ARC BRIEF

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Cisco TelePresence in Manufacturing: Changing Behavior for Enhanced Collaboration

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Global Volatility Challenges Manufacturers

The financial turbulence of 2008 has quickly made its way into the manufacturing sector and into the supply chains that keep this sector functioning. The resolution of the current crisis is certainly unclear at this point. However manufacturers can note the important ways in which their environment has changed since the crisis began, and can begin their adaption to these new conditions. What are they?

> The turbulence in global financial and product markets gives the traditional manufacturing virtues of speed, agility, and quality even greater importance as success factors in manufacturing.

- **Increased Volatility** – More important even than the decline in demand is the huge increase in market volatility that began in 2008 and still persists. Manufacturing organizations experience this through the huge disturbances felt by their supply chains and distribution networks. In addition the price and availability of energy and materials has bounced between extremes. The run-up and precipitous fall of commodity prices in 2008 has wiped out the common expectation of sustained high prices. Futures markets indicate that energy and material prices are expected to rise. However the uncertainty of all future price estimates is now substantially greater.
- **Higher Risk Premiums** – The present financial market environment is characterized by a flight to safety now perceived in government securities. Creditors are demanding far higher returns in order to bear the financial risks of normal business activities.
- **Reduced Credit Availability** – The availability of credit remains a challenge despite the massive injections of liquidity into financial intermediaries. These intermediaries are now seeking to strengthen their balance sheets through de-leveraging, but they are doing so in an environment of falling asset prices. These falling asset prices work against greater availability of credit. This creates a need for manufacturers to maintain increased liquidity.

The impact of this newly volatile environment is to amplify the importance of the traditional manufacturing virtues of speed, agility, and quality. Never have these characteristics been more important, nor has the value of effective collaboration in manufacturing been greater. During economic downturns manufacturers must find new processes and strategies that minimize ongoing costs and create the most value with their employees and partners. One important innovative enabler, a solution for network-enabled face-to-face collaboration called "TelePresence," has been brought to market by Cisco Systems.

In this business climate speed, agility, flexibility and quality in manufacturing are far more important than ever.

TelePresence in Brief

Cisco TelePresence is a solution that provides a live "face-to-face" meeting experience via the enterprise network. The solution encompasses high-definition video, advanced audio, software, a hardware-optimized meeting environment, and integration services. Each of these elements contributes toward making the underlying technology invisible to the users and operable without training. The major elements of the solution are shown below.

Element	Capabilities Included
Audio/Visual	720-1080 line progressive scan high definition video cameras
	Advanced video codecs compress video signals so that high quality video can be transmitted at lowest possible bit rates
	Advanced audio Coding with low delay, echo cancellation, and interference filters for a life-like audio experience
Network	Uses IP the networking deployed on enterprise networks
	Quality of Service (QoS) for high bandwidth applications
	Purpose-built furniture
Hardware Optimized Environment	Furniture design incorporates the technology elements such as cameras, microphones, speakers, and projectors, and lighting
	IP telephony
	Standards-based launching of sessions using a VOIP phone rather than customized controls
Software	Integrates with existing groupware solutions (e.g. Microsoft Outlook) for scheduling and corporate information access
	Scheduling, management, reporting, accounting/billing, performance metrics, and real-time support

Elements of Cisco's TelePresence Product Offering

The In-Person Experience

A TelePresence endpoint is a meticulously designed environment. This attention to design is not limited to the high technology involved but encompasses the ergonomics (human factors) as well. The design objective is to create an "in-person experience" – so that users in a TelePresence session perceive something very similar to what they perceive in a personal encounter. The differences between the TelePresence experience and less intimate forms of conferencing are not strictly quantifiable in terms of accounting or engineering, but are quickly recognized by the people who participate. Furthermore, this attention to creating an in-person experience is reflected in how people use TelePresence and (more important) in their behaviors while using TelePresence.

A Meeting Conducted Via TelePresence

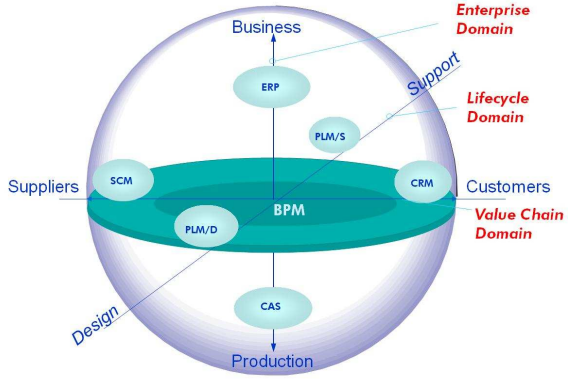
In creating this environment, Cisco's explicit objective was that the technology should become invisible. Participants perceive instead a person-to-person encounter. This requires very high technology, of course. Life-sized, high definition and dynamic video representations of all participants must be maintained during the session. In addition to video, the audio system is engineered to simulate normal human dialog. Audio is captured from the person who speaks, so participants can simply speak and act normally, and they are seen by others engaging in their normal behavior.

This realism is created by the application of very high technology. The objective is to "fool" the senses of participants so that their experience (and behavior) reflects the way people behave in person-to-person interactions.

The huge difference in intimacy between the TelePresence experience and traditional video-conferencing enables far more normal human interaction, and promotes the building and maintaining of personal relationships. People can get to know others, and be known themselves, through this shared experience.

TelePresence in a Manufacturing Context

ARC's Collaborative Manufacturing Model (CMM) envisions manufacturing activities along 3 distinct axes: Value Chain, Lifecycle, and Enterprise. The value chain axis represents the transformation of materials into products and their distribution. The lifecycle axis represents the evolution of products from concept to production, and the support and service activities that occur as these products are used by customers. The enterprise axis represents the internal generation and use of information about the company's manufacturing operations – sensor to boardroom, if you will.



The ARC Collaborative Manufacturing Model

The CMM emphasizes the fact that collaboration is critical along all of these axes. But cutting edge technology investments in collaboration, such a Cisco TelePresence, tend to appear initially along the enterprise axis. This axis is more internal, and thus offers higher certainty of financial return on investment. Later as a collaborative technology becomes more widespread, it is worked into product lifecycle or supply chain activities that are deeply involved with those outside of the manufacturing firm. This model of technology deployment is a good one for TelePresence in manufacturing, as the following cases illustrate.

Bobcat:
Building a Smooth Transition after an Acquisition

Bobcat Company is a world leader in the manufacture of compact excavators, loaders, and utility equipment, and their attachments. A Fargo, North Dakota company founded in 1947, Bobcat was acquired in 2007 by Korean giant Doosan Infracore. Suddenly a new set of global and cross-cultural relationships had to be built and maintained. Bobcat's enterprise infrastructure was 100% Cisco, so they asked Cisco about what was available to support this collaboration. As a result, Bobcat and Doosan deployed Tele-

Presence endpoints in Fargo and Charlotte in the US, and at Doosan headquarters in Korea. Bobcat's IT organization was convinced of the technology, but not of its business value. They liked the design, saying, "If Cisco does something, they do it 100% and it is awesome, but it doesn't come cheap. We thought this project would be a waste of money; that it would never be used."

Instead, the opportunity for collaboration was hugely important. "It was critical, since we had a new parent company. We use all the Cisco tools. While we don't use TelePresence nearly as often as we use other things like Cisco Meetingplace, sometimes you simply must have face time."

For Bobcat executives each "opportunity" for actual face time with their parent company meant losing 2 full days to air travel, spending thousands of dollars in travel expenses, plus the fatigue and lifestyle costs of frequent long-distance travel. Not to mention that there are times when weather makes air travel from Fargo simply impossible.

Rather than a waste, the consistently high utilization of Bobcat's TelePresence system has been a surprise to Bobcat's IT team. The investment has been worthwhile solely on the metric of travel expense reduction. "For that kind of trip, you do not have to avoid very many before the savings become large." Bobcat will expand its TelePresence to the European headquarters in Belgium shortly.

The telepresence investment was justified on travel cost reduction, but it has also enabled faster decisions.

Utilization of the TelePresence system has been primarily for meetings between American and Korean executives, primarily for critical management topics. While the company's "hard" metrics have justified the TelePresence investment entirely from reduced travel cost, the ability of managers to meet easily has enabled faster decision-making and smoother relationships between widely dispersed business units.

TelePresence In a Global High-Tech Manufacturer

ARC also discussed TelePresence with a global 100 high tech manufacturer who insisted that their identity remain confidential. This company has completed 3 phases of TelePresence deployment consisting of 10-20 endpoints, and plans more for 2009. The investment justification was based on business travel cost reduction alone, and the company has made careful measurements to gauge its success.

They describe their own company as having a culture of travel where "people will get on a plane in order to be present at a 1-hour meeting". To evaluate TelePresence, they measured the travel history and expenses of their most frequent business travelers, excluding their sales and marketing organizations. These organizations were assumed to do primary customer-facing travel that would not be reduced by TelePresence. In this company also, doubt was expressed among potential users that TelePresence would have much impact. After more than a year of use, they describe their experience this way:

> *"To be honest, it has been nothing but people lusting after this capability. The impact of TelePresence is very effective because it is such an immersive technology. Be prepared for it being a disruptive technology. It is going to be disruptive from many factors."*

The "lust" has been reflected in extremely high utilization of their TelePresence endpoints. The company policy was to open the system to all potential users. They told ARC that "It is often sold as an executive system, but that is the wrong profile." The metrics reveal that their usage splits evenly between technical and non-technical meetings. Non-technical users are primarily from support organizations (IT, Finance, and Human Resources). As to the type of meetings, these were described as critical problem solving sessions or critical 1-on-1 meetings. Utilization has been so high that a priority scheme was put into place in order to allocate the TelePresence endpoints to the most valuable uses.

"TelePresence engages people deeply, leading to more focused and productive meetings and faster decision making."

Metrics also reveal that meetings are shorter than was expected. Most are less than day-long affairs, and even 1-hour TelePresence meetings are fairly common. Executives questioned whether this use profile really reflected travel savings. Users say it does. They report that the use of the system involves behavioral changes that make the meeting time far more productive. "It is so immersive that you can't multi-task", they reported. "We accomplish more in 3 hours than in a 1-day face-to-face. The atmosphere is much different and more focused in a TelePresence context". One benefit has been better use of in-house domain experts by product teams. This has led to shorter product time-to-market for dispersed development teams, and time-to-market is the key success factor for this company's business.

A major cause of the high utilization is the smooth integration of TelPresence endpoints as a corporate resource, and their ease of operation. Users can reserve TelePresence endpoints the same way they reserve any conference room using their existing desktop software (in this company's case via Microsoft Outlook). Initiating a session is simplified to a button-push task. "They can schedule and operate it themselves. They do not need IT assistance". Capture of the usage metrics is also built in to the system. According to the company this has "raised the bar" for ease of integration.

The integration of TelePresence with existing office productivity tools and its ease of use greatly contributes to its acceptance by end users, who do not need IT assistance to collaborate via TelePresence.

The company uses other video technologies, and evaluates the market regularly. But ease of integration and integration with existing deployments are drawbacks for many of the other products they see on the market today. They are especially wary of products that leave much of the integration work to the owner's IT function or (worse) to end users of the system. "With TelePresence you simply go in and push a button. With older technologies, people would become frustrated".

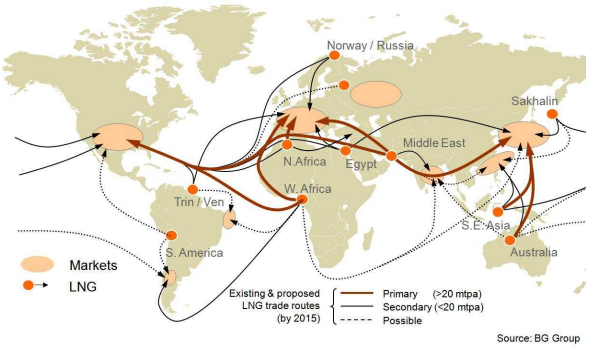
Finally, the company effused about the value of Cisco's support and channel partners. Because of Cisco's in-house experience, they avoided a number of potential pitfalls. The company felt Cisco's commitment to the success of their experience. "They have been a great company to work with. They have been great partners. They throw a lot of their people at this to make it successful. I really can't say enough about them."

Global Capital Projects: Ripe for TelePresence Collaboration?

Despite the current downturn, many long term capital projects undertaken by manufacturers remain in progress and need to be completed. One example is the huge number of energy projects to bring liquefied natural gas (LNG) to global markets. The objective of these projects is to supplement gas supplies in high-demand markets with LNG transported from regions that have a surplus of gas that otherwise must be flared or used ineffectively.

In recent years a global build-out of LNG infrastructure has been ongoing. These projects involve inter-continental transport of LNG and the construction of new LNG facilities at diverse locations. A typical project investment is in the hundreds of millions of US dollars, and some are larger. The num-

ber of simultaneous global LNG projects has stretched the available human resources with LNG expertise to the breaking point.



LNG Development Involves Global Project Teams

Existing projects need to reach commercial operation as fast as possible. Yet each project has executive and technical teams on several continents. Adding a TelePresence endpoint at each of these locations could quicken the resolution of issues and allow developers, EPCs, and suppliers to use their best experts without as much wear from global travel. ARC believes that collaborative infrastructure such as TelePresence should be added as part of the commercialization plan for such projects. This improved collaboration has the potential to shorten project schedules, improve performance, and increase employee satisfaction. Furthermore, since multiple projects are often managed from a single location, a single TelePresence capability could support many projects.

Recommendations

These experiences indicate that as an immersive and smoothly integrated videoconference tool, TelePresence effectively impacts the normal "meeting behaviors" of its users, giving sessions sharper focus and improving productivity. While benefits from its B2B use are potentially huge, often they are more difficult to develop and to measure. However successful deployments can be justified on the basis of travel savings alone, based on savings for small group face-to-face meetings. A multi-phase deployment should be used. As these deployments grow, they can be used to refine the case for more advanced uses in external collaboration. TelePresence should also be evaluated as part of the supporting infrastructure for major capital expenditures, regardless of their stage of completion.

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