

Project Management Supply-Chain Challenges

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Introduction

Essential to project success is the timely, accurate, and cost effective delivery of materials, supplies, and equipment. Unless project resources arrive when and where required, achieving project success is difficult to achieve. As an example, it has been reported that hurricane Katrina emergency response suffered from a lack of required resources at the needed locations at appropriate times to a point that "... Phil Capitano, mayor of Kenner, La., ... was famously quoted, 'The Red Cross and FEMA need to take a masters class in logistics and mobilization from Wall-Mart' (Inman 2006, p. 28).

Key to ensuring project resources arrive as required are supply-chain management methodologies and methods. These essential project processes assist in mitigating negative effects, such as hurricane Katrina, by delivering the right resource to the correct location at the required time. While project supply-chain management is always essential, today's project globalization landscape intensifies the need to effectively manage procurement and delivery of the project resource needs.

The expanding project globalization landscape, the state of interacting across national borders, is linked to the corporate environment. Within the global economy, corporations are competing not only locally but internationally to ensure their survival. To achieve this corporations are not only offering products and services nationally and internationally, they are also economically leveraging foreign manufacturing facilities, labor and the application of joint venture agreements to develop natural resources or new products (Teeikangas).

An essential element for global survival is the need to be more competitive through the production of products or services faster, cheaper, and better (Sennara 2002). Project management, as a discipline, is recognized as a process that provides enhanced capabilities to achieve these objectives (Kerzner 2002) while assisting in enhancing the global company's potential for success (Iles and Hayers 1997). Supply-chain management is an essential process within the project manager's tool kit.

From a definitional viewpoint, "Supply-chain management is the integration of the activities that procure materials and service, transform them into intermediate goods and final products, and deliver them to customers" (Heizer and Render 2006). Essentially, supply-chain management transforms a project's identified material, supply and service needs into available resources for its customers, the project. Achieving the effective and efficient transformation of project needs into available resources requires a comprehensive set of supply-chain management skills and techniques.

Yet, the process of project supply-chain management can be linear or non-linear. As Ivory and Alderman discuss, "Linear interaction[s] [are processes that] can be expected and even predicted, while non-linear interactions ... cannot be predicted by the system designers" (Ivory and Alderman, p. 6).

Within the project context, the linear supply-chain perspective includes those procurements that are well defined and perform as designed. Conversely, non-linear supply-chains occur when identified or unidentified risks occur and the intended linear procurement process goes awry. These non-linear process risks have the potential to generate cascading negative influences across the project.

The potential non-linear supply-chain challenges can be viewed as similar to the quantum physics uncertainty principal (Wolf 1989) in that, for the supply-chain, reality of achieving the final result depends on how we go about making the choices and applying the operators. The supply-chain operator's purpose is to provide a linear process with measurable positive results. Application of the supply-chain operator, however, faces many challenges that if not effectively managed will generate a non-linear negative cascading project effect. A few of these challenges are discussed in the next section.

Supply-chain Challenges

Some supply-chain risks and challenges include lack of supplier attention, late placed orders, internal

procurement challenges, critical material damaged in shipment, and supplier induced changes.

The lack of supplier attention has been recognized as a problem on many projects. NASA, for example, experienced problems in this area in spite of the money they were willing to throw at the problem.

Ivory and Alderman reported that within the NASA environment, a root cause of "... poor [supply-chain] service stemmed from the one-off nature of the work that, because it would not result in a long-term stream of work for those suppliers, was not as valuable to them as competing work and, therefore, did not get their best attention" (2005, p. 6).

The vendor view of a one-off project sale is not an uncommon project experience. Indications of this view can be traced to events such as promised delivery dates missed as higher valued competing orders are filled first. In this situation, the project team determines that their order has been preempted by another firm's order as the supplier is providing a higher level of service to a larger and/or repeat customer rather than the one-off project order. Other lack of supplier attention examples include failure to return phone calls or Email inquiries in time, slow response to requested updates, and frequent shifting of procurement requests between different sales personnel.

While lack of supplier attention is a risk factor, the project team can also be the source of supply-chain risks and challenges. This supply-chain attribute can be recognized as late placed orders due to conflicting objectives and goals. Within the theory of conflicting objectives and goals, the project team must balance competing objectives and goals. The project management team faces the objective of managing cash flow burn yet must ensure required resources are available. These objectives may be in conflict as part of the cash flow management is to ensure that material is procured when required and within the quantities required. Managing where and when the material is purchased as well as when the material arrive supports the overall cash flow objective if the best price available is obtained and the material is delivered when required.

If, on the other hand, a better price is obtainable for early delivery, the project is faced with potential additional store, breakage, and shrinkage costs.

Another contrasting side of project procurement conflicting objectives and goals is the need to ensure that the material is on hand when required. Potential issues of vendor backorders, late deliveries, and wrong deliveries encourage the project team to order sooner than required to allow for these potential risks. Obtaining the materials earlier helps to minimize the risks yet can result in additional storage, breakage, and shrinkage costs as well,

Supply-chain management is also subject to internal procurement issues. As an example, one project leader stated that the procurement process orders, "... would go into this black hole called the buying office...[and] they will probably take the cheapest regardless of what you get... We have suffered heavily for that" (Ivory and Alderman P. 11).

Other internal challenges include conflicting or restricting company purchasing policies and procedures. Various supply-chain management constraints can include appropriate levels of procurement signature authority, mandatory competitive bid requirements, and restriction on the types of vendors' equipment that can be used. Other limiting company policies can include stringent insurance and warranty contractual requirements. These various issues can present significant challenges to the project team's ability to obtain the specific material within the timeframe required at an optimum price.

Another supply-chain risk involves the receipt of damaged material. One recent example of this involved the procurement of a large turbine power generation unit. On receipt of the system it was discovered that the device had been subjected to shock forces greater than specified. This resulted in sending the unit back to the manufacturer for inspection.

During the detailed inspection process, corrosion was identified on critical parts. The combined material defect issues quickly moved the project supply-chain management process from a linear effort to a non-linear state. In this non-linear state

cascading negative project effects are highly probable. High risk, non-linear supply-chain effects can very quickly occur when highly technical, complex systems are damaged during the supply-chain process.

When it comes to technology intensive and complex systems, supplier induced changes are an additional area of supply-chain risk. Supplier induced changes involve the state where the supplier provides the requested part but has introduced a change from the original design. These changes can range from something as simple as substituting Metric standard bolts for English standard bolts to supplying a software intensive system that has a newer operating system version. In either case, the supplier-induced change can result in a continuum of issues from a minor irritation to catastrophic system impacts.

A minor irritation may be that the Metric bolt forces the project team to procure new tools that are sized for Metric bolts. This is an added cost and time impact to address the supplier induced change. On the other extreme, a supplier induced software version change is a ripe minefield of potential catastrophic problems. As an example, during one project, the system developer delivered a product where they had implemented an operating system software version change. What the system developer failed to understand was the extent to which other associated software was not certified to operate with this next generation operating system.

Much to the developer's and the project team's frustration, the system acceptance test identified significant problems. The solution involved installation of a new operating system and a complete system acceptance re-test. While in the case a solution was achievable, there was an impact to the project from both a cost and schedule perspective.

Managing the risk of untested software, mistaken supply chain orders, material damage, late shipments and conflicting project objectives are just a few of the challenges facing project team delivery of a product or service on time, within budget, and which meets the established quality standards. It is the project management team's charter to manage these risks using a variety of tools, techniques, and skills.

Supply-chain process discussion

Supply-chain management knowledge, skills, and tools are essential project management support elements. Effectively applying these skills and tools enhances the project team's opportunity to provide a cost effective delivery of required materials or services when and where needed.

Supply chains in a global environment must be able to

1. React to sudden changes in parts availability, distribution or shipping channels, import duties, and currency rates.
2. Use the latest computer and transmission technologies to schedule and manage the shipment of parts
3. Staff with local specialist who handle duties, freight, customs, and political issues (Heizer and Render 2006, p. 433).

Providing the identified adequately trained and experienced supply-chain experts is critical. With the right people in the right positions, the ability to manage the supply chain is greatly enhanced. Ideally, the project management team will have a direct say in the supply-chain experts that are assigned to the project. If the project management team has the authority and responsibility to staff these critical team positions, they can ensure they have the best knowledge and skills available to support the project.

If the project management team is not able to directly influence the selection of the supply-chain personnel, they need to quickly learn who will be supporting the team's supply-chain needs. By knowing who will be responsible for supporting the project team, it assists in avoiding the perception that all material and service requisitions disappear into that "black hole" where at some unknown time or place the correct material and service may or may not arrive. Establishing the personal project manager to supply-chain expert linkage provides that personal interaction that contributes to lowering the black hole risk that others have fallen into.

The project management team can also minimize the non-linear supply chain risks by clearly identifying and linking material needs to specific activities and the resulting scheduled requirement dates. Creating this supply-chain needs linkage is achieved from the project plan genesis, to the development of the work break down structure, encapsulated within the project schedule, and fully detailed in the material requisitions efforts. This multi-pronged approach will show a clear linkage of material or service needs from the original design until the material or service is consumed within the project context.

Conclusions

In conclusion, supply-chain management is a critical project management knowledge and skill set for the team. Adequately applying the knowledgebase, tools, and skill sets can assist the project team's delivery of the product or service on time and at a lower cost.

To achieve the highest level of supply-chain management requires having the right people available and being able to clearly trace the material or service needs to a component of the overall project.

About the Author

Morgan Henrie, PMP, PhD Anchorage, AK.



- *asapm* Member since: July, 2004
- President of MH Consulting, Inc., providing Project Management Consulting and Training (www.mhcinc.net)
- Director of Marketing for *asapm*.
- Presents project management papers both nationally and internationally

Project Management Focus /Interest

The social aspect of project management in understanding how culture influences and affects multi-national projects. I am also focused on the complex project management of systems of systems projects that integrate multiple systems into a cohesive new meta system.

Editor's note: Morgan Henrie was awarded his PhD late last year, focusing on Multi-National Project Management. Congratulations Morgan!

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