CHAPTER 2
LITERATURE REVIEW

Production system exist since the earliest days of civilization in the pattern of Crafts manufacturing, in which handcrafted product made with uniqueness and entirely by one person. In ancient time, during the Gupta period in India (AD 300–600), craftsmen’s associations were known as “shreni” where as in China known as “Hanghui”.

In the 17th and 18th centuries new “The Putting-Out System “come in existence, it was a means of subcontracting work. It was also renowned as the workshop system. In putting-out, work was contracted by a centered agency to subcontractors who accomplished the work in their own facility.

In the late 18th century, French General Jean proposed “Interchangeable system “in this system component could be constructed much quicker and more. This system would furthermore make field fixes simpler to carry out under various conditions.

Mass production system using interchangeable components was first accomplished in 1803 by Marc Sambaed Brunel in collaboration with Henry ford for the British regal Navy throughout the Napoleonic War.

In 1854, the British Army obtained their infantry arms through a system of contracting with private manufacturers established principally in the Birmingham and London areas. Whereas important variation appeared, almost all of the contractors constructed components or fitted them through a highly decentralized, putting-out process utilising small workshops and highly accomplished labor.

In 1970, Japanese companies became significant players in production of automobiles and consumer electronics in mass production and in similar time Just-in-Time (JIT) is introduced. After the achievement of JIT, the Toyota-style KANBAN system is considered as a Pull System.
Robinson et. al. (1987) explained a vendor ranking system founded on ten presentation factors evolved by a company in their study.

Kozoił(1988) explained the changed pattern of JIT in alignment to advance its operations throughout down times in the a job-shop iron alloy fabricator.

Krause et. al. (1988), studied another demonstration of the JIT’s applications for the small closely-held enterprise.

Gupta et. al. (1989), proved that rates can be realized only when the number of Kanban is selected optimally.

Kaplan et. al. (1989) described about the important implementation aspects of JIT’s in any industry including the removing of unnecessary activity in process.

Lave et. al. (1989) suggested a decentralization of MRP II to function in cellular manufacturing system. For this process every constructing cell computer required to join to the centered MRP II.

Sandwell et. al. (1989) stated about the advanced demand forecasting system that are needed is to planning for production the industry, and the way about procedures and system analysis.

Drury (1990) described about the implementation aspect of JIT system according to the manufacturer floor and flow lines.

Womack et al., (1990) described about lean manufacturing and focuses on decreasing waste and Non productive activity. Included production waste can be defects, over production, unnecessary inventory, excessive transport, insufficient processing, waiting and motion.
Spearman et al. (1990) proposed CONWIP system by the simplest ways to implement pull control.

Spearman et al. (1990) presented study about CONWIP, which is a generalized system of kanban and initially proposed as a pull alternative to kanban.

Spearman et al. (1990) delivers showed that the CONWIP system could apply in assembly system by two fabrication lines. Hopp et al. (1991) researched about such fabrication assembly system by utilising statistical throughput method.

Duenyas et al (1992) displayed the application of CONWIPs system for assembly shop. Investigation directed on queuing mesh approximations in computing the throughput of any assembly shop production.

Spearman et.al (1992) mentioned that CONWIP produces a higher mean throughput than Kanban.

Shanthikumar et al (1993) studied the comparison assessments of CONWIP with other system for construction equipment product.

Veatch et al (1994) showed that how inventory-based control systems react to the change in inventory level Duenyas (1994) generalized approximation to a cyclic assembly system with general processing time distributions.

The parameters which they utilised are number of products, buffer size, utilization and work in method for the procedures designing and scheduling troubles in flexible manufacturing system.

Hopp et al. (1996) described that in a make-to-order manufacturing environment, the lead-time is the time the customer permitted the manufacturer to produce an piece. In the occurrence of that variability, the lead-time should be more than the mean cycle time to be agreeable by the customer.
Hodgson et al (1996) offered strategy where the first two stages 'push' and all other stages 'pull'. They showed the different control principles and the results of this hybrid combination.

Kern et. al. (1996) analyzed the effectiveness of diverse rescheduling principles in JIT environment.

Sarker et. Al. (1998) described the method for determining the number of kanbans between two workstations for single-stage and multi-stage kanban systems.

Price et. al. (1998) studied optimization models of kanban control systems. Khkiat et. al. (1998) proved that the conventional systems are not performed during execution than the JIT systems.

Correa et al., (1998) stated various constraints and characteristics of the developed production system which is responsible for performance in complex manufacturing environment.

Yusuf et. al. (1998) described about factor can be added to MRP II systems for improving the existing functions.

Hopp et. al. (1999) use statistical throughput to investigate CONWIP systems.

Shaolom et. al. (2000) processed the use of a non-integral number of kanban cards in the production system and clarified how one can predict the performance of such a system.

Yang (2000) contrasted different kanban and CONWIP system and displayed that kanban makes the longest mean waiting time with high WIP.

Gaury et.al. (2000), described a methodology for utilising algorithm and discrete-event simulation for the selection of a pull production-control system.

Liberopoulos, et.al. (2000) characterized that Base stock control system is a very productive in decentralized form of production system where production at a specific stage depends on the different stages.

Dallery et.al. (2000) applied directions for determining the number of kanbans and considered about the use of extended kanban system with dedicated kanbans in a multiproduct, multi-stage production system. Duri et. al. (2000) evaluated different principles in a different conditions for an automobile assembly line.
Karaesmen et. al. (2000) suggested most important property of the extended kanban system with combination with base supply system and effect on counting system of kanban card.

Chen et. al. (2001) used an integer nonlinear mathematical programming to arbitrate an optimal production sequence and allotment dimensions in a CONWIP single output line.

Das et. al. (2001) directed a simulation-based optimization method called Reinforcement discovering (RL) and a heuristic policy entitled Behavior-Based command (BBC) on a four-station successive line. For the comparison of control policies such as CONWIP, kanban and other different hybrid principles on the basis of total mean WIP and mean cost of WIP with two distinct demand arrival methods.

Chan (2001) presented the effect of kanban card circulation on diverse parameters like service grade or fill rate, inventory, pending orders, lead time.

Gaury et. al. (2001) stated JIT constructing is nearly affiliated with the principles of pull control system. Material departure controlled the issues from the inventory of the system.

Maaseidvaag et. al (2001) presented a new adaptive kanban type pull control means which determined the timings to issue or reorder raw components based on customer order and inventory back instructions.

Dallery et. al. (2002) described with traditional Kanban system to dedicated Kanban system in order to supply clarity into complex manufacturing environment.

Alabas et. al. (2002) discovered that the Tabu seek methods needs less computational efforts when balance to genetic algorithm, simulated annealing and the Meta model. They used algorithms to find the optimum number of kanbans with the minimum cost by a replication model also.

Ben Daya (2002) studied the interaction between production and inventory level in a deterministic context.

Lejtman et al. (2002) designed of the routing desires an evaluation of the whole used and unused space for a shop layout for effective material flow.
Sullivan et al. (2002) investigated that VSM is a visualization tool for identifying and eliminating the waste and advancing the components flow.

Petroni et. al. (2002) utilised production lead time, mean WIP for forecasting of resource utilization of manufacturing system.

Shahabudeen et. al. (2002 & 2003) designed dynamic kanban systems utilising a simulated annealing algorithm and based on demand, lead-time and total WIP with matched for the JIT system.

Takashashi et. al. (2002), suggested a reactive control system for Kanban system.

Jing (2003) showed about the advancement of job shop method by reducing setup/processing time variability. He assessed three components for job shop which are mean flow time, mean work-in-process inventory and mean set up time with processing time ratio.

Ryan et. al. (2003) used non-linear programming formulations to work out WIP with mixed product manufacturing environment. Framinan et. al.(2003) considered procedures and applications of different CONWIP production systems with comprehensive comparisons.

Shah et. al. (2003) discovered that the advantages of lean practices implementation for proper functioning of plants. By the use of implementation aspects like customized solutions, interior components flow in workstations, production conditions and particular characteristics of each workplace.

Framinan et al. (2003) discussed procedures and advantages of distinct CONWIP production systems.

Koh et. al., (2004) discussed the advantage of CONWIP system when its combined with the low inventory grades of Kanban and the high throughput of MRP System. In this condition CONWIP furthermore distributed the benefits of kanban & MRP such as shorter lead times and reduced inventory levels while being applicable to a broad variety of production environments.
Cao et. al. (2005) developed a nonlinear blended integer programming model for a CONWIP founded production system where an assembly position is fed by two different production lines.

Takahashi et al. (2005) used the Kanaban, CONWIP and synchronized CONWIP for provide the better production system. They showed upon a linear output line with exponential service time distributions and unlimited demand at the final buffer inventory. Akturk et. al (2005) categorized the techniques of Kanban and provided the design parameters and Kanban sequences for a JIT system.

Nahmias (2005) defined push system as “A system starts output in anticipation of demand.”

Geraghty et. al. (2005) offered a comparison of the performance of some pull-type controlling system on the basis of service level v/s WIP in an complex manufacturing environment with low variability and demand load.

Al-Tahat et. al. (2006) established the flow methods by connecting work centers so that there is even and balanced flow of materials in the whole production process.

Zhoua et. al. (2006), used KANBAN principle in remanufacturing method under dynamic performance of a hybrid inventory system.

Framinan et. al. (2006) have been accustomed the actual number of cards in pull systems that can be addressed either statically or dynamically. They reconsidered the different contributions considering card controlling in pull system especially for CONWIP and then suggested a new method and checked under different conditions.

Qi Hao et. al. (2008) convoluted kanban based material management system in an assembly line using both discrete event and hybrid approach.

Jodlbauer et. al. (2008) further divided pull control system in as kanban, CONWIP, etc. on the basis of the sequence of order and material flow.

Dasci et. al. (2008) analyzed a controlling system which is functioning under pull type control and shows pull control utilizing basics of kanban systems.

Kim et. al. (2008) have extended and proposed approximation procedures for the analysis of production line performance.
Paolo Renna (2010) focused on the dynamic card in a conwip system. Basis on approach to set the number of cards in alignment to adapt to the change of the production systems both in periods of external change in the demand and internal change like working time of the machine.

Rotaru Ana (2011) explained the controversy on the superiority of pull control system. Kanban, Conwip and Base stock control system on the basis of simulation trials and contrast the performance of Kanban, Conwip and Base supply for a multi-stage, multi-product production environment.

Rotaru Ana (2012) evolved a replication model to study of a usual long line production system.

Joshua Prakash (2013) In the paper studied the workings models of card systems on the basis of the traditional, hybrid and the multi-product.

scheme et. al. (2014) presented a new mechanism for the coordination of machines and other resource in multi stage, multi line and manufacturing system. The methodology is mainly to control and optimize the assets in the intelligent manufacturing environment, utilizing discrete replication of model, assess and contrast the two different variants of kanban mechanisms.

Joshua Prakash et. al. (2015) proved that pull systems can be successfully implemented in production environments that do not conform to the typical prerequisites of the kanban system.