

Innovation Diffuse “E-DELJIT” System: A New Concept in Reducing the Impact of Supply Networks Disruption

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Abstract— This article seeks to provide research opportunities in supply chain networks. For manufacturing industries, materials supply is an essential input to the production process for a sustainability value creation for firms and stakeholders. However, due to several reasons have caused issues to material short supplies in the production process that caused additional cost leading to a negative impact to firm operating performance. The purpose of this study to address the current phenomena of materials stoppage or short supply that affects the production process ultimately creating a possible loss to firm from the delayed time in the production process and supply of finished goods to customers. This has been ongoing crisis felt by manufacturers that require immediate attention particularly by those charged of organizational governance from operational to strategic level management of firm operation along the line of supply chain process. This article mainly to focus on the factors contributing to materials shortages or short supply in the production process in manufacturing industries. This material/inventory problem has not been discussed and lack of investigation done so far, well this article will bring out the important issues related to materials shortage that require further attention especially academician, researchers and managers. Therefore, the operation challenging issues pertaining to parts/ material shortage should be known through this paper. Further, the contribution outcome of this paper, addresses the critical issues related to production line stoppage that mainly caused by materials shortages based on the author’s more than twenty years working experience dealing with materials shortages issues in the electronic & electrical base manufacturing. This article will be practical guide to those manufacturing industries facing poor supply of parts issues that add additional costs to firms which influence the operating profit/ performance. This article seeks to spur inventory operations research and providing examples and cases of deductive approach believe to be helpful and nurturing particularly the middle level management to make effective decision and also the academicians to further

findings towards constructive and sustainability solution to firm operation

Keywords— *Materials; Manufacturer; Operating Performance; Production; Supplier*

1. Introduction

The manufacturing landscape is ever-changing and challenges predominantly evolve overtime and to adapt to this changes require constructive long term and intermediate planning. The activities from buying the input, converting that input to output for delivery to customers is known as supply chain activities involving the external supply chain parties the suppliers of input (e.g. raw materials) including customers the buyer of output (e.g. finished product) and the internal supply chain parties mainly from direct operators for example store, purchasing, engineering, production, warehouse and indirect operators for example the accounts, cost control and security departments. Basically this internal supply chain parties involve in the conversion of input to output process including moving the output to customers. Thus, the internal supply chain parties works through a system of governance by organizing the manufacturing process by converting the raw material to a finished product that to delivered customers. Manufacturing is a process that about converts materials from input into goods and services for ultimate value creation to firm and stakeholders through the sustainable firm operating performance involving all parties in the internal supply chain governance in organization.

The blossom and achievement of the manufacturers rely on effective and efficient delivery of action plans of the internal supply chain governance that mainly address to improve productivity and to reduce unnecessary waste due to loss time incurred during production stoppage as to avoid the additional cost reducing the operating firm performance. What causes production stoppage and to what extend the loss incur? These are the pertinent questions normally been address by the practitioners and researchers. Well to answer this

critical questions, firstly to look back on the factors contributing production stoppage and secondly to narrow down to few critical factors affecting badly as for this study concerning materials shortages. Production stoppage can be reason out on many factors such as line balancing, quality issues on raw materials, work in process (WIP) assembly issues, model design problem, and workers related issues, design of the production line, inserting wrong materials, equipment and machinery problems related and finally on materials shortages. As for this paper, more focused at materials shortages/ short supply that badly affecting manufacturing production output. This paper mainly state the factors contributing to materials shortage base on real incidents occurs for the last two decades of experiencing at the manufacturer plant. Concurrently the issues pertaining to materials shortages surrounding the manufacturer's quite alarming and immediate attention to focus resolving this critical matters should be well absorbed by many parties especially the operations managers and the relevant stakeholders. The next discussion to highlight the factors contributing to materials shortages.

2. Factors Contributing Materials Shortages

There are several factors contributing to materials shortages in the manufacturing environment that may lead to production stoppage. Refer to Table 1 w split into two entity on organization and departmental (manufacturer) which highlight the factors and responsible unit. However, this paper provides details explanation for the main 6 factors causing the materials shortage issues.

Table 1.0 Contributing Factors and Responsible Units

FACTORS	ORGANISATION / DEPARTMENTAL
Delay in shipment	Supplier
Poor quality incoming raw materials (Defect)	Supplier
Supplier capacity issues	Supplier
Delivery of wrong parts	Supplier
Short pack	Supplier
Short Lead time Purchase Order Release	Purchasing
Pricing issues unsettlement	Purchasing
Design Change in Materials (BOM)	Engineering

Quality inspection late approval	Quality Control
Delay in processing for receiving urgent parts Mishandling during receiving and put away	Warehouse Warehouse
Locating of materials at wrong SKU area	Warehouse
Book versus physical not tally	Warehouse
Missing of parts at storage	Warehouse
Quantity insufficient in picking list	Warehouse
Spoilage parts incur during production	Production
Materials defect detected during input	Production
Wrong parts insert during production	Production
Sudden increase in demand	Sales & Planning
Delay in payment to vendors/suppliers	Accounts

2.1 Delay in shipment

Supplier main responsible to deliver on time without failure all the time as stipulated in the agreement of the purchase order but there are cases whereby vendor does make thing complicated by not following what they have promise initially. One of that is the shipment delay to the respective client or not meeting the delivery due date without solid or valid reason that eventually those urgent materials required by manufacturer will badly hit the production. Such delay can be avoided if proper planning been done upon confirmation or acknowledgement of purchase order that has stated clearly on the delivery time and proper lead time been governed and agreed by both party. Manufacturer practices built to order process will be affected badly rather than built to stock perspective. Built to order basically depend s on actual confirmed order from direct customer means production plans exact quantity to be produced and therefore exact quantity of materials requirement are indeed the important to avoid unnecessary stoppage due to insufficient supply of materials.

2.2 Poor quality incoming raw materials (Defect)

Supplier responsible to ensure right quality that meets the manufacturer standard quality specifications. There are cases during the receiving at warehouse detected poor quality during sampling inspection carried out by Quality Control (QC) personnel. Some materials classified as defect during inspection can be observed and these

materials most likely improper for production usage and if at all the materials seem to be urgent requirement for that day usage may ending up production stoppage if not attended properly. Therefore such situation could be handle case to case base on the urgent needs by carrying out rework immediately sorting out all the materials again despite of relying on sampling. Immediate replacement that be shouldered by vendors to deliver soonest possible if located closer proximity to manufacturer.

2.3 *Supplier capacity issues*

Suppliers have several customers to deal for allocation of capacity. Such information required by major customers (manufacturer) before deciding to appoint the potential vendors. Main reason to work out such a way in order to avoid unnecessary issues due to arising from capacity problem which are unable to produce the exact quantity required. There are some suppliers claim due to sudden increase order will have spiral effect whatever they have planned initially and this prompt for misallocation of capacity to the urgent client and reduce capacity for others. Eventually the materials cannot be produced as planned and shortfall in quantity requirement needed by the affected manufacturer.

2.4 *Delivery of wrong parts*

Manufacturer place several type of raw materials to same vendor. The commitment given by them (vendors) to meet the client (manufacturer) standard requirement at all time but there are still some suppliers deliberately send in wrong materials instead that actually in standard packing (cartons or boxes) properly sealed. The inner content seems to have wrong parts compare to the outer label with correct part name. The main issue when production receive such condition with standard packing without checking thoroughly is already too late. The production directly feel the impact of materials shortage while waiting for immediate replacement from vendors. Deliver wrong parts is a serious matter to deal with as this will give greater impact to production itself.

2.5 *Short pack*

Supplier delivers the materials to manufacturer with hoping no discrepancy towards the shipment accountability. Manufacturer basically do accept the delivery and trust without fully inspect the quantity and quality upon receiving the materials. There are some cases the quantity stated in cartons or boxes and the physical count of the said content is not matching. This lead to short pack claim. Short pack is an abnormal condition in the label versus physical content is not accountable. Vendors shoulder full responsible on the hiccups incur

during packing and deliver short quantity as does not match the label quantity. While waiting from suppliers to offset the differences in quantity is already been too late and shortages is been notify to productions. This give great impact to them (production)

2.6 *Delay Payment to Suppliers*

Practically, the payment to suppliers mostly is on credit term of 30 or 60 days upon delivery based on invoice payment terms. There should be effective and efficient system of operation in the accounts payable section to process the payment to vendors. Any delay in the payment to vendors shall affect the delivery of future orders to the manufacturing firms causing to the materials shortage issues. A good system is required to address over the issues of discrepancies in items or quantity delivered and missing invoices as this possible to cause delay in vendor payment. Similarly, the firm should enforce in effective cash flow system with proper planning in the cash inflows and cash outflows. The adequate control in credit management system by managing the collection from the receivables within the due dates that ensures sufficient cash inflows to meet the cash outflows. The exceptional payment system to vendors avoid delay in payment that assures continuous business commitment and support from vendors.

3. **e-DELJIT in Managing Supply Networks**

Conventionally Suppliers tend to deliver materials using delivery orders (D/O) base on purchase orders (P/O) release by manufacturer refer to figure 2. This requirement explode base on forecast order plan by manufacturer. Certain lead time been observe long the way. To cut the wastage of time and money and also reducing the delivery disruption by suppliers, one cutting edge concept by applying delivery just in time electronically (e-DELJIT system) refer to figure 3. How it works? Suppliers deliver materials base on DELJIT through on line requisition a kind of e-voucher instead of using conventional documents P/O and this system allows to enter demands spread over time in a single order. This is also known as e-DELJIT scheduling. Upon delivery tracking of real time been observe using radio frequency identification (RFID) at warehouse and immediate stock availability been known to respective production counterparts. Production base on pull request e-DELJIT signal to warehouse to prepare the necessary materials required and leave it at picking area. Any shortcoming of supplier's delivery will be known immediately by the manufacturer as well production counter parts in early stage signal. Any changes in production plan regularly update into e-DELJIT system and send it via electronically using EDI. This cutting edge

innovation diffuse approach supports the manufacturer achieve zero materials stoppage at all time, more precise and accountable which enables the manufacturer to make purchases from vendors in a Delivery Just In Time (DELJIT) electronically and towards sustainable development.

The normal practice to track supplier's outstanding payment is through the reconciliation with the supplier's accounts statement with the purchaser accounts statement. The proposed innovative way of tracking the supplier's outstanding payment is through electronic DELJIT linking of supplier's accounts receivable platform with the purchaser's accounts payable platform. This would provide the both parties to track the movement of invoices reconciled with payment on real-time basis. Instead of doing manual reconciliation once a month upon receiving the supplier's accounts statement, the reconciliation can be done immediately through the real time approach. Thus, the innovative measure possible to overcome missing invoices, invoice input entry errors and delay in payment processing. This measures possible to indirectly contribute minimize the material short supply due to delay in payment to supplier.

Figure 1 : Materials Flow : Conventional Method

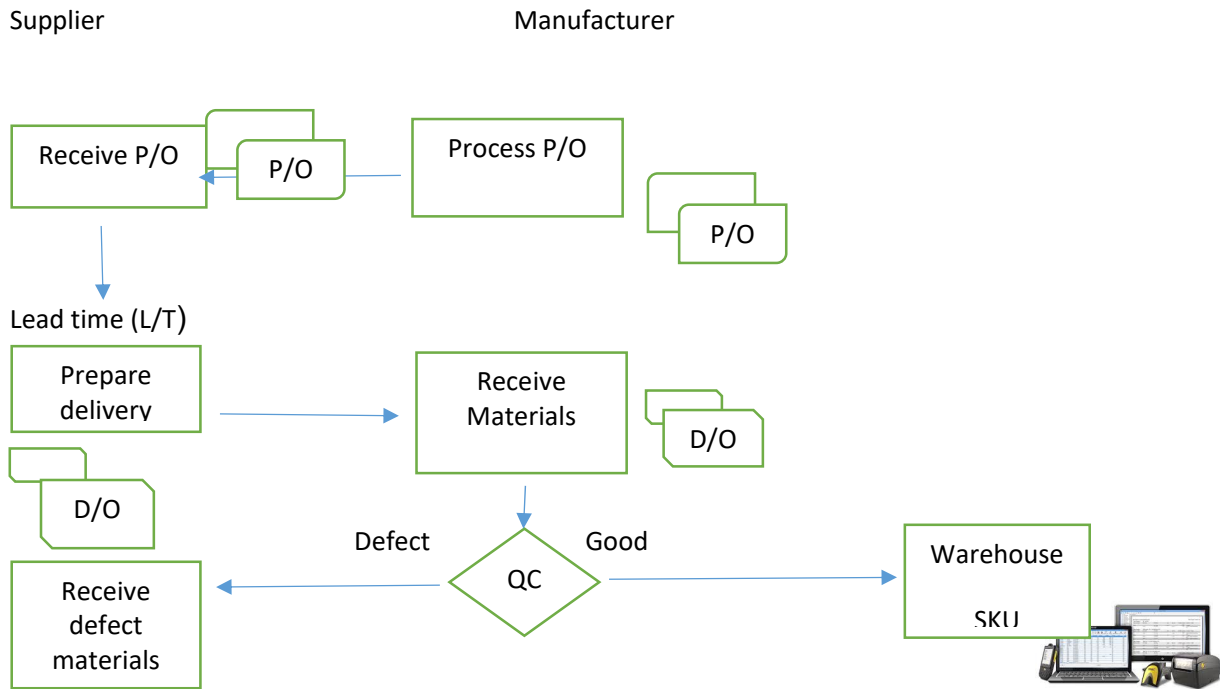
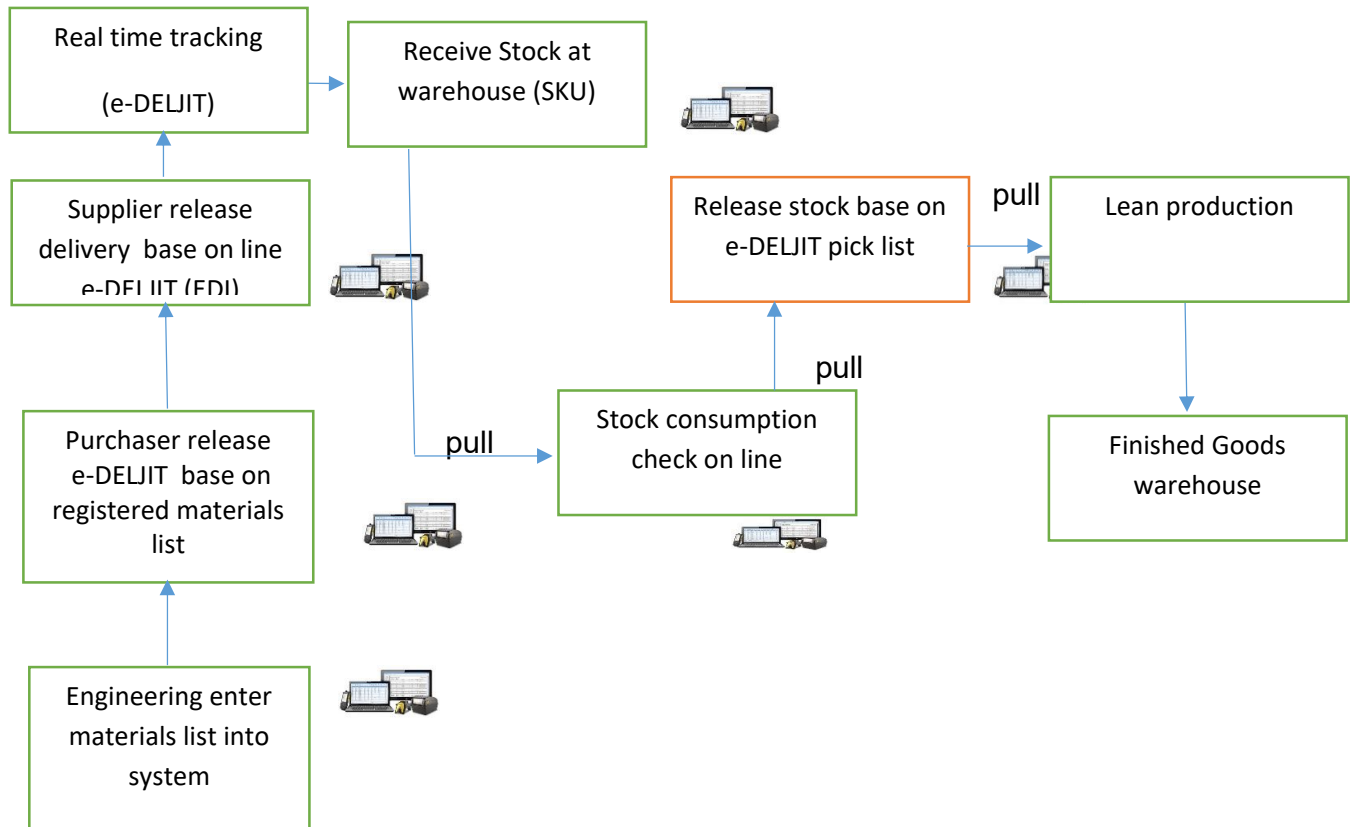


Figure 2 : e-DELJIT System



4. Discussion & Conclusion

The materials shortages implications critically influence the firm productivity and production yield that affects the customer confidence in firm supply chain operation which sequentially affects the business ties of manufacturers and customers, possibly leads to unfavorable impact to operating performance. The reasons for materials shortage confined to suppliers action on delivery and quality performance, poor warehouse management as well as from the internal process of various departments within the internal supply chain governance such as purchasing delivery performance, quality inspection performance, engineering design performance and finally the production itself. The factors causes to materials shortages delays the production process that provides a unfavorable impact to supply chain activities. Basically is a not a good news to internal supply chain governance and customers that possibly provides a negative outcome to firm operating performance. This is a

firm journey for the smooth function of firm operations with involvement of all levels of management in the supply chain process for firm sustainability and stakeholders' interest protection. Thus, immediate attention to focus resolving this critical matters should be well participated by the organizational governance of all levels of management and the relevant stakeholders for example vendors support and commitment. Based on the materials shortages contributed by the vendors as a whole has been an ongoing problems reflect the inefficient days of supply to manufacturer eventually leads to production stoppage. This paper will spear head to an empirical study that will look on six factors; delay in shipment, poor quality incoming materials, capacity issues, and short pack, wrong parts delivery contributed by vendors itself and delay payment to vendors. Future research will look on the manufacturers itself base on the balance of fourteen factors refer to Table 1.0.

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