COOPERATING FOR THE FUTURE:

A CASE STUDY OF THE ASHKELON DESALINATION PLANT

BY

C2010

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Submitted to the graduate degree program in International Studies and the

Graduate Faculty of the University of Kansas

in partial fulfillment of the requirements for the degree of

Master's of Arts.

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COOPERATING FOR THE FUTURE:

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Abstract

The purpose of this thesis was to determine when it could be advantageous for two competing technology companies to cooperate with one another. To answer this question, an illustrative case study of the Ashkelon desalination plant was analyzed against traditional theories and, once those theories were proven to be insufficient, a more refined contingency approach of cooperating for the future was proposed. This thesis' study revealed that a competing technological company can cooperate with a competitor, if their collaboration promises to result in a breakthrough technology or advancement for an emerging market. In addition to the introduction of a contingency approach that is in favor of technological competitors cooperating, the final chapter also provided managerial advice to help understand and apply the cooperating for the future approach.

1. Introduction

Hamel and Prahalad describe competition for the future thus, “Alliances are being formed, competencies are being assembled, and experiments are being conducted in nascent markets – all in hopes of capturing a share of the world’s future opportunities. In this race to the future there are drivers, passengers, and road kill” (Hamel et al., 1994, 28). Today the survival of companies depends on their ability to be innovative within their research and willing to form beneficial cooperative ventures.

Within this vein, the research question of this thesis is concerned with when it could be advantageous for two competing technology companies to cooperate with one another in an international joint venture. In general, the term IJV is an alliance between two or more companies to create a new organization, either permanently or temporarily, that is distinct from the IJV participants (Inkpen et al., 2007, 2). Such a joint-venture can be either national or international and can involve friendly or competing participants. Some existing motivations for competitors to cooperate are: gaining access to a domestic market, sharing risks and costs and creating economies of scale, etc.

This paper focuses on how the optimal conditions for a cooperative IJV between can be reconsidered. The argument of this thesis demonstrates an approach by which competing technological companies can cooperate in order to become more competitive, even as they continue to compete against one another as individual companies. Specifically, this paper reveals that it is advantageous for two competing technology companies to cooperate when their collaboration promises to result in a breakthrough technology or advancement for an emerging market. The result is a suggestion of how a motivating factor can push competing companies to work together

successfully. This paper uses both primary resources from the case study participants' websites, as well as archival sources from business publications and news journals.

In chapter 2, a review of literature focusing on cooperation and international joint ventures (IJVs) between competing technology companies is discussed. Above all, both the traditional motivations for the formation of an IJV and the challenges of creating a successful IJV between competing participants are shown.

Chapter 3 details the characteristics of the Ashkelon case, the construction of the largest desalinating water plant in the world. In particular, the competing company participants of the Ashkelon case (IDE and Veolia) and the components of their IJV are discussed. In addition, the effects and possible complications of the Ashkelon IJV for IDE and Veolia are considered.

Chapter 4 considers the existing theories on cooperating competitors from chapter 2's literature review and uses the theories in an analysis against the Ashkelon case. In the end, the pre-existing IJV theories prove to be insufficient when considered against the Ashkelon case. Consequently, an approach of cooperating for the future is suggested as a possible motivating factor for the Ashkelon IJV's ability to become a success despite challenging factors which could have impeded the IJV endeavor. In addition, the possible rewards for competitors who choose to cooperate for the future are highlighted. Lastly, an option for further research is considered.

Finally, chapter 5 provides applicable small- and large-scale recommendations for company managers who are considering the formation of an IJV with a competing technological company and who would like to understand how to recognize and utilize the approach of cooperating for the future within their companies.

2. Literature Review of Cooperation between Technological Competitors

"Technological innovation [is] the means by which the ability to compete is sustained – the investment that ensures that a company will still be in business in five years' time. It is the most important fixed cost that the modern multinational must support" (Collins et al., 1991, 8). In addition to the necessity for companies to progress technologically, Jeffrey Dyer and Harbir Singh reason that the advantages of a company are often connected to the advantages of that company's alliances (Dyer, 1998). Today, cooperation in an IJV offers a means for a company to both increase their network and enhance their technological abilities, but when competing technology companies form an alliance a delicate balance between cooperation and competition ensues.

Several motivations for why competing companies may desire to form a cooperative IJV with one another exist. Gary Hamel calls this kind of alliance a 'competitive collaboration' and contends that the root incentive of forming such an IJV is for the participants to gain skills and/or learn from one another via the IJV connection (Hamel, 1991, 87). As a result, cooperating competitors could be better able to progress in their technological innovations by learning from one another in an IJV.

However, cooperating and sharing technological know-how with potential competitors can lead to exploitation and other costly disasters. Tarun Khanna, Ranjay Gulati and Nitin Nohria argue that "firms often fail to recognize the existence or the magnitude of the asymmetric incentives to invest that inevitably arise as an alliance evolves. The differential incentives to invest are a result of the competitive aspects of what is simultaneously a cooperative and a competitive enterprise" (Khanna, et al., 1998). Thus, the inherent duality of an IJV that consists of competitors has the potential to assist the participants in learning and progressing in

technological innovations, but also harbors the risk that the IJV participants will have asymmetric incentives which could lead to exploitive and other risk factors via the IJV.

This thesis is concerned with when it could be advantageous for two competing technology companies to participate with one another in an international joint venture (IJV), despite the potential risks involved with such a venture.

2.1. Existing Challenges to Forming Successful IJVs between Competitors

Despite the growth of IJV formations, prominent theories exist which suggest that caution in IJV formations between competing technology companies is necessary. The best known reasons against competitors cooperating within the technology industry are the race to learn and knowledge leaks.

Some theorists maintain that an alliance between two competing technological companies creates the possibility for a race to learn, where each competing company tries to gain knowledge from the other first (Gary, 1991, Vol. 12 88-103). Two such theorists, Aimin Yan and Yadong Luo, state that, "particularly in technologically intensive industries, where there are large gains from innovation and steep losses from obsolescence, competition is best regarded as a learning race" (Luo et al., 2001, 113). Consequently, these theorists maintain that the race to learn factor within technology is not conducive to cooperative joint ventures as the participants would always see one another as competitors rather than as partners.

The possibility for a learning race to exist between cooperating technological companies might also lead to a knowledge leak, i.e. when a significant company intelligence and/or copyrighted contribution which company A provides to an IJV is appropriated by another participating company. As a result, company A loses some or all of its bargaining leverage within the cooperative relationship (Yan et all, 1994, 1478-1517). The underlying idea of

appropriated intelligence is that sensitive information, particularly technical know-how, could be leaked to a competitive joint-venture partner. Consequently, because of the potential risk of intellectual appropriation, technology companies are wary of entering into joint-ventures with their technological competitors – despite the notion that sharing technology can hold the key for a company's future prospects.

An additional challenge for competitors forming an IJV is the potential to lose talent. This happens when a capable employee from one IJV participant leaves to work for another company participant of the same IJV, either because of mismanagement and/or superior hiring incentives. Dean Tjosvold and Kwok Leung contend that losing talent is one of the most significant reasons for IJV failures (Tjosvold, 2003, 131). For this reason, companies can be hesitant to participate in an IJV with a competitor for fear of losing talented employees.

Despite the challenges in creating and maintaining an IJV, in today's world of fast paced globalization and technological growth, the combination of creating major technological projects to gain access to nascent markets could be a sufficient motivation for the formation of a successful IJV between two technological competitors.

2.2. Known Motivations to Forming an IJV between Competitors

Although the above theories against cooperation between technological competitors are still prominent today, several theories which are motivators for cooperation between technological competitors have also gained recognition and support within technological industries. The following theoretical arguments suggest that a possible technological 'competitor' could also be a potential 'partner.' They argue that, despite the possibility of a race to learn, technology can still be a source of collaboration, even if the two companies openly compete with one another outside of the IJV during or after their cooperative effort.

To begin with, Bernard Garrette and Pierre Dussauge agree that cooperation can occur, but argue that even if two competing companies choose to cooperate that competition could still continue to exist between them (Dussauge et al., 1995, 429-452). However, although Garrette and Dussauge suggest that a cooperative joint venture between competing technological companies is possible, they do not provide possible motivations for why such an IJV should form despite the risks involved.

One such motivation for technological competitors to cooperate within an IJV is to gain access to a domestic market. When making this argument, Inkpen and Beamish contend that, "as competition increasingly becomes more global, many firms are using alliances to enter new markets…" (Inkpen et al., 2007, 2). For this reason, some theorists reason that competition is becoming a global game where alliances can help maneuver new domestic markets.

Another factor in favor of cooperation between technological competitors is the opportunity for a technological joint venture to minimize uncertainty, as can be seen in Yan and Luo's argument that "new technology is both a stimulus to and a focus of cooperative effort that seeks to reduce the inherent uncertainty associated with novel products or markets" (Luo et all., 2001,113). Thus, because of the unpredictability of new products and markets, having a partner – who as a competitor is similar in nature – could help to circumvent and solve unforeseen problems the technological IJV may face.

In addition to avoiding uncertainty, competing companies could also cooperate in a joint venture for the purpose of creating long-term company coalitions. Arguing this point, Gary Hamel and C.K. Prahalad argue that today competition for the future of technology often takes place between company coalitions, sometimes even involving the creation of a new joint venture company (Hamel et al., 1994, Vol. 12 187). Therefore, if a long-term collaboration between two

competing technology companies is possible, then such a venture could justify the formation of an IJV between competing companies.

Furthermore, even without the creation of a separate company as part of a long-term venture, the potential for long-term gains alone could be a motivating factor for cooperation between two competing technological companies. This can be seen, for example, in Contractor, Lorange and Farok's reasoning that one of the most valuable reputations a company can earn is that of forbearance, when two companies choose to refrain from competing and decide to cooperate as a means to gaining more over the long-term (Contractor et al., 1988, 36). For this reason, if long-term benefits exist, such as an enhanced team-player image, then cooperation between technological competitors could be recommended.

Besides the long-term pay-off of an enhanced reputation, another reward which could justify cooperation between competitors is a sizeable financial profit for all participants. This reward does not need to be long-term in order to be a viable incentive to cooperate. Because of this, Contractor, Lorange and Farok contend that the success of an IJV is likely to be higher if the effect of the cooperative venture is strategically significant to all participants; particularly important is an equal financial distribution among the IJV participants of all profits earned (Contractor et al., 1988, 40).

In addition to large and equally distributed financial rewards, Hamel and Prahalad agree that an IJV between technological competitors can be fueled "by the desire to make a difference in people's lives – the bigger the difference, the deeper the commitment" (Hamel et al., 1994, Vol. 12 35). In this light, some technological joint ventures could qualify as making a beneficial humanitarian difference in the world and could thereby deepen commitment among an IJV's competing participants.

Beyond humanitarian incentives to create a technological IJV with competing participants, cooperation to gain economies of scale is an additional motivating prospect. As Doz and Hamel explain, IJVs can form "to obtain economies of scale and scope in marginal and well-known market segments" (Hamel, 1998, 6). According to Hamel, economies of scale – cost benefits gained through growth – is one motivating factor which is considered to be a very safe reason for competing companies to cooperate.

Another motivating factor for cooperation between competing technological companies is to collaborate on research and development (R&D). Supporting this argument, Timothy Collins and Thomas Doorley state that "besides formal equity joint ventures, companies are getting together in less permanent ways to collaborate on R&D, teaming up to achieve major technological goals, and later splitting up to compete in specific applications" (Collins et al., 1991, 3). Because the competing companies would use the developed research as individual companies within their created applications, individual sensitive product know-how and applications can be safeguarded while cooperative research is achieved.

Finally, the potential for a joint venture to strengthen weaknesses within the participating companies' infrastructures could also be a positive impetus for competing technology companies to cooperate. For this reason, Collins and Doorley argue that joint ventures "can help companies with technology to acquire adequate manufacturing or marketing skills; they can help companies to combine technologies to enter new applications markets; and they can help companies with little or no relevant technology diversify into new markets. In some cases, the venture is a carefully planned move to change the core business portfolio; in others, it is an opportunistic move to exploit a technological competence that would otherwise lie fallow" (Collins et al., 1991, 206). Consequently, a joint venture could be an opportunity for competing companies,

who are weak as individual companies within the global market, to strengthen themselves through cooperation.

Consequently, a number of motivations exist which encourage a cooperative IJV between technological competitors. However, the case study highlighted in this thesis represents an example of an IJV between competing technology companies, where the motivating factor is not one of the before mentioned motivating theories in favor of cooperation. For this reason, an additional consideration for competing technological companies can be suggested and analyzed.

2.3. Common Solutions to Strengthen IJVs

Because having some challenging factors when forming an IJV is likely, some protective solutions can be used to help create and sustain a successful IJV. One such solution is the establishment of trust between the IJV participants. However, within IJV formations, trust does not require affinity; for this reason, Richard Mead and Tim Andrews explain to IJV company participants that "[trust] does not necessarily involve emotional commitment – you may not even like them [the other IJV participant]" (Mead, 2009, 297). Instead, an agreement of trust means that the participants understand one another's needs and interests and are able to anticipate one another's behavior. A trust between IJV participants might include an agreement on the details of the IJV's plan, the IJV contract, the IJV stages of development, the management protocol, the methods of communication and criteria for evaluating the IJV's growth and success (Mead, 2009, 297). Consequently, an agreement of trust can be a helpful solution in circumventing some challenges during the IJV formation and operation.

Another example of a protective measure against possible IJV challenges is the creation of a covenant. As Jerry Cohen and Alan Gutterman explain, a covenant between IJV participants (who were or are still competitors outside of the IJV) can create a strict agreement against competing during the IJV (Cohen, 1998, 166). If an IJV participant should break the covenant, such as by exploiting copyrighted information, then that company could face pre-determined repercussions.

All in all, strategic agreements of trust concerning the operation of an IJV or covenants against competitive rule breaking are protective measures which can be used to help prevent some of the challenges that IJVs can face.

2.4. Cooperating for the Future

Competing technology companies can participate in an IJV to create a technological milestone and be able to enter an emerging global market, thereby enhancing their reputation as technological leaders and gaining more contracts and money outside of the initial IJV.

A case study of the world's largest desalination plant in Ashkelon, Israel and its analysis against IJV theory demonstrates that when two competing technological companies choose to cooperate for the achievement of a technological breakthrough within an emerging industry, by doing so the participating competitors will benefit in two ways. First, the companies will be able to develop a technological milestone. Even though the companies in the Ashkelon project each had the capability to develop an advanced desalination plant technology independently, the competing companies chose to collaborate. Secondly, and as a result of the first benefit, voluntary participation within an IJV for the sake of technology, a shared vision and teamwork, the cooperative relationship will provide both competing companies with a reputation as

international team players and technological leaders within their industry – helping both to gain future contracts and larger profits.

Overall, these benefits mean that competing technology companies could collaborate in an IJV to become more competitive later. In other words, they can actively compete by cooperating for the future.

2.4. Conclusion

Today an IJV between competing technology companies could provide a means to achieve technological milestones. For this reason, technological competitors who want to remain competitive, particularly within a world where technological breakthroughs and advancements are continuously expected, could benefit from cooperating in an IJV with a competitor. Yet, before a theoretical analysis of cooperating for the future can be done, the following chapter describes the Ashkelon IJV case study; specifically, the Ashkelon project's competing participants, its advanced technology and market impact are detailed.

3. The Ashkelon Case

The sea water desalination plant in Ashkelon, Israel is the first of its kind in size and technology. The plant, created by the international joint venture OTID (formed equally by OTV Veolia Group and IDE Technologies), was the world's first large-scale desalination plant and was completed in 2005 (www.water-technology.net). The plant purifies 110 million cubic meters of water per year at one of the world's lowest desalinated water prices of .52 cents per cubic meter. It is estimated that the plant meets 5-6% of Israel's national water demand (www.water-technolgy.net). Overall, the Ashkelon desalination plant has transformed the water needs of Israel and has become both a stepping stone and a symbol for the future of water technology and the water purifying market.

This chapter briefly reviews the significance of the global water market. The roles of the companies IDE and Veolia, both of which cooperated in the OTID joint venture to create the Ashkelon plant, are also highlighted. Finally, the Ashkelon desalination plant is discussed, as well as the effects of the plant and possible complications it might face in the future.

3.1. The Fresh Water Market

Before a description of OTID and its participating companies can be given, the water market's economic prospects and consumer demands should be discussed. All in all, the fresh (i.e. potable) water industry is only emerging and, until recently, has not been dominated by any one company (Dickie, 2007).

Although still young in development, the economic significance of the market for fresh water is growing exponentially. "In the business world, water is a hot new commodity and that heat is generating more than steam: it is a $400 billion industry growing at about 6 percent per year. But, besides the financial opportunities, water technology is clearly an attractive market for

other more important reasons. New technology promises to quench the world's thirst and to provide environmentally sound solutions to reducing water shortage and water contamination" (Kloosterman, 2008). The fresh water market is an ever increasing success because currently only about 2% of the Earth's water resources consist of fresh water, and even the presence of this small percentage faces threats from both drought and pollution (Solutions in Water). Consequently, the future of the fresh water market is promising.

Yet the potential economic benefit within the water market is not the only factor associated with the growing demand for fresh water. Water shortages could result in a humanitarian crisis. Perhaps the most obvious side effect of inadequate water resources is dehydration and death. Today, it is estimated that about 2 billion people worldwide do not have access to enough drinkable water and are suffering as a consequence (Mayer, 2007). A large range of social and health issues can be caused by water shortages. Moreover, within the Middle East region many experts believe that conflict over vital water resources, to be used as drinkable water, will cause a full-scale war in the future (Leyne, 2004). For this reason, the fresh water market is not only projected to expand because of increasing global water shortages, but also because of pure human need and international demand from governments seeking to avoid other countries' use of water as a political weapon.

However, one of the most anticipated technologies for solving the dilemma of inadequate drinking water is water desalination. Desalination of water is the removal of salt and other substances to *create* drinkable water (Dickie, 2007). Until recently, desalination was viewed as a 'Rolls-Royce solution' of last resort, too costly to be a practical fix to the Earth's water shortage crisis (Leyne, 2004). However, because the plant in Ashkelon used the most advanced desalinating technologies available, its desalination technology is proving to be a worthwhile and

even cost effective tool for creating fresh water. To date, only 1% of all water consumed is produced by desalination; yet 25% of the world's population resides within less than 25 km from a seacoast from which water for desalination could be easily retrieved (Eye on World Largest reverse osmosis seawater desalination plant in Israel, 2006). As a result, the use of desalinating technology by a significant percentage of the world's population could dramatically lessen water shortages and their global and humanitarian effects. The success of Ashkelon's desalinating plant has thus rendered the technology of OTID a breakthrough within the fresh water market.

On the whole, the world's market for drinkable water is still immature. The economic potential for drinkable water is predicted to continue growing as water resources become increasingly depleted. In addition, development of the water market industry holds the possible promise of being able to positively affect humanitarian needs. To be sure, because of the Ashkelon project, both IDE and Veolia are becoming company leaders within the developing water industry of desalination technology.

3.2. The Ashkelon Project

The cooperative international joint-venture between the competing companies IDE and Veolia allowed for the completion of the world's largest water desalination plant in Ashkelon, Israel. The following information provides greater detail concerning the Ashkelon project's participants, the nature of their IJV contract, as well as the advanced technology which the Ashkelon IJV employs.

Figure 1 General View of Ashkelon Desalination Plant (Sauvet-Goichon, 2006).

3.2.1. The IJV Participants

Two leading companies equally participated (50-50%) within the OTID joint venture for the construction of the Ashkelon desalination plant project, they are IDE Technologies Itd. (Israeli) and OTV – Vivendi Group (French) (Sauvet-Goichon, 2006). It is important to mention that the Israeli investment company, Dankner-Ellern Infrastructure, participated in a separate IJV to finance the Ashkelon project (called VID), but the Dankner-Ellern company did not participate in the construction IJV to build the Ashkelon plant (called OTID), which is the primary focus of this case study (Sauvet-Goichon, 2006).

Before undertaking the construction joint-venture OTID in Ashkelon, both IDE and Veolia shared many similarities, but were also competitors within the water desalinating market. Before Ashkelon, IDE was a leader in the production and supply of fresh water worldwide, with about 300 employees and a focus on customized designing and manufacturing of state-of-the-art water treatment technologies (The IDE Vision, 2008). "Since its inception in 1965, IDE has designed and supplied over 360 plants of various types and sizes in nearly 40 countries worldwide, with an overall production capacity of about 1,280,000 m^3/day" (Key Customers & Technology, 2008). In comparison, OTV - Vivendi has more than 2,000 employees and is also a

world leader in tailored solutions for environmental services (Veolia Environment, 2008). However, while IDE focuses on only water desalination technologies, Veolia also specializes in water management, waste management, energy management, and passenger transportation" (Veolia Environment, 2008).

Overall, before the Ashkelon project both companies were equally-sized competitors in the fresh water market and both continued to be competitors during the Ashkelon contract and after the contract's completion. This can be seen in that both companies have not worked together on additional contracts since the Ashkelon project; yet, both companies vie for the same international project calls for tenders.

3.2.2. The VID and OTID Contracts

In July 2000, Israel called for international tenders to apply for the opportunity of creating the world's largest seawater reverse osmosis (SWRO) desalinating plant in Ashkelon, a city in Israel's arid Negev desert (Sauvet-Goichon, 2006).

The Ashkelon project was divided into two separate contracts. The financing, operation and maintenance aspects of the Ashkelon project were covered in an IJV contract which was awarded in September 2001 and signed in November 2001 by a consortium of individual companies, including Veolia – Vivendi Group, IDE Technologies ltd. and the Israeli investment company Dankner Ellern Infrastructure. The financing and maintenance IJV created by this consortium was named VID and responsibility within the VID joint venture was separated into 25% Veolia, 25% Ellern and 50% IDE. However, an additional contract for the engineering, procurement and construction (EPC) of the Ashkelon Project was signed in the same month with IDE and OTV – Vivendi Group; this EPC joint-venture was named OTID and was separated into 50% Veolia and 50% IDE. The OTID contract was completed in 2005 upon the completion of

the Ashkelon plant's construction (Sauvet-Coichon, 2006). However, the VID contract, which consists also of the OTID members plus one investment firm, operates on a build operate transfer basis (BOT), where after 25 years responsibility for the Ashkelon project as well as 100% of profits generated will transfer to the Israeli government's National Water Company, Mekorot (Ashkelon Desalination Plant, Seawater Reverse Osmosis (SWRO) Plant, Israel, 2007). The initial contracts signed called for an annual production of only 50 million cubic meters per year, but a second agreement was signed in April 2002 doubling the required annual production capacity. As a result, with a fresh water production of 100 million cubic meters per year (or 320,000 cubic meters per day), the Ashkelon desalination plant would become the first large-scale, as well as the largest ever created, seawater plant of its kind (Ashkelon Desalination Plant, Seawater Reverse Osmosis (SWRO) Plant, Israel, 2007).

Within Israel, 100 cubic meters of fresh water per year is equal to about one seventh of Israel's water demand, not including agriculture and industry needs (Leyne, 2004). In a different light, 108 million cubic meters per year is the fresh water consumption of about 1.4 million people (Veolia Water starts up operation of the world's largest reverse osmosis seawater desalination plant in Ashkelon (Israel), 2005). The total cost of the Ashkelon desalination plant was approximately US $250 million and was created by a mixture of 23% equity and 77% debt. By 2030, the total expected revenue over the 25 year contract period will be about US $825 million (Ashkelon Desalination Plant, Seawater Reverse Osmosis (SWRO) Plant, Israel, 2007). Overall, the price of Ashkelon's desalinated water is about US $0.52 per cubic meter, which is only slightly higher than the pre-existing water costs in Israel at around US $0.45 per cubic meter (Leyne, 2004). Yet, the water from Ashkelon is of a higher quality and opportunities and technologies with which costs may be lowered are experimented with continually (Leyne, 2004).

After the Ashkelon plant's completion in 2005, the plant began providing "one of the world's lowest ever prices for desalinated water" (Ashkelon Desalination Plant, Seawater Reverse Osmosis (SWRO) Plant, Israel, 2007).

Consequently, due to Ashkelon's size and novel technologies employed, the Global Water Awards named it the 'Desalination Plant of the Year' in 2006 (Ashkelon Desalination Plant, Seawater Reverse Osmosis (SWRO) Plant, Israel, 2007). A close look at the technologies involved within the plant reveal how the project was able to achieve its success, as well as the project's technological advancement within the water desalinating industry.

3.2.3. Advanced Technologies

The combined creative efforts of IDE and Veolia within the international joint-venture OTID allowed for the implementation of novel ideas and new technologies to create a low-cost fresh water product and an efficient, award-winning desalination plant. The following points address the key innovations which made the Ashkelon plant into an award winning advancement within the fresh water market. For a general understanding of the Ashkelon plant's workings, readers should refer to Figure 1's diagram below, entitled "How Reverse Osmosis Desalination Works."

First, the Ashkelon plant consists of two separate, autonomous plants (the North and South plants) built on the same 70,000 square meter construction site (IDE Technologies launches, 2008). Each individual plant contributes 50 million cubic meters of fresh water per year, or half of Ashkelon's total amount produced annually (Veolia Water starts up operation of the world's largest reverse osmosis seawater desalination plant in Ashkelon). In addition, "with the exception of the seawater intake, the product water treatment system and the dedicated power plant, the site sub-systems have been duplicated to ensure independence of operation" (Ashkelon

Desalination Plant, Seawater Reverse Osmosis (SWRO) Plant, Israel, 2007). Because the plants work independently from one another, back-up measures and separate maintenance servicing can be performed while the overall plant can continue to be online and functioning; production is also more efficient and cost effective with the use of two separate plants (Ashkelon Desalination Plant, Seawater Reverse Osmosis (SWRO) Plant, Israel, 2007).

Secondly, the three-center design model created specifically for this plant allows the pressure pumps, energy recovery devices and membrane banks to operate independently and more flexibly. Specifically, "separating the high-pressure pump from the energy recovery device and breaking the link between pump capacity and the [Reverse Osmosis] bank capacity… brings significant technological flexibility and high efficiency to the system while also reducing overall water cost" (Ashkelon Desalination Plant, Seawater Reverse Osmosis (SWRO) Plant, Israel, 2007).

Third, OTID's advancements in the membrane technologies used at Ashkelon further reduced the cost of desalination (Solution in Water, 2008). In particular, the membrane technology uses a unique Boron removal system which is highly flexible and adjustable to water temperature fluctuations; moreover, the system is capable of removing more than 92% the sea water's impurities (Ashkelon Desalination Plant, Seawater Reverse Osmosis (SWRO) Plant, Israel, 2007).

Fourth, in addition to being able to retrieve energy from outside of the plant's site, a novel addition to Ashkelon was that of a dedicated gas turbine power station on site which has been "a major factor in both safeguarding operational reliability and reducing energy costs" (Ashkelon Desalination Plant, Seawater Reverse Osmosis (SWRO) Plant, Israel, 2007). Ashkelon's independent power plant has a capacity of about 80 MW and prevents the plant from

relying solely on outside power sources, allowing the plant to perform more reliably and efficiently (IDE Technology launches, 2008).

Finally, OTID designed an innovative Energy Recovery System (ERS) as a state-of-the-art means of saving energy (IDE Technology launches, 2008). The ERS recycles around 85-90% of the energy used for extracting brine, which ultimately saves money and further reduces the cost of Ashkelon's desalinated water (Davis, 2005).

Overall, these creative solutions – in combination with one another – work together to more efficiently create a higher quality fresh water product that is less expensive to produce; these innovations "make the difference between producing water at 80 cents a cubic meter and achieving a price of 52.7 cents per cubic meter" (Davis, 2005).

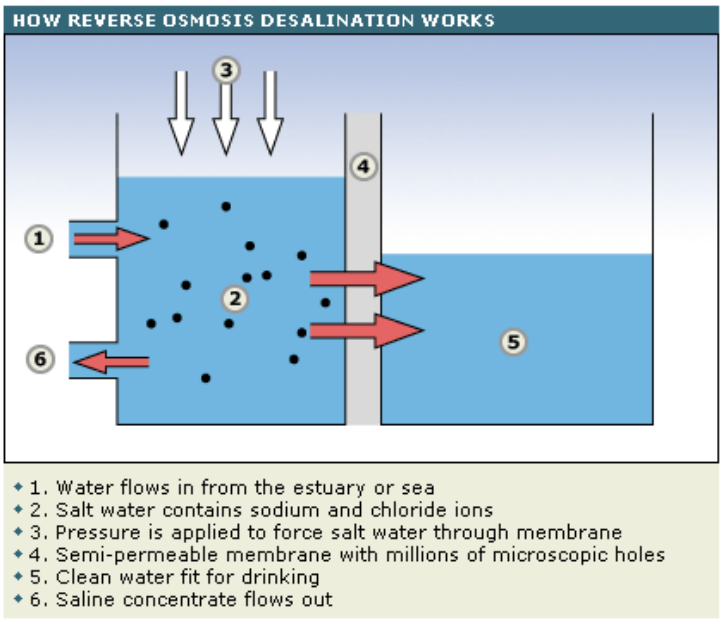

Figure 2 How Reverse Osmosis Desalination Works (Leyne, 2004). This diagram shows the basic process of the reverse osmosis desalination which the Ashkelon plant uses.

3.3. The Effects of Ashkelon

The Ashkelon plant, created by the OTID international joint venture, uses several technological advancements within its design and water purification process. These advancements have had significant positive effects, as well as some potential negative consequences, for the Ashkelon plant – as well as for its joint creators IDE and Veolia.

3.3.1. Enhanced Reputation

As noted earlier, the Ashkelon plant was named the 'Desalination Plant of the Year' in 2006, just one year after the plant went online. The advanced technologies within the Ashkelon plant, as well as the innovative teamwork that both IDE and Veolia performed, made the plant and its participating companies famous worldwide within the fresh water market.

Concerning IDE, it was said that the Ashkelon plant was "the latest milestone in IDE's impressive track record of achievements, further solidifying its position as the global leader in seawater desalination mega-sized projects" (IDE Technology launches, 2008). Because of the company's enhanced reputation within the fresh water industry, IDE has signed contracts to create more desalination plants in other countries, including Australia and China (IDE to Build Desalination Plant in Asia, 2008). Similarly, Veolia's image has become that of a world leader within the fresh water market since its work on Ashkelon and subsequent contracts (Veolia Water wins important seawater desalination contract, thus confirming its international expertise in desalination, 2008). In particular, Veolia has won desalination plant contracts in Queensland, Australia's Gold Coast and Sur in Oman (Veolia Water wins important seawater desalination contract, thus confirming its international expertise in desalination, 2008).

In summary, both IDE and Veolia have individually enhanced their reputations as a result of their advanced technologies and cooperative work within the OTID joint venture. Because of the image as world leaders within the desalination industry which both companies gained from their work on the Ashkelon project, both IDE and Veolia have gone on as individual companies to win further desalinating plant contracts within the fresh water market.

3.3.2. Future Complications

Although the Ashkelon project had a positive effect on IDE and Veolia's reputations and futures as individual companies, potential negative factors have also risen since the desalinating plant's completion in 2005. The following variables might present future complications for the Ashkelon plant and its participating companies within the continuing VID joint-venture (even though OTID's venture ended upon completion of the plant project, the reputation of OTID's participants could still become diminished).

To begin with, there is some concern by scientists within the fresh water industry that increasingly polluted sea waters would increase desalination costs for desalination plants due to the need to service the filter technology more frequently (Water Week EWN Publishing, 2007). Yet, so far Ashkelon's unique boron filter system has allayed any fears that pollution will dramatically, if at all, affect the plant's desalination costs. In addition to concerns about pollution, because the plant's site in Ashkelon is only 11 km from Gaza, the plant has been in the range of rocket and artillery fire on several occasions (Water Week EWN Publishing, 2007). Nevertheless, the plant in Ashkelon has avoided collateral damage until now. Furthermore, should the plant sustain damage in the future from conflicts in the region, the plant itself consists of two separately working plants so that reparative service can be completed while water is still desalinating at half capacity. Also, having an independent power source on the plant's site, in

addition to also having power available from outside of the plant site, is a useful precaution against the damages of war. Lastly, and perhaps most controversially, a possible concern in the future is that "although cost and energy consumption to operate desalination plants are being reduced, experts say that marine environments could be seriously affected by chemicals used in the water production process, with copper accumulation the most impactive" (Hunter, 2009). This final factor could prove to be the most damaging to the Ashkelon plant because it could affect the image of the plant's advanced technology, as well as the technological images of IDE and Veolia.

In brief, the Ashkelon plant could face several negative variables both now and in the future, including: pollution within the sea water collected, conflict within the region and, finally, the prospect that Ashkelon's work might be negatively impacting the environment rather than being a scientific improvement upon it. Nevertheless, none of these factors have fully materialized or have proven to be detrimental to Ashkelon's success thus far.

3.4. Conclusion

In conclusion, the plant in Ashkelon, Israel is the largest and most efficient desalination plant in the world. Its cooperative construction by the OTID joint venture, which equally included both IDE and Veolia, allowed for the creation of innovative and advanced technologies. The final product is a desalination plant that has set a very high precedent and has gained a leading reputation within the world's fresh water market. The next chapter analyzes the traditional IJV theories against the Ashkelon case and presents the argument of cooperating for the future.

4. Cooperating for the Future: An Analysis of the Ashkelon Case

This chapter compares the Ashkelon case (from chapter 3) against the most significant existing IJV theories, which are used to determine the ideal conditions necessary for an IJV to succeed. Whereas chapter 2 reviewed the existing theories on cooperating competitors, this chapter uses the theories in a comparison against the Ashkelon case to highlight the motivation of cooperating for the future. Overall, the analysis of the Ashkelon case against previously existing theories (both specifically related to cooperating technological competitors as well as general IJV theories) results in the suggestion of a contingency approach; namely, cooperating for the future, which provides an additional motivation for successful IJV formation between technological competitors.

4.1. Traditional IJV Theories and the Ashkelon Case

In addition to the learning race, there are potential challenges when competitors create an IJV. Although these theories show the motivations and challenges for the formation of international joint-ventures which can be helpful for most companies that are questioning whether or not to cooperate with their competitor, in the Ashkelon case these theories prove to be insufficient. Normally, before any IJV is formed these traditional theories are consulted to discern whether or not the motivations in favor of formation outweigh the potential challenges. These calculations are different for every joint-venture situation, depending on the variables involved.

It is important to emphasize that even though the Ashkelon case seems to negate these theories, the theories are still accurate and helpful in the majority of IJV formations. In addition, this qualifying list of pro and con factors is not meant to be exhaustive, but rather to show the most common variables which are weighed before forming an IJV. Finally, although the

Ashkelon plant was created by the OTID international joint venture, which consisted of an equal 50-50% partnership between the competing companies IDE and Veolia, for the sake of simplicity the rest of the thesis will address Ashkelon's IJV as VID and not OTID. This is because VID, which consists of the same OTID members plus an investment company, is concerned with the maintenance and continuity of the Ashkelon plant during the life of its contract, while OTID was only created for the construction of the desalination plant.

4.1.1. Challenges of Forming an IJV

There are several traditional theories which highlight the negatives factors when creating an IJV. The following factors normally weigh heavily against joint venture formation. When considered in the Ashkelon case though, these theories are insufficient.

To begin with, failure rate is a factor against the formation of IJVs. Collins reasons that equity joint ventures in particular are inherently unstable and that the anticipated benefits of cooperation all too often turn out to be elusive (Collins et all., 1991, 202). For example, the Securities Data Corporation (SDC) records that in 1995 19,617 mergers and acquisitions took place, and Collins contends that two-thirds to four-fifths of those joint venture projects were considered strategic failures" (Triantis, 1999). The prospect of a larger market or profit gain can help sustain an IJV against inherent instabilities which come with cooperating endeavors. However, the Ashkelon plant was created by a temporary international joint venture, VID, which will need to transfer ownership of the Ashkelon plant to the state of Israel after a period of 25 years (Sauvet-Goichon, 2006). Because Ashkelon's IJV is for only a temporary contractual period, the result is a decreased margin of time in which VID can earn profits. Since the long-term viability of VID and its potential profits are limited, it is even more remarkable that the

project has thus far been successful in circumventing the high risks associated with many other IJVs.

Another variable against the formation of an IJV is the cultural and country-level differences that can exist between cooperating companies (Hofstede, 2003). These differences can affect an IJV's ability to communicate and understand both participants and may possibly cause instability and failure for the IJV in the future, as Collins suggests above. In the Ashkelon case, VID consists of both French and Israeli employees. Both French and Israeli nationalities are often stereotyped as fiercely nationalistic. Furthermore, within the last fifty years both nations have been on the opposing sides of international conflicts involving the Middle Eastern region (Fishman, 2006). These are both cultural differences which could have had an adverse affect on the Ashkelon IJVs. In addition, country-level differences exist between France and Israel, such as language differences (French vs. Hebrew), religious differences (Christianity vs. Judaism) and, finally, regional differences (European Union vs. Middle Eastern region). The list of cultural and country-level differences between French and Israelis is surely much longer than just these aspects and consists of many more variables than these few alone. For this reason, when all the cultural and country-level differences are considered together, particularly the existence of past international conflicts between the two nationalities, it could be considered a paradox that a French and Israeli IJV would be successful.

Bureaucracy can also be a hazard for IJV formations (Kaufmann et al., 2005). If the government of a participating company is corrupt or with a great deal of red tape, then the formation of an IJV may be more difficult to implement and the risks much greater. Both France and Israel have histories of high corruption within their governments and businesses (Fishman, 2006). Although one could argue that corruption is a shared cultural variable which both sides

might understand within each other, corruption is a factor that, even when shared by both parties, ultimately inhibits progress and cooperative initiatives.

Finally, as discussed in chapter two, a race to learn and knowledge leaks are also potential drawbacks of an IJV formation. Today, with increasing technological advancements and technology infringements, this final reason against an IJV formation continues to become more critical. As American companies learned when the microchip, an American innovation, began to be produced even better by outsourced parties, when technology is concerned it is absolutely crucial that company know-how remain a secret (Johnstone, 1999). This secrecy is not only to ensure a stable IJV, but also to individually protect the participating companies from losing their technological advantages in products or services. However, despite that VID's Ashkelon desalination plant is the first of its kind in terms of technology and size and also despite that many know-how secrets were necessary in its construction, the Ashkelon case has not experienced a race to learn or a knowledge leak between its joint venture partners. However, in 2007 (two years after the Ashkelon plant began operating) IDE's Vice President and manager, Gustavo Kronenberg, left IDE Technologies to head the competing desalination company Tahal Group (Kronenberg broadens his portfolio with Tahal). Although Kronenberg's decision qualifies as a potential knowledge leak and lost talent, it is significant to emphasize that this challenging factor for the Ashkelon IJV occurred outside of the IJV participants.

In addition to all the above negative variables, some argue that even the act of trying to overcome these negative factors to create an IJV would result in exorbitant costs which would be a negative in itself (Inkpen et al., 2007, 6). Overall, these theoretical reasons against the formation of an IJV all condemn the Ashkelon joint-venture and are also all confounded by VID's continued success. By their reasoning, the Ashkelon project should not have been

undertaken and, if created, it certainly should not have been successful. Similarly, the following traditional motivations *in favor* of an IJV formation likewise prove unhelpful when dissecting the Ashkelon case.

4.1.2. Motivations for an IJV Formation

There are also many traditional theories which encourage the formation of IJVs. The following factors normally weigh in favor of joint venture formation; however, they too prove to be unsuitable when considering Ashkelon's IJV.

One favorable reason for creating an IJV is the opportunity for one of the participating companies to gain access to a resource that another participating company has available within its local country (Contractor et al., 1988, 5). This resource can be natural, such as oil, or could be something else, such as a cheap labor force. Nevertheless, in the Ashkelon case VID was not formed to gain access to a local resource, but to create a renewable resource (water) for a local population. Consequently, access to an existing resource was not an applicable motivation for VID's formation.

The ability to enter a new domestic market is another possible advantage of an IJV (Luo et al., 2001, 8). Accessing new markets can be crucial in order for a company to expand geographically and to enlarge its customer base (Collins et al., 1991, 201). However, since VID has a contract life of only 25 years, this new market potential within Israel is limited. Consequently, the ability for VID to enter a new market (in this case Israel) and thereby extend its participating companies' global customer base by gaining exponential growth within that local market is not possible since VID's contract life is capped. As a result, the possibility of entering a new market is a positive motivation for VID, but perhaps not as encouraging when compared to what a long-term IJV could benefit from when permanently entering a new market.

All in all, the limited time to gain from Israel's market demand for drinkable water could not completely justify the Ashkelon IJV's start-up expenses.

An additional motivation in favor of the creation of an IJV is the opportunity for partners to share risks and costs (Collins et al., 1999, 201). When partners share the risks and costs to create an IJV there is more possibility for innovation and larger-scale endeavors can be undertaken. Yet, IDE Technologies and OTV- Vivendi included an Israeli investment company Dankner Ellern Infrastructure to help carry the risk and costs associated with the VID joint venture. Therefore, the partnership of IDE Technologies and OTV- Vivendi was not necessary to share risks and expenses.

Another motivating factor for the IJV formation is the advantage of having larger economies of scale (Contractor et al., 1988, 5). The traditional rational for this is that "by sharing financial resources that otherwise are not available to each individual partner, two smaller companies in an industry can form a joint venture to achieve economies of scale similar to those that are enjoyed by their larger competitors" (Luo et al., 2001, 9). However, VID was created by the partnering of two companies that were already large and had worked successfully as individual enterprises before joining the equity joint venture. Furthermore, the basic principal of economies of scale is that the product will be able to be manufactured in a large enough quantity and as inexpensively as possible to maximize the profit margin of sales (Jackson, 1998). Yet, VID's goal has been to produce filtered water as inexpensively as possible as well as to sell that drinkable water for a minimal profit. This is because of Israel's pre-contractual price guidelines with VID which required the price of US $0.52 (Sauvet-Goichon, 2006). Consequently, should Israel's demand for drinkable water continue to rise, VID's costs to produce as well as its price to sell the water are roughly fixed. Therefore, in addition to the

contract time limit, the fixed contractual price also severely limits VID's potential economy of scale.

Finally, the opportunity for IJV partners to create knowledge and obtain new skills by cooperating with one another is a positive reason for companies to form a joint venture (Inkpen et al., 2007, 7). This advantage only works if both companies can learn from one another. In particular, knowledge creation is only an IJV advantage if it can "accelerate entry into a new product market requiring skills that neither partner can provide alone" (Collins et al., 1999, 201). However, both IDE and Veolia market themselves as having been the dominant company within the VID joint venture. Both companies were growing and were equally capable within the desalination field prior to the Ashkelon project. Moreover, since Ashkelon both have individually created large-scale water desalination plants worldwide without the help of one another. This phenomenon suggests that although obtaining new skills or knowledge might be a positive reason to form an IJV in general, for VID it was not a major incentive.

On the whole, if only the above theories in favor of IJVs were used as a guideline when judging whether or not to create VID, then VID in Ashkelon might not have been recommended as an advantageous IJV possibility.

Overall, both the theoretical challenges and motivations of forming international joint ventures failed to adequately justify or even explain VID's creation and success. In summary, if the traditional theories for whether or not one should participate in a joint venture are insufficient in the Ashkelon case, then the question raised is what could have been the motivating factor (or factors) to create an accomplished joint venture in this case.

4.2. Cooperating for the Future

Because the traditional challenges and motivations of the formation of IJVs between potential competitors do not relate to the Ashkelon case, VID provides a theoretical exception where cooperation between competitors in order to produce a novel technological achievement for an emerging market can provide both companies beneficial outcomes with long-term effects.

4.2.1. Technological Advances and Emerging Market Access

Because Ashkelon presents a unique IJV case, in which dominant joint venture theories prove to be insufficient, the existence of other driving incentives can be revealed. The two strongest factors present in the Ashkelon case, but not in traditional IJV theory, are technological advancement and access to emerging technological markets. Together, these factors represent the motivation of cooperating for the future.

One possible reason for VID's success was its completion of a major technological milestone. Even though IDE and Veolia were competitors before the Ashkelon project and continue to be competitors outside of the IJV today, by cooperating together in Israel they were able to be the first to complete a significant technological advancement. The Ashkelon desalination plant's technology is distinct in both the plant's size and overall performance (including its water purifying capacity and price per liter) (Sauvet-Goichon, 2006). Consequently, VID's performance shows that collaborative work – even among competing companies who do not fit the theoretically ideal IJV profile – could still be beneficial if it leads to the completion of first-time scientific advances and breakthroughs. In the end, cooperation may not need to be based on sharing risks, costs or even knowledge, as have all been previously argued. Instead, cooperation could be beneficial merely to bring together energy and shared ideas between equally leveraged partners in order to create a new technology. Rather than

sharing risks, costs or finances, as was not the case with Ashkelon, cooperation could be based on sharing scientific progress.

Another explanation for VID's success may be a shared motivation between IDE and Veolia to capitalize on the emerging water desalination market. Although the traditional IJV theories would have opposed the creation of VID, the Ashkelon case demonstrates that the possibility of redefining or creating a new technological market could provide sufficient incentive to form an IJV. "Initial success goes to those companies that can recognize a new technological or market opportunity, and mobilize the R&D and marketing resources to take advantage of it" (Collins et al., 1999, 17-18). Although it is not a new idea that gaining a new market opportunity is highly beneficial for a company to grow, in the case of Ashkelon the new market which is gained is not a population of people within a specific location who are in need of some service or product which other populations elsewhere already have. Rather, the technology market that VID redefined is a worldwide industry which is still in its infancy. Globally, the large-scale water desalination market had yet to be conquered. As a result, VID's cooperative joint venture has redefined the nascent water desalination market and has allowed VID and its participating companies, IDE and Veolia, to become dominant players within that market. Consequently, although earlier IJV theories might have opposed VID's formation, the success of the Ashkelon project suggests that the ability for an IJV to develop an immature or non-existent technological global market might be a supportive factor in the IJV's success.

In the end, both technological progress and access to an emerging technological market can be seen as strong incentives for VID to have formed, despite that the IJV would not qualify when analyzed against traditional IJV theories. While cooperating for the future to develop a

new technology and to capitalize on an emerging market can explain the motivations for forming an IJV, it can also account for VID's continued success.

4.2.2. Rewards of Cooperating

Cooperating for the future, working with competitors to create a technological advancement for an emerging market, can have several beneficial effects for all participating companies. Similarly, because of their cooperative IJV, VID has experienced the following rewards.

Perhaps the strongest effect of VID's cooperation has been the global reputation that both IDE and Veolia have gained as individual companies through VID's technological accomplishments. Even though VID's contract is not permanent, the reputation, as well as its rewards, which both IDE and Veolia have gained, could likely be long-term for both companies. Once the media reported the significance of the Ashkelon project, both IDE and Veolia's reputations as individual companies became global and dominant within the water desalinating market. Specifically, both companies have earned reputations as being forward thinking, team-oriented and technological leaders (Contractor et al., 1988, 36). In this light, IDE describes that its "mission is to be recognized as a world leader in the delivery of engineered water treatment solutions" (The IDE Vision, 2008). Similarly, when discussing its future large-scale desalination plant with Saudi Arabia, Veolia states that they are leading specialists in the water desalination sector, who "are able to implement the latest state-of-the-art solutions and technologies" (Beolia Water is chosen to build one of the world's largest desalination plants in the Saudi Arabia, 2007). As a result, for both IDE and Veolia, their reputations have increased the demand for future contracts around the world, including IDE's contracts in Australia and China, as well as Veolia's contracts in Australia and Oman (IDE to Build Desalination Plant in Asia, 2010). Like a domino

effect, an enhanced company reputation has led to more contracts for IDE and Veolia and, naturally, more desalination contracts have also increased the overall profits of both companies.

Another significant achievement IDE and Veolia have both been able to gain, by cooperating together in VID, has been the enhancement of their companies' research and development. Like any technology company today, it is crucial for both IDE and Veolia to invest in research and development (Collins et al., 1999, 8). Since IDE and Veolia's incomes are greater because of their growing worldwide reputation and consequent increase in contracts, both companies have more funds to invest towards research and development. If both companies can remain at the forefront of future advancements in the water desalinating market, then their reputation's beneficial cycle will continue into the future. In other words, IDE and Veolia's ability to invest in future research will earn them both an even greater profit.

As a result, because IDE and Veolia chose to cooperate for the future by creating a technological breakthrough to capitalize together in an emerging market, both companies have reaped several beneficial rewards from their decision. In particular, IDE and Veolia have enhanced their reputations worldwide, allowing them to earn more contracts and they have also been able to use their increased capital from their new contracts to invest in further research and development – thereby generating more profit. The bottom line is positive and one in which all companies pursue; namely, they have increased their incomes exponentially!

4.2.3. Opposing Argument

On might argue that cooperating for the future is comparable to the first mover advantage theory. Similar to cooperating for the future, the first mover advantage relies on the idea of being the first company to make a move in an emerging market (Collins et al. 1999, 15). In

addition, it is likely that the participants of VID have been better poised to dominate the desalination market because of their early entry, just as the first mover advantage would predict.

However, it is important to highlight that in this paper the idea of cooperating for the future only involves new technology markets and not any other kind of market. Furthermore, the most important difference between the two theories is that the first-mover theory places companies in a race against one another to create a new product or service and then to be the first to enter the new market. Yet, rather than racing against one another to be the first and dominant mover, in the Ashkelon case two competing companies chose to collaborate and share the glory that is commensurate in the development of a technology and entry into an emerging market. In addition, beyond being seen as technological leaders in their respective market, IDE and Veolia's cooperative relationship further enhanced their reputations as international team players willing to overcome differences to reach a goal. This international team player image might prove particularly powerful in the 21st Century's trend of humanitarian concerns, resource shortages and of globalization and its ever increasing demand for technology. However, a company that operates under the first mover theory, which places one company in a race against all others, would not be able to tout such a global reputation.

Overall, although early entry is a shared similarity between the first mover theory and the cooperating for the future approach, more important theoretical differences than similarities, such as teamwork over competition, exist between the two.

4.3. A Similar Cooperative Occurrence

In addition to analyzing the VID international joint-venture, today there are similar global alliances in technology with which VID can be compared. One such conglomerate is the European Aeronautic Defense and Space Company N.V. (EADS), which is made up of

Germany's DaimlerChrysler Aerospace AG (DASA), France's Aérospatiale-Matra and Spain's Construcciones Aeronáuticas SA (CASA). These three European companies merged in 2010 to develop aircraft (Airbus), space and other technological devices (www.eads.com). Nevertheless, although EADS consists of international companies – who were former competitors – in order to produce technology, several differences between VID and EADS exist. First, EADS creates products for existing markets rather than emerging ones, as with VID and the potable water market. Second, EADS formed in order to better compete with more successful and established foreign companies, like Boeing; whereas VID formed to share the initial flag of leadership within the water market. Third, EADS is a permanent international joint-venture, while VID's contract in Israel expires after 25 years. Fourth, the European Union is able to interfere and/or assist EADS with government subsidies and some theorists argue that without such subsidies EADS would not be able to compete with the prices of other international companies (Thompson 2010). Yet, VID does not receive government subsidies or assistance until the government becomes the full owner of the Ashkelon plant after 25 years time. "[VID's] agreement with the State is based on the BOT principle, whereby the entrepreneurs finance and construct the desalination plants on the State's land which is made available to them. They operate the plant as a private business, and sell the water to the government of Israel at a pre-defined price, over a period of 25 years (including the construction period). At the end of the contract period, the plant is handed over and becomes government property" (IDE lead consortium's largest and most advanced seawater desalination facility of its kind began operation in Ashkelon).

Finally, one could reason that because Germany, France and Spain are all countries within a larger governmental body, that of the European Union, the nature of the EADS joint-

venture is not precisely one of differently minded and internationally competing companies, but rather a European-centric effort to consolidate and improve within the aeronautical industry.

Overall, further research comparing technological IJVs consisting of competitors against the VID joint-venture could be very helpful in delineating whether creating a technological advancement is enough motivation to cooperate – without requiring an emerging market.

4.4. Further Research

In addition to the cooperating for the future's components of creating a technological advancement and entering an emerging market, which could explain the success of the Ashkelon case where traditional theories have failed, other possible reasons might exist that were not covered in this paper, but which could have contributed to VID's achievements.

One such contributing factor could be the comparable size of VID's participating companies. Traditional theories usually highlight the importance of having one dominant company within an IJV (Collins, 1999, 15). Yet, it is possible that the fact that IDE and Veolia were of comparable clout as individual companies may have aided the eventual success of VID. Suggesting this point, Dussauge, Pierre and Bernard reason that "the influence of the symmetry or asymmetry in size between allies upon the dynamics of alliances has been stressed in empirical studies…These studies suggest that alliances between similar firms tend to be more successful than asymmetric partnerships" (Dussauge, 1995, 55). Although the importance of IJV's consisting of similar-sized firms has only been suggested, further research would need to be done in order to identify whether shared-size is a sufficient factor when other traditional motivations are not present. Nevertheless, the goal of this paper has been to show that

competing companies can successfully participate, even when traditional motivating theories are not applicable, given that the companies are pursuing technological breakthroughs for an emerging market.

Because competing companies are usually of a comparable size, this factor was not considered. However, it possible that VID would not have been successful had its participants been asymmetric in size. Further research would need to be done in order to test this possibility.

4.4. Conclusion

Overall, the Ashkelon case shows that competing technology companies can collaborate in a short-term IJV to become more competitive later. More specifically, IJVs can achieve success – even in the absence of traditional challenges and motivations – if they are producing a technological advancement for an emerging market. In other words, if companies are willing to cooperate for the future their IJV can be successful. As Hamel & Prahalad insightfully suggest, "competition for the future is competition for *opportunity share* rather than market share. It is competition to maximize the share of future opportunities a company could potentially access within a broad *opportunity arena.*…" (Hamel, 1994, Vol. 12 31). In this light, cooperating for the future is the competition of the future. The next chapter explains in greater detail how managers can recognize and apply the approach of cooperating for the future within their companies.

5. Management Recommendations

In chapter 4, a close analysis of the Ashkelon case against preexisting IJV theories revealed the approach of cooperating for the future. Specifically, the idea of cooperating for the future is that two competing technology companies can successfully collaborate on a short-term IJV if the project involves the creation of a breakthrough technology for an emerging market. Yet, the question of how managers can recognize and implement 'cooperation for the future' within their companies remains. This chapter may be used as a tool for company managers to help them address this issue.

5.1. Recognizing Opportunities

Technology companies that are considering the creation of an IJV with a competitor, but might not know how to recognize the opportunity to cooperate for the future, can address Table 1 below.

As shown in Table 1, if two competing companies would like to form a joint venture, then both companies should consider whether their IJV will create an advanced technology for an emerging market, will not create an advanced technology for an emerging market or will create an advanced technology for an emerging market, but with an IJV based on two asymmetric-sized companies. After the intention of the IJV in question has been considered, the companies should research whether their planned venture falls within traditional theories of the challenges and motivations of forming a joint-venture.

If two competing companies want to form an IJV based on the approach of cooperating for the future, then the companies should be similar in size (regardless of whether the IJV is equity-based) and they should be concerned with the creation of an advanced, breakthrough technology for an emerging market. So long as the companies meet the before listed

requirements, they will receive a positive recommendation to proceed in their joint venture – regardless of whether or not their IJV falls within the guidelines of traditional theories.

Although recognizing the conditions necessary to cooperate for the future is important, it is only the first step. After determining whether or not cooperation for the future is applicable, the next process for both companies is the ability for them to become vulnerable enough towards each other in order to become an integrated and successful IJV.

Table 1 How to Recognize 'Cooperating for the Future'. The table below shows whether or not a company should engage in a joint-venture with a competitor. The table also reveals the conditions necessary so that cooperating for the future can occur.

	Against Traditional Theories	In Favor of Traditional Theories
Advanced Technology with Emerging Market	Yes This is cooperating for the future	Yes
No Advanced Technology with Emerging Market	No Forming an IJV is not recommended	Yes
Advanced Technology with Emerging Market, but with Asymetric-sized Companies	Maybe More research is necessary	Yes

5.2. Becoming Vulnerable, But Separate

Once both companies have discerned that cooperating for the future is ideal for their joint-venture situation, they will need to actively implement conditions within their companies' infrastructure to help their cooperative efforts succeed. When considering the Ashkelon case, several factors may have helped IDE and Veolia to become a more integrated IJV, separate from their own individual, competing companies.

First, VID was an off-site work place (Ashkelon Desalination Plant, Seawater Reverse Osmosis (SWRO) Plant, Israel, 2007). Both IDE and Veolia have separate offices in Israel, but

rather than one company joining the pre-existing work-site of the other, instead IDE and Veolia worked away from their respective offices on the site of the Ashkelon project itself.

In addition, a neutral language, English, was used for VID's venture (Ashkelon Desalination Plant, Seawater Reverse Osmosis (SWRO) Plant, Israel, 2007). Although IDE does business in Hebrew and Veolia works in French, both companies had a working knowledge of English within the culture of their companies before VID was created. A common, neutral language can be beneficial for creating an IJV between competitors, this is because a company that works with its native language might have an advantage over the cooperating company that does not know or have the same ability within that language.

Thirdly, as in the Ashkelon case, having similar levels of leadership among participants from both companies would help with knowledge sharing and general feelings of equality (Sauvet-Goichon, 2006).

Furthermore, the IJV should have clear terms and goals from the onset. VID was very concise and organized in putting its desalination project into action and this likely helped both IDE and Veolia to be more united when working together on site (Sauvet-Goichon, 2006).

Finally, the promise of a shared glory, when included as part of the IJV's culture, could help create a cooperative mindset between two competing companies. As shown in chapters 3 and 4, both IDE and Veolia's individual reputations benefited greatly from their Ashkelon IJV because they shared the prize of success evenly.

Overall, the above infrastructural suggestions are only a few methods which proved useful in the Ashkelon case and which could also be implemented into the culture and practice of new joint-ventures to better help them cooperate for the future.

5.3. Getting into the Mindset

The preceding points discussed possible large-scale conditions which competitive companies can implement to assist their cooperative efforts for the future. Yet, in addition to creating ideal cooperative conditions within the larger infrastructure of an IJV, companies should also consider smaller initiatives to help their employees enter a cooperative mindset when working with competitors for a temporary IJV period.

The following list of suggestions is not meant to be comprehensive or a requirement of cooperating for the future; instead, the list should be used as a starting point to help companies and their managers discover methods that help their employees achieve a cooperative mindset when working side-by-side with competitors. These ten suggestions may prove helpful in assisting companies in their creation of an "I need you and you need me" mentality within the IJV. In addition, these suggestions might help to alleviate the immense amount of responsibility employees will feel to cooperate successfully.

1. Decide from the onset how responsibilities will be delineated between the companies and make the outcome of this decision transparent to employees of both companies. This will allow employees to know what is expected of them from the beginning.
2. Give a projection, via a written document or a team meeting, of the bigger picture that working with a competitor can afford both companies. If employees can understand the incentive to cooperate, they could be more willing and enthusiastic to do so.
3. Although it is recommended that the work of the IJV be done at a neutral location, it could be beneficial for both companies to host a general tour within non-competitive areas of their company building. Allowing a competitor to have an official tour of

company facilities could help to facilitate a feeling of “visitor” rather than of “competitor” among employees of both companies.

4. Although it is standard for company CEOs and Presidents to present speeches at official IJV gatherings (such as breaking ground, etc.), presentations should also be done by lead engineers and other employees who are on the field directly cooperating and contributing to the IJV regularly. These speeches can be fed via a live video feed to all employees of both companies so that all employees are updated and have an understanding of the IJV.
5. A brief course for employees about the differences they might expect to encounter when working with personnel from the competing company should be offered. Such a course could help prevent problems between cooperating employees before they potentially arise.
6. The IJV could also use a web work-space, such as Google Documents or Microsoft Workspace, to allow employees from both companies the chance to connect and interact with IJV documents in real-time. A virtual work-space might lesson the difficulties associated with long distances and/or possible misinterpretations of body language which might occur between cooperating employees from both companies.
7. The cooperating companies should inform and update outside organizations, such as government or non-governmental officials, since such organizations could lend media support to the IJV’s goals of making a global impact through the use of technology. By making third party organizations aware of the IJV’s efforts, employees and the world at large may be more able to identify with and become inspired by the IJV’s goal.

8. Rather than having an official presentation or learning course, or perhaps even in addition to these ideas, a short documentary could be created and posted on the websites of both companies. The documentary could interview leaders and employees from both companies and share their visions in a cohesive storyline about the breakthrough technology which both companies hope to create by cooperating together. The companies could also place this short video on Youtube.com and thereby double the initiative as an advertising effort to begin building awareness of their IJV and enhancing their reputations.
9. Of course, as with any joint venture, it is important to officially involve the media to create an excitement in the work place, as well as in the greater community, about the IJV and its goals.
10. Finally, casual social events should be planned between both cooperating companies. Such an event could be as simple as employees bringing their favorite national food and having a potluck-style lunch hour. However, it would probably be best to maintain gatherings on the official IJV site so as to instill a sense of formality to the occasion; after all, it would not be desirable for employees to divulge sensitive information about their respective companies.

Whenever two competing companies work together temporarily, any or all of the above suggestions could be used as smaller-scale initiatives to help companies create a cooperative mindset and framework for their employees.

5.4. Final Remarks on Cooperating for the Future

Therefore, it is possible for two competing companies to recognize whether or not cooperating for the future by creating an advanced technology for an emerging market is an ideal

approach. Companies can consider this by addressing the above Table 1. In addition, as the Ashkelon case reveals, it is possible for cooperating companies to implement suggestions into their respective company infrastructures by becoming vulnerable enough with each other while still remaining separate entities. Furthermore, in addition to larger-scale infrastructural suggestions, there are smaller-scale recommendations which cooperating companies can utilize to assist their employees in temporarily – yet meaningfully – cooperating with competitors.

6. Conclusion

As Collins reasons, companies must create advanced technologies to remain competitive continuously (Collins et al., 1999, 8). The argument of this thesis demonstrates that it is possible for competing technological companies to cooperate in the creation of an innovative technology in order to become more competitive – even against one another – into the future. Such cooperating for the future can be achieved if competing technological companies form an IJV to create a technological milestone for an emerging global market.

A review of existing literature between cooperation among competing companies was discussed. After highlighting both the challenges and motivations for creating an IJV, the pre-existing IJV theories proved to be insufficient when considered against the Ashkelon case. As a result, a contingency approach of cooperating for the future was suggested. Within the topic of cooperation among competing technologies, the cooperating for the future approach provides an additional motivation for competitors to cooperate given that the participants form an IJV to create a novel technology for an emerging market.

Furthermore, the possible rewards of competitors choosing to cooperate for the future were discussed, including an enhanced reputation for the cooperating competitors, greater contract potentials for both companies and overall higher future profits. Lastly, an option for further research was considered; specifically, the significance an IJV with symmetrically-sized participants which cooperates for the future requires more research.

Finally, recommendations were provided for company managers who are considering the formation of an IJV with a competing technological company in order to cooperate for the future. Above all, a chart was provided to aid managers in recognizing whether or not an opportunity to

cooperate for the future existed. Moreover, specific large-scale and small-scale infrastructural suggestions for an IJV composed of competing technological companies were given.

In conclusion, Hamel and Prahalad reason that the difference between competition for the future and competition for the present will be "the prospect of making an impact, rather than the certitude of immediate financial returns" (Hamel et al. 1994, Vol. 12 35). In a similar way, the cooperating for the future approach demonstrates that making an *impact* by creating a technological breakthrough for an emerging global market can also provide significant financial *rewards.* Furthermore, even though the financial reward might not be immediate when cooperating for the future (since companies must first navigate cooperation with their competitors); nevertheless, the financial profits could prove to be sizeable and long-term. Overall, the approach of this thesis reveals an additional motivation (breakthrough technology and emerging market) which can be considered by competing technology companies who, based on pre-existing challenges and motivations, might not have considered forming an IJV otherwise.

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