CHAPTER 2

LITERATURE SURVEY

In this chapter a review of various works carried out on demand forecasting improvement of bullwhip effect, multi echelon inventory systems and performance measurement in supply chain management and related topics are presented. A major objective of the literature review is to study and follow developments & approaches in the area of supply chain management.

Supply chain management has attracted increasing attention in the academic community and corporate sector, to improve their competitive position in the global market. SCM is a process of co-ordination and information flows among suppliers, manufacturers, distributors, retailers and customers. The stake holders in the supply chain should coordinate and share information. Many factors influence the performance of a supply chain. One important factor is the accuracy of the forecasts used by different stake holders in making decisions.

V Padmanabhan et al. [13] evaluated the causes of bullwhip effect in the supply chain management. There were main fundamental four reasons for the occurrence of the bullwhip effect. These reasons were demanding signal processing, order batching, rationing game, and price variations. The downstream activities provided the information that supplied to the upstream activities. They included the decision regarding the stock mandatory for the manufacture intention. Some actions regarding the tackling bullwhip effect were also discussed.

Swaminathan et al. [14] described the supply chain modeling framework. With the help of this approach, the supply chain composition of the agents performing the role of the retailers, manufacturers, transporters, their inventory policy, and their communication mechanism can be understand. It performed the risk-benefit investigation of re-engineering alternatives before captivating the ultimate conclusion. Simulation provided an efficient pragmatic approach to comprehensive investigation and valuation of supply chain drawing and organization alternatives. To describe a simulation-based frame for mounting modified supply chain models from a collection of software mechanism, they
developed the intelligent agents accomplished by modifying their control policies based on simulation for developing situations.

Jaime E. Pérez[15] analyzed quantitatively impact of the interaction between demand management strategies and forecasting methods on BWE. Authors experimented different forecasting techniques for different levels of seasonality, lead times, and order batching to identify an overall performance measures BWE.

Frank Chen et al. [16] to quantify the bullwhip effect for single retailer and single manufacturer based two-stage supply chain system. To empathized the inventory control policies based on the demand updates. Those inventory policies played very important role in the performance of the supply chain system. They did not use any optimal demand forecasting algorithm for the correlated demand process. This model used simple moving approaches for calculating the demand updates.

Jennifer K. Ryan et al. [17] demonstrated that the impact of the exponential smoothing forecasting by the retailer on occurrence of the bullwhip effect and compared those results with the moving average forecast variability. The bullwhip effect took place due to the retailer's necessitate to estimate, with the precise mean & the standard deviation of demand tried to handle the bullwhip effect. The bullwhip effect take place when retailer manipulated the forecasting method having mean and standard deviation of demand updating in all phases, thus required the order-up-to the point in all phases that caused the bullwhip effect. They took the demand processes with the correlated demand process and linear trend.

Mason-Jones et al. [18] worked on the role of uncertainty in the supply chain system that generates the bullwhip effect. It showed the integration of the uncertainty cycle with the traditional supply chain system. The uncertainty circle was found as the useful concept in really civilizing the recital of real-world supply chains to the benefit of all components of the supply side and manufacturing process segments. The author discussed the actions and methodology to reduce the supply chain uncertainty due to demand amplification in the supply chain system.
Mark Fox et al. [19] investigated the issues and the solutions for building of the intelligent agent-oriented software design. They proposed the software architecture for running the supply chain at the planned and prepared levels. It views the supply chain as composed of intelligent software agents performing the supply chain activities & interacting with other agents.

Carlson et al. [20] proposed fuzzy logic controller for the demand signal processing for avoiding the incorrect demand updates, applied the fuzzy logic in the order batching and price variations resolution in the supply chain. They showed that using the fuzzy logic resolved the future demand variance that was very effective in reducing the bullwhip effect. They analyzed the correctness of the simulation through the verification with previous results. Accordingly the lead-time variability exacerbates variance amplification in a supply chain & information sharing and information quality are highly significant.

Schmidt et al.[21] opined that amplification (smoothing) is indicated by a ratio larger (smaller) than one, or a difference greater (less) than zero. Due to data availability, some empiricists use alternatives such as production quantity, sales and goods shipments which are easier to observe than orders and demand.

Bruccoleri et al. [22] focused on the inventory inaccuracy caused by behavioral aspects of workers, and show that traditional inventory policies to address bullwhip effect are not effective for this kind of inventory error.

Cannella et al. [23] considered a n-stage collaborative supply chain. They show that the bullwhip effect is monotonously increasing in the levels of the inventory error, and even a small amount of such error may notably increase the supply chain costs. the decision maker’s response to share information of differing quality remains unclear, along with the effect of such information on his order variability. Also studied how an ordering decision based on accurate real-time information affects the decision upstream partners, and whether such a decision amplifies or attenuates the bullwhip effect.

Lio and Yangtze Kiang [28] projected the employment of met heuristic, to mix with exponential smoothing ways, in statement future demands and in deciding
the best inventory policy. The results indicate that the inventory value will increase with increasing time interval and also the best demand statement methodology for minimizing inventory value varies with the inventory policy used and time interval.

Heydari et al. [25] studied the impact of time interval variability in a very serially connected chain with four levels and located that the rise within the time interval variance can result in inventory fluctuations.

Sharma [26] has projected and analyzed a method during which the demand of a strategically selected item is changed with another appropriate item within the cluster.

Hongnian Yu [33] discussed the impact of the downstream stock detail in dipping bullwhip activities over the upstream inventory information. Information sharing lead to irritation and inferior recital in settings for actually acting information. The distinction in the retailers and wholesaler's order in the upstream activities appeared superior to the baseline. The upstream information had the probable to perk up recital in self-motivated tasks. For this purpose they had used the controlled version of the Beer Distribution Game and changed the amount and location of inventory information shared across treatments. The crash on the bullwhip effect was discussed & compared it on different levels and found out the information sharing benefits.

Lee HL et.al Agrawal S et.al [32–36] have recognized that the demand process, lead times, and the forecasting models employed have significant bearing on the bullwhip effect.

Hosoda and Disney [34] identified “The statistical approaches become uncontrollable when net inventory variances are considered as the expressions for the covariance between the condition of the system are very complex”. Uncertainties inherent in client demands end in loosing sales opportunities or keeping excessive inventories.

The supply uncertainty affects the ordering policies, inventory levels, and product availability level by Lead time uncertainty [40]. Chen et al. [41], investigated the impact of lead time on the bullwhip effect Chatfield et al. [37], Duc
et al. [39] and Kim et al. [40]. Chatfield et al. [37] and Duc et al. [39] analyzed the bullwhip effect resulting due to lead time variability with stochastic lead time and exacerbate variance amplification in supply chains.

Zarandi et al. [42] practiced modified Hong Fuzzy Time Series to simulate the bullwhip effect in a multi-stage supply chain. This series was designed by utilizing the Genetic Algorithm module that can predict the trends of fuzzy data. The intelligent agent based supply chain was designed for minimizing the total cost and reducing the bullwhip effect. The system offered the rational ordering policies.

Lihong et al. [43] focused on information sharing based quantitative analysis model used for reducing the bullwhip effects in two stage supply chain, discussed various important findings regarding the bullwhip effect. Also showed that the grouping of the demand information sharing and dropping reserving phase, minimize the bullwhip effects in supply chain having the extremely association of time and demand.

Zhang et al. [44] applied the principal-agent theory for analyzing the bullwhip effect phenomenon. The intelligent agents became extremely imperative means in operating the supply chain system. The principal–agent problem concerns the difficulties in encouraging one party to proceed in the best interests of another without their individual benefit. It was attempting to index marketplace and non-market barriers to power competence implementation with proper handling of the market failure arise with cost-effective technology. They built two-phase path supply chain for studying the information sharing problem with the principal theory.

In the introduction, briefly described the Bullwhip Effect and the different methodologies used to study it. In this chapter, to collect the existing literature on the Bullwhip Effect by positioning published contributions to the theory in a different way; rather than grouping different works according to their methodology, to group them according to their purpose.

First introduced the stream of research that attempts to measure the Bullwhip Effect. to includes the theory “Bullwhip Effect”, to implement the mathematical basis for everything that came after; the work that sets performance measures for
different aspects of the bullwhip; and the empirical work that seeks for evidence of the Bullwhip Effect in real-life data. Then, we turn our attention to the analysis of the bullwhip: How different replenishment policies and forecasting methods impact the bullwhip.

To observe different manifestations of The Bullwhip Effect a phenomenon that has been studied for decades, and which explains the observations made that (1) the variability of orders tends to be larger than the variability of demand, and (2) that this amplification of demand variance itself increases the further upstream a company is in a supply chain. In other words, The Bullwhip Effect states that “sudden order of increases” is capable of causing to amplify as it travels upstream through the supply chain; by the time it reaches the upstream, the change that observes in the demand is far larger than the equivalent amount of products needed to produce.

Cachon et al. [45] investigated the amplification of the demand on the occurrence of the supply chain system. The provisional price shocks direct to implication and the constrained competence for shortage gaming. For example the bullwhip effect is more faced in wholesale industries in comparison of the retail industries generally.

Moyaux et al. [46] discussed the role of information sharing in reducing the bullwhip effect. They discussed two principles related to the shared information for the purpose of reducing the amplification of order variability due to the lead times. The impact of the lead times encouraging the impact of the bullwhip effect and it concerned the retailers in the upstream suppliers when the retailers were not as much bothered by order variation than upstream suppliers. This second contribution depends on how backorders were deliberated in period. The simulations confirmed the value of these two principles with regard to costs and customer service levels.

Mujaj et al. [47] addressed the problem of growing order variances in multi-tier supply chains. It relied on information distribution & supportive forecast in inter-organizational systems. They maintained the restricted self-sufficiency of the participants in the supply chain and provided a multi-agent-oriented explanation for the crisis. They designed an agent-based reverse pricing model for identical deliver
an order between self-governing agents. They adopted the reverse pricing for prepared procurement decisions and matchmaking that can be computerized to a huge degree. They evaluated the suggestion by conducting the imitation revision using a multi-agent-based simulation system, and showed that it resulted in the momentous lessening of the bullwhip effect.

Haruhiko et al. [48] studied the control of security parameters for inventory control means on bullwhip effects under demand ambiguity. The Inventory Control supervised the operations in the supply, storage space and ease of access of substance in order to make certain the sufficient delivery exclusive of unnecessary oversupply. It maintained the interior control intended to endorse competence the completion of a strategic or maintain resources or stay away from deception and inaccuracy. The inventory control methods were being applied in the period of the progress of time steps. They tested the bullwhip effect caused by the inventory control method with respect of the safety store. The numerical simulations were used to find the relationship between the total profit and bullwhip effects.

Bai et al. [49] proposed the control technique for tumbling the bullwhip effect in supply chains. This technique had been broadly used in the variance lessening in simulation and arithmetical procedure management. It distorted an unfeasibly exclusive imitation scheme into a practicable individual. The efficiency of the control various technique established for motionless demand. The purpose of this method managed demand processes with significance potential investigation. This method was efficient and straightforward to execute in supply chain systems. The basic concept behind this technique was to alleviate the inventory control policy to diminish the effect of propagation through use of the correlated control variants to the original order. It showed that the method directed to the system-wide optimal performance with the help of stabilizing policies.

Strozzi et al. [50] applied the control technique on the basis of the divergence of system for reducing the bullwhip effect in a single-product one echelon supply chain. This model used the Order-Up-To (OUT) order policy. To concentrate on the stability of the supply chain, total costs and divergence-based
control strategy applied for stabilizing the supply chain dynamic effects with reduction of the total costs of the bullwhip effect.

Boute et al. [52] offered a spreadsheet exploring the demand forecasting and type of ordering policy. The spreadsheet intended to demonstrate the ordering dynamics between two supply chain buddies. The authors illustrated the modification in the parameters of the replenishment policy on the single product two-echelon supply chain system to reduce the bullwhip effect. It demonstrated the impact on inventory assets on bullwhip reduction through use of the spreadsheet.

Y.K. Tse et al. [53] proposed the multi-artificial intelligence system titled as the Integrated Intelligent Logistics System. It provided superiority logistics solutions to accomplish lofty levels of service performance in the logistics industry.

Zarandi et al.[54] offered the multi-agent System for lessening of the bullwhip effect in fuzzy supply chains. The majority productive ordering strategy was missing information circulation caused the bullwhip effect in the supply chain. The multi-agent system applied the tabu search algorithm for fuzzy rules generation and innovative data filtering technique for extraction of training and testing data from the supply chain data warehouse. They made four agents performing the task of data collection; data filtration, sensing and rule generation. Experiments showed that the designed multi-agent system were capable of running the bullwhip effect in the fuzzy supply chains competently. Simulate lessening of entire cost and the bullwhip effect.

Jiang et al. [55] proposed the case-based reinforcement learning algorithm for energetic stock control in a multi-agent supply-chain system. In case of the self-motivated atmosphere, the consequences of them became imprecise causing unnecessary inventory or deficiency. Under the circumstance of non-stationary consumer stipulates, the S value of (T, S) and (Q, S) supply review technique was learnt by means of the projected algorithm for gratifying objective service level, correspondingly. They implemented the multi-agent simulation of a simplified two-echelon supply chain. It showed the effectiveness of the CRL in mutually assessment methods. They considered the framework for all-purpose knowledge technique helped in the entire aspects of supply-chain management.
Veenstra et al. [56] acknowledged the supply chain management strategies for joining-up government organizations working on involved organizational service delivery chains on the basis of two dimensions. The first dimension of the supply chain strategies was the intensity of control of the supply chain which defined the roles and responsibilities of the supply chain orchestrators and the second dimension is based on the information systems integration strategy which defined the level of the information passed between the supply chain entities. On depending on these dimensions, they further classified the merger, orchestra, relay race, and broadcasting strategies. Each of those strategies made the impact on the service delivery. Based on the three cases presented in this paper, they practiced that the preference for a precise policy was made depending on multiple factorslikes as the institutional context, political ambitions for the service delivery chain and organizational readiness.

Xiaoyan et al. [57] discussed the bullwhip effect under the dissimilar manufacture atmosphere and diverse catalog strategy by desirable quality of organizational dynamics. The results showed that the longer the foremost time, the longer the supply modification, and the longer the smoothing occasion. They verified the relation between variables and understand the cost of decisions for the policy reference in supply chain management.

Makui et al. [58] proposed the mathematical model is demonstrated the effects of price and speed of price changes. The bullwhip effect had been deliberating for the market having the proposed model could clarify the performance of the changes on the worth and order. They stated that the dissimilarity of cost caused the dissimilarity in demand and faced an encouraging criticism between the values and stipulations. They found that the bullwhip occurred in uniform price and demand. Their model behaved indistinguishable with the traditional demand model.

Barlas et al. [59] examined structural sources of the bullwhip effect by the dynamic simulation system through exploring the efficiency of information distribution to eradicate the unwanted fluctuations. Simulation results demonstrated regarding a chief structural reason of the bullwhip effect having isolated demand
forecasting performed at each echelon of the supply chain, and forecast sharing strategies appreciably diminished the bullwhip effect. The wide-ranging simulation investigation was passed regular ordering policies, demand forecasting with lead-time parameters. Simulation results showed the role of the isolated demand forecasting & forecast sharing strategies would reduce the bullwhip effect.

Etebari et al. [60] proposed new model that is agent-managed supply chain for improvement in supply chain performance. They tried to employ the intelligent agent for removing the lack of coordination in the supply chain. They empathized on the concept of vendor-managed inventory alienated into three categories such as expenditure, elasticity and consumer receptiveness indicators. The bullwhip effect was being tried to diminish with the agent-based systems. They studied three echelon supply chain performances without intelligent agents and deliberated performance indicators & introduced agent-based supply chain and measured performance indicators & compared with the basic model. This paper demonstrated the recital of intelligent agents in the enhancement of supply chain performance indicators.

Shoar et al. [61] produced the methodology based on fuzzy inference system having the familiarity of experts to enumerate the bullwhip effect for plummeting its unenthusiastic impacts. The bullwhip effect had been considered as one of the most significant issues in supply chain management. It consisted the demand signal dispensation, order batching, betting and pricing in front of tribulations in qualifying it. They studied the legality of constructed fuzzy system. They implemented projected methodology in the Iranian companionship and the bullwhip effect labeled low to medium. This evaluation facilitated the hasty conclusion creation and conventional characteristic events for managers. They selected the Kruskal-Wallis test they found no considerable dissimilarity among two series of data.

Nepal et al. [62] analyzed the impact of bullwhip effect and net-stock amplification in a three-echelon supply chain considering step-changes in the production rates during a products life-cycle demand. This was nearly all extensively worn forecasting method in carrying out principally due to its ease of execution. Also, the policy was extremely accepted in the automotive industry. The
suppliers had the universal intelligence for the OEM’s planned production during the planning horizon without knowing the factual demand progression with the unpredictability in genuine inventory utilization at the OEM. The investigation was paying attention around extremely multifaceted and engineered to have long production life-cycle products having requirement of significant capital investment in manufacturing.

Dongfei Fu [63] analyzed on centralized supply chain (SC) under consideration on product information flows with an ordering policy serving as control strategy a closed-form solution of an optimal ordering decision for each echelon is obtained by locally minimize a cost function. The analyzed in centralized structure as it has full process knowledge and signal information which allows it to coordinate the decisions.

Roberto Dominguez et.al [64] meant the demand variation in supply chain network (SCN) as the bullwhip effect. This effect produce a large volume of inefficiencies as it moves a greater numbers of units are necessary, increase stock and generates stock outs. And also computational experience carried out show that the bullwhip effect can be large extent reduced by association or the smoothing replenishment rules in divergent SCN’s. The bullwhip avoidance features of the strategies are also significant for the arborescent SCN. Proposed limited by the input demand used. It also extended by the use of other types of input demand.

Amir Hassanzadeh et.al [65] The authors have studied the Bullwhip effect is a major case of supply chain shortages of demand or inventory variability as it moves up the supply chain both inventory levels and orders. To analyze simulating a three stage Supply chain consisting of a single retailer and single wholesaler and single manufacturer under both centralized & decentralized chains and causes of bullwhip effect from order and inventory variance using the response surface methodology.

Erland Hejn Nielsen [67] has studied actual demand data from fast moving consumers goods transferred from manufacturer to retailer to consumers. The slightly variable demand (upstream) is less than downstream demand; it causes large variation and this effect is known as bullwhip effect. The retailer demand closely
follows consumers demand. And also compared the industries and various products families with in given supply chain, where fast moving consumer goods are manufactured by a major manufacture and distributed by a major retailer.

Chong Li et al [68] the author’s were proposed a lead time delays to take place the in vendor order, it leads an uncertain environment. This uncertainty depend robust inventory control method using inventory position information ensures the stability of supply chains and the suppression of bullwhip effect .The bullwhip effect control problem in context of a supply chain system faces with uncertainties with respect demand; production process, supply chain system, inventory policy, and vendor order placement lead time delays on replenishment performance To identify the weak links in supply chains better inventory control strategy and improve supply chain performance relation between different uncertainty sources in supply chain operation.

Carlos Andres Garcia Salcedo et.al [69] they were analyzed inventory controls strategies in the entire supply chain and also evaluate centralized and decentralized approach enhances the behavior with respect to the inventory target tracking demand rejection and bullwhip effect in supply chain systems. Relation between the decentralized and centralized control strategies in closed loop forecast demand were feed forward schemes used to adjust the inventory target.

Chong Li [70] the author aimed to reduce inventory volatility in supply chains. To optimization of simulation model to flexibility of reducing BWE and improving supply chain performance, even under conditions of limited information sharing. In this model uncertainty with respect information sharing inventory control optimization method, its effect on improving supply chain stability

ManMohan S. Sodhi [71] Investigated there is no information sharing core manufacturer company inherent to any supply chain of the underlying demand characters and replenishment lead time quantity an increment BWE various operations such as (order placements, batching, lag in sharing demand forecast) Quantified core bullwhip effect that absence of information distorted with autocorrelation underlying demand
Yanfeng Ouyang [72] analyzed the effect of information sharing strategies on the bullwhip effect of multi echelon supply chain, ordering polices utilize shared information, any possible customer demand development. The bullwhip effect will arise without knowing the customer demand variance of the order stream at any level of a multi stage chain. Sharing customer demand information across the chain considerably reduces the bullwhip effect.

M.H. Fazel Zarandia [73] proposed to minimize the total cost to reduce the bullwhip effect in supply chains and also practical ordering polices and considered the effect of demand forecast. The complete simulation in fuzzy environment using genetic algorithms and sharing business environment

Huynh Trung Luong [74] Information on demand is distorted while moving up streams. Proposed demand forecast, lead time order batching, shortage gaming and price fluctuation are the main sources that leads bullwhip effect, his aimed to take two stages supply chain and one environment where the retailers employs base stock policy for their inventory demand forecast is performed through the first order auto recessive the relation between variance of demand of variance of error term in auto regressive demand process are evaluating the influence of bullwhip effect and it can help management to allocate effort in order improve the impact of bullwhip effect in supply chain when lead time increase.

Yanfeng Ouyang, [75] The variance of the order streams in the network based on system operating polices of customer demand is stationary, the exact customer demand not knowing the bullwhip effect will rises.

Lenny Kohb, [78] developed simulation model linear demand seasonality orders to observe the interaction between the forecasting parameters & bullwhip effect Proposed seasonality in E-SCM using time series forecasting techniques by using reduce the longer lead times and it leads reduce bullwhip effect

Issam Dhahria [79] Proposed reduce or eliminate the bullwhip effect in two respects namely increase of service back to customers (demand, stock level, order quantity) etc.
Charu Chandra [80] analyzed by considering higher order auto regressive demand, the relationship between the order variance increase and the inventory performance for various inventory management.

Xiaolong Zhang [81] proposed the replenishment is controlled an order-up-to policy delays reduce the variability of the order. Delay demand information for forecasting of dampens the bullwhip effect. The long-term single-period and lead time demand forecast average their unconditional exponential. Late demand news can sometimes be good for the up streams suppliers. Delay increases the forecasting errors.

Giuliano Caloiero [82] analyzed amplify the bullwhip effect and the inventory oscillations, to maintained small oscillations in the inventories and bullwhip effect valves near to near and increase the shaft-term demand to reduce the bullwhip effect.

Chen et al. [16] quantified the bullwhip effect for single retailer and single manufacturer based two-stage supply chain system. He focused on the inventory control policies based on the demand updates. Those inventory policies played very important role in the performance of the supply chain system. The authors did not use any optimal demand forecasting algorithm for the correlated demand process. This model used simple moving approaches for calculating the demand updates. Their model emphasized on the demand forecasting and order lead times to root the bullwhip effect, to comprehend those results for the multiple-stage supply chains having and not having the centralized customer demand information and demonstrated the reduction of the bullwhip effect with centralizing demand information.

Chaharsooghi et al. [104] analyzed the consequence of forecasting methods on the bullwhip effect. The association of demand of reliant goods was described by VAR (1) model. The retailers specified the ordering policy for products. This model applied the moving average technique to predict lead-time slim of every product separately. After description of model, they derived a general expression for the bullwhip effect and mentioned that it is not possible to provide an explicit equation for the bullwhip effect of two products when they use the covariance function of
VAR (1) process for quantifying the bullwhip effect. They experimented on the time series procedure (ARMA) compared with Moving Average and Exponential Smoothing to find out the forecasting accuracy for reducing the bullwhip effect. They found that applying more truthful forecasting technique was not alike to creating less bullwhip effect.

Fiorioli et al. [51] proposed the mathematical model for quantifying the bullwhip effect in supply chain systems through the stochastic demand and lead time. It allowed demand’s coefficient of variations that quantifying the Bullwhip Effect. The basic aim of this proposed model was to build the improved management of the supply chain by attenuating the dissemination of the bullwhip effect.

Huynh Trung Luong [76] quantify impact of bullwhip effect in which information on demands is destroyed while moving up stream. The bullwhip effect is increase or decrease depending upon the demand forecast, lead time, order batching, shortage gaming and price fluctuations. Should maintain the base stock for their inventory and demand forecast and also reduce lead time to measure the bullwhip effect in supply chain when lead time increase.

Truong Ton Hien Duca [77] quantify bullwhip effect information on demand distorted as moving up a supply chain. Single retailer and single supplier demand forecast mixed autoregressive moving average model. Should increase or decrease the lead time its effect on bullwhip effect.

Jeon G. Kim [86] investigated two methods one is stochastic lead time and quantifying the bullwhip effect both with information sharing and without information sharing. Variance increase nearly linearly in echelon stage with information sharing & exponentially in echelon stage without information sharing.

J Dejonckheere [83] analyzed multistage supply chain information sharing first chain observes end consumer demand and up streams stages of forecasts on incoming orders and also implemented replenishment rules of order-up –to police & smoothing polices. The information sharing from one stage to another stage to reduce the bullwhip effect (variance amplification of ordering quantity). The control
engineering based measure to quantify the variance amplification bullwhip effect or variance reduction

Eric Sucky [84] The variability of orders increase as up the supply chain retailers to wholesaler to manufacturer to suppliers In this paper bullwhip effect is overestimated a simple supply chain is assumed and risk pooling effects are presents and statically relation between the all the process. Proposed 3 stage supply chain consisting of a single retailer single wholesale single manufacturer risk pooling effect.

Belarmino Adenso-Díaz [86] Analyzed influence of factors identified as significant with regard to bullwhip effect in forward chain on the appearance of the bullwhip effect in environments’ of reverse logistics and its pattern of evolution along the chain. The closed loop environment give rise to classical upstream growing pattern of bullwhip effect observe an increase in the percentage of material returned reduces the like hood of finding a growing between pattern. A closed loop supply chain where a dealer stage collect material from the consumer and separates stage wise recycle materials from waste received. The adjustment controller is the factors that increase bullwhip effect more significant and there is also important influence of final demand variability.

Yohanes Kristianto [88] implemented Adaptive fuzzy control to support VMI allocating inventory coordinating suppliers and buyers are ensure minimum inventory levels across a supply chain, the adaptive techniques using search optimal parameters.

Hong LIU, [89] determined Demand distortion may occur as a result of optimizing behaviors by players in the supply chain and recognized four main causes of the bullwhip effect: forecasting technology for demand, batch ordering, price variations and rationing game between retailers as a result of supply shortages.

S. Gearya [90] studied very costly in terms of capacity on costs and stock-out costs on up streams and stock holding and obsolesce costs on the downstream. Poor material flow from one stage to another stage.
Elena Ciancimino, [92] The author focused on 3 parameters the periodic review smoothing (s,R) order up to policy(lead time, demand smoothing forecasting factor, replenishment the performance measure of customer benefits synchronized supply chain The order inventory stability properties The weight of lead time and safety stock on customer service level.

David Wright [92] the order variability is called BWE. The variability is identified and inter linked with forecasting methods. The BWE is reduced by using any ane forecasting method (Holtor Brown’s forecasting methods) in scm.They was analyzes BWE in the SC using simulation and also improved forecasting methods. Using single exponential smoothing & MA to forecast demand Adjustment stock levels to supply levels.

Marko Jakšić [93] focused on demand variability increase from customer to factory moves up in supply chain to used replenishment polices such( ordering cost, stock outs holding cost of inventory, target service levels) etc. Analyzed of replenishment polices effect of lower variability of order over demand .it leads decrease the probability of the BWE.

Xiaolong Zhang [94] Investigated different combinations of lead time, price demand patterns and includes auto correlation and cross correlations, price varies these various are called BWE. The author is taken by zero lead time and also replenishment polices to be considered.

Thomas Kelepouris, [95] minimized orders in chain to reduces costs and increase customers satisfaction by make decision and replenishment policy .demand information is sharing reducing order moves up and down inventory levels in a supply chain Short lead times lead efficient operation of supply chain

Sunil Agrawal [96] The authors are proposed two echelon system in supply chain to sharing information of lead time on bullwhip effect on inventory. Reduce the lead time as sharing information, it leads reduce the bullwhip effect. Analyzed information sharing from warehouse to retailers and used inter information sharing and intra information sharing scheme, it can lead time reduction is more comparison to sharing information,
Xiaolong Zhang [97] The author is aimed to find the optimal solution to using different forecasting methods to reduce the lead time of demand autocorrelation, this leads to reduce the effect on BWE and also measure BWE of order policy (S S).

Man Mohan S. Sodhia [71] the author is aimed to reduce the variation of the price leads to bullwhip effect from maintenance repair and overhaul (MRO) manufacturer to constant consumption by the customer studied managerial proposition to reduce the customer’s order variance and manufacturer variance in the transactions prices but also fixed ordering cost for customers’ increase of market levels.

Qinyun Lia [99] Real life problems using numerical simulation and real life demand pattern is using damped tread forecasting qualitatively different bullwhip effect behavior and more traditional forecasting policies.

Gerard Gaalmana et al. [100] In order to compensate for possible weaknesses of the proportional out policy, to propose replenishment rule that accounts for the characteristics of the demand in a top manner. The characteristics of both policies are compared for several parameter settings of the ARMA(2,2) model.

Jui-Lin Wang Ju et al [105] a simulated procedure and systems analysis regarding these series demand uncertainty modeling parameters will be investigate the fluctuation effects on the amplifications of bullwhip effect. The proposed method to permits controlling the retailer orders’ variability above the other factors in the bullwhip effect.