

Electronic
manufacturing
services industry
commerce essay



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This research discusses Electronic Manufacturing Services industry and providers' trends and its relation to supply chain aspects of electronics industry. The challenges that faced and still facing this industry are discussed in details. Electronic Manufacturing Services industry provides solutions and mechanisms to solve supply chain problems in electronics industry. A case study of Flextronics International Company presented to explain how this industry helps Original Equipment Manufacturer and how it can be a good solution for the major problems and challenges in electronics manufacturing world.

Introduction:

Electronic Manufacturing Services (EMS) or Contract Manufacturer (CM) has started their service since 1960, once huge Original Equipment Manufacturer (OEM) began working with subcontractor in order to achieve more profit and to deal with high demand changes without the needs to new labor and capital. The EMS industry grew up and played a major role in manufacturing processes and technology, also EMS providers have increased their capability, manufacturing flexibility, purchasing power and cost reductions of material used in this industry. Therefore, it has been hard for OEM to cope with high demand changes and manufacturing flexibility beside cost reduction since EMS providers had handle all of those aspects efficiently [1].

From 1970 to 1990, EMS has increased their role and share in global network and supplied a high variety of services such as assembly, prototype, testing, circuit board, material purchase and management, and shipping to the end customer. A huge demand was created due to technological development

since 1990; this has obliged OMEs' to deal with EMS providers in order to respond more efficiently to product innovation, the shorter life cycles and dynamic changes of demand. EMS providers have facilitated enlargement and development of OEM companies by providing them high flexibility and better control of the variety of new products and demand changes [1].

Outsourcing works better in electronics industry for several reasons. First, the products of most electronics are similar in production process and building methodology. Second, the nature of electronics markets is very dynamic and interacted which push OMEs to deal with EMS. All parts of personal computers and medical appliances are consisted from parts such as capacitors, memory chips, and resistors. The reason that makes the product unique is the method of joining the different parts onto printed circuit board, customization of components and parts, and the programming of the device and its special software. The basic similarity in finished goods makes the EMS to have an easy methodology to divide their apparatus, skills and data, and information to cope with several production orders [2].

Challenges Facing Electronics Industry:

The main challenges that faced and still facing this industry and cause it to deal with EMS are:

High customization: customers demand is increasing continuously and rapidly. They required the manufacturers to produce vastly customized products quickly and at relatively low cost. This results in very high load and pressure on electronics firms to respond to those highly customized orders with flexible supply chain and low cost [3].

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Second challenge is the short life cycle: producers have to manufacture new products that have good price, keep up reasonable profit and keep market share. This will result in too short life cycles of products and will make it more complicated to forecast customer demand. Therefore, manufacturers must be close to customers and must work with retailers and resellers to better understand markets needs and demand [3].

Third challenge is inventory control versus quick declination: the challenging environment in electronics industry requires the manufacturers to produce components at low price with new performance and functionality, to keep high competitiveness. Therefore, using the existing inventory as early as possible is very important to maintain profit [3].

The conflict between supply and demand is the fourth challenge: material is one of the main constrained in electronics industry. Continuous production of new products and redesign of old parts and components are being processed while the prediction of customer demand is very difficult. Therefore, manufacturer must work collaboratively with material suppliers to satisfy demand and at the same time they have to work with retailers to forecast customers demand [3].

The fifth challenge is the high pressure from distributors and retailers to deliver products at the right time and right place. This applies high strain on electronics manufacturers. Thus, good communications and collaboration with retailers and distributors is required to guarantee better delivery and customer satisfaction [3].

EMS Industry Growth and Supply Chain:

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EMS industry has a major role in supply chain management and components. It is being an important part and partner in electronics manufacturing world. The reasons behind this evolution are as follows:

Economical scale: the demand of electronics is increasingly very high, and it depends on product cycle. Therefore, if EMS providers decide to increase capacity to satisfy high customer demand this will lead to excess labor and resources but, they have the ability to shift those excess labor and resources to another OME customer. This means that EMS providers have high flexibility and alternatives to deal with [2].

Main capability: electronics industry witnesses high competition between OEMs thus, looking for customer needs and expectations is very important part to design high competitive products quickly. Thus, the main capability of OME is in new product design and customer satisfaction. By dealing with EMS, electronics OMEs can focus and make more attention on new products design and customer satisfaction [2].

Decreasing materials cost: the huge growth of EMS providers gives them more power and influence of obtaining raw materials. This increased power and size can result in decreasing components costs [2].

Better profit and return on investment: electronics manufacturing overhead cost and capital investment is very high and to pay it back it takes long time. Taking into consideration that the life cycle is short in this industry, it will be very hard to make the decision of investment. Thus, EMS providers can help OEM to take their decision by constructing the whole manufacturing

processes and overhead cost which will result in better profit and return on investment [2].

The high pressure of time to market: as we discussed before, the cycle time of the product is too short thus, being at the top in the market is very essential to gain higher profit. EMS providers can supply capacity and expertise required for new products and new design process quickly. Therefore, EMS providers have the ability to bring new products into market quickly and satisfy customers demand [2].

Markets globalization: nowadays, markets are being global and OMEs are struggling to satisfy demands in global markets. EMS providers have the ability to take the advantage of low labor costs in many places in the world. Furthermore, they can supply products at short lead time and decrease supply chain costs locally [2].

EMS Providers Customers:

Choosing customers is the most important decision for EMS providers. Since EMS providers are not in the business to make demand, they must be careful and aware about products that have huge market demand in addition to future changes. EMS providers must place themselves in manufacturing areas that enable them to add more value. For instance, most of EMS companies get rid of personal computers assembly processes and they get more involved in medical electronics, servers and cell phones so they can add more value to their manufacturing processes due to the high demand on those electronics areas [2].

Typically, EMS providers have a wide customer found and they are producing a collection of components and products. Consequently, they achieve high production and capacity utilization. EMS is striving to build high diversity of OME customers to gain higher return on their investment and improve utilization. Additionally, by building this wide base, EMS providers can compensate the demand from other customers if one of their customers market has gone down [2].

Another issue for choosing customers is the competitors. Once EMS wants to make contract with a competitor of one of its customers, EMS provider usually ask for permission from his old customer, then he will construct a special production line for this new customer. This behavior leads to construct EMS industry that has ethical base and reliable attitude.

Furthermore, the maturity of EMS industry will lead to high competition within electronics industry and small OEMs have the ability to grow up within short period into big company through dealing with EMS providers and taking the advantage of their supply chain capabilities [2].

EMS Industry and Supply Chain Management:

Ever more, EMS providers are not only produce components and provide services but they are also being a major part of supply chain solutions to OME manufacturers. Supply chain roles consist of product manufacturing and design, shipping and delivery to end users, demand forecast and expectations, suppliers' management and interaction [2].

Demand forecast and expectations of EMS depends basically on OEM orders.

EMS providers are trying to produce all orders of OME companies. OME
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provides demand for long and short term periods and EMS uses the short term for material purchasing. Long term demand is used typically for capacity requirements planning and material forecasting. The demand is very dynamic, so the long term demand may change and the OME can amend this demand based on its contract with EMS. Sometimes, if EMS provider not able to deliver the planned quantity it may get penalized; therefore, EMS starts to build its own skilled expertise and procedures to work on demand forecasting with OEMs in order to protect itself from penalization [2].

Shipping and delivery to end users is being a service that many EMS providers may provide. EMS providers have started to provide entire supply chain solutions. They started shipping the products to OEMs customers and end users. This results in add more value to EMS providers and to solve shipping issues that may face OEM companies. Transportation costs may be very high and OEMs want to make the assembly process close to their end users. EMS has increased its global existence to be very close to the end users markets. Building their factories close to the end users enables them to decrease lead time and decrease shipping costs to the end customers [2].

In order to manufacture and design new products, EMS should expand its capacity. When OEMs outsource more and more of their works to EMS, then, filling the capacity will be not hard. The main challenge of building the capacity and the time of this building is the short life cycle of electronics products. Thus, EMS providers should be careful when to build the capacity required and should be aware how to combine and integrate all facilities and capacities of all customers to achieve higher utilization [2].

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Electronic Commerce and EMS:

Recently, EMS providers are using electronic commerce in their supply chain management strategies. The aims of using this tool are to accelerate purchasing process time, to automate purchasing process and to decrease overhead cost. Therefore, the supply chain will be more efficient and overall cost will be minimized. In addition, the application of electronic commerce enlarges the supplier foundation for EMS providers and affects global sourcing positively. Another main fact is, sharing the information between OEMs, EMS, suppliers, and end customers will be very important to integrate supply chain parties and will lead to success of EMS industry [2].

Challenges Facing EMS Industry:

First challenge is managing inventory level, which is very hard issue for EMS providers. Presently, studies show that the typical minimum level of the inventory is about 2 weeks. Determining the level of inventory depends on accuracy of demand forecast from OEM and the ability of suppliers to respond to this forecast [2].

The accuracy of demand forecast is very important and depends mainly on OEM. EMS and OEM agree on specific mechanism to capture customers' needs. For example, OEM may provide one month demand and four months forecast. Based on this agreement, OEM will add one more month at the beginning of each month besides providing actual demand for the coming month. Consequently, this kind of agreements will help to better control inventory level [2].

Ability of the supplier to respond to the new demands and forecast is a major factor to help EMS controlling inventory issues. Responsiveness of supplier depends on lead time, capacity available, and safety stock level. Some suppliers choose to build additional capacity to be able to refill EMS orders within couple of days for example. EMS should provide bonus for such suppliers [2].

EMS usually has many customers, this means that EMS should pool inventory for those customers. Furthermore, suppliers of EMS industry will face the same issue and they should manage their inventory to face the problem of pooling [2].

Demand uncertainty is a big challenge in EMS industry thus, the owning the inventory is subjected to high risk. Unsurprisingly, no one wants to take the risk and own the inventory. Suppose that the supplier owns the inventory, this may lead EMS to set a high inventory level. Without a doubt, setting the optimal inventory level is very hard and taking the risk of inventory ownership needs more and more study and analysis [2].

The second challenge is risk sharing in electronics industry. EMS providers have, due to their position, the ability to relocate risks to suppliers or OEM as much as they can. Their special position in electronics industry supply chain allow them spread and share the risks of demand ambiguity and capacity investments with suppliers or OEM customers or both of them. Consequently, EMS could reduce risks through supply chain relation [2].

EMS Industry and Information System:

In recent times, Make-to-Order (MTO) strategy is being more efficient in electronics industry to control demand uncertainty and short product life cycle. MTO needs more sophisticated information system tools to control and manage the complicated supply chain. Electronic commerce ability must be improved and used in this industry. Another challenge to EMS information systems is to design for manufacturing product and process. The ability of prediction and innovation of new designs necessitates EMS to continuously improve its knowledge base and information system tools [2].

Flextronics Case Study:

Flextronics International is EMS provider registered as Singapore Company and based in San Jose. It was founded in 1969 and from 1994 to 1998 it expanded and gained high growth in several regions. “ The company’s annual revenue has grown to \$5. 74 billion for fiscal 2000 ended March 31 from \$640 million in fiscal 1997” [4]. “ Flextronics has been among the five largest EMS providers in the US since 1997” [5].

The company is implementing the principle of “ Industry Park” or “ Campus”. It built low cost production campuses in North and South America, Asia and Europe where major customers exist in. Every property or campus is prepared with high manufacturing equipments and technologies, engineering staff and services, and plastics skilled expertise. Flextronics has expanded its service area by being close to suppliers of its material needs such as molding of plastic, chips and microchips packaging, and product allocation at its campus in Guadalajara-Mexico, Sarvar-Hungary, and Doumen- China. The strategy of Flextronics enables its suppliers to rent areas close to campuses

which help them to supply materials easily and build their own foundation.

Flextronics is considered currently as a leader in responsiveness, speed, and flexibility in EMS providers' world [2].

The company has strength points in many areas such as product quality, purchasing capability, and customers' base. It is manufacturing many products in different areas such as computers, communications, and medical equipments. The company provides its customers high degree of product and mass customizations, flexibility of production and design, superior supply chain management, efficient logistical issues and decreased time to market. Flextronics has located its business in all markets to control cyclical changes of each industry, thus rising consistency and steadiness, and improving quality. Consequently, provide the ability to OEM customers to decrease production and shipping costs and at the same time Flextronics growing up its customer foundation [2].

The high diversity of services and flexibility offered by Flextronics resulted in new contracts and awards from international OEMs like IBM, Microsoft, Nokia, Ericsson, and Motorola. Flextronics has boosted its presence in Europe by purchasing Dii Group in 2000 for \$2. 4 billion and in the same year, the company has achieved a huge step by signing a contract with Motorola Company for \$10 billion. By signing this contract, Flextronics was planning to produce cellular phones, pagers, and other wireless devices for Motorola Company by the end of 2005. Flextronics became the major EMS provider for Motorola business. The expected value of this alliance is about \$30 billion [6].

Product Portfolio and Customer Base:

Flextronics has broad customer base as mentioned before. The company chooses its suppliers and customers carefully. Flextronics focuses on telecommunications products and servers. Figure 1 shows the product market mix of the company in 2000. Comparing those numbers with numbers in 1998, for example, the results shows that consumer electronics products share decreased from 10% to 8%, whereas computer products increased from 15% to 27%, and medical and others increased from 5% to 12% [5, 7].

Figure 1: Percentage of Product Market Mix of Flextronics International Ltd [2].

Flextronics Supply Chain Strategy and Challenges:

Flextronics has transformed from seller to manufacturer and EMS provider. The company chooses its suppliers carefully based on performance and trust. Meeting the demand and forecast is very important as a measure of performance. Strategy of Flextronics is to deal with wide range of suppliers and makes acceptable profit without have narrow range of suppliers [2].

Flextronics wants to supply production schedules to customers. However, the company usually uses short term demand because it believes that the long term forecast is not accurate. Furthermore, the company has its own engineers that are responsible for demand forecast [2].

The company uses Kanban system in its manufacturing factories with limited buffers at each stage. Using MTO strategy, the company doesn't own
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finished goods warehouse. Singapore warehouse carries on about two days of inventory from each supplier, and then ships them twice a day to the site in Malaysia. Flextronics is the owner of this warehouse and pays for inward shipping. The company wants its suppliers to have about two weeks of inventory if possible, but this is not committed inventory because it knows that its suppliers have other customers [2].

It's very rare to ship components to the production location from every region in the world. Therefore, Flextronics has come up with the model of "Industrial Park" to solve logistical issues that face supply chain. This strategy enables all of the suppliers to be close or in the same region of the company campus. Furthermore, geographical boundaries can be eliminated, keep away from import and export limitations, and minimize logistical difficulties for distribution [2].

Flextronics Information System:

The complicated nature, short life cycle and demand uncertainty results in the need for complicated information system to deal with all aspects in electronics industry. It is common for EMS providers to build software solutions to enable them to track their demand, production processes and inventory control. During 1999, Flextronics use to upgrade its electronic commerce ability using some new software programs. The software allows buyers or purchasing managers to use the Internet to view customer orders and demands. A number of Flextronics major customers have their own websites to post their new orders. The company looking forward to enable suppliers in close future to view and respond to orders too. In addition,

Flextronics has web-based tool for OEMs and they can log in the website to view important information about the products being produced on production line and related quality data, engineering observations, production rates, and failure rates [2].

Conclusion:

EMS providers are being an essential part of electronics supply chain industry. Electronic industry is very complicated and has many challenges and obstacles. Short product life cycle, uncertainty of demand, inventory problems and capacity and lead time constraints are being solved through contracting and dealing with EMS providers. EMS industry integrates supply chain and increases capacity utilization. Furthermore, it can share industry risks with OEM and suppliers. The growth of this industry is increasing since it offers several services, manufacturing solutions, supply chain flexibility, reduced materials costs and proximity to raw materials suppliers.