Forging Strategic Business Partnerships: Models for Energy Efficiency Productivity Enhancements[1]

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ABSTRACT

Forging strategic business partnerships is an effective means of achieving corporate and strategic goals. Successful partnerships increase the likelihood that mutual goals will be met, contribute to improved organizational productivity and enhanced economic value, and at the same time, mitigate risks. When the partners share similar goals and philosophies, such partnerships can be long-lasting and affect both organizational culture and structure. Once formed and proven effective, partnerships often result in a commitment to continue sharing resources and competencies, leading to new and varied opportunities.

This paper describes several types of strategic partnerships and explores some of the strategic partnerships that the New York State Energy Research and Development Authority (NYSERDA) has created through its public benefits programs, offering research and development opportunities, technical and financial assistance, and equipment and product sales assistance to commercial and industrial businesses and residential consumers. NYSERDA has forged strategic partnerships with manufacturers, architects and engineers, equipment vendors and distributors, equipment retailers, and directly with customers that have resulted in: (1) significant reductions in energy use and costs, (2) better product and service quality, (3) improved labor, energy, and capital productivity, (4) development of new business models for sharing information, (5) reduced technological, regulatory, and market risk, and (6) new opportunities in furtherance of corporate and public policy goals.

This paper provides evidence of successes and the opportunities available through business and government partnerships that should be of interest to business energy managers, federal, state and local governments, and industry trade organizations. These partnerships provide economic and environmental benefits that result from the more efficient use of energy including lower costs of energy and environmental compliance, better product or service positioning in the marketplace (*e.g.*, competitive advantage), better product or service quality, and improved public image.

Dimensions of Partnerships

One dimension of partnership is the structure that links the partners together. This linkage can be described as either horizontal or vertical and as either primary or secondary.

[1] The views expressed within this paper are those of the authors and do not necessarily reflect the views of the New York State Energy Research and Development Authority, policy makers in New York, or any referenced company or person mentioned herein. Additionally, reference to any specific product, service, process, or method does not constitute an implied or expressed recommendation or endorsement of it.

Horizontal Linkages

A horizontal linkage can be characterized by a joint venture. For example, in 1996, the Maytag Corporation joined with Hefei Rongshida Group Corporation (RSD) to manufacture and market washing machines and refrigerators in China. With RSD's name recognition and brand loyalty with Chinese consumers, Maytag was able to enter a market that was growing at double-digit rates. RSD was able to enter the refrigerator business, expanding its product line and technological expertise, and expand to other Pacific Rim countries. The partnership enabled both companies to participate in an explosively growing market while mitigating the risk of failure. This type of horizontal partnering is referred to as a business to business (B2B) model in this paper. Other examples within the B2B collaborative model include: (1) industries offering the same products and services working together to complement each others' strengths and address weaknesses (*i.e.*, several firms, each with strong knowledge of a specific product and geographic area, partnering to provide a seamless advertising campaign across a geographic region); (2) industries offering complementary products and services partnering to comprehensively address customers needs (*i.e.*, technical consulting firms partnering with lending institutions to provide reduced rate financing on investments in energy efficiency); and (3) competitors offering similar products or services to enhance overall growth of their industry (*i.e.*, dealers and installers of similar photovoltaic technologies partnering to strengthen the infrastructure and grow the market).

Similarly, government can form horizontal linkages with businesses to meet shared goals. An example of such a government to business (G2B) partnership includes government efforts to increase the availability of high efficiency equipment by joining forces with product and equipment manufacturers. The common goal is the reduction of market barriers to the design, development, and adoption of energy-efficient technologies. The goal of the business participant is likely to be increased profit and market share, whereas the goal of government is likely to be improved energy productivity, greater economic growth, and improved environmental quality. Government's role in the G2B partnership is that of market facilitator, or in certain instances market maker, consumer watch-dog, and economic developer.[2]

Vertical Linkages

A vertical linkage is one in which one partner is a consumer of the other partner's goods or services. The consuming entity could be another business or it could be a government entity, institutional, or residential customer. This type of linkage is referred to as a business to consumer (B2C) model in this paper. An example of a B2C partnership is that between a manufacturer of automobiles and the company that supplies automobile parts. Another example of a B2C partnership is a long-term, operating or energy performance contract between an energy service company and its business customers, (creating a mutually dependent relationship that benefits both parties).

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[2] DeCotis, Paul A., Ellefsen, Jennifer, Kim, Helen, and Coleman, Mark C. 2000. "Determining the Success of Market Development Programs and the Continuing Role of Government." *Efficiency and Sustainability: Proceedings from the 2000 ACEEE Summer Study on Energy Efficiency in Buildings*. American Council for an Energy Efficient Economy. Washington D.C.

Government can also develop vertical partnerships directly with consumers (G2C) to meet their needs and meet public policy goals at the same time. For example, reducing energy costs benefits both the customer directly, and helps serve the public policy goals of reduced energy use, reduced costs, and improved environmental quality.

Primary and Secondary Linkages

The relationships among parties in a partnering model could be described as primary or secondary, depending on how and when the relationships are formed. A primary relationship, with the shared goal of increasing sales of high-efficiency equipment, might exist between government and manufacturers. Secondary relationships might then be formed between equipment manufacturers and distributors, thus furthering the goal of the primary partnership.

NYSERDA offers a full range of programs that provide technical and financial assistance, develop new technologies and products, and increase availability of existing high-efficiency products and services. These programs operate through G2B and G2C primary relationships and often foster B2B and B2C secondary relationships. These relationships are portrayed in Figure 1. Any combination of relationships can occur as long as goals are shared and the teaming relationship is able to bring about benefits and value that are not possible if either of the entities goes it alone.

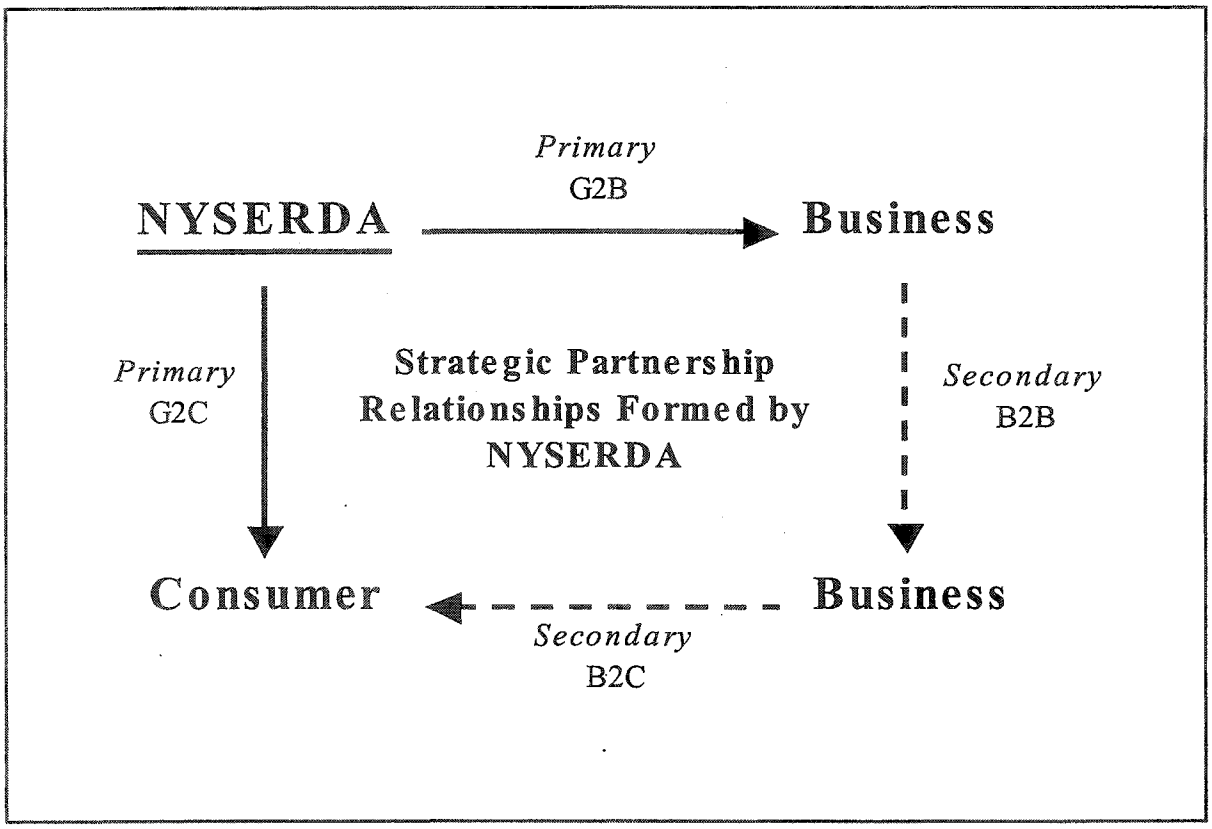

Figure 1

Strategic Partnerships

Government-to-Business (G2B) Partnership

Strategic partnerships between government and businesses can be developed for any number of reasons. NYSERDA is partnering with the architecture and engineering (A/E) industry to advance energy-efficient design and construction practices. The New Construction program, described in Exhibit 1, promotes energy-efficiency measures in new construction and major retrofits through a combination of technical assistance and financial incentives. The program seeks to produce permanent improvements in "standard" design practices among building architects and engineers. The beneficiaries include building owners and occupants. Unlike one-time service programs, an important goal of the New Construction program is to establish relationships with architects and engineers that carry over to influence other design activities.

Exhibit 1: G2B Partnering - New Construction

In 1998, close to $20 billion was spent on energy in New York's commercial, institutional, and multi-family buildings sector, accounting for close to 64% of the State's total energy use. Recurring costs, such as costs for energy, represent the largest single component of a buildings life-cycle costs. By applying energy-efficient design practices and technologies, energy costs in buildings can be reduced by 15-20%. To realize this savings, the construction industry must move beyond a "first-cost" orientation and consider costs incurred over the building lifetime.

To date, NYSERDA's New Construction program has received over 280 project applications, representing close to 33 million square feet of floor space. New applications are being received at a rate of over 30 per month. Early results indicate that architects, engineers, and construction managers have expressed a willingness to continue this partnership and incorporate more energy-efficient designs and equipment in their future projects. The program benefits builders and owners by advancing the state of buildings technology, reducing life-cycle building operations costs by reducing energy use and resultant pollutant emissions, and offers a better internal environment for building occupants.

In addition to new construction partnerships, NYSERDA has developed ongoing relationships with engineering firms by placing them under contract to identify energy savings opportunities in existing buildings. The FlexTech (Flexible Technical Assistance) program brings together engineering firms, banks, local government, economic development agencies, and utilities to provide individualized energy-related technical assistance to commercial/industrial (C/I) and institutional facilities. A complementary program, called Energy Operations Management, is designed to maximize the operating efficiencies of existing equipment through comprehensive energy engineering analysis. The program provides customers with funds to offset the cost of technical assistance services, increasing the demand for these services and the number of firms offering those services in the State. A sample project under this program is described in Exhibit 2.

Exhibit 2: G2B Partnering - Technical Assistance Service Providers

Optimation Technologies, Inc., a 100-person engineering consultant firm with offices throughout New York State, was hired by General Mills to analyze the performance of a newly acquired advanced process control system in their Buffalo plant. The plant employ's approximately 400 people in the production of several brands of cereal. With cost-sharing provided by NYSERDA to General Mills, engineers from Optimation Technologies are maximizing production efficiencies from system operations. The control system is currently monitoring electricity, natural gas, steam, and compressed air use in multiple operations. To date, annual cost savings of $30,000 have been realized from shifting and shedding energy loads and other operations improvements.

Another example of a strategic partnership between government and businesses is in the area of transportation. The transportation sector of New York State accounts for nearly 30% of the energy used in the State and 37% of the State's carbon dioxide emissions.[3] Thus, the potential to improve air quality, public health, and achieve energy savings is high in this sector, heightened further by the collaboration of industry groups. NYSERDA is working to establish alliances with partners that demonstrate an ability to develop and commercialize products that reduce pollution, enhance economic development, and improve public health and safety. A partnership to develop commercial-ready hybrid electric power trains for the transit bus market, created through NYSERDA's Advanced Vehicle Technology Development project,[4] is a good example of this, as illustrated in Exhibit 3. This government-to-business (G2B) collaborative project shows how government can spur the development of commercially available but undervalued technologies which yield societal and economic benefits.[5] This partnership was instrumental in both demonstrating the feasibility of hybrid-electric powertrains in commercial applications and in helping to spur demand for this environmentally-sound technology.

As of January 2001, over 340 hybrid-electric buses have been ordered by the Metropolitan Transportation Authority (MTA) of New York, 200 in December of 2000 alone, at an estimated cost of $77 million. This demand, fostered by the successful demonstration of five pilot buses purchased by the MTA in 1998, is contributing to the continued economic vitality of New York State, as well as to New York's environmental quality. The December 2000 order for 200 electric-hybrid buses by the New York MTA, is the largest of its kind in North America. In addition, the order for these buses, made to Orion Bus Industries of Oriskany, New York, furthers the economic development of the State. Not only was the core technology of the product (the hybrid-electric powertrains originally developed under Lockheed Martin and made commercially available under BAE Systems, NA) developed in New York State, but the complete assembly of the product as well as its commercialization is occurring in the State.

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[3] New York State Energy Research and Development Authority. September 2000. *NYSERDA: A Three-Year Plan for Energy Innovation 2000-2003. A Three-Year Plan for New York State's Energy, Economic, and Environmental Future.*

[4] NYSERDA's Advanced Vehicle Technology Development project is a component of NYSERDA's Transportation and Power Systems program.

[5] Press Release. December 18, 2000. "Governor: Orion Wins MTA Order for 200 Hybrid Electric Buses." New York State.

Thus, New York is rendering benefits associated from the initial project from several interrelated and economically beneficial avenues.

Exhibit 3: G2B Partnering - NYSERDA's Advanced Vehicle Technology Project

In the early 1990's NYSERDA entered into partnership with Unique Mobility, to test the feasibility of hybrid-electric powertrains. This effort successfully demonstrated that the hybrid-electric powertrain concept could be applied to buses. The company, however, had no intention of taking this technology to market, something that NYSERDA had an interest in. In 1995, through the efforts of its Advanced Vehicle Technology project, NYSERDA teamed with Lockheed Martin Control Systems, to make hybrid-electric drivetrains a commercially viable product. The Johnson City Lockheed Martin division is now BAE Systems, NA. BAE Systems, North America, a subsidiary of British Aerospace, has recently purchased the Lockheed Martin Control Systems division, based out of Johnson City, Broome County, New York. Lockheed Martin, at the time was looking toward civil and commercial business opportunities to diversify its operations in lieu of its cyclical manufacturing pattern. Lockheed looked to NYSERDA for assistance in funding and expertise to help prove the commercial viability of the hybrid-electric product and to help garner support from their management.

NYSERDA provided upward of $1 million to supplement Lockheed's financial investment of close to $20 million committed through 1998. NYSERDA's role in this strategic partnership, particularly early on in the design and testing stage, was instrumental to the project's success. NYSERDA provided cost-sharing for the project concept largely as a result of Lockheed's technical prowess in powertrain electronics and computer science applications as well as technical merit and experience in process manufacturing at low expense.

By 1998, Lockheed Martin Control Systems produced a commercial product known as the HybriDrive™ propulsion system which has the capability to propel the bus through the use of an AC motor powered by a diesel-driven generator and batteries that are recharged as the bus is driven. Lockheed developed the commercial hybrid-electric drivetrain, holding to their commitment. As orders for the product began coming in, first for pilot tests, and then for large fleets, market demand proved to be sustainable, as originally suggested by NYSERDA's strong push and advocation of the technology and willingness to support it.

Government-to-Customer (G2C) Partnership

Government often partners with proactive customers who are willing to try new products or techniques that are expected to provide widespread benefits, but may not yet be widely accepted. For example, NYSERDA, with assistance from other research organizations including the New York State Museum and Oak Ridge National Laboratory, is working to accelerate the development of a biological control agent for zebra mussel infestations in power generation facilities. The "customer" for this particular demonstration project happens to be the New York Power Authority, however, it is anticipated that other power generation facilities, and perhaps other industrial facilities could benefit from this control agent. As described in Exhibit 4, this partnership is helping the customer to improve operating efficiency while providing public benefits including reduced use of chlorine and improved water quality.

Exhibit 4: G2C Partnering - Biological Control of Zebra Mussels in Electric Generation Facilities

The zebra mussel was introduced into North American freshwaters about a decade ago. Their widespread infestation throughout inland waters has resulted in a major economic loss to raw-water-dependant industries in New York State, including electric power generating facilities. At present, there are few control options for power plants and other facilities in the State. These facilities typically rely on the use of broad-spectrum, chemical biocides (*i.e.*, continuous chlorination for three weeks) for controlling zebra mussels. However, biocide treatments are increasingly becoming regarded as environmentally unacceptable. Chlorine, for example, can combine with organic compounds found in water and form trihalomethanes, dioxins and other potentially carcinogenic substances. Reduction in the use of such biocides is generally viewed by New York's power industry as environmentally prudent and desirable. Electric power generating facilities in New York State are in need of effective, economical and non-polluting techniques for managing zebra mussels.

Under its Bioresources Development program, NYSERDA is fostering a partnership between state and national government researchers at the New York State Museum and Oak Ridge National Laboratory, and facility managers with the New York Power Authority. A project with the former Empire State Electric Energy Research Corporation (ESEERCO) underwent extensive laboratory screening of more than 700 bacterial strains to isolate one strain that is lethal to zebra mussels. Mussels of various sizes have been tested in laboratory settings and appear to be susceptible to kill by this bacterial strain. A small-scale trial was conducted at the New York Power Authority's Crescent hydroelectric station on the Mohawk river, resulting in 94% kill. The next phase of research to be funded by NYSERDA will involve a larger scale fermentation of the bacteria to allow for up to eight facility trials and accelerate commercial development of the biological control agent. Clearing zebra mussels from power facility intake pipes through the use of this novel biological control agent will improve plant efficiency and reduce the introduction of chlorine into the environment.

Business-to-Business (B2B) Partnership

Strategic partnerships between businesses lead to sharing and leveraging of information, technical expertise, research and development, facilities, and financial resources. A number of NYSERDA programs facilitate B2B partnering. Exhibit 5 describes a B2B partnership in which Biofine, Inc. will partner with paper manufacturing facilities to drive the successful demonstration, manufacturing capability, and marketability of a high-value and versatile commercial product derived from the conversion of paper sludge into chemical components.

Business-to-Customer (B2C) Partnership

Partnerships formed between businesses and customers are typically long-lasting and mutually beneficial to both partners. For example, many businesses establish preferred customer relationships to certain customers. Customers in the B2C partnership can be characterized as (1) representing the largest purchasers, (2) continually engaging and challenging the business to improve its products and services to meet changing needs, (3) frequently exchanging information and sharing resources to improve productivity and product and service quality, and (4) sharing common interests, management beliefs, or corporate or social mission. An example of such a partnership facilitated by NYSERDA is presented in Exhibit 6.

Exhibit 5: B2B Partnering - NYSERDA's Multi-Phase Partnership with Biofine, Inc.

Biofine, Inc. of Waltham, Massachusetts, has patented a process to convert biomass, such as waste fibers from pulping and paper making, into levulinic acid (LA). LA, currently selling at $4-6 per pound, is a highly versatile chemical intermediate used to create agricultural chemicals, gasoline oxygenate additives, and other materials that might otherwise be derived from petroleum. Economically converting biomass to high-value chemicals could offer significant benefits, including decreased dependance on fossil fuel derived products, and a waste-management alternative to landfilling. With the support of NYSERDA, the U.S. Department of Energy, Biometics, Inc., and others Biofine has completed several major milestones, including: (1) completed a study of markets to identify potential end-use applications for value-added derivitaves of LA, (2) performed a preliminary review of the viability of manufacturing processes and costs for the products, (3) designed, procured, constructed and operated (for three years) a one-ton-per-day demonstration plant to manufacture LA from paper sludge in upstate New York, and (4) successfully demonstrated LA production from municipal solid waste and paper sludge feedstock.

During the first phases of this research and development project, Biofine has found that the process to manufacture LA is economical even without charging tipping fees for the waste feedstock. LA as a product is a valuable chemical building block which can be made at low cost from abundant waste materials. Furthermore, Biofine has found that wet feedstock can be used without drying, thereby saving energy. As the scale of LA manufacturing increases (*i.e.*, from 50 tons per day up to 1,000 tons per day dry feedstock) the cost of production is expected to drop from about $0.32 to $0.04 per pound.

NYSERDA has recently agreed to support another phase of this project with Biofine. During the next phase, Biofine aims to produce and evaluate new polymeric LA derivatives with improved characteristics such as increased solubility and reduced viscosity during processing. Once multiple polymers of these derivatives are tested, Biofine will design a processing plant to take LA product from the existing facility and manufacture the most promising polymer commercially.

Exhibit 6: B2C Partnering - AnAerobics Inc. and Canandaigua Wine Co.

This business to business partnership was established in 1994 when AnAerobics Inc. of Aurora, Cayuga County, saw an opportunity to solve Canandaigua Wine Co.'s wastewater treatment problem. AnAerobics, which was a two-person firm in 1994, submitted a proposal to NYSERDA to address waste water treatment problems at the Canandaigua Wine Co., a New York State winery. A NYSERDA project manager who was familiar with AnAerobics Inc. and its principals, supported the proposal. After several modifications, the proposal was approved and it also became an important document that AnAerobics Inc. used to obtain private financing. Furthermore, in order to ensure bank financing, NYSERDA agreed to subordinate its recoupment so that the bank had precedence.

AnAerobics Inc. entered into a performance contract with the winery, where the customers pay based on the money they saved. Currently, AnAerobics' services to the winery are based on a straight cost per pound of water treated, which is the manner AnAerobics prefers to do business. As of 2001, Anaerobics employs nine people and expects to hire at least 11 more in 2001 based on projects with other food processing facilities.

The winery is using anaerobic technology to treat about 60,000 gallons per day of high-strength wastewater. The system has reduced wastewater treatment costs by 85%, enabling the winery to expanded its wine production by 50% and hire 63 additional employees. Currently, AnAerobics is financing a 50% expansion of the wastewater treatment capacity at the winery.

Conclusion

Strategic partnerships are formed and maintained because of shared interests. The ability of the partnership to provide value to all participants requires that each partner agree to a mutual relationship that is unlike the many day-to-day business transactions, and that brings businesses together toward a common purpose, whereby both parties can achieve more together than either might achieve alone. As portrayed in Figure 2, successful partnerships require (1) continuous communication that is honest, open, and clear, (2) coalition building within and outside of the organizations involved, (3) collaboration among similar and sometimes dissimilar organizations, (4) cooperation among partners, and (5) strong commitment among partners.[6] In addition to these factors, successful partnering requires realistic goals, clearly-defined values, and a clear understanding of objectives.[7]

NYSERDA's experience in forging strategic partnerships reveal that the most important requirement for success is acceptance from each partnering organization, sound and meaningful goals that are shared by each partner, and similar management philosophies. In addition, the metrics used to measure progress are of little consequence unless goals are clearly defined, monitored, and redirected with the changing needs of the partnership over time.

Strategic partnerships can exist in many forms and offer many benefits to participants. When developed according to sound principles and goals, strategic partnerships can yield many positive results. For businesses, benefits include:

- Reductions in costs.
- Better product and service quality.
- Improved market positioning.
- Improved productivity and employee morale.
- Development of new business models.
- Shared and managed technological, regulatory, and market risk.
- Expertise in furtherance of organizational goals.

For government, strategic partnerships provide a means to work toward goals that benefit the public at large, such as economic growth and environmental health and safety. For consumers, strategic partnerships have the potential of reducing costs and enhancing quality of life.

The strategic partnership examples highlighted in this paper demonstrate clearly that such partnerships are an effective means of achieving corporate and strategic goals, and that successful partnerships do in fact increase the likelihood that mutual goals will be met, contribute to improved organizational productivity and enhanced economic value, and at the same time, mitigate risks.

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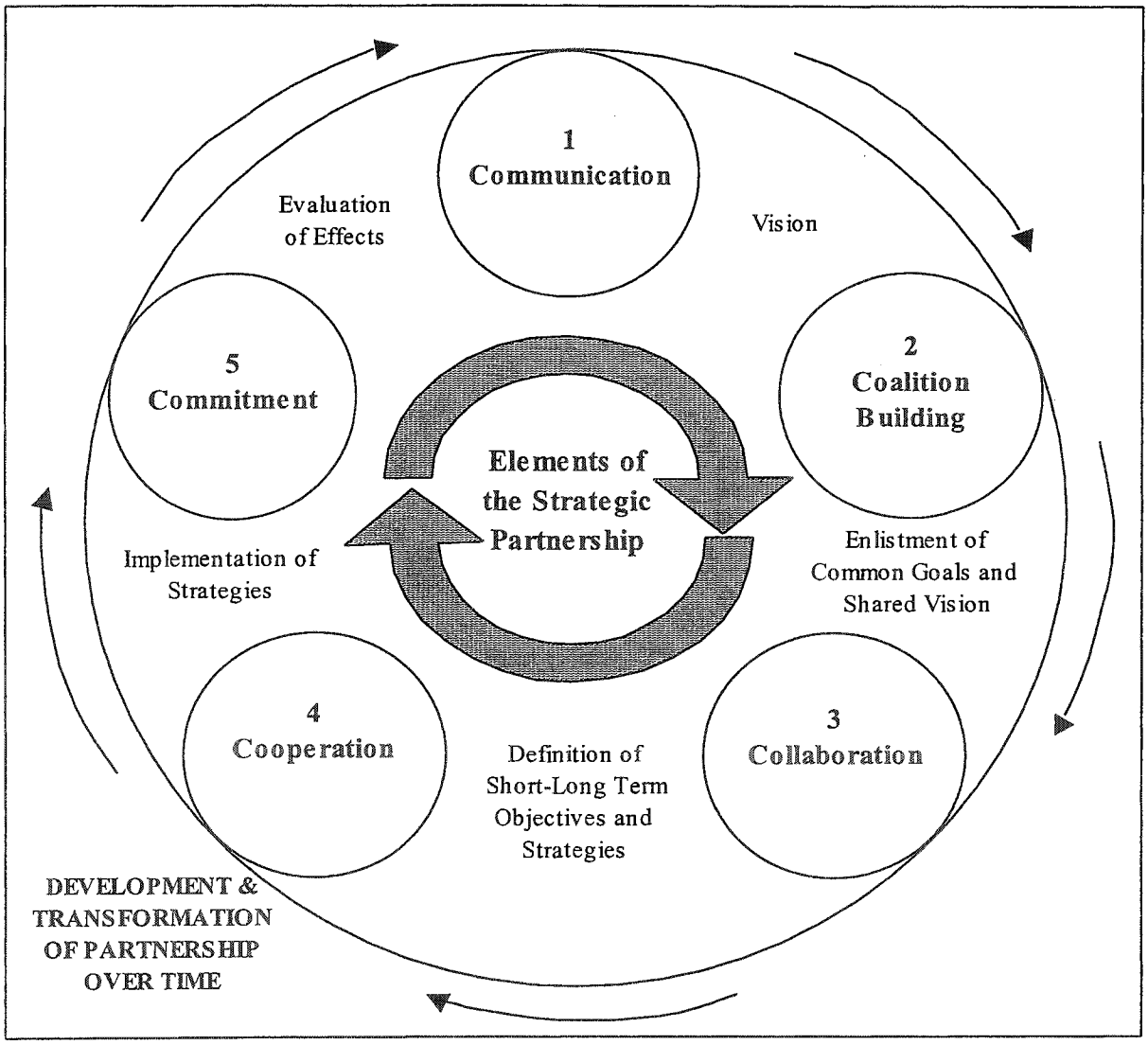
[6] Astroth, Kirk A. Fall 1991. "Getting Serious About Strategic Alliances." *Journal of Extension.* Volume 29. Number 3.

[7] Fox, Geraldine. 1999. *"From Commodity Vendor to Strategic Partner: Moving Outsourcing Relationships Up the Value Chain."* Compass America, Inc.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Communication
Vision
2
Coalition
Building
Enlistment of
Common Goals and
Shared Vision
3
Collaboration
Definition of
Short-Long Term
Objectives and
Strategies
4
Cooperation
Implementation of
Strategies
5
Commitment
Evaluation
of Effects
Elements of
the Strategic
Partnership
DEVELOPMENT &
TRANSFORMATION
OF PARTNERSHIP
OVER TIME

Figure 2