A leanER Process

A Glovia White Paper
# Table of Contents

**Introduction**  
1

**What is Lean?**  
2  
- Brief Background  
- 5 Steps  
- 7 Areas of Waste  
- 10 Technical Elements  
- Critical Success Factors

**Misconceptions of Lean**  
5  
- Cannot Coexist with MRP and MPS  
- Cannot Coexist with ERP  
- Only for Large Corporations  
- Lean and the Internet Do Not Mix

**A New Lean**  
7  
- DDSN, Internet, Globalization  
- New Approach to Competition  
- BTO and BOSC as Catalysts for Extended Lean

**Lean BOSC**  
9  
- Lean BOSC and IT/Internet  
- Lean BOSC and ERP

**How Can Glovia Help?**  
11  
- Customer Portal  
- Supplier Portal  
- Supply Chain Management  
- Connectivity and Business Intelligence

**Conclusion**  
14

**Table 1 – Glovia and Lean Manufacturing**  
15
Introduction

Eliminate waste. Increase flow. Improve continuously. These are just a few of the many phrases businesses and manufacturers have come across when talking about Lean manufacturing and the benefits it brings. Lean has become a proven method for improving operational performance, product quality, customer relationships and most importantly, the bottom line.

In past years, repetitive manufacturers have had great success with Lean. Their ability to implement Lean was mainly attributed to the fact that remapping the value stream was straightforward, the implementation process was often limited to the factory and customer demand was somewhat more predictable. As time went on, the pressures that burdened these and other manufacturers remained, continuing to grow and magnify weaknesses in the organization. Today, increases in customer expectation and foreign competition are forcing companies to further drive down costs and improve flexibility in an environment where product lifecycles constantly shrink.

Through Toyota and the formal introduction by James P. Womack, numerous companies have been exposed to the Lean philosophy and entranced by the overwhelming success stories that came along with it. Unfortunately, many businesses sought quick answers by implementing piecemeal approaches, not realizing or understanding the methodology and commitment of resources required for success.

Despite misapplications and incomplete implementations, other companies have been able to realize substantial positive results. Lean has managed to progressively build a steady growth in popularity and is again being discussed in executive meetings and IT departments. Most of the renewed interest is due to the changes that have occurred in both the application of Lean and competition in the marketplace.
What is Lean?

In order to understand the changes in the application of Lean and competition in the market place, the basic fundamentals of Lean and critical success factors should first be revisited:

To be “lean” is to adopt a philosophical strategy that is relentless in its effort to create value for the customer through the elimination and prevention of waste, such as excess inventory, needless motion and other time and resource consuming activities. Essentially, Lean aims to create a value stream that is comprised of only the processes that add perceived customer value; everything else is unnecessary and should be disregarded.

As more value is created with fewer resources, lean operations can increasingly focus on allowing customer demand to pull products and services through production and the supply chain. However, unless there is stability and optimal flow, the Lean value stream cannot meet the demand that is pulled through the system without using a considerable buffer inventory.

Flow, which is created through communication and synchronization, will minimize delays within the system and allow for collaboration. This customer focused value stream ultimately improves productivity, decreases waste, creates flexibility and responsiveness and increases customer satisfaction, while reducing inventory and adding to the bottom line.

Brief Background

Although Lean’s roots go back to centuries of process thinking, it was only a half century ago when Taichii Ohno and Shigeo Shingo of Toyota created a system that lay the true foundation for lean thinking. The development of the Just-In-Time (JIT) and Toyota Production System (TPS) systems were reactionary steps taken by Toyota so that they could compete in domestic and foreign markets with limited resources and capacity. Their ensuing success became a case study and model for manufacturers all over the world.

For decades, Lean saved and brought businesses back to life. Then in 1990, James Womack finally coined the term “lean” in his eye-opening book The Machine That Changed the World: The Story of Lean Production. The evolution of Lean over the last fifty years has given businesses an initial framework to implement the strategy, both on an organizational and individual level. The following is a brief overview of that framework, which includes the 5 basic steps of the Lean process, the 7 areas of waste that are targeted by the process and the 10 technical elements that make up and sustain the process.

5 Steps

- Specify- The most dominant underlying principle of Lean is the creation of value for the customer. This step breaks down the entire value chain and requires the organization to calculate the customer perceived value for each area.
- Map- A continuation of the first step, once the value chain is broken down, steps are valued and mapped in their respective places. Those areas that do not possess any value are considered as waste and are either minimized or eliminated. The remaining elements lay down the foundation for a future value chain.
- Flow- This step creates flow between the remaining steps to convert the chain into a value stream for the company. The increase in flow will ultimately improve lead times and eliminate “bull whip” effects, creating maximum efficiency.
Pull- Pull and flow are two of the most important elements of not only the implementation process, but of lean itself. Once the value stream is created, products can be manufactured according to the demand that is created and not by assumptions or arbitrary forecasts.

Perfect- Complacency is a disease that has plagued everything from championship teams to Fortune 500 companies. Organizations must not let the taste of success get in the way of their continual pursuit of perfection. Process improvement is never ending.

7 Areas of Waste

- Overproduction- Poor forecasting and faulty communication are a few reasons why manufacturers tend to produce more than their customer needs. Simply put, the business can waste time, money and energy on any area of operations when it does more than necessary.
- Inventory- A direct result of overproduction and long cycle times is excess inventory. This type of waste can be especially burdensome when it begins to take up space, require maintenance/record keeping, and freeze up a good portion of liquid assets.
- Transportation- When creating shorter cycle times, a good place to start would be the transportation portions of the value stream. Any time you have materials, parts or finished goods in transit, there is enormous waste because the parts and goods are sitting in a container creating no value.
- Processing- Products should only carry the value that is perceived or appreciated by the customer. If they cannot see the value in a particular feature or understand its purpose, then there is reason to have it in the first place. This waste is present in many areas such as design and engineering.
- Motion- Similar to transportation, motion creates waste when materials, products, equipment and people are used inefficiently. Excessive movement should be automated where applicable or eliminated altogether so that cycle times may be reduced.
- Waiting- A byproduct of poor process design, waiting time creates lags in the system, which not only affect that particular phase of the operation, but the ones that come before and after it as well. This “bullwhip” effect is a common occurrence that creates many capital and risk issues.
- Errors- As in most cases, the cost to repair damage or defects is usually more than the amount required to prevent them. Taking preventative measures and focusing on a mistake free process will lead to a smoother experience for everyone involved, including the customer.

10 Technical Elements

- 5 S’s- Seiri, seiton, seiso, seiketsu, shisuke are roughly interpreted as sort, simplify, shine, standardize, and sustain. The purpose is to create a clean and organized work environment that is consistently productive.
- Visual Control- An important aspect of Lean, visual controls promote the importance of communication and visibility. This is a key element in any process because the signals invoke almost immediate responses from the target.
- Standardized Work- It was only a matter of time before factories and the Industrial Revolution decimated the cottage industry. Standardization is the clear path to efficiency when producing quality products on a consistent basis.
- TPM- An adoption of Toyota’s total productive maintenance, TPM stresses the importance of utilizing, updating and maintaining equipment to create a production line that is flexible and flows at an optimal level.
- Cellular Production- A type of “division of labor,” cellular production organizes the manufacturing process into sub-processes and enables the company to produce smaller lot sizes, increase flow and improve product quality.
• Mistake Proofing- Referred to as poka-yoka in Japanese, the idea here is to identify the source of mistakes and create measures that will cause them to either be eliminated or spotted easily for correction.
• Takt Time- The basic rate of production, Takt time uses customer demand and production time to create a steady flow in operations, eliminating many areas of waste such as inventory, overproduction and waiting.
• Continuous Flow- Using a timed execution schedule and some of the aforementioned techniques, optimal flow is created and maintained to allow operations to keep inventories to a minimum and shorten cycle times.
• Leveled Production- Utilizing tools such as Takt time, leveled production aims to remove bottlenecks and allows work to flow through the production process by coordinating with customer demand.
• Pull System- In order to decrease cycle times and keep inventories low, pull systems will only consume materials required because they are based on demand, instead of forecasting tools.

Critical Success Factors

Tremendous opportunity exists not only for companies that have had initial success with Lean, but also for those who are starting or have not yet begun the journey. Despite some initial misconceptions, Lean can support a wide range of manufacturing styles from Repetitive and Make-to-Stock to Build-to-Order and Engineer-to-Order; in addition to entire enterprises and supply chains. Success in these environments is highly contingent on the design and application of the appropriate Lean solution. However, one size does not fit all.

Critical success factors for a Lean initiative include:
- Top management desire, commitment and leadership
- Consistent goals, objectives and performance measures throughout the company
- Active daily support from all levels of management
- A thorough understanding of “as-is” customer needs, business requirements and processes
- A clear and consolidated company purpose, lean vision and strategy
- New operating philosophies, “to-be” methods and processes
- Fully engaged and knowledgeable people at all levels of the business.
- Ownership by team members directly involved in the Value Stream
- A company-wide focus on daily problem solving for continuous improvement.
- The intelligent application of proven technologies to enable the transformation by supporting people and processes
- Experienced Lean consultation to help ensure success

Prior to creating Lean strategy, vision and “to-be” value stream process models, it is important to clear up some misconceptions about MRP, ERP, appropriate Lean applications and the Internet. Also, there is further opportunity to leapfrog the competition and drive significant performance improvements by considering the benefits and implications of demand-driven supply networks and build-to-order supply chains.
Misconceptions of Lean

Cannot Coexist with MRP and MPS

One of the dominant principles of lean is that production should be based on demand pulled through the system; anything in excess of that demand is considered waste and hence should be avoided. In the past, however, manufacturers used material requirements planning (MRP) and master production scheduling (MPS) to help them push their work through production. At first glance, it would seem that Lean’s “pull” and MPS’s “push” could never coexist because the purpose for one is a polar opposite of the other.

Despite the seemingly distinct line between the two, a company that adopts lean practices does not have to part with the components of their “push” system. In fact, MRP and MPS can be used with lean to create a balanced attack towards keeping inventories low and cycle times short. MRP and MPS can actually help automate wasted areas of motion, increase visibility and create avenues of heightened communication. If forecasts can be frequently updated and demand history is broken down into small homogeneous streams, MRP and MPS will be able to assist in the receiving and relaying of signals for procurement and production.

Cannot Coexist with ERP

As a product of MRP and MPS, enterprise resource planning (ERP) is also a target of many lean enthusiasts because of the centralized techno-bureaucracy that exists. They feel the concept of sending information back and forth, as well as the mass amount of reporting, would end up clogging a system that is intended to eliminate waste.

In the end, as technology becomes better and faster with each passing day, the reasoning behind their logic becomes poorly grounded. Accurate data can be transferred in real time, giving everyone in the organization an up to date status report, regardless of time or place. Despite the fact that ERP in its relation to Lean, was met with great skepticism ten years ago, advances in technology have now made it an essential tool for successful implementation.

Only for Large Corporations

Smaller and medium sized businesses feel pressure to implement cost cutting strategies as well, but think the strategies applied by large corporations are inapplicable to them. The price tag for implementing lean and the accompanying technology is too much for an organization that is more reactive and concerned with the total cost of ownership. The expectation and need for short-term results keeps them from weighing in the ROI or long-term benefits.

As long as the company focuses on mission critical areas and improves their core competencies, there should be no reason why lean and technology cannot benefit smaller and medium sized businesses. Lean is a scalable solution that requires a great deal of personnel commitment; the technology can be worked in so it is cost effective and manageable.
Lean and the Internet Do Not Mix

Another dichotomy that exists within lean is its apparent conflict with the natural forces of the Internet. While lean tries to create efficient manufacturing by keeping the variety and flexibility of a product limited, the Internet and technology enable companies to provide the variety and flexibility customers desire.

The Internet and IT are labeled as inhibitors of lean, but nothing could be farther from the truth. The two are actually great facilitators that help reduce and eliminate a large of amount of waste, whether it is on the shop floor or with customer/supplier management. The Internet and IT allow lean principles to be implemented, both directly and indirectly, throughout the supply chain as communication and visibility are created on a real time basis. With suppliers on board, the role that the Internet plays for lean and its "pull" principle is clear. Demand driven manufacturing is triggered through customers on the Internet on a real time basis, allowing everyone one involved in the supply chain, even the outsourced suppliers, to receive updated information on the materials and parts required.
A New Lean

Many of the lean misconceptions were formed by traditionalists who made observations during a period of time when the Internet was in a stage of infancy and when IT was trying to justify its existence on a corporate board.

Both technology and the Internet continue to amaze us as they shrink the world and speed up time. In fact, their influence on globalization is so deep and widespread that it is hard to defend a lot of traditional business practices. The rise of demand driven supply networks (DDSN), development of the Internet and growth of globalization have created a level of competition that forces companies to seek leaner strategies.

DDSN, Internet, Globalization

Demand Driven Supply Networks, the Internet and Globalization are interconnected and all play integral roles in shaping the current market environment that exists today. Through globalization and lean objectives, companies are able offer more to their customers for less, and in effect lay the groundwork for DDSNs as well as foster the development of the Internet. DDSNs need a system that can respond to demand in real time, across a network of suppliers and employees. This network of suppliers, which is a product of globalization, can only develop the superior responsiveness required through the use of the Internet. Because information is so critical, the Internet is regarded as an important tool that actualizes the full potential of globalization and DDSNs. By recognizing and utilizing these three forces correctly, a company can achieve the ultimate goal in delivering the right product at the right place at the right time.

New Approach to Competition

The confluence of these three forces has changed the outlook on competition dramatically over the past decade. In the past, competition was gauged by comparing two firms. However in today’s world, it is now defined at the supply chain level, comparing not only respective firms but all the ones that are strategically aligned as well. Supply Chain Management’s role has increased significantly as it’s responsibility continues to encompass the entire value chain. In addition to globalization, DDSNs and the Internet, companies have further complicated matters by outsourcing more of their non-core activities. Relationships with these companies are now crucial, because while they may not perform any of the core competencies, which are kept in house, they still pose an incredible risk.

This paradigm shift in competition has many companies scrambling for solutions or trying to reinvent the way that they do business. For those who have already adopted primary lean principles, it is time to recognize the last step of continuous improvement and extend those principles throughout their enterprise. Nevertheless, these same companies have a head start, because they have already laid down the foundation and are now in a position to take advantage of the new market with the help of information technology.

BTO and BOSC as Catalysts for Extended Lean

Fierce competition, finely tuned supply chains, and advancing technology have given customers the upper hand in determining what, when, where and how they will purchase goods and services. As organizations became customer centric, they realized their product offering was having an affect on the performance of their supply chain. A tradeoff was developing between product variety and the supply chain, because as the increase in variability moved up through the supply chain, the impact of the bullwhip became more pronounced. In an effort to counter this negative impact on the supply chain, organizations looked to increase the speed of their operations.
Speed up communications. Create flexibility. Decrease response time. These are the goals set by businesses when they decide to focus on the customer and take on the new supply chain model that is built to order. By leveraging IT and strategic alliances, the built to order supply chain (BOSC) becomes a tightly integrated value stream that strives to meet individual customer demands with short lead times and minimal inventory. Partnering firms provide the complementary competencies, which give businesses the responsiveness and flexibility to offer quality products at competitive prices in a short time span. When properly managed, benefits can include the ability to customize products efficiently, lower costs considerably, greatly reduce inventory, and significantly increase flexibility.

The BOSC shares many of the same benefits/advantages and strives for the same goals as lean thinking. It is also important to note that as the business environment has evolved, so has the approach on lean thinking. What was once viewed as a tool to eliminate waste and focus on value, lean manufacturing has come a long way from the days of Toyota and James Womack. When lean first came out, it was modeled after the company that started it all, Toyota. Businesses were promoting hierarchical relationships between their customers and suppliers, the operations were independent and separated by function, the focus was on improving internal operations (specifically the factory) and performance metrics were to meet specific target numbers. While this traditional approach has worked wonders in the past, the Lean philosophy must reflect changes in the market.

Lean has gone beyond the factory walls and encompassed all aspects of business, in effect extending itself across the entire enterprise. The market now requires a leaner process that can concentrate on full collaboration externally, among suppliers and customers, as well as internally, among the various functions of operations. This outward focus is propelled by the objectives of customer management instead of waste prevention/reduction. Improvements are employee driven, not by project teams, which creates a much more dynamic environment that is flexible and responsive. A great example of the new lean is Dell Computers.

Dell is a wonderful portrayal of how to create a productive synergy by taking a built to order supply chain and integrating extended lean principles. As a poster child for lean thinking, Dell Computers has been able to show how the BOSC can actually serve more as a catalyst, rather than a hindrance. The Dell story has been told many times over, so it is in the best interest to simply point out some interesting facts and lessons. With the lean supply chain, Dell Computers has maintained their position at the top of the industry. This large market share can be attributed to their collaboration with suppliers in creating a system of processes that is able to keep inventories at a minimum and measure inventory turnover in hours, rather than days.

Dell shows that if there is one area of the supply chain that must be focused on, it must be the customer aspect. The supply chain's performance can be improved immensely by managing the customer demand signals and communicating the information as quickly and accurately as possible throughout the organization and to all suppliers. As a result, Dell experiences an incredibly high inventory turnover rate, which is much higher than the industry average. This turnover rate has improved by an average of 6% over the past fifteen years, going from 10 to 88 during this period. That increase has a direct positive relationship with free cash flows, which means Dell is continuously freeing up more money each year to invest in other businesses or areas of operation, instead of tying it down to inventory. The keys to their success are communication, synchronization and collaboration, all three of which contribute to a lean BOSC that integrates and maximizes the potential of information technology.
Lean BOSC

A natural assumption about the relationship between BOSC and Lean is that they cannot work together because the former caters to the customer and therefore has to provide a variety of products, which in turn creates erratic timetables. Lean, on the other hand, looks to create long, stable production runs so that operations can gain the maximum amount of efficiency.

While the claims for both are true, it does not mean they cannot coexist in a mutually beneficial relationship. By establishing strategic alliances and using three vital resources (the Internet, information technology and people) to the company’s advantage, the BOSC can actually become quite productive while providing solid stability.

Lean BOSC and IT/Internet

Automation and technology are crucial for a BOSC because they increase the responsiveness and flexibility needed to support the small batch sizes and product variability, required by a market that makes few concessions. And because the customer makes all the decisions regarding how the purchase of a product is made, the realization that information is power drives demand for increases in the speed and accuracy of how information is gathered and distributed.

As a result, distribution channels are becoming less oriented on logistics and more focused on the information being delivered, which is vital to a responsive and flexible decision making process. Sharing information on a real time basis allows a business to track products throughout the supply chain, enabling better planning for everyone involved. Coupled with the rapid development of information technology, the higher utilization of the Internet has further increased the visibility of internal and external operations, adding ease of use to the mix of precision and quickness. IT’s ability to disseminate information on a real time basis and act as a complementary solution for ERP systems is the reason why lean BOSCs are even possible.

Lean BOSC and ERP

ERP systems play a major role in helping facilitate the information through IT channels, in the connectivity between functions within an operation, and with the partnerships in the supply chain. The systems, which incorporate technologies such as intranets, EDI and RFID, integrate the entire value chain, offering the visibility needed to make sound management decisions. MRP and MPS, additional components of ERP, help manage the resources when rolling out a plan or following a forecast by sending out advance notices to members of the supply chain. That way everyone is on the same page and ready to respond when called upon.

As companies adopt ERP systems and their various technological components, they are ultimately generating and working towards the same theme; When developing a lean BOSC the most important aspect of that supply chain is the management of customer demand and the ability to control demand signals across the value chain. This mindset and approach will produce the higher performance companies strive for, enabling them to take advantage of market opportunities. ERP provides the necessary infrastructure and offers the keys for success in a BTO market. Communication (Visibility), Synchronization (Flow) and Collaboration (Strategic Alliances):
● Communication- As mentioned earlier many times, information is one of the most valuable assets an organization can possess, so it critical this resource can be accessed by a network, including suppliers and customers. With optimal speed and accuracy you are able to control demand through prices, promotions and services and therefore have planning that is not only cost effective, but responsive and flexible to customer demands as well.

● Synchronization- Lean's virtual redesign of the value stream and the growing reliance on outsourcing challenge a company’s ability to break down their supply chain and reorganize it so operations flow smoothly. This flow, just as with Lean and BOSC, preaches speed and efficiency in the exchange of information and the movement of parts and materials across the entire value stream. Which in turn, allows various functions in operations and suppliers to plan and react immediately to the unstable demands of the BTO market.

● Collaboration- Dell and Wal-Mart are great examples of how collaboration with strategic suppliers can create enormous benefits. In a lean BOSC, unless collaboration exists among the key suppliers in the value stream, the advantages of communication and synchronization will be limited and most likely stunted. The cooperative efforts eventually form a symbiotic relationship that helps improve efficiencies and reduce costs.

Therefore, a lean BOSC is a collaborative effort that must be built on a solid foundation of technologies. IT, notably ERP systems, must create the flow and visibility an organization needs to respond in a BTO market. Many businesses are wary of the impact IT and ERP systems will have on their bottom line, because they are unable to justify the cost for such big projects. The truth of the matter is that, without the two, businesses will lose any existing competitive edge over the long run. What about the BOSC that has already adopted lean measures? The ones that will gain the upper hand will be those who understand that these solutions must be tailored to each organization's unique value stream. They also understand that they must take advantage of technology and a flexible ERP system, which is open and standards based.
How can Glovia help?

Glovia International, a wholly owned subsidiary of Fujitsu International, has been in existence for 35 years. During that time, Glovia has gone from being a solutions provider for manufacturers to serving the entire operation, bringing visibility, flexibility, responsiveness and improved efficiency to all aspects of business.

Glovia's extended ERP suite, which consists of over 70 seamlessly integrated modules, is geared towards providing organizations with the tools they need to support a Lean enterprise. As a leader in enterprise applications for Lean Manufacturing, Glovia offers a plethora of solutions that can be applied to product management and manufacturing on the factory floor. (To see how glovia.com supports lean manufacturing, please refer to the Table 1.)

The innovative nature of Glovia has also taken Lean beyond the factory walls, creating advantageous opportunities to apply ERP, IT applications and the Internet. The following are some of the lean BOSC oriented modules found in glovia.com:

**Customer Portal**

Customer Portal is a module that provides direct access to a sales quote/order and the status of that order via the Internet, at all times. Its easy to use browser interface allows customers to retrieve important information about their order in a timely and accurate manner, freeing up customer service so they can perform other value adding activities. All information regarding a quote or the status of an order is a reflection of that particular moment in time, enabling real time communication.

In addition to customer service management, the portal is also a great tool for controlling the demand that is being pulled through the lean BOSC. The module is capable of employing flexible pricing techniques, discount promotions, product substitution, up selling and cross selling. The decrease in cycle times and streamlining of order management processes are results of the visibility and accuracy created.

**Supplier Portal**

Quite similar to the customer portal, the supplier portal focuses on the upstream portion of the supply chain. Because a major part of operations deals with suppliers, it is crucial that organizations avoid time lags and bullwhip effects by establishing properly connected networks. Visibility and collaboration are vital when responding to sudden changes in demand from customers and manufacturers, which is a frequent occurrence in a BTO market. In order to satisfy demand more effectively, Glovia's supplier portal has a real time browser based solution that ensures suppliers are working with up to the minute information, using status overviews and message boards, and splitting deliveries. Electronic kanban signals are used as well for the management of materials and resources.
**Electronic Kanban**

In addition to the communicative capabilities of the customer and supplier portals, Glovia also offers an electronic kanban solution. Based on the original kanban concept of eliminating shortages and reducing inventories, electronic kanban uses signals to manage materials and resources beyond the internal environment of a single manufacturing site. An important tool in supply chain management, Glovia’s e-Kanban allows a business to monitor the inventory levels of a collaborative supplier and establish triggers to automatically replenish inventory. Applicable at any point along the supply chain, from supplier to customer sites, the solution can add significant value to the Lean BOSC by optimizing efficiency and maximizing cost effectiveness.

**Supply Chain Management**

Lean demand management is the key to running a Lean BOSC successfully. Glovia’s SCM solution is a great facilitator for many reasons including: the ability to analyze recent demand trends and then forecast on a regularly timed basis, the synchronization of enterprise wide demand with current plant conditions, real time order processing, and options for available and capable to promise. Like the Supplier Portal module, but in a more expanded role, the SCM solution provides flexibility to react quickly to changes such as rush orders, unplanned maintenance, or other production disruptions through the help of four individual modules.

- **Factory Planning** - Performs a number of Lean functions such as eliminating waste related to excess inventory, motion and waiting. Factory planning is able to respond to machine breakdowns and unexpected inventory shortages by running a number of “what if” scenarios and then choosing the optimal plan to eliminate bottlenecks, reduce cycle time and improve customer service. In short, it is a constraint based planning tool, designed to optimize all aspects of production. Also, real time production planning enhances responsiveness within the supply chain, by quickly communicating accurate data and immediately enabling informed decision-making.

- **Forecasting** - Although forecasting is not an exact science, Glovia’s module makes it as accurate as possible using over two dozen models, correlations between future demand and production output, and multiple “what if” scenarios. The forecast can be created on a weekly or monthly basis, and separated into smaller more homogeneous demand streams. This information is then analyzed and transferred to MPS for final processing. The forecasting allows for proper planning and collaboration among strategic partners and internal operations.

- **Order Management** - Customer centric BOSCs require organizations to respond to demand, but if there is a lack of visibility in operations then the production plans become out of sync with actual supply orders, resulting in either late deliveries or excess inventory. Order management keeps production steady and inventories lean by using stable yet realistic plans. It is the visibility, responsiveness and flexibility that will allow businesses to improve customer service, decrease cycle times and keep inventories low, all of which are critical to a successful BOSC.

- **Supply Chain Planning** - The backbone of the SCM solution and an integral piece to a lean BOSC, the Supply Chain Planning module is geared towards overcoming the obstacles that are associated with decentralized operations, shrinking product life cycles and increasing customer demands. Supply and demand are synchronized throughout the enterprise, creating visibility for high levels of communication and responsiveness to react to sudden market changes. In addition to supporting Production/Sales/Inventory (PSI) planning, Supply Chain Planning also allows for collaboration in a multi tiered environment between trading partners and suppliers. These benefits are all imperative for an organization that is trying to satisfy the demand driven strategy of a lean BOSC.
Connectivity & Business Intelligence

As the Supply Chain Management solution creates the groundwork for an organization to communicate, synchronize and collaborate, the Connectivity & Business Intelligence solution is a perfect complement to the foundation because it improves upon each area, bringing additional speed, accuracy and ease of use. The solution allows businesses to integrate core information systems, streamline business processes, eliminate silos, map and automate business processes, link disparate systems and collaborate throughout the enterprise. The following are just some of the modules the solution offers:

- Electronic Data Interchange (EDI)- EDI improves customer service and communication with suppliers by providing message handling, change control management, data mapping and cross protocol capabilities. This module keeps you synchronized with your suppliers and customers, archiving reports and inquiries to be used as audit trails.

- External Interface Facility (EFI)- EFI provides ultimate flexibility for your business applications, acting as a powerful tool for data mapping and transferring information between existing systems. This open, standards based application is essential for any evolving business.

- Interstage
  - Application Server- Application server provides the foundation for successful e-business implementations by extending operations systems and utilizing network based applications and processes. Benefits include an increase in IT productivity and quality, better customer service, and sustained operational stability
  - Business Process Manager (i-Flow)- BPM can improve the productivity and profitability of businesses by maximizing the value of an enterprise’s existing IT infrastructure and optimizing the utilization of its workforce.
  - Integration Manager (Collaboration Ring)- Integration Manager creates closer collaboration among internal and external systems and optimizes the flow that runs through critical business processes. Able to support web services, the Integration Manager is a system capable of integrating with any system and collaborating on both a local and global level. While it effectively utilizes any existing assets, such as legacy systems, the module is also able to evolve with your business and reflect any relevant changes made to the system.
  - Portal (Portalworks)- A front-end integration product that organizes content, applications, people and processes, Portalworks streamlines the integration and presentation of enterprise content and applications. It is a single point of access that provides critical data, team collaboration, and communication capabilities in a synchronized real time environment.

- XML- The growing influence of the Internet has created a demand for tools to effectively integrate internal operations as well as collaborate with customers and strategic partners. XML is an open platform that enables organizations to share information internally and externally, thus going beyond the factory walls and moving towards a truly extended version of lean and the BOSC. Automation and flow are increased in order to further streamline business processes. The open, standards based connectivity between glovia.com and other systems produces an increase in supply chain visibility, improvements in responsiveness and agility, reduction in costs, increase customer services and compression of cycle times. Information is too valuable a resource to be ignored. XML provides the quality, accuracy and speed of information needed to develop communications and relationships with customers and suppliers.
Conclusion

With the growing influence of globalization and the Internet, the face of competition and customer demands have both evolved significantly. Manufacturers and businesses must now look past their own organization and use a wider perspective by analyzing competitive advantages and identifying opportunities on a supply chain level. As the manufacturing environment has changed, so has a well-known practice, which was previously labeled as being limited. Lean has also spread beyond the manufacturer’s wall to the entire enterprise and supply chain, creating new models to perform optimally in today’s demand driven supply chains. Implementing Lean depends on the adherence to technical elements and fundamentals and properly tailored critical success factors. Whether you choose to facilitate the implementation through Glovia or another technology supplier, realize that Lean will have a real and lasting positive impact on your business’s most important resource – your people.
Table 1: How glovia.com facilitates Lean Manufacturing

<table>
<thead>
<tr>
<th>Lean Technical Elements</th>
<th>Supporting Modules</th>
<th>Functionality</th>
</tr>
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<tbody>
<tr>
<td>Visual Control</td>
<td>Shop Floor Data Collection</td>
<td>Real-Time data collection for historical analysis and continuous improvement</td>
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<td></td>
<td>Factory Planning</td>
<td>Displays loading graphics/ job timelines, Provides visibility throughout factory</td>
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<tr>
<td>Standardized Work</td>
<td>Publisher</td>
<td>Provides access to documentation, anytime, anywhere</td>
</tr>
<tr>
<td></td>
<td>Engineering</td>
<td>Manages BoM and routings</td>
</tr>
<tr>
<td></td>
<td>Costing</td>
<td>Reports actual vs. estimated costs to develop cost-effective work standards</td>
</tr>
<tr>
<td>Set-Up Reduction and TPM</td>
<td>Engineering</td>
<td>Improves information management for product BoM</td>
</tr>
<tr>
<td></td>
<td>Engineering Change</td>
<td>Streamlines engineering change notice process, Ensures change execution</td>
</tr>
<tr>
<td></td>
<td>Estimating</td>
<td>Enables continuous engineering and supports evolving BoM</td>
</tr>
<tr>
<td></td>
<td>Factory Planning</td>
<td>Schedules jobs to minimize set-up times and changeovers</td>
</tr>
<tr>
<td></td>
<td>Shop Floor Data Collection</td>
<td>Provides real-time data collection for analysis, reports machine breakdowns</td>
</tr>
<tr>
<td>Cellular Production</td>
<td>Engineering</td>
<td>Flattens BoMs and links components to operations, Compresses cycle times</td>
</tr>
<tr>
<td></td>
<td>Repetitive Manufacturing</td>
<td>Helps establish and manage production cells, Supports pull techniques</td>
</tr>
<tr>
<td></td>
<td>Shop Floor Data Collection</td>
<td>Provides real-time monitoring of cells for reporting and visibility</td>
</tr>
<tr>
<td>Mistake Proofing</td>
<td>Publisher</td>
<td>Makes “best practice” documentation easily available to reduce defects</td>
</tr>
<tr>
<td></td>
<td>Repetitive Manufacturing</td>
<td>Allows workers to stop production line to fix defective processes or reschedule</td>
</tr>
<tr>
<td></td>
<td>Tool &amp; Gauge Management</td>
<td>Controls and tracks movement of all tools and gauges used in manufacturing</td>
</tr>
<tr>
<td></td>
<td>Engineering Change</td>
<td>Enables company to simulate and analyze effects of proposed product change</td>
</tr>
<tr>
<td></td>
<td>Work Orders</td>
<td>Backflushes only for affected or selected components</td>
</tr>
<tr>
<td></td>
<td>Shop Floor Data Collection</td>
<td>Provides real-time reporting and signals disruptions to downstream processes</td>
</tr>
<tr>
<td>Takt Time</td>
<td>Engineering</td>
<td>Identifies use problems associated with item-level routings</td>
</tr>
<tr>
<td></td>
<td>Factory Planning</td>
<td>Smoothes variable demand, Helps establish and adjust Takt time</td>
</tr>
<tr>
<td></td>
<td>Shop Floor Data Collection</td>
<td>Provides real-time feedback from factory floor, Ensures production is met</td>
</tr>
<tr>
<td>Continuous Flow</td>
<td>Repetitive Manufacturing</td>
<td>Adjust production schedules, based on changing demand and flow rates</td>
</tr>
<tr>
<td></td>
<td>Shop Floor Data Collection</td>
<td>Real-time feedback and pull capabilities</td>
</tr>
<tr>
<td>Leveled Production</td>
<td>Factory Planning</td>
<td>Sequencing capability, schedules blocks of work together</td>
</tr>
<tr>
<td>Pull System</td>
<td>Factory Planning</td>
<td>Smoothes variable demand, Synchronizes subassembly production</td>
</tr>
<tr>
<td></td>
<td>Shop Floor Data Collection</td>
<td>Provides real-time reporting, Triggers e-Kanban and replenishment signals</td>
</tr>
<tr>
<td></td>
<td>Kanban</td>
<td>Automates flow of materials using pull techniques</td>
</tr>
<tr>
<td></td>
<td>Repetitive Manufacturing</td>
<td>Provides backflush capabilities for low-mix, flow based manufacturing</td>
</tr>
<tr>
<td></td>
<td>Inventory</td>
<td>Provides sophisticated Min/Max inventory control for low-cost components</td>
</tr>
</tbody>
</table>