity sales in the US grew from 369 to 1,083 billion kwh, thus the average firm was able to triple its output. Thereby most firms also exhausted their scale potential and only smaller market participants are able to still achieve econo-mies of scale (Christensen and Greene, 1976).

Within the distribution segment *wires* and *supply* are the two main cost aspects. Wires refer to the required infrastructure, while supply refers to marketing and administrative functions as well as the allocation of the energy between the generator and customer. Overall, wire-related costs account for 59% of the total distribution costs while supply-related costs account for the remaining ones. Of the total wire costs the physical network accounts for two thirds. This particular cost item is a fixed cost one. With respect to supply costs the main cost items are of a variable nature such as for instance customer accounts. The scale calculation reveals that economies of scale exist for the distribution on a whole and in addition for its components wires and supply. In particular, the scale economies depend on the mwh of output as well as on the customer density (i.e., economies of density) yet not on the territory size. However, the scale economies for wires are substantially larger than for the distribution since the fixed costs are averaged over more customers if the customer base can be increased. In addition, electricity and gas combinations in particular lower the operation costs for supply related activities as well as costs associated with customer accounts (Kwoka, 2005).

With respect to single energy sources, existing evidence indicates a variety of emerging scale and scope related synergies along the production, trading as well as distribution stages of the value chain. On the production side, cost synergies can result due to common procurement activities which finally lead to favorable purchase conditions. Other cost synergies potentially arise during the trading stage where human resources as well as infrastructure partially become obsolete due to redundancy; yet only if the M&A is within the same geographical boundary (Bösecke, 2009). Scale synergies at the distribution stage have been identified above such as the usage of common grid networks as well as their maintenance or economies of density.

Piacenza and Vannoni (2009) complete an investigation of the Italian electricity market in the period of 1994-2000. Overall they report that costs increase more than proportionally with the increase of all outputs for the median firm. Thus, for focused electricity M&A in contrast to diversified energy-related M&A scale synergies are identified. Moreover, scale synergies are demonstrated for vertical as well as horizontal aspects, hence at a particular stage and by multiple products. On the other hand, scope economies (both vertically and horizontally) are significantly lower than the sum of the individual costs. This finding implies that firms specialized solely on serving one customer group (residual or industrial) or solely on power generation have higher costs. Therefore, this particular research identifies substantial synergy potential for electrical energy firms and suggests that related M&A lead to synergies. Comparable scale related findings for the electricity market are concluded by Salvanes and Tjotta (1994) for Norway, by Burns and Weyman-Jones (1996) for England and Wales, by Filippini (1996) for Switzerland, and by Yatchew (2000) for the Canadian electricity market.

On the whole, scale and scope synergies are identified for small multi-utility firms while empirical studies cannot demonstrate these for larger ones. Moreover, for single utility firms scale economies are retrieved as well as for the power generation and distribution segment.

2.2. Financial and operational synergies. According to Bösecke (2009) financial as well as operational synergies primarily manifest during the final stage of the energy value chain, the administration. Here, synergies can result due to the consolidation of management boards, strategic planning departments, as well as through shared services. Especially focused M&A have the potential to consolidate business units and thereby combine best practices and enhance the operational efficiency.

Goto, Shang, and Toshiyuki (2009) investigate whether diversified electrical utility (gas-electricity) firms outperform electricity-concentrated ones from a financial point of view during 1990 and 2004 in the US. In a first instance they show that there is a positive causality between the studied firms' financial performance and their corporate value (measured with the Tobin's Q). The corporate value of multi-utility firms is higher than for single utility firms before the market deregulation. This trend reversed after the deregulation. Hence solely prior to the deregulation financial synergies are realized by extending the utility focus. Overall, it is thus suggested that within the deregulated European market diversification harms financial performance and the best strategy is to focus on one utility only. This finding is in compliance with the findings on scale and scope synergies for large multi-utility firms.

Goto and Sueyoshi (2009) analyze the operational performance (productivity) of electricity firms against electricity/gas combinations. The investigation reveals that electricity focused firms outperform diversified ones. Hence there were no operational synergies present in the US for diversified utility firms. Nevertheless, the average operational efficiency of electricity focused firms is decreasing from 1996 on while the one of diversified utility firm remains constant. This implies that deregulation policies greatly affect sole ventures in favor of the multi-utility combinations (Goto and Sueyoshi, 2009). Therfore, a convergeance of the energy market can be inferred which is further supported by the fact that bi-energy bundles between gas and electricity increasingly manifest in the market place. On the long run Granier and Podesta (2010) propose that the combinations of energy sources will lead to synergies yet not attained in the short run after the deregulation.

Furthermore, Garnier and Podesta (2010) demonstrate that prior to any deregulatory activities, hence prior to being able to bundle products, there is no incentive to engage in any M&A activity. Independent pricing does not trigger M&A. This is in compliance with the studies discussed above which were unable to spot benefits from an energy M&A. However, once a bundle is offered to the market all other market participants have an incentive to do so as well. Through bundling firms attract additional customers by setting, for instance, lower prices and therefore other market participants are unable to compete. For instance, after the merger between Gaz de France and Suez prices for bi-energy bundles were at a discount of 36€ as compared to the individual prices on an annual basis (Granier & Podesta, 2010). However, this price reduction may only be feasible if synergies evolve.

2.3. Summary of empirical evidence on energy sector synergies. Owing to the empirical research discussed above, synergy potential is suggested for certain energy-related M&A. Table 1 summarizes these findings which will serve as a guideline for the discussion of our interview-based research. The majority the empirical studies is completed prior to the market deregulation and thus is solely concerned with single energy sources; especially electricity and in particular with scale and scope synergies. Other synergy effects as well as bi-energy product bundles which are popular under the recent deregulated market are not specifically investigated.

Table 1. Synergies in the energy sector: an overview

Study	Utility focus	Synergy objective	Timeframe	N	Findings	Comment
Christensen & Greene (1976) Focus: US	Power generation	Scale synergies	1955-1970	124	Scale economies diminish with increased firm size	/
Sing (1987) Focus: US	Gas/electricity utilities	Scale/scope synergies	1981	108	Mean utility firm has diseconomies of scale/scope	Certain combinations display synergies
Salvanes & Tjotta (1994) Focus: Norway	Electricity utilities	Scale synergies	1988	91	Scale synergies only for small utilities	/
Burns & Weyman-Jones (1996) Focus: England/ Wales	Electricity utilities	Scale synergies	1980-1993	12	Evidence for scale economies for all utilities	/

Table 1 (cont.). Synergies in the energy sector: an overview

Study	Utility focus	Synergy objective	Timeframe	N	Findings	Comment
Filippini (1998) Focus: Switzerland	Electricity utilities	Scale synergies	1988-1991	39	Economies of density for small/medium utilities	No scale synergies for large utilities
Yatchew (2000) Focus: Canada	Electricity/ water utilities	Scale/scope synergies	1993-1995	81	Scope synergies are suggested for small utility firms	/
Fraquelli, Piacenza & Vannoni (2004) Focus: Italy	Gas/electricity/ water utilities	Scale/scope synergies	1994-1996	90	Small utility firms display economies of scale/scope	No synergies for large multi-utilities
Kowka (2005) Focus: US	Power distribution	Scale synergies	1989	436	Scale economies are conducted	/
Piacenza & Vannoni (2009) Focus: Italy	Electricity	Scale synergies	1994-2000	25	Vertical and horizontal scale synergies	/
Goto, Shang & Toshiyuki (2009) Focus: US	Gas/electricity utilities	Financial synergies	1990-2004	104	Synergies vanished for multi-utilities after deregulation	/
Goto & Toshiyuki (2009) Focus: US	Gas/electricity utilities	Operational synergies	1990-2004	104	No synergies for multi-utilities	/

3. Methodology and findings

3.1. Interview method and rational. Solely considering the transaction premium as a tool to capture synergies it is proposed that these exist for all energy-related M&A. On average the premium for purely electricity focused M&A in 1999 was 22% while it was 27% for a mixed-utility merger between electricity and gas (Klimchuk, 1999). Yet, empirical research previously discussed shows only minor synergies for specific M&A transactions, thus the additional perspective of practitioners shall sheet light upon this discrepancy. We, therefore, especially conducted a clinical study to be able to identify unique aspects which do not *average out* though a larger sample size.

Additionally, daily business confronts managers with obstacles or incentives empirical research does not explicitly focus on. Obstacles are, for instance, Roll's Hubris Hypothesis (Roll, 1986; Homberg and Osterloh, 2010), agency conflicts (Mueller, 1969), diverging incentives between the management and firm owners (Painuly, 2009), or opportunity costs (Edlin and Stiglitz, 1995). These aspects may however significantly shape the perception of synergies and hence their disregard potentially leads to misleading conclusions. Therefore, interviews as a supplementary research instrument are most suitable to extend and aid to the understanding of the existing energy sector synergy research. Thus the intention is to incorporate as well as to expand the field of synergies by the managerial and to a certain degree behavioral perspective of the involved decision makers. Owing to this goal we intentionally conducted open-ended interviews to enable the experts to not only direct the focus towards their perceived importance, but also to elaborate on rich detail. Furthermore, prior empirical studies have unanimously focused on single synergy effects while our interview research methodology allows us to additionally investigate the interdependency and relative importance of various synergy sources. Moreover, the extensive practical experience of the interviewees increases the expressiveness of their opinions and allows to infer, in combination with existing empirical findings an actual perspectives upon the generation of synergies and correspondent shareholder value.

All interviews were structured open-ended, following the outline below (see Figure 1) with the objective to identify drivers for shareholder value, generated by synergies. Therefore the interviews were split into three sections with respect to each synergy sources. The focus of each category was to identify (1) the perception and relevance of the synergy source within the energy sector, and (2) the primary value driving characteristics. Thereby, the prior described literature review serves as the basis for the discussion.

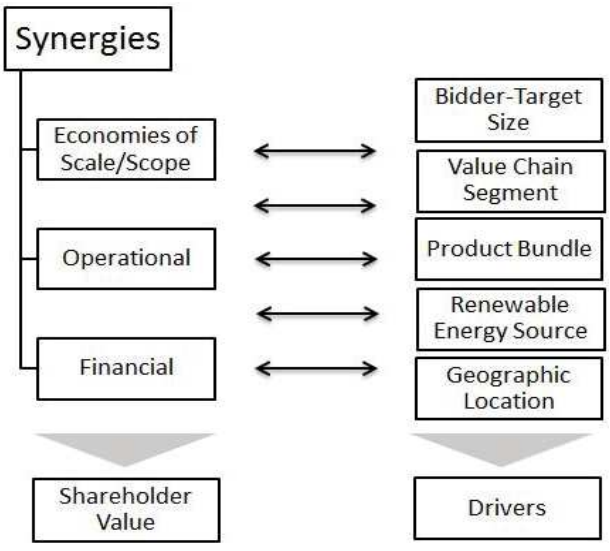

Fig. 1. Interview structure

The interviews were conducted on August 30, September 9, and 13, 2011 with three managers of the three leading, publicly traded energy providers in Germany. The first interviewee, currently serving as the head of controlling and M&A valuation has more than 8 years of work experience. Prior to his current position he was employed as an M&A project manager for four years and served two years as the assistant to the chief financial officer. The second interviewee with four years of M&A experience is employed as an M&A project manager. Prior to this position the expert served as an M&A speaker for three years. The third industry expert has worked for leading consulting firms with a focus on the financial sector and M&A advisory for more than five years after joining a German utility firm in 2008. Currently, the interviewee is employed as a group speaker for group planning and controlling. Combined, the interviewees have more than 17 years of experience and followed as well as valued multiple M&A transactions in the field of energy. Due to disclosure reasons the interviews are discussed anonymously without indicating any firm specific information.

3.2. Findings. Overall, the expert's statements concerning the multiple research areas had a high degree of uniformity. Thus, we cannot expect to attain additional, relevant perspectives by conduction further interviews. On the whole, the generation of synergies is not described as the primary goal of the M&A activity, rather the strategic reorientation is placed as the initial objective. Frequently the M&A strategy is to increase the market presence and thereby strengthen the market power. Synergies are described as a *nice-to-have* factor while their role is twofold. They are in fact essential for the bidding price calculation, thus for the premium calculations. On the other hand, they are a critical aspect which can be released to internal bodies as well as investors to support the M&A.

Financial synergies appear to be attained the simplest and are not specifically generated due to any energy-related activity but owing to the financial transaction. One interviewee is not aware of any transaction in which financial synergies, besides the transaction-related ones evolved at all. Therefore, it may be implied that these particular synergies rather demonstrate a side effect and are not specifically taken into consideration in an M&A.

Operational synergies are directly associated with cost savings. These can especially result if an already established business unit is increased in size and they manifest particularly in the distribution and retail segment of the value chain. Thus the synergy driver is the number of customers. One interviewee argues that the cost savings especially manifested in the smaller firm of the merging entity while another interviewee perceives that the operational synergies can be maximized if the merging entities are of equal size and thus have an equal rights allocation. Under these conditions organizational structures as well as number of customers correspond which enables the most efficient integration and synergy realization. However, operational synergies are also subjected to be the most difficult to realize within the German market. According to one interviewee roughly only one third of the intended and communicated magnitude is actually realized. An explanation is redirected to the organizational structure of most German energy firms. The significant market players, which were formerly state-run, are still subjected to have highly bureaucratic structures. Therefore, the implementation and reorganization of organizational procedures is difficult and time-consuming. For instance, reducing the headcount is supposed to be a common operational synergy, yet especially German firms are struggling to do so due to powerful Employee Work Councils.

Economies of scale and scope are indicated to be especially present in certain areas of the value chain, namely energy trading and within purchase aspects. Purchasing power can be built through increased size, thus an increased amount of mwh, which enables favorable purchase conditions and reduces costs. Moreover, if the M&A is also able to increase the market power, margins can be increased which would also account as a synergy effect. Hence the latter aspects of the value chain can also be targeted to generate synergies. In addition, scope and scale economies manifest within interdisciplinary functions. However, these synergies are described to be not as substantial as in other industries since their potential is not as large. The existing networks can only be leveraged to a certain degree and thereby cap the synergy potential. Therefore, if the territory size is increased through the merger, new network grids have to be acquired or built and hence newly gained customers cannot be fully utilized to spread the fixed costs.

With respect to product bundles the gas/electricity bundle is supposed to demonstrate the highest synergy potential since these energy sources illustrate the same features such as consumption-dependency or price-sensitive customers. Thus, operational synergies can be attained. Besides, customers of this segment, the so-called dual-fuel customers, are the ones which demonstrate the highest profit potential since two products are sold in one instance. Thereby two margins are gained while associated costs occur

only once. This however, on the other hand, leads to intense competition in the gas-electricity market segment. Furthermore, this market is expected to grow, thus the convergence of electricity and gas can reasonably be projected to increase which should lead to increased synergy effects across markets.

Bundles with renewable energies rather serve as a pulling factor than as a synergy generating element. Thus, customers shall be attracted by additional bundle offers with renewable energies yet potential synergies cannot be redirected to the regenerative nature of the energy. Nevertheless, German energy firms are actively pursuing M&A with regenerative energy sources in order to acquire the most recent technology for their energy generation portfolio and to be able to be part of the knowledge generation process. Since the customer's willingness to pay in excess due to the renewable energy generation is low no scale can be attained which potentially enables synergies. As has been elaborated above the synergy source is the increase in customers and this so far does not manifest in the market.

Another perspective indicates that no bundle reveals any superior synergy potential but the firm's focus on, for instance, exploration or distribution as well as the territory size accounts for synergies. Therefore, in contrast to the prior industry experts, traditional and renewable multi-utility combinations have an identical synergy potential.

Besides, all interviewees describe the geographical distance and hence the consequent cultural distance as important for the M&A success and the synergy generation. A precondition for synergies is the integration of departments and the industry experts proposes that a closer cultural distance on average leads to higher synergies. However at which *distance* the synergy generation is affected is perceived differently. One interviewee argues that an outside-Germany M&A will affect synergies while another expert perceives that solely M&A outside the EU have the potential to do so.

4. Discussion and implication

Empirical research documents solely minor synergies, yet premiums (reflecting synergies) in the order of 22% for mixed utility mergers (Klimchuk, 1999) are paid, hence managers perceive synergies differently; a final comparison assessing the empirical research perspective against the managerial perspective with respect to synergy sources and value drivers is presented below by Tables 2 and 3.

Table 2. Importance of shareholder value effects from synergies

Study	Scale and scope synergies	Operational synergies	Financial synergies
Christensen & Greene (1976)	Medium importance	-	-
Sing (1987)	Low importance	-	-
Salvanes & Tjotta (1994)	Medium importance	-	-
Burns & Weyman-Jones (1996)	High importance	-	-
Filippini (1998)	Medium importance	-	-
Yatchew (2000)	High importance	-	-
Fraquelli, Piacenza & Vannoni (2004)	High importance	-	-
Kowka (2005)	High importance	-	-
Piacenza & Vannoni (2009)	High importance	-	-
Goto & Toshiyuki (2009)	-	Low importance	-
Goto, Shang & Toshiyuki (2009)	-	-	Low importance
Interviews	High importance	Medium importance	Low importance

The interviewees concluded that scale and scope economies are the primary arising synergies regardless of the M&A, be it focused or unrelated. This finding is in support of empirical research which demonstrates scale and scope economies for certain energy-related M&A. The synergy sources, i.e. those merger characteristics driving the value effect, are according to the industry experts described similar to the ones concluded on the US market (Kwoka, 2005), namely the increased customer density and not the increased territory size. A distinction between these features is of significance as territory size may increase while customers density does not, hence M&A officials need to examine the population within potential acquiring regions. Moreover, empirical research evidence and managerial experience confirm the presence of scale and scope synergies, particularly within the power generation segment of the value chain. Besides, financial synergies are subjected to be rather of minor relevance and thus the empirical research which was not able to demonstrate any financial synergies (see Goto, Shang, and Toshiyuki, 2009) in the US market is supported within Germany. No financial synergies may be traced back to any energy sector chain link.

Table 3. Synergy effect drivers

Study	Value effects	Interview
Christensen & Greene (1976), Salvanes & Tjotta (1994), Fraquelli, Piacenza & Vannoni (2004)	Synergies diminish w/firm size	Synergies can be maximized w/similar firm size
Sing (1987)	Increased quality diminishes synergies	-
Yatchew (2000)	Product bundles drive synergies	Product bundles drive synergies
Burns & Weyman-Jones (1996), Kowka (2005)	No of customers and mwh drive synergies	No of customers and mwh drive synergies
Piacenza & Vannoni (2009)	Related M&A drive synergies	Unrelated product bundles experience increased synergies
Goto & Toshiyuki (2009)	Deregulation increases synergy potential	Cross-sectional mergers enabled through deregulation increase synergies
Goto, Shang & Toshiyuki (2009)	Deregulation decreases synergy potential	Cross-sectional merges enabled through deregulation increase synergies

The perspective upon operational synergies is twofold. Energy-related M&A have the potential to generate these, yet their ex ante measurement and ex post generation is questionable. A significant proportion of this synergy type is characterized as best practice approaches and subsequent value (i.e. synergies) results from their transfer to the bidder or target firm. Most frequently, according to the interviewees, the bidder firm transfers its knowledge and implements their operational procedures being the more powerful party. However, these aspects, especially their dollar figure value effect, can hardly be measured ex ante and thus operational synergies are somewhat ambiguous. This finding also serves as an explanation for the results by Goto and Toshiyuki (2009) who were not able to prove operational synergies for multi-utility firms. Thus our interviewees in contrast to the empirical studies which are based on stock market data do not perceive operational synergies as irrelevant. Moreover, this ambiguity hints towards the political aspect of synergies which is an essential aspect that was not considered by prior capital market-based studies. The interviewees mention that synergies are a mean to support an M&A decision and, therefore, higher synergies are expected to increase the probability of its realization. Thus, if certain approval processes are necessary, synergies might be computed towards a higher magnitude especially with respect to ambiguous aspects such as operational synergies. This conclusion may furthermore also demonstrate the presence of Roll's (1986) Hybris Hypothesis within the German energy market. Potentially, managers in the energy sector seem to be overconfident about the realization of operational synergies, hence communicated synergies possibly do not realize. As these are however most likely priced in the transaction value, shareholders will experience a loss from their non-realization.

This political aspect also reveals its relevance by considering the efforts towards renewable energy sources. The experts indicate that only minor synergies are possible due to the renewable nature of the energy yet M&A between black and green utility firms are pursued. Communicating synergies in the light of this process may thus serve as an efficient tool to support the M&A decision, yet their degree of implementation is again questionable, which prevents empirical research from demonstrating them and again highlights the necessity of our interview driven research design. Thus, it appears that synergies also serve as a tool to fulfill personal goals under the deregulating environment. Moreover, M&A in the German energy market, as our experts describe, apparently has the potential to evolve market power contradicting the research by Fee and Thomas (2004).

With respect to product bundles the expected convergence by empirical studies of gas and electricity can partially be confirmed. Thus, the favorable development of the deregulation for utility-bundles as predicted by Granier & Podesta (2010) for the US market also manifests in the EU. One expert further indicates a higher synergy potential for gas/electricity bundles in contrast to other bundles which is yet not in accordance with empirical findings by Fraquelli, Piacenza, and Vannoni (2004). The reasoning for this discrepancy may be that due to intense price competition in the German and also in the European market emerging synergies are frequently used to lower consumer prices and thereby the prior gained benefits diminish. Thus market pressure may force firms to fully transfer the value generation (i.e. synergies) towards the consumer. Other experts support the view that all bundles create similar synergy potentials, while also considering renewable energy sources. Therefore, it cannot be finally concluded whether certain utility combinations demonstrate higher synergies.

Lastly, the interviewees indicate a discrepancy between planned and thus communicated synergies and their actual implementation which decreases the realized shareholder value; the transaction price incorporates communicated synergies and the failure to realize these decreases value. Nonetheless, the potential to generate synergies is given throughout the value chain as indicated.

Overall, we are able to draw the following policy implications at the firm level. M&A are designed to maximize the shareholder wealth generation and evolve in particular with regards to the deregulated European energy market. Synergies in general do not increase with an increased territory size, hence value-generating M&A should seek for targets that maximize the number of customers and also widen their focus towards other energy sources. Besides resulting synergies, a diversified utility portfolio also serves a risk reducing element which consequently also increases perceived shareholder value. Secondly, empirical as well as managerial research suggests the highest synergy potential for scale and scope economies. However, these predominantly only evolve if the merger leads to the creation of product bundles (i.e. an unrelated M&A) and moreover increase with a higher geographic proximity. Hence, best possible the M&A should (1) add a novel energy source to the product portfolio and (2) the target should be located within the same region. Unanimously the industry experts perceive mixed bundles to share operational costs at the maximum level while increasing revenues. The latter is the driving value generating force as related mergers increase revenues to a lesser extent. Therefore, contradicting empirical capital market-based studies operational synergies are relevant. Thirdly, the payment of an increased transaction premium solely owing to expected operational synergies is nevertheless likely to lead to a loss of shareholder value. The realization of this particular synergy source is highly ambiguous and thus can solely partially be predicted ex ante. Consequently, decision makers should not allocate too much weight upon their importance in terms of merger benefits. They at least should include a kind of precaution discount for expected operational synergies to prevent a loss for their shareholders. Fourthly, mergers with renewable energy sources do not in particular have an increased synergy potential. Renewables are highly supported by government institutions and are perceived as the future growth market which fosters utility firms to pursue M&A within this market sector. Nonetheless, firms should be caution to base the transactions premiums upon emerging synergies generated through these transactions and rather base potential premiums upon future market growth and an eventually increased market share. Otherwise, a loss in shareholder wealth appears to be likely.

Conclusion

Our analysis intends to advance the empirical discussion upon energy related synergy effects, in particular within Germany. To establish a theoretical understanding synergies within the energy sector are discussed. This analysis reveals that the industry's unique structure highly influences the synergy potential. The European energy market is in a state of transmission towards liberalization. All energy providers are thereby enabled to acquire or merge across markets, which also enables single firms to provide multiple services such as bi-energy product bundles. Besides, the government-demanded transition towards renewable energy sources requires energy providers to widen their product portfolio and a common mean to do so is through M&A.

The investigation upon scale and scope economies demonstrates that while considering the whole energy value chain only minor to none synergies exist. Scale and scope economies are only demonstrated for small utility firms. However, a more detailed examination demonstrates that certain segments of the value chain have synergy potential, namely the distribution and generation (Christensen and Greene, 1976; Piacenza and Vannoni, 2009). These empirical findings are supported by industry expert interviews. Operational synergies, the second most relevant synergies according to interviewees, are mostly present in the distribution and retail segments of the value chain. Furthermore, it is indicated that the size relation between bidder and target matters; however perspectives hereupon vary significantly and no final answer concerning the target or bidder size can be concluded.

Finally, financial synergies are perceived to be not as relevant as within other industries. Their generation, according to the expert interviews, is not unique to any energy-related M&A and empirical research concludes that diversification towards other utilities actually harms the financial performance (Goto, Shang, and Sueyoshi, 2009).

To further increase the expressivness of synergies during energy-related M&A in the EU it is suggested to advance the quantitvate analysis based on the implications of the conducted expert interviews. In this light, it is of relevance how the capital market evaluates the communicated synergies since their measurement is highly ambiguous; a gap between communicated and implemented synergies has been proposed, in particular due to political behavior of managers. Hence, the question of whether the capital markets discount the communicated synergies evolves. Besides, it is suggested that the varying effects of focused and unrelated M&A are analyzed. In addition, the factors contribution to the magnitude of the energy-related synergies should be explored in more detail, such as the cutural distance or size relation between the bidder and target firm.

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