Personal Development: The Key to Change Acceleration in Global Operations

Improving the quality of relationships between your company, your vendor, and other key players affecting your organization's agility.

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Imagine this situation in your organization. Quality problems in the supply chain threaten product and technology introduction. You organize a meeting only to find that the data and information needed to solve the problem lie outside of your company's walls. The problem does not exist inside any one organization, but is a supply chain problem involving multiple organizations. Quickly you reach the obvious conclusion: Someone from your team will need to get in touch with vendors that might assist in resolving the problem.

You realize that the quality of relationships between your company and your vendors will have a significant effect on your capacity to resolve this problem quickly. While traditional customer-vendor relationships are based in obedience (meeting contract specifications), rapid problem solution and knowledge breakthroughs require creativity and innovation through collaborative relations.

For example, the Plastics Procurement and Engineering Team at Hewlett-Packard's (HP) Inkjet Business Unit (IJBU), an inkjet cartridge manufacturing operation in Corvallis, OR created a network of relationships that has both solved problems and generated important new knowledge. This has resulted in a very agile organizational structure that solves problems by forming collaborative networks that accelerate problem solution by generating new knowledge.

Generating New Knowledge in Inkjet Chemistry

A reality in the inkjet business is finding materials that will be compatible with inks. If ink and ink cartridge materials are incompatible, the unit will fail. The task, then, is to match inks with materials that will not be negatively affected by the ink chemistry. This is complicated by the continuous invention of new inks.

Our story begins with its solution. Ray Babb, the manager responsible for the Plastics Procurement and Engineering Group for IJBU's plastics supply chain, asked a plastics engineer, Paul Nash, to be present at his staff meeting. Paul presented scientific-technical information on an important breakthrough in understanding ink-material compatibility. During the course of his presentation, it became clear that Paul has generated important new knowledge that will have a positive impact on the product development process and on product quality. Paul discovered that ink interactions with some materials could be predicted based on new experimental evidence. Before this was discovered, IJBU engineers would have had to test new ink-material combinations through a time-intensive process which started with vendor testing/discovery and ended with IJBU replicating these

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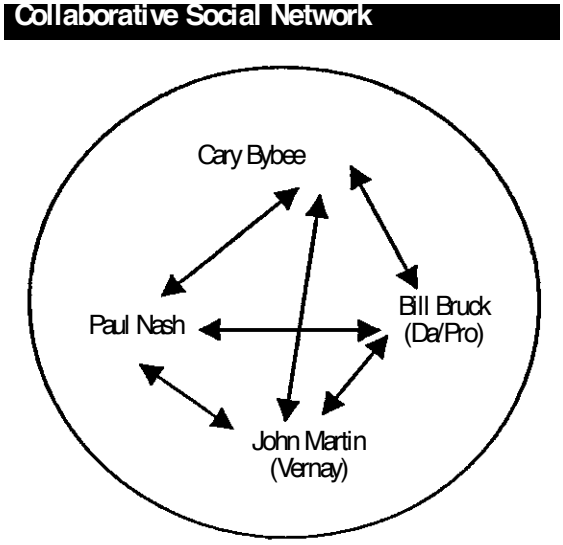

Figure 1. Collaborative social network; Cary, John, Paul, and Bill solved part problems together.

studies. Ink compatibility was a trial and error process.

With the new discovery, a tool that reliably predicts ink compatibility replaced this long matching process. Paul had not come up with this new knowledge on his own. The process of creating this new insight into material science is the focus of this article.

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Collaboration Begins

Here's how the collaborative efforts leading to Paul's new knowledge about ink interactions began. Paul was invited into a meeting with IJBU Product Engineer Cary Bybee. Cary had been working on a problem involving inkjet cartridge parts. Some of the material being used in a cartridge assembly was not compatible with ink. Cary introduced Paul to two outside vendors. Bill, a representative of Da/Pro Rubber, Inc., explained how he had brought practical knowledge on materials to his relations with Paul and Cary. From Bill's perspective, Paul had brought a theoretical understanding of material to the table. John works for another vendor, Vernay Laboratories, Inc. Da/Pro and Vernay had a history of being competitors and had not collaborated; competition had kept them from sharing technical information. For Cary, this created a bottleneck in problem solving.

Cary was instrumental in changing this situation by insisting that the quality of the relationship between the two vendors change from competition to collaboration. Collaboration became a business requirement. To be successful, all parties would need to share their knowledge of ink interactions. John and Bill honored this request and collaborated through meetings, teleconferences, and e-mail with Paul and Cary on a solution.

At this point, two interesting things happened. The first might be expected. The social network of Cary, John, Paul, and Bill solved the specific part problems that brought them together (see Figure 1). The second accomplishment was even more substantial. Paul, Cary, John, and Bill continued their collaboration and began to study trends in their experimental data. They felt that if they could understand the chemistry of ink-material interactions, they not only could apply it to the problem at hand, but could generalize the findings to new inks and new materials. This is precisely what happened. In the course of studying their test results, they invented a new tool (a chemical framework to aid the decision-making process) that could predict certain ink-material compatibilities. No longer would engineers need to engage in the lengthy matching process. Now they could simply use the tool developed by Paul, Cary, Bill, and John to predict which materials would be compatible with new inks.

After Cary had insisted upon their shift from competition to collaboration, the relations between the two vendors "blossomed." John said, "Once we got through the legalities, HP provided an umbrella for us to work together. Since then we've been able to help one another. We've traded technical information, been in each other's plants, and helped to solve each other's problems. Our relationship switched from competition to cooperation."

Bill also reflected on the speed of resolution that Cary and Paul had brought to the project: "There's a lot of knowledge at HP and it is hard to bring knowledge into a central pool. Too often, knowledge is reinvented. Paul and Cary accelerated the learning process." It was now understood that in the process of solving a specific part problem, the collaborative network of Cary, Paul, John, and Bill had also formulated a scientific hypothesis that generated a significant breakthrough in material science — an understanding of material compatibility had been nonexistent.

From Knowledge Creation to Knowledge Distribution

These new insights into material science began to be shared via word of mouth. The close-knit collaborative network now opened and grew as requests to share the new knowledge were made. The new tool predicting ink interactions was useful for the inkjet cartridge manufacturing sites and HP's printer manufacturing sites. Cary shared the knowledge with HP Divisions in San Diego, CA; Vancouver, WA; and Barcelona, Spain. Paul's scientific presentation gained popularity as the knowl-

edge was also shared with teams involved in other product lines (see Figure 2).

A Vancouver HP employee mentioned, "I learned a lot about material compatibility and will go back to Paul for more information." Another design engineer commented that the new knowledge "took the black magic out of (material) compatibility." Yet another Vancouver Division employee explained it this way: "(The team's) work shifted the paradigm from individual material testing to understanding material families compatibilities. There's a lot of apprehension about new materials. Introducing a new material can add weeks to the product life cycle. (They) dispelled the myth of material degradation and replaced it with a scientific understanding about material compatibility."

Realizing that the act of disseminating this new knowledge could take him away from his materials research, Paul collaborated with an HP employee from Vancouver to put his presentation on the company's intranet, allowing virtually any HP employee to access the new material science insights.

From Knowledge Distribution to Knowledge Utilization

Shortly after Paul gave his presentation (about ink-material compatibility, mentioned earlier) in Ray's staff meeting, he discussed these findings with Ray's supervisor's staff. The knowledge was spreading across HP sites, product families, and now through the hierarchical network of IJBU (see Figure 3).

Knowledge dissemination had led to knowledge utilization. Since the network of John, Cary, Paul, and Bill had collaborated on the discovery of the new material knowledge, HP has continued to use it in the design of new products and in the improvement of existing products. John has also found that the new material insights were of use to his customers in the appliance and automotive industries. The formerly competitive relationships that turned collaborative upon Cary's request created a win-win environment. While the knowledge of materials was of great significance, the knowledge of how the knowledge was created holds possibly more significance for the three companies involved.

Constraints and Opportunities in Supply Chain Knowledge Management

In most organizations, particularly global organizations, the limit to effective response to emergent problems, like material compatibility, lies in the difficulty in getting alignment in either the decision-making process or in developing a coordinated response. Conflict and misunderstanding can arise as formerly separate departments, divisions, or supply chain companies need to change their relations in order to collaborate on new solutions.

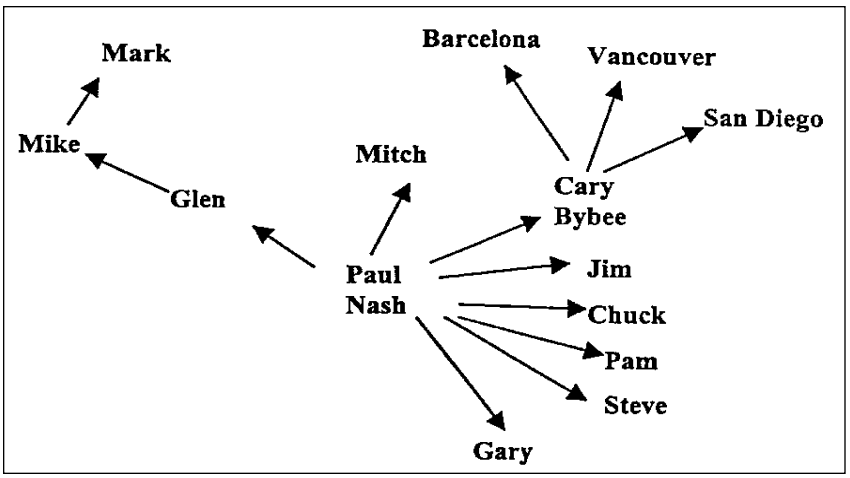

Figure 2. Distributive social network; the close-knit collaborative network opened and grew.

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Inflexibility and blockage occur when individuals get stuck in defending positions instead of being in search of what is in common and needs to be conserved as a means to continued business success. This inflexibility and blockage "disconnects" the very network of relations that must solve problems. This creates a clear opportunity for improving the effectiveness of global manufacturing organizations. If we improve the quality of our relationships, we will improve the quality of our knowledge and accelerate our learning and performance. This result improves the connectivity in the supply chain network and aligns the supply chain in a process of continuous improvement. It has been the key to the entire team initiative as well as a foundation for HP's culture popularly known as the "HP Way."

The Knowledge Life Cycle

In today's economy, knowledge is capital. Knowledge accelerates new product development and decreases costs through continuous quality improvement. A history of cultivating knowledge is the basis for continued business success. Acceleration in knowledge creation is dependent on the quality of relationships and the capacity to work in collaborative, distributive, and hierarchical network structures.

In our story, new knowledge was created in a collaborative network. Everyone worked closely together with an aim to solve the compatibility problem by subor-

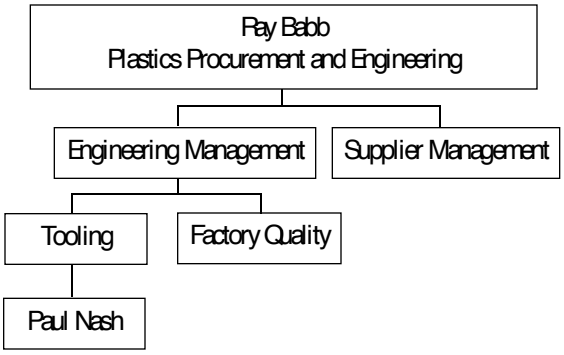

Figure 3. Hierarchical social network; knowledge was spreading through the hierarchical network of IJBU.

Management Roles

- You can not optimize a system you can not communicate across. Be thoughtful about what network you are working to optimize.
- Avoid arbitrary constraints in the collaborative network which limit communication velocity.
- Ensure the decision structure is able to keep up with the learning rate of the collaborative structure.
- Become truly engaged in appreciating and discovering the dynamics of the human relationships unfolding in the supply chain and the capacity of each individual to create.

Figure 4.

The quality of the social network is only as good as the quality of the relationships between network members.

dinating themselves to the success of the whole. Once the new knowledge was discovered, the relations shifted and network began to distribute the new discovery. The network discussing material compatibility that had been confined to the small group of four had grown to include many as the knowledge was widely shared. Finally, during Paul's presentation to Ray's staff, the knowledge was shared with the hierarchical network that could ensure utilization of the new knowledge.

We believe that this is a natural social process. We create new knowledge, creativity, and innovation in small collaborative social networks. Once our discovery has proven value, we share the knowledge through "star" (distributive) networks. Finally, we optimize utilization of the knowledge by deciding that the new practice become standardized and used throughout the organization. This occurs in the hierarchical network.

Agility in Supply Chain Knowledge Networks

As described by psychologist Jean Piaget, Dr. W.E. Deming, and Humberto Maturana and exemplified by Paul, Gary, Bill, and John, knowledge is a social process. We learn from one another as we coordinate our daily work activities. Our collective coordination of action generates knowledge essential for improvement. So knowledge is generated in supply chain social networks.

The capacity of social networks to restructure accelerates the generation of knowledge used in response to the changing environment. Flexibility in social networks consists of flexible relationships among social network members.

In our example, the social network members include representatives from IJBU, Da/Pro, and Vernay. Agility was created as individuals saw the possibility that their personal relationship skills limited organizational effectiveness. The metaphor of the chain being only as strong as its weakest link applies to the supply chain. One individual's resistance to learning, innovation, or change based on continuous improvement can shut down the generative capacity of the entire social network.

None of us, however, is fundamentally open to others trying to reform us. Thus creating opportunities for teams to take on skill development in areas of interpersonal relationships generates an environment of exploration of what works, expanding the social network and the basis for relationships in the global organization. This skill development must then be linked to taking on real problems for the organization.

Improving the Knowledge Network Through Personal Development

Social networks are improved only through the improvement of relations between individuals — understanding, trust, cooperation, etc. This may seem counter-intuitive. Many times we believe that if we attend to the entire network through tools such as new organization charts, etc. we will improve the entire network. What is demonstrated in this case study is a fundamental social principle: The quality of the social network is only as good as the quality of the relationships between network members.

The good news is that social-biologist Humberto Maturana and organizational-quality scientist W.E. Deming (see the "Additional Resources" box) remind us that it is human nature to be cooperative. Both have also described competition within an organization as being a recent and destructive tendency in management. Personal development can reverse this tendency if it improves the quality of interpersonal relationships. Suggested management roles are shown in Figure 4.

We believe that individual improvement is limited by several factors. First is the individual's commitment to share risk in an uncertain environment. Second is the ability of individuals to feel in control of the environment in which they would like to contribute. Third is making time to share honest reflective feedback. Finally, the individual's rate of learning limits personal development.

This understanding emphasizes the critical nature of relationships in the organization and within the supply chain. As demonstrated by Cary, Paul, John, and Bill, respect for each other preceded learning, while mutual trust preceded their adaptation to a changing environment. If individuals fail to develop their skills in observing and listening, they will contribute to misunderstanding, lack of trust, and separation within the organization and the supply chain. This separation will result in reduced creativity and support, leading to frustration, blame, and finally internal competition in the network. Collaborative and internal competitive process models are shown in Figure 5.

The key to agility in the supply chain network lies in personal development, which results in listening, understanding, and building trust. These relationship behaviors will generate collaboration, which in turn will create creativity, support, and agility in the supply chain network.

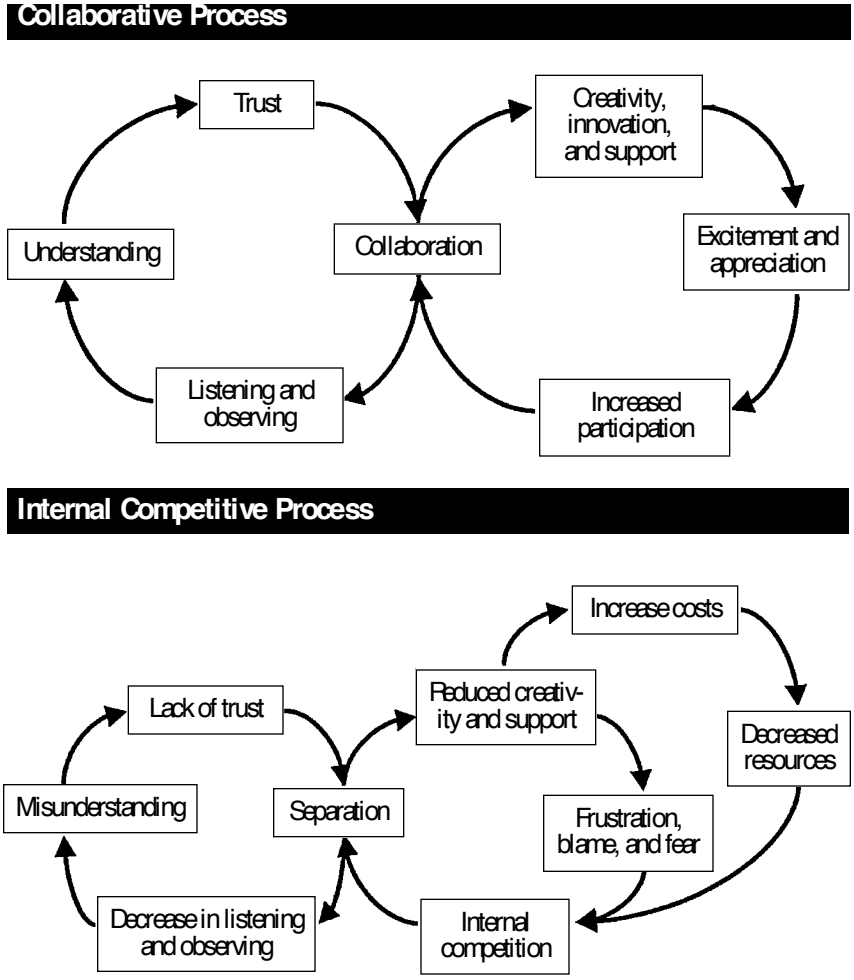

Figure 5. Collaborative process and internal competitive process.

Steve Jewell-Larsen, worldwide supply chain manager for Hewlett-Packard's (HP) Inkjet Business Unit (IJBU), and Dennis Sandow, Society for Organizational Learning and University of Oregon, were speakers at AME's Annual Conference during October, 1999 in Portland, OR.

Additional Resources

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