Managing Marketing Multi-Channel Conflict to Maximize Profit in The Egyptian Consumer Electronics market

by

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ABSTRACT

Today more and more companies apply multi-channels as a go-to- market strategy. This is because of the fact that there are different types of consumer segments with different buying behavior, and each has a preferable channel that suits his needs. Multi-channels is an effective strategy to increase market share and increase profits. The introduction of E-commerce and hypermarkets as new channels that address different buying segments, pushed suppliers more towards multi-channel strategies. But the main problem that faces such channel strategy is the inevitable channel conflict that is caused by various sources. Especially to operate newly introduced channels along with the traditional distributors, or direct sales leads. This channel conflict can have a destructive effect on the channel relation between the supplier and other channel members.

This research, aimed to build a system dynamic model that quantifies the channel conflict and channel optimization. It was done to help the decision maker, in a consumer electronics supplier to take critical decisions; he is obliged to take, about: the promotion rates, the number of channel members, the types of channels, in order to achieve the goal of maximizing profit, and keeping channel conflict as low as possible. The model is containing the key variables that the decision maker is using to control the channel structure like, inventory allocation, number of salespersons in each channel, and promotion rates.

The researcher main findings is the determination of the optimum number of promotions, and inventory allocation in each channel in an Egyptian consumer electronics producer, that will generate the maximum profit while maintaining the channel conflict as low as possible in all channels. The researcher used a system dynamics model that was built based on the supply and demand causal loops and stock and flows. Channel conflicts were integrated to the model it was shown in the research that the optimum scenario to achieve maximum profit is by applying a single promotion per month in the hyper market, and allocate the inventory equally between the two channels. The research highlighted the factors that lowers the channel conflict in each channel, like increasing the number of sales people, decreasing the time taken to resolve a channel conflict, and increasing the ability of the sales persons in each channel.

The findings recommend that the supplier should not try to push too much towards hypermarkets and follow the trend of making a lot of promotions in that channel seeking brand building. This is due to the fact that these promotions hurt the relation with traditional, and lower their demand in the long term, a reasonable promotion rate (once a month) is enough for keeping the business running in both channels with low channel conflict.

KEYWORDS:
Channel conflict, Hypermarkets, Distribution, Wholesalers, System thinking, Model, Channel optimization, Business dynamics, channel strategy, Go-to-market strategy.

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LIST OF ABBREVIATIONS

Producer/supplier	Consumer electronics supplier /producer .
Hyper markets /Hypers /H	New elite locations that sell all consumer goods under one roof, in a very attractive environment.
End Consumer	The ultimate user of the product or service.
Retailers	The final place in the distribution channel, by which products or services are sold to their consumers for their personal use.
Wholesale channel /WS	Channel that handles the flow of products from manufacturer to the retailers or business users (Sub-wholesalers/ B2B customers).
TID	Total industry demand.
D.Sales	Direct sales through sales persons who work in the supplier organization, and sell directly to the end customer.
S.rooms	Show rooms, that belong to the supplier, and existing in shopping areas to sell the supplier products only.

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CHAPTER ONE
INTRODUCTION

1.1 AN OVERVIEW

The number of companies using multiple channels in the distribution of each of their products is increasing steadily (Coelho and Easingwood, 2008). In the past, a lot of companies went to market only one way, through direct sales force, or through distributors. But in their desire to increase market share and addressing new market segments, companies introduce new channels types or assign more members to the same channel. In all cases, this activity causes old channel members to be dissatisfied. Moreover if they are not a member of the same organization of the supplier, it can reach the extent of breaking the relation. The financial drawback of channel conflict -if not resolved in an early time- appears in the reduction in demand that can reach the extent of breaking relation with distributors and even law suits. This makes managing multi-channel, and channel conflict to be a great concern for companies seeking an in increasing market share and looking forward to be ahead of the competition.

The change in the buying behavior of consumers and the appearance of new shopping trends, like hyper market and e-commerce forced the suppliers of all products and services to modify their channel strategy to adapt to changes in the end consumer buying habits. Also, concurrent channels are better for customers because customers can choose the channel that suits their needs (Sa Vinhas and Anderson, 2005). The traditional channels like distributors, wholesalers, direct sales force and show rooms that were existing long time before, and are still important to the supplier, feel insecure and the new assigned channel appears to the old channels as a competitor who is targeting the same customer and all activities done by the new channel causes conflict with the old ones.

The main problem of designing and managing multi-channel marketing system lies in a fundamental question. This question is what mix of channels and with what percentage of assigning supplier

resources will lead the supplier to achieve the goal of maximizing profitability and minimizing channel conflict?.

The scope of this research is to address the problem of channel conflict that a supplier is obliged to face in multi-channel structure. Furthermore, it was designed to determine how to optimize the performance of the supplier in the multi-channel structure to achieve the goal of maximizing the profitability and minimizing channel conflict. To address such an issue we will be working on the consumer electronics business in Egypt as an example. This will be done by studying the existing channel types and using system dynamics to design a model to help the supplier organization take critical decisions like various resources allocation, assigning new channels, increasing the promotion rate and increasing number of channel members in a more rational way.

1.2 PROBLEM DEFINITION

Companies are pushed to apply multi-channel strategies in their attempt to address various consumer demands, to increase market share and to maximize revenues and/or profits. But in applying such a strategy, companies are faced by the inevitable channel conflict, caused by goal incompatibility, domain dissensus or differing perception of reality. This conflict affects the demand of the existing channels, which impact the revenues and profitability. It can reach the extend of breaking relations with channels and law suits.

Thus, there is a need for a quantitative model to help the decision maker, optimize the channel structure, in a way to maximize profits and make the conflict level as low as possible. It is a critical area where some decisions can affect the company existence.

1.3 RESEARCH OBJECTIVE

The research was developed to design a system dynamics model that aims at helping consumer electronics producers in their strategic and tactical decisions related to managing their channel

structure. hence, optimizing that structure to achieve maximum profitability and minimum channel conflict.

1.4 CONCEPTUAL FRAME WORK

To help consumer electronics producer in Egypt in taking strategic and tactical decisions related to managing multi-channels and resource allocation, a model was developed for simulating future impact to create "what-if" scenarios. This was done in order to show the effect of channel conflict on the wholesale channel level and the effect of promotions and number of channel members on the profits and conflict.

A pool of variables including dependent and independent was identified. Research assumptions and limitations were developed. A total of 88 variables from which assumptions and limitations were driven based on their relevance to the purpose of the research. The main conceptual framework that was used in developing the model is the Adam Smith Invisible Hand and The Feedback Structure of Markets (Sterman,2000). The model will be developed to suit multiple channels, serving different consumers with different buying behaviors.

1.4.1 Dependent Variable:

Profitability of wholesales operations, profitability of hypermarkets operations, wholesales channel conflict, hypermarket channel conflict and total profits are the key dependent variables.

1.4.2 Independent Variable:

Percentage of inventory allocation to both hypermarket and to wholesalers, promotion rate ,number of contracted wholesalers and number of contracted hypermarkets are the key independent variables.

1.4.3 Research Assumptions:

A1: No significant change in the external environmental factors (Political, Economic, Social, and Technological) over the time of the study.
A2: Price is constant for members of the same channel.
A3: The suppler have full control over the direct sales, direct show rooms, and E-Commerce.

A4: Hypermarkets are the only source of promotions.

A5: A relationship exists between model variables

A6: The TID indicated does not include telecom Egypt demand as the supplier provides it with a different sales team and through different production line.

A7:The consumer electronics market in Egypt is a free market; there is no government intervention to affect this freedom.

1.4.4 Research Limitations:

L1: The research is limited to external channels conflict and does not tackle the effect of internal channel conflict between different departments inside the supplier organization responsible for different channels.

1.5 RESEARCH QUESTIONS

1.5.1 Major Research Questions:

1. What is the optimal channel mix (optimal resource allocation) that makes the supplier achieve the goal of maximizing profit and keeping channel conflict as low as possible in the Egyptian consumer electronics market?
2. To what extend does promotion activities done by hypermarkets affect the wholesales demand?
3. How can the supplier effectively reduce channel conflict?

1.5.2 Minor Research Questions:

Considering the cause-effect relationships among different elements, minor research questions such as but not limited to, the following could be extracted from the conceptual framework described above:

1) Is there a relation between the channel conflict, profitability and the TID?
2) Could the producer change strategy according to various demand and supply scenarios?

1.6 RESEARCH METHODOLOGY

Research type

Paradigm:	Quantitative
Purpose:	Analytical
Outcome:	Applied
Logic:	Inductive & Deductive
Process:	Quantitative and qualitative
Methodology:	Longitudinal

1.7 THESIS STRUCTURE

After a review of available literature about the channel management, channel conflict and channel strategy the research was designed based on best practices locally and globally, plus the literature review available in chapter 2. It also includes a brief description of the consumer electronics market world wide and in Egypt. Chapter 3, introduces the pool of variables identified from the development of Adam Smith invisible hand model (Sterman,2000) plus best practice of global marketing distribution channels and from which the mental model has been developed. After the development of mental model, the answers to major and minor questions are through the mental model and building the stock and flow diagram. Chapter 4 is a brief introduction about the consumer electronics producer, then it has the model formulation phase, the simulation model then validated, evaluation phase before the analysis and policy analysis phase. Chapter 5; concludes findings from the data analysis and possible improvements in the related areas and identifying future related research areas.

CHAPTER TWO
LITERATURE REVIEW

2.1 MULTIPLE MARKETING CHANNELS

2.1.1 Introduction

Today more and more companies become multi-channel operators (Coelho and Easingwood, 2008).This is mainly because of having different buying behavior of customers which led to segmentation. Product differentiation or cost leadership is no longer an enough reason for a company to build a sustainable competitive advantage in today global competitive environment (Rosenbloom, 2006).Product differences whether based on a technological breakthrough, design innovation, or a quality issue can easily be copied. Also surly there is another place in the world that can produce any product with a lower cost.

Technology is still important but is less differentiating. It is the channel-to-market strategy that provides a key leverage. As a result, Channel design and effective management continues to be the most critical and success factor for companies to gain competitive advantage. This is because a successful channel strategy "Go-To-Market strategy" that a company has, is much more difficult for competitors to copy quickly. Now companies do not have a single channel to go to the market, but rather a channel mix, which enables the company to increase its reach and coverage. It also gives the customer the privilege of choosing his best suitable channel to purchase through (Webb, 2002).

But companies thinking of have a new channel, or even an Ecommerce channel are faced with a lot of obstacles both internally and externally. Channel conflict is the most important one (Webb, 2002). Channel conflict is not a new phenomenon, it received considerable attention in channel research in 1970s and 1980s (Webb, 2002).

Since the second half of the twentieth century, globalization increased international competition, as well as the recent internet based e-commerce all made marketing channel management to be a challenging and complicated issue. The topic of channel management in a multi-channel mix is still

of interest for a lot of business research especially with the introduction of the internet as a new channel.

2.1.2 Marketing Multi-channel conflict

A Marketing Channel is defined as "a set of interdependent organizations involved in the process of making a product or service available for use or consumption"(Coughlan et al., 2001) .Manufacturer, wholesaler, or retailers are all channel members, each channel member depend on the others to do their jobs.

A multi-channel strategy is employed when a firm makes a product available to the market through two or more channels of distribution (Coelho and Easingwood, 2008).Today, most companies choose multi-channels to go to the market, while in the past most used to have a single channel.

Rangan (2006) shows different forms of channels arrangements that a company can have to reach the customer as shown in figure 2.1. In a typical arrangement a supplier has four alternative channels to reach the customer that he can mix between or choose only one.

There are different types of go to market systems that companies use, such as : (1) direct sales :using company own sales force, internet, direct showrooms; (2) using Sales agents; (3) selling directly to retailers; and (4)having a third party wholesaler or distributor.

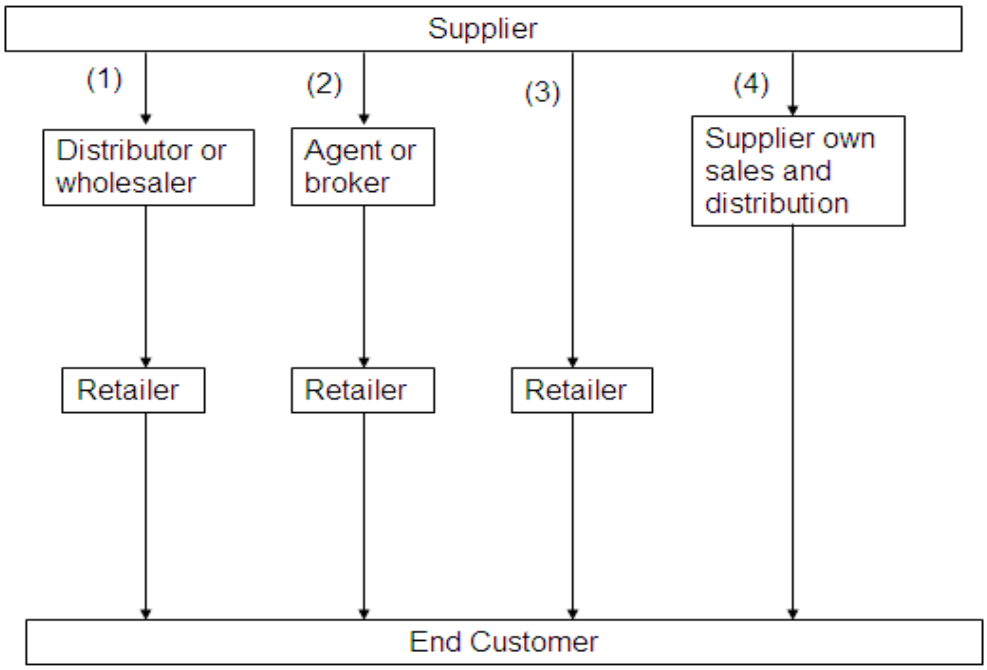

Figure 2.1 Channels arrangements that a company can have to reach the customer

(Source: Rangan, 2006)

Companies choose a marketing channel-mix (hybrid marketing system) from these forms. A channel is chosen to best serve a specific marketing segment. The customers are segmented because of the difference in need and buying behaviors. The e-commerce, direct show rooms and telesales are all included in the supplier own sales. Making any change or redesigning the channel structure is a cause of inevitable channel conflict with existing channel members. If these members are external entities like distributors or wholesalers, the conflict is much more appearing and can even reach the extent of breaking the relation and law suits.

Conflict is defined as "the behaviors or feelings of interdependent parties in response to potential or actual obstructions that prevent one or more of the parties achieving their goals". (Coughlan et al., 2001) .Moreover definition of Channel Conflict is "a situation in which one channel member perceives another channel member(s) to be engaged in a behavior that prevents or impedes it from achieving its goals". (Coughlan et al., 2001).

2.2 CONSUMER ELECTRONICS

2.2.1 Consumer Electronics World Wide

The consumer electronics market is a market that is steady growing and characterized by a lot of innovation. Consumer electronics global market in 2008 is estimated to generate revenues of $663 billion in 2008 at the retail level, with the U.S. accounting for 21 percent of the total. (Consumer electronics association, 2007). The United States consumer electronics market is showing a steady growth since the year 2000. As shown in figure 2.2

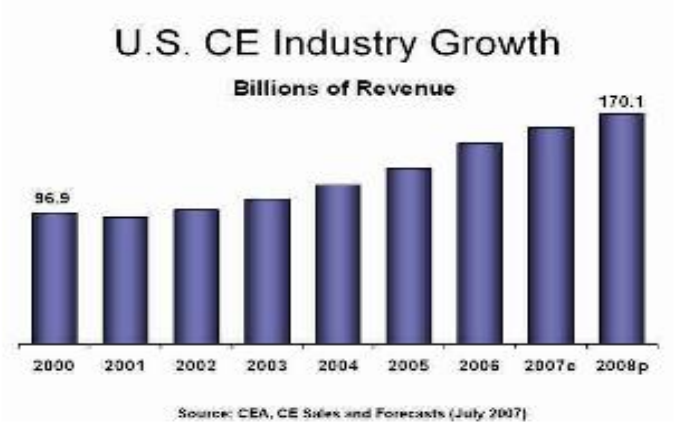

Figure 2.2 The United States consumer electronics market

(Source: CEA, CE Forecasts, 2007)

The sector consists of products ranging from audio equipment (MP3s car audio, and speakers), communication and information products (mobiles, fixed phones, satellite radio and cordless), video (LCDs, cameracorder, DVD).

In spite of the expectation of slow economy in the United States and world wide, the sector is projected to increase revenue by 6.1% to $171 billion in 2008 in the United states (Consumer electronics association, 2007). Consumer electronics are usually purchased by end consumers from specialized shops, home appliances shops, hypermarkets, manufacturers direct show rooms and recently the internet.

Tough competition takes place between products suppliers to acquire shelf space at every possible location. In their struggle to reach the maximum profit, to increase coverage and to meet changes in consumer buying behaviors, the producers introduce new market channels that best suit the customer requirement. These new channels start to cause conflict with each other as well as with old traditional channels. That channel conflict can cause very harmful effect to the manufacturer as well as all channel members. Channel conflict is not a new subject; it was addressed many times before, but it increased in the last two decades by the introduction of the E-commerce as a new channel, as well as direct show rooms and hypermarkets.

2.2.2 The Egyptian consumer electronics and channel conflict:

The consumer electronics market in Egypt is part of the consumer goods sector, which is always measured by the activity of the retail sector. According to (the Economist intelligence report, 2008) the sector is showing a steady growth since 2003 and the report is forecasting the growth to continue till 2012 Figure 2.3.

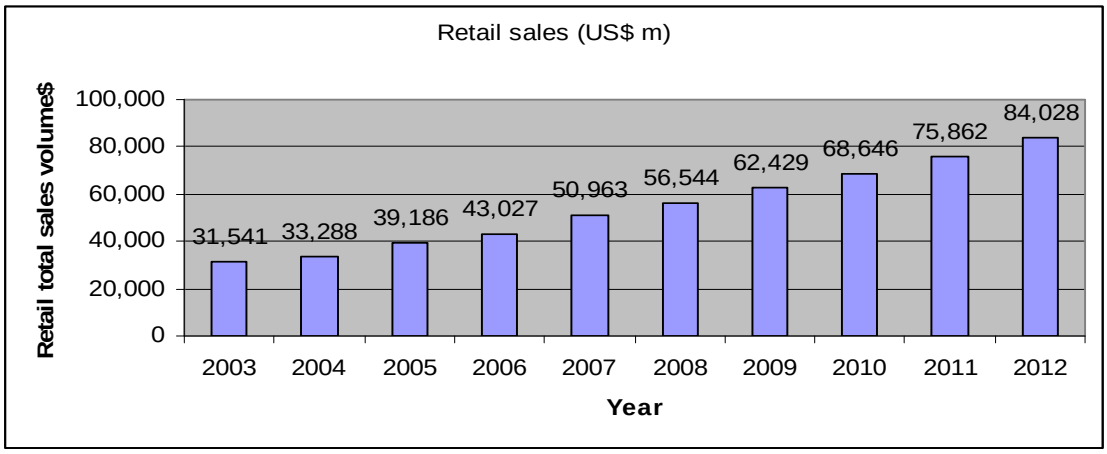

Figure 2.3 The Egyptian consumer goods sector

(Source: Economist Intelligence unit 2008)

.The sector achieved an estimate of 50,963 million USD in 2007. The sector includes all retail items and not only consumer electronics like the United States report, a separate figure for consumer electronics is not available. The growth started since 2004. It was helped by the appointment of an economically liberal cabinet in mid-2004, which implemented economic reforms. The report forecasts that the retail sales will grow the next few years as the private consumption rises. The demand for consumer goods has been supported by tariff cuts introduced in 2004 and in 2007, and an income tax cut. The Egyptian retail industry is highly fragmented especially in the consumer electronics. The vast majority of food and nonfood retailers are small family owned businesses (The Economist Intelligence Unit Limited , 2008).

As mentioned in the Economist Intelligence Unit report (2008), roughly 8% of the Egyptian population classified as wealthy or middle class and above, while the largest share of the population defined as poor and below middle class. In 2002, Carrefour introduced its first Hypermarket targeting this wealthy 8% of the population. The French giant with partner ship with Majid al-Futtaim (joint venture named MAF Misr) launched two Hypermarkets in Maadi Cairo, and in Alexandria, followed by another two in 6 of October, The hypermarkets consist of Carrefour, local and foreign retailers outlets, fast food restaurants, and other kids and family entertainments . Other hypermarkets are also starting the same model, Spinney's as one of them, all the Hypermarkets were targeting the wealthy part of the population not exceeding 8%, they are concentrated in greater Cairo and Alexandria, which have the high purchasing ability. The governorates that encompass Greater Cairo and Alexandria accounts for quarter of the Egyptian population. This population is considered to be the riche elements of the society; moreover they have access to computers.

Despite the fact that there is improvement in the quality and availability of the local produced goods most Egyptians continue to favor foreign made products, considering them of higher quality (The Economist Intelligence Unit Limited, 2008). In the consumer electronics some brands are historically recognized by the Egyptian consumers and so managed to escape the foreign made issue. Among them the Olympic Electric products in white goods, Bahgat Group products in televisions and Miraco in air conditions, which are the market leaders each in his field, each of these companies had joint ventures with international producers to produce their brands in Egypt.

Quicktel, The Egyptian Telephone company in the Telephone sets (corded and cordless)enjoys nearly the same situation, as its telephone sets were introduced with each telephone line to each home in Egypt by the mother company Telecom Egypt. After privatization telecom Egypt becomes only a shareholder .The company is traditionally known for its high quality telephone sets with high reliability and long age compared to the Chinese low quality telephone sets.

The Egyptian Consumer Electronics market used to have some key brands in every product and these brands used to have some traditional channels to reach all consumers .These traditional channels are in most of the cases exclusive dealers for all of Egypt. They distribute goods to fragmented retailers, family owned retailers in most cases. Television sets, air conditions, mobile phones are all examples of products that are distributed in such channels .

In the recent years new consumer buying behavior started to show with the introduction of hyper market and huge shopping mall. These markets and malls attract the middle and upper class Egyptians that have a high purchasing potential. These markets have a very high density of customers visiting it. Therefore any company can not risk not having its goods presented there, especially when all its competitors are also presented there.

The problem with hypermarkets is that it attracts consumers by offering all types of goods with a very competitive price for the same good that a consumer can find else where. They try to decrease their profit margin and also take a very competitive price from supplier. Also these hypermarkets are very powerful that; they impose there terms and legal requirements on any supplier contract. They also have spontaneous demand that can not be well forecasted. They have a lot of items that they will not do a forecast for each item. They also have shopping promotion events, during which they make extra discounts to attract more customers. All the mentioned reasons, forced suppliers to directly deal with them rather than making one big distributor deal with them, especially with the presence of the low profit margin as a main reason.

The direct show rooms is also an issue that a lot of suppliers find inevitable for its brand image. They sell directly to the customer and consequently causes a higher profit margin than the margins from distributors, the direct show rooms also let the company have direct feedback from customers.

The introduction of the E-commerce is also an issue that many Egyptian companies are thinking of, and it also affects the already complex channel situation. But E-Commerce is not having a significant impact till now for many reasons. First, the internet users in Egypt are highly concentrated in Cairo and Alexandria near the retailers so they can reach the retailers easy and purchase the product. Second the E-commerce is not well developed by many companies and still the government did not put all laws and regulations. Direct Sales for some suppliers to big large accounts is another form of channel.

All the mentioned channels caused the existence of channel conflict between suppliers and traditional channels (mainly wholesalers) and new channels .Which make it a very important issue that may lead to serious problems to all suppliers of consumer electronics. Because of all the motioned above it seems that the issue is worth to be deeply studied to come with an optimized channel strategy that consumer electronic suppliers can use to maximize profits and reduce channel conflict.

2.3 RELATED RESEARCH WORK:

A lot of researchers tackled the issue of channel management and channel conflict because of its crucial effect on the company and its future (Rosenbloom, (2007) and Ranagan, (2006)) are examples for such works. Companies select a marketing channel-mix(hybrid marketing system)from the mentioned above forms. A channel is selected to best serve a specific marketing segment. The customers are segmented because of the difference in need and buying behaviors. The E-commerce, direct show rooms and telesales are all included in the supplier own sales.

Many factors may affect a customer decision to purchase from a certain channel stores. One particular aspect that is being examined is the costs which associated with the transaction process (Chen, et al.,2006). Other factors affecting the customer decision are the geographic location, buying behavior and quantity purchased.

Making any change or redesigning the channel structure is a cause of inevitable channel conflict with existing channel members, if these members are external entities like distributors or wholesalers, the conflict is much more appearing and can even reach the extent of breaking the relation and law suits.

Moriarty and Moran (1990) proposed a model that is still widely used till now helping companies identifying the optimal Multi-channel strategy, This model also answers the big question of what mix of channels or communication methods can best accomplish the assortment of tasks required. They found that the solution is to break the demand generation tasks both within and across a marketing system. They noted that channels are not the basic building block of a marketing system, but marketing tasks are. A map of task and channels helps managers to best design their existing and desired marketing systems as shown in figure 2.4.

The mechanism by which the task moves the customer through the purchasing processes. So the firm decides which of the tasks can be done by its own force and which tasks need the use of channel partners. The big mistake that companies most of the time usually makes is that they assume that each channel must perform and controls all demand-generation tasks.

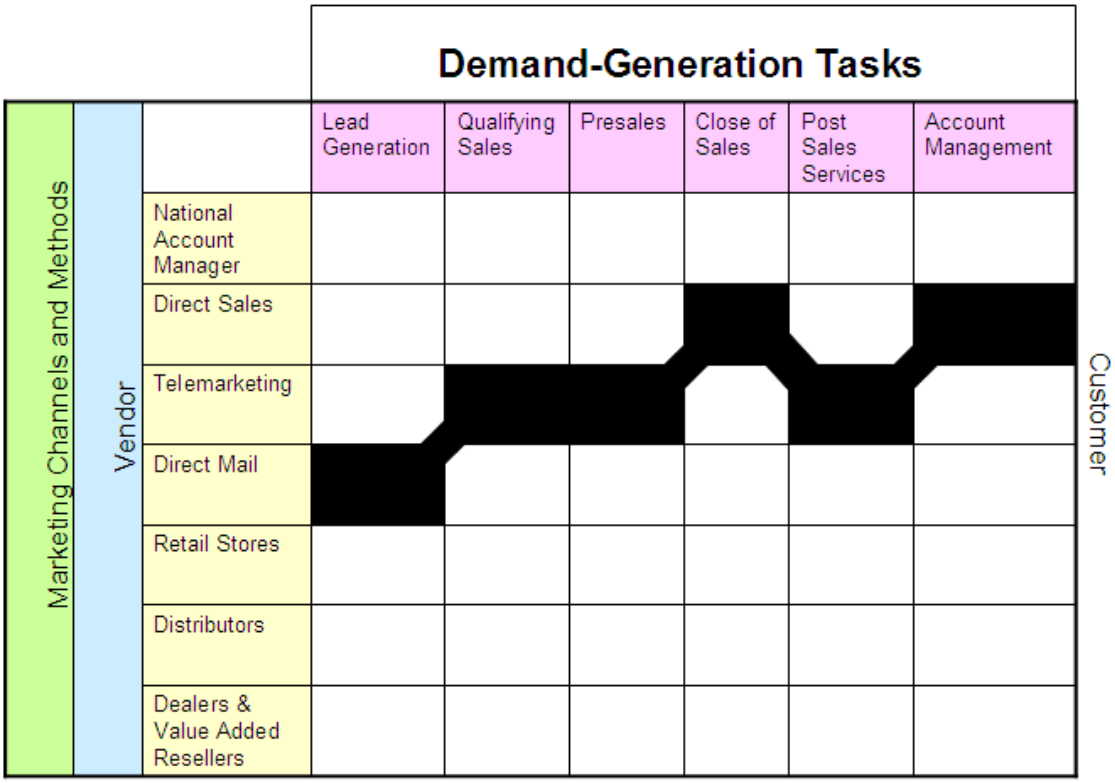

Figure 2.4 Moriarty and Moran Hybrid grid

(Source: Moriarty and Moran 1990)

But the Hybrid Grid forces managers to consider various combinations of channels and tasks that will optimize both cost and coverage. Most companies align high cost channels –Direct sales- with big customers, and low cost channel with small customer, which is logic if this is the way the customers buy.

The design of an effective hybrid system needs a great understanding of consumer buying behavior (i.e. Segmentation), Channel costs; as we have to balance between minimizing cost and maximizing customer satisfaction. Companies mostly design channels only taking in consideration what is best to the company to minimize cost, but not what is best to the customer. Buying behavior of the customer and segmentation are very critical. Moriarty and Moran (1990) pointed out that channel conflict is inevitable in a hybrid channel structure, and companies should be able to solve this conflict and minimize it. They proposed effective ways of solving channel conflicts. first companies

must recognize and communicate the existence of conflict. Second assessment to the magnitude of the conflict must be done by asking how much revenue does the company have in conflict? Where is this conflict? How channels and customers react to the conflict? And How much management time is devoted in dealing with the conflict? Also bounding the conflict by establishing clear boundaries and communicate them, use contracts to enforce them, showing which customer to be served by which method. Categorizing by (1) Customer characteristics boundaries: (customer size, order size, decision making process, industry), (2)Geographic boundaries, and (3)Product boundaries.

Managing channel addition requires the modification of the existing channel structure. It will be always met with resistance, Three general administrative guide lines are very helpful: (1) Decisions about the structure and support policies matching with the overall goals of the marketing system: Will new channel increase customer satisfaction in a cost effective manner? Will it increase market share? Will it limit destructive conflict inside organization? ,(2)the timing of the change :the new channel should not be responsible for a high percentage of the total revenue in its first year, And (3)Compensation of the old channels, to allow new channels to make sales.

Moriarty and Moran (1990) listed the benefits of a successful hybrid system: the company has a strong marketing system that suits customer buying behavior. The company constructs the marketing system using marketing tasks, not entire marketing channels as the building block, Minimize conflict in the marketing system. Leading to a balanced design between customer needs and economics. Channels will grow with conflict minimized and segment boundaries Reinforced.

Bradford et al. (2004) divided channel conflict into two types: interpersonal conflicts and task conflicts. They established a model and came with outputs about how each type of conflict affect network outcomes as shown in Figure 2.3

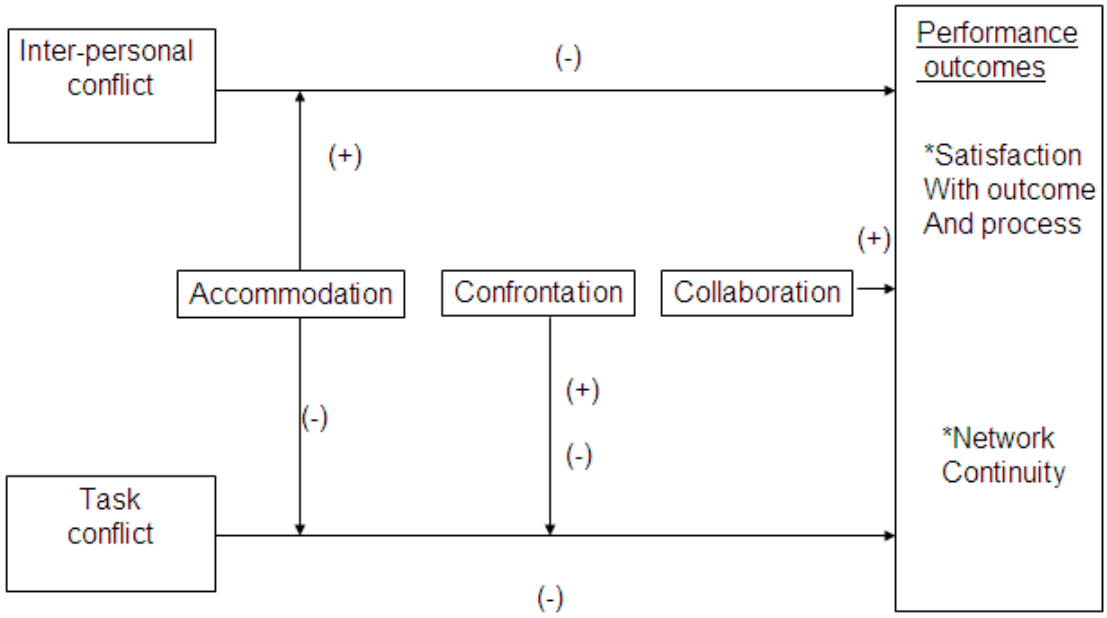

Figure 2.5 Interpersonal conflicts and task conflicts by K.D.Bradford et al. ,2004

(Source: Bradford et al.,2004)

They divided conflict into: (1) Interpersonal conflict, which are disagreements within network based on non-task related incompatibilities. Feeling towards an individual representing another firm is an example. (2)Task conflict ,which are disagreements over how to accomplish work together, as network members have organizational, cultural, and resources differences, that creates differences in perspectives on how to accomplish work.

They divided approaches to solve any conflict into tree types: (1) Collaboration; reflects activities in which network members explore integrative solutions, finding new and creative ideas, a (win-win solution) to maintain continuity of the relationship. (2) Confrontation; The behavior used by one or more network members to emphasize his own prospective. It involves (The Clashing of Ideas). and (3)Accommodation; The behavior that network members use to create an environment where each party allows others to have their way and/or accept the other members perspective. Each party is willing to listen to the other, accept their point of view, and (make concessions) to move forward on issues.

The network outcomes are either: network satisfaction; the satisfaction of network members with the process and the out come, or network continuity: The degree to which the members desire to continue the relationship in the future.

The results are as follows: (1)both types of conflicts (task, and interpersonal) are having negative effect on network outcomes(satisfaction within the network and desire to continue).(2)using Collaborative conflict management by network members can reduce the level of the conflict and increase satisfaction when faced with both types of conflict. (3) only using accommodative conflict management in high interpersonal conflict, and only use confrontational conflict management in the presence of low interpersonal related conflict. (4)avoid using confrontation when task and interpersonal conflict is low.

Coughlan et al. (2001) introduced a formula for measuring conflict that is widely used by other researchers like (Bradford et al., 2004) The formula measure the channel conflict as follow:

$$\text{Conflict}=\sum_{i=1}^{N} \text{Importance}_i \times \text{Frequency}_i \times \text{Intensity}_i$$

The measurement is done by gathering four types of information:

- Counting up the issues: what are the major issues of relevance to the two parties in their channel relation for car dealers on study found the number is fifteen issues.
- Importance: each issue is assessed to determine its importance to the parties. This can be done judgmentally or by asking the parties directly.
- Frequency of disagreement :for each issue we need to assess how often the two parties disagree over each issue. This can be done judgmentally or by collecting data .
- Intensity of dispute: for each issue we need to assess how intensely the two parties differ on the issue (How far apart the two parties position are). This can be done judgmentally or by asking the parties directly.

Sharma and Mehrotra (2007) proposed a model for "Choosing an optimal channel mix in multi-channel environments" They listed advantages and disadvantages of multi-channels as, Not only does multi channel allow the firm to reach the customer in different ways, but it also allows the

customer to choose the preferred channel(Direct sales, retailer, or internet). Also multi-channels increase coverage, matching customer needs, as some distribution channels are better in reaching certain types of customers. And multi-channels increase awareness. But multi channels has disadvantages like conflict between channels, reaching the extent of breaking the relation, when a number of distribution channels work in the same area. Furthermore, buyers have access to multiple price points. The problem get worse when one channel does the sales effort and another channel gets the order "free rider". Plus by increasing the number of channels carrying the product, the sales derived from each channel drops, making it more difficult for the manufacturer to recover its cost. This is because the low hanging fruits (higher sales distributors) are picked first. there is also a sales struggle with enhanced coverage that reduces the sales of both existing and new channel members. Finally customer communicates with different channels to bargain getting the privilege of the least price and best service.

Sharma and Mehrotra (2007) proposed a multi-channel strategy process of six steps:(1)Develop strategic multi-channel objectives. (2)Understand customer and channel touch points to leverage advantage.(3)Undertake a review of industry structure and channel options.(4)undertake channel usage pattern.(5)review channel economy.(6)develop an integrated channel management strategy.

Customer seek specific channels, because each channel has something unique in its offering that fulfill customers need. Also each channel attracts a specific type of customer, so that customers may not approach the firm if that type of channel is not available.

They also mentioned that customers choose between different channels based on economic goals, need for affirmation, symbolic meaning associated with the product and shopping, social interaction , experiential impact, and reliance on schemas for purchases.

In conclusion, their findings are that firms need to expand in multi-channel environment, but have to carefully take into consideration the level of channel conflict and the drop in profits.
Sharma and Mehrotra (2007)proposed a frame work that is shown in Figure 2.4

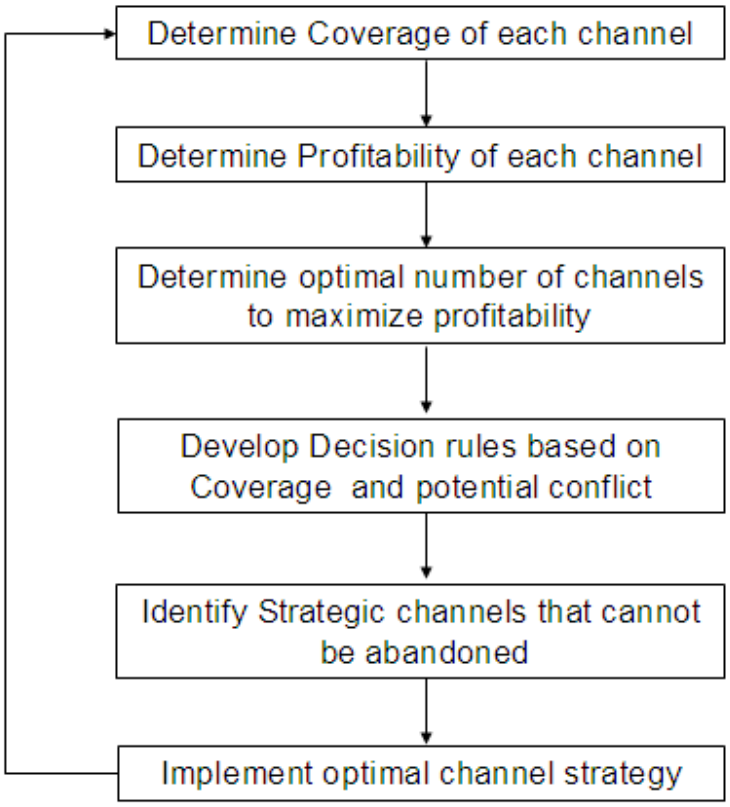

Figure 2.6 Framework for optimal channel mix. Arun Sharma ,Anuj Mehrotra 2006.

(Source:Sharma and Mehrotra 2007)

The framework facilitates the design of multi-channel strategies through optimized programs. The decision of multi-channel needs two steps; first choosing channels suitable from the different available types of channels, second determining how many channel members a firm should seek in each channel type. The strategy is based on maximizing profit, but it can be used to maximize sales, or market share.

Determine the coverage of each channel: the determination of customer segments and the coverage that each channel member provide for each segment, also the firm need to determine the number of customers in each category and the number of possible channel members in each channel. Determine profitability of each channel; the largest and most profitable customers, segments, and channel members. High profit channels are approached first as they are the low-hanging fruits to the

firm, but as coverage increase each new channel will provide lower profits levels. The profitability of each new channel member is expected to be less than the previous member and need to be calculated. Also it is assumed that the profit is linearly related to the number of accounts.

Sharma and Mehrotra (2007) determined the optimal number of channels to maximize profitability: by calculating breakeven points for each channel member. To determine the breakeven number of accounts for each channel, firms need to examine the relation between costs and profits of each type of channel. But firms do not need to reduce the number of accounts when the breakeven number is lower than the current number as the acquisition cost is already spent. So another breakeven point needs to be calculated considering only retention cost. Consequently, there are three numbers that firms need to calculate; the number of current accounts, the breakeven account number after examining acquisition and retention costs, and the breakeven account number after examining retention costs. If profits from each new account are less than the previous channel account selected. If profits from each new account are higher than the previous channel account selected. Rare cases.

For channel i the profit is calculated as follows:

$P_i(X_i) = m_i X_i + C_i$

$M_i = P_{i1} - P_{i2} / X_{i1} - X_{i2}$

$C_i = X_{i1} P_{i2} - X_{i2} P_{i2} / X_{i1} - X_{i2}$

Where $P_i(X_i)$ is the profit of the X_i account for channel i, m_i and C_i represent the slope and the constant in the linear relation between profit and account umber for channel i

Break even point:

If a_i and r_i are the acquisition and retention costs for channel i the break even account number q*1i is calculated as follows:

$q^*1_i(a_i + r_i) = m_i q^*1_i + C_i$

The second breaking point taking only retention cost into account:

$q^*2_i(r_i) = m_i q^*2_i + C_i$

If profits from each new account are equal the previous channel account selected. Developing decision rules based on coverage and potential conflict: the resulting optimum numbers should be used in two things; compared to the size of the market of the channel, as well as the coverage that each channel member provides. The potential conflict across channel types is examined to minimize

channel conflict. Identify strategic channels that cannot be abandoned: due to some strategic necessities of the firm some channels are kept active even if they are costly.

Implementation is the most difficult part, and firms should develop rule-based system to enhance channel coverage and reduce conflict, including rules for channel pricing and channel commission sharing ,ongoing channel evaluation. The Framework is applied by first calculating of profit of each channel, then estimating a linear relation between profit and number of accounts. Then a breakeven analysis with two breakeven quantities are calculated, the one based on acquisition and retention.

There is a Managerial implication as firms need to determine the profits from each channel. Unfortunately most accounting systems give product level profitability rather than channel level. The model is a very good mathematical model based on profits of each channel it compares to determine optimum number of channels and accounts per channel to maximize profit. But it is a business to business model and will have some limitations if applied in the consumer products. The researchers highlighted the need to have profits in companies determined per each channel rather than product.

Rosenbloom (2006) highlighted the dimension of having the E-commerce as a new channel for manufacturers and the impact that it has on channel conflict, He raised a lot of issues like should all products of the company be sold through the internet, and if the online channel will lower the cost. He mentioned that the customer also benefit from multi-channel as he has the choice in purchasing from the most convenient channel.

Rosenbloom (2006) also mentioned a very good advantage of multi-channels that others did not which is "Synergy" meaning one channel reinforcing the effectiveness and efficiency of other channels and of the overall sum. and He also mentioned that the online channel can be utilized to give customer information before purchasing through conventional channels.

Rosenbloom (2006)claimed that sustainable competitive advantage can no longer be achieved only by cost leadership or product differentiation due to the globalization and easy copying. He argues that they are important but not sufficient, and that the channel strategy and particularly the multi-

channel strategy will continue to enjoy increased attention as a means for gaining a sustainable competitive advantage. This is because a well established channel strategy is more difficult for competitors to copy quickly. It requires long time commitment and investment in infrastructure involving capital and human skills. He gave the example of Caterpillar world wide dealer network as something that competitors could not easy copy.

Webb (2002) addressed the problem of channel distribution in the e-commerce age; he described strategies for proactively managing conflict both externally among channel partners and internally among the subunits responsible for managing the channels. He developed twelve propositions by which suppliers can influence the level of channel conflict, eight of which relate directly to channel mix and four focuses on channel communication and coordination.

Webb (2002) defined E-commerce as "the strategic deployment of computer-mediated tools and information technologies to satisfy business objectives". He mentioned that all marketing channel systems must perform three fundamental tasks :the exchange of goods , the exchange of money and the exchange of information. The internet can perform the exchange of money and information , but physical exchanging goods can not be done through it except electronic goods like, music and e-books.

The most important reasons for suppliers to have multi-channels is to increase market share and to reduce cost. It also allow companies to better adapt to changes in customer needs and shopping patterns. Moreover excess manufacturing capacities can be utilized in supplying products to new outlets when existing channels are saturated. But having multi-channels have also many challenges, as competing demand on internal company resources, like capital, personnel, products, and technology, also the various distribution channels may compete with each other for the same customer in the market place, increasing customer confusion and dissatisfaction. Therefore, he concluded that, introducing the electronic marketing channel to an already complex distributing system increased the possibility of unwanted conflict.

Webb (2002) views that conflict is inevitable, because of inherent differences in the perceptions and goals of the organizational members. He used previous Marketing researches done by (Coughlan,et Al.,2001)in identifying the three primary causes of channel conflict as first goal incompatibility, second domain dissensus, and third differing perception of reality. Goals of different channels may differ including profit margins, competition for alternative channels, and access for product supply. The domain dissensus is divided to four elements: the population to be served, the territory to be covered, the functions or tasks to be performed, and the technology employed. The difference perception of reality is due to lack of communication. He referred to the way of measuring conflict introduced by (Coughlan, et Al., 2001) indicating that the conflict is measured by the frequency and intensity of disagreements, weighted by the importance of the issue.

Webb(2002) also stressed that some amount of conflict can be healthy, because it prevents the channel members from becoming passive. The internal conflict is a very important issue that he mentioned, it is resulting from the company having different channels, has corresponding sales and marketing subunits that serve these channels, and internal conflict will take place between them also; of course managers can have more control over the internal conflict. He concluded that conflict either internal or external affect one another and cause conflict in the other. Webb introduced his twelve propositions for managing conflict for companies with a complex multi-channel and also introducing the E-commerce as a new channel.

There are eight propositions related to marketing mix and four related to communication and coordination to cure goal incompatibility, domain dissensus, and difference in perception of reality.
Concerning the eight marketing mix strategies he recommended first to understand what customer likes in each channel, do current channels meet customer needs and expectations?. He recommend to start with market segmentation and provide channels that meet these segments. The eight propositions are:

Proposition 1: Supplier firms will experience lower levels of channel conflict by not pricing products on their website below the resale price of their channel partners.

Proposition 2: Supplier firms will experience lower levels of channel conflict by diverting fulfillment of orders placed on their website to their channel partners.
Proposition 3: Supplier firms will experience lower levels of channel conflict by providing product information on their website without taking orders.
Proposition 4: Supplier firms will experience lower levels of channel conflict by promoting their channel partners on their website.
Proposition 5: Supplier firms will experience lower levels of channel conflict by encouraging their channel partners to advertise on their website.
Proposition 6: Supplier firms will experience lower levels of channel conflict by limiting the offering on their website to a subset of their products.
Proposition 7: Supplier firms will experience lower levels of channel conflict by using a unique brand name for products offered on their website.
Proposition 8: Supplier firms will experience lower levels of channel conflict the earlier the products offered on their website are in the demand lifecycle.

Concerning the other four communication and coordination, Webb recommended the supplier to have a very transparent policy with various channels members both internally and externally. He claims that telling the channel members about the intentions of the company to introduce new channel(internet) or any other channel strategic move is much better than doing it in secrecy as it will be known at the end.

He also mentioned that the channels should understand the customer segments requirements and understand the value adding each channel do to satisfy it target customer. He gave an example of IBM and SkyTel as they developed a document that highlights all the roles and responsibilities of all their channels, this document clarifies all "gray areas" and it is so important that it is part of the initial training of new employees. Also highly recommended is the joint planning and goals' setting between supplier and its channels is vital to minimize conflict.

The four propositions are:

Proposition 9: Supplier firms will experience lower levels of internal (external) channel conflict the more effectively they communicate their overall distribution strategy internally (externally).
Proposition 10: Supplier firms will experience lower levels of internal (external) channel conflict the more effectively they coordinate their overall distribution strategy internally (externally).
Proposition 11: Supplier firms will experience greater channel coordination internally (externally) the more effectively they communicate their overall distribution strategy internally (externally).
Proposition 12: Supplier firms will experience lower levels of internal (external) channel conflict the more they make use of superordinate goals internally (externally).

Webb (2002) mentioned that the most deepest fear that the supplier not having internet strategy at all. He also mentioned that channel conflict is inevitable in multi-channel structures, and companies should b prepared to live with some amount of it, A small amount of conflict is sometimes good to keep all members active.

Aboul-Enein (2003) tried to measure the conflict with a model from a consulting group (General Management technologies, 2000). The model is presented on the internet, but it is viewed as a weak point to utilize a model not from a primary souse of data. The model is a three dimensional model having the brand power, companies vulnerability in channel and Ability of retailers to retaliate. As shown in Figure 2.7.

The other model used is the Hybrid model (Moriarty and Moran, 1990),discussed above It is widely used but is slightly old, thirteen years old then Aboul-Enein (2003) depended in her measurement on only interview with sales persons in the mobile operator company, and did not make any interviews with the other concerned party; the distributor.

The output of the big question (the customer preferred channel) is very obvious from the beginning and could have been predicted i.e. any customer would prefer to deal directly with the service provider or the producer, and not with a reseller or distributor.

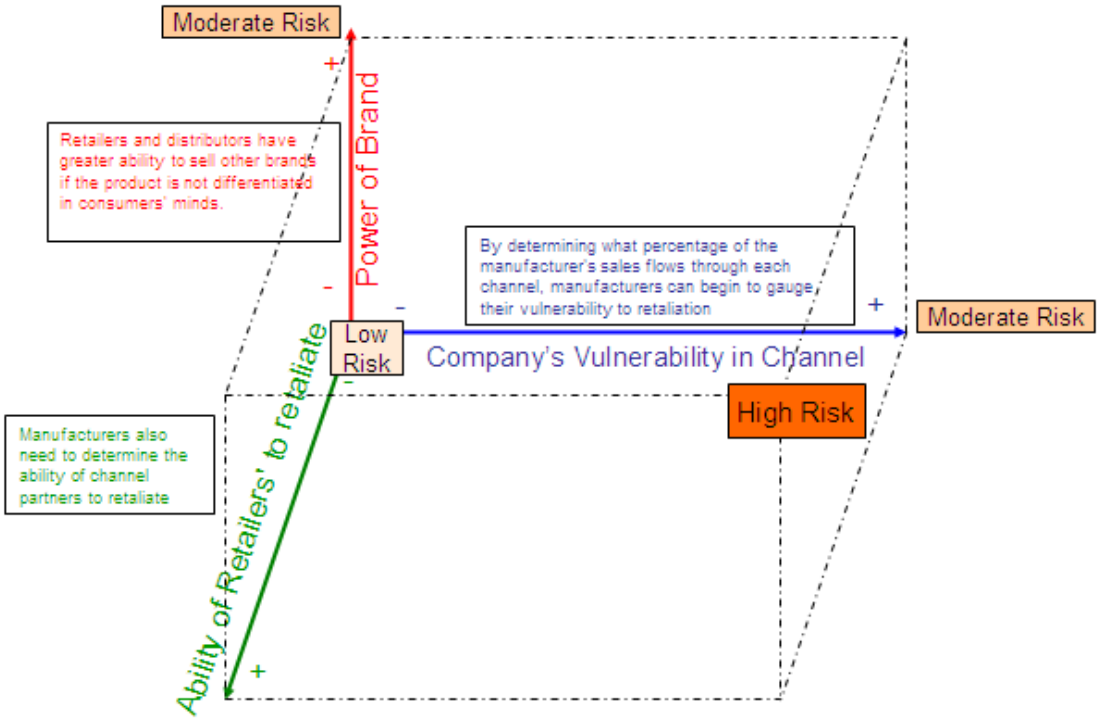

Figure 2.7 GMT Channel conflict measurement model

(Source: General Management Technologies ,2000)

The researcher did not take in mind the value added by the distributor in the mobile industry which is mainly the reachablity to far and remote customers. The operator can not afford to have a shop in each village and street in Egypt, and the Hybrid model is most important to chose a cost effective channel strategy that meets the customer needs, with a cost effective way. The two big recommendations contradict each other. At first the researcher recommended that the company sholud deploy a new channel strategy that focus on direct sales channels. While in the second recommendation, the researcher suggested that the company apply a conservative channel policy in dealing with the distributors, by paying attention to there relation, consulting them, and enhancing their incentive plan .The researcher missed that the main channel conflict in any industry is because the company tries to sell by it self, and so the distributor become a competitor at the same time, which creates conflict, and so the first recommendation has to be reversed.

Minisy (2006) tried to solve the problem of managing the channel conflict in the lubricant distribution channel. He used business dynamics which is a very good choice to give quantitative data. But the conflict in his case occurs between members of the same channel wholesales as they are the only means of distributing the oil. However there is a difference concerning the consumer electronics which is that it has different form of channels direct show rooms, wholesales, and hyper markets, with the hypermarkets having the upper hand on any supplier.

Rangan (2006) introduced a framework to effectively design and manage channel in the new era. He claims that channel strategy should be dynamic and not stagnant, and that most companies once they design a channel structure, it slowly gets cemented in its place. Most companies uses channel management to respond to environmental changes, although it is a design issue. He also said that the manufacturer biggest mistake is to treat channel members as customers; they are in fact business partners. He introduced the definition of "Channel Stewardship" This is the ability of a given participant in a distribution channel-a Steward-to craft a go-to-market strategy that simultaneously address customer best interests and drives profits for all channel partners.

A Channel steward can be a manufacturer (Procter & Gamble), supplier (Intel), Retailer (Wal-Mart), assembler (Dell), or any participant in the value chain to the customer. Steward means constantly guiding and directing changes in channel design and management to align the channel with customer needs while driving profits for all parties. Channel steward has two important out comes: increase the market share and profit of all parties, and Designing a very accurate adaptable channel system, that have only value adding members, who are rewarded as their contribution. Channel stewardship involves the construction of a channel value chain that mirrors the needs of the demand chain as closely as possible. His book introduced the framework of the three disciplines of channel stewardship as shown in figure 2.8.

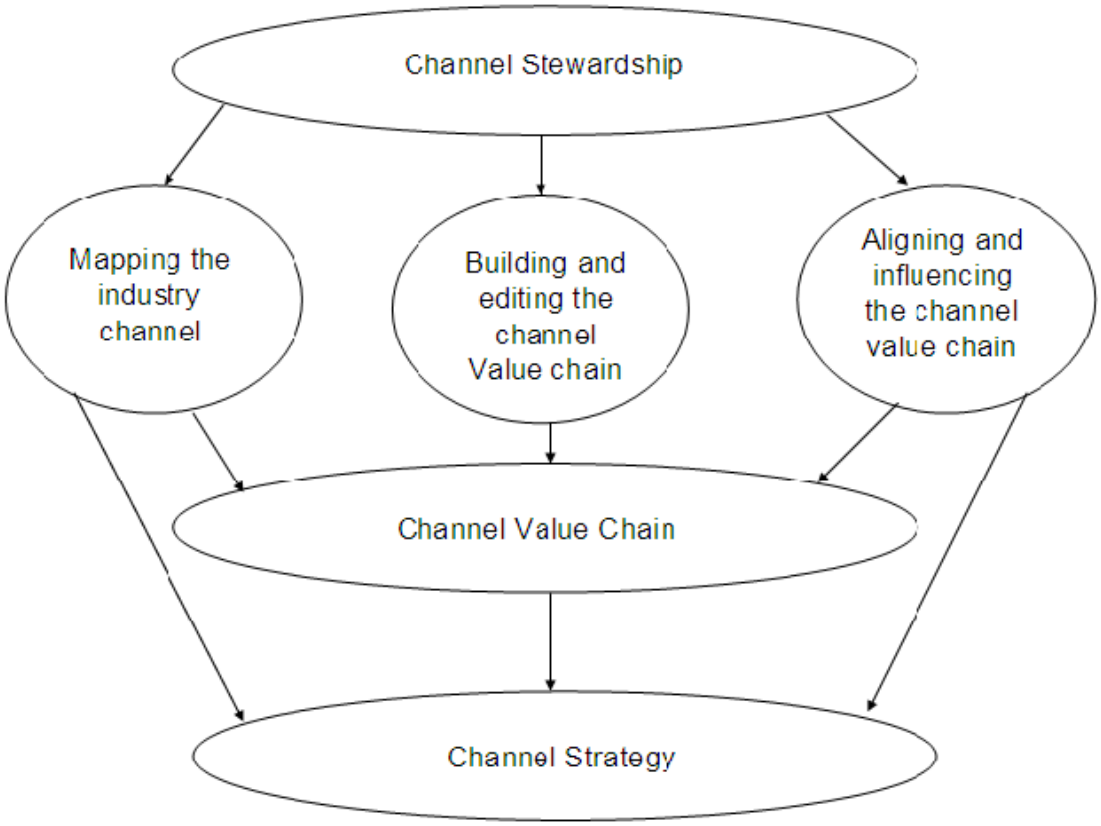

Figure 2.8 the three Disciplines of channel stewardship

(Source:Rangan,2006)

Mapping the industry channel; to see the big picture by studying the four channel forces, it is an industry level exercise, rather than a business level, it provides view of what others are doing helping identifying opportunities and threat. The four forces are the direct influence on the channel strategy, they interact and influence each other, but they are affected by environmental forces in the industry. Regulatory framework is one example of the environmental influence. As shown in Figure 2.9 .it suggests ways that top management can attempt to shape the environment. There is a difference between the mapping and porter five forces. An analysis based on Porter five forces provides diagnostics about the state of an industry channels to market. But the mapping make companies focus on what specially influence channel strategy. So this model is more focusing on the channels strategy.

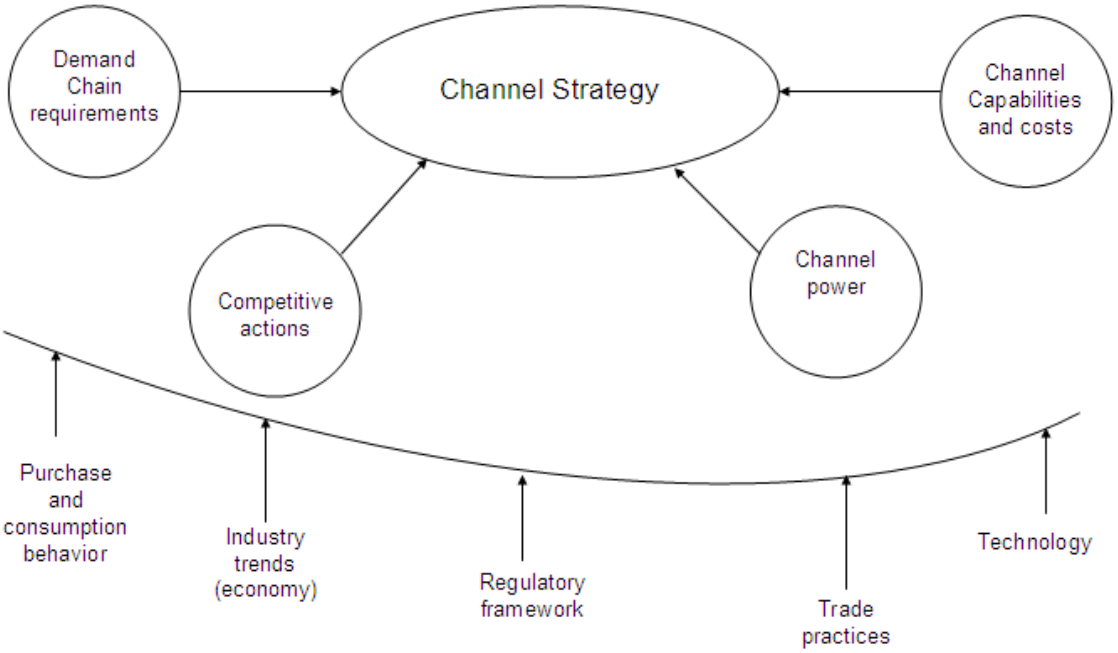

Figure 2.9 Mapping the forces affecting channel strategy

(Source:Rangan,2006)

Then building and editing the channel value chain; balancing the customer needs with channel capabilities. By editing and updating the channel capabilities. You connect the broad picture of the mapping to the firm capabilities, establishing links to the customer demand chain requirements, and establish a channel system to meet the requirements.

Finally, aligning and influencing the channel value chain; by altering the behavior of channel partners and by keeping them "tuned" to the need of the customer. The reward of each partner must be equivalent to his effort. This discipline focuses on channel policies, rules, and procedures that are all part of channel management tactics. Like channel coordination, control, and conflict resolution.

2.4 CONCLUSION

Most of the reviewed research work was done on business to business firms like (Sharma and Mehrotra, 2006). Very few were done on business to consumer like (Aboul-Enein, 2003). Also, the researches are mostly qualitative and do not give a quantitative solution on how to manage the channel mix, to minimize conflict, and choose the optimal polices and quantities that will make the company achieve the objective of highest profit with the lowest possible channel conflict.

Studies about channel conflict in the Egyptian market are very few; only two were done in MSM-Riti (Aboul-Enein, 2003) and (Minisy, 2006).The earlier was for mobile operators business, not consumer electronics, also it had some weak points as mentioned above. The second study, used business dynamics in lubricant oil, but has only one channel type (wholesalers), and the conflict is between the members of the same channel (wholesalers). The effect of hypermarket as anew trend in the consumer purchasing behavior and conflict with traditional wholesalers was not tackled before.

Thus, there is a need for a quantitative research which has the objective of optimizing the multi-channel structure to achieve the goals of maximizing profit and lowering channel conflict especially for consumer electronics, that involve the whole sales and hypermarkets, and specifically for a local manufacturer.

CHAPTER THREE
THEORETICAL FRAMEWORK AND RESEARCH DESIGN

3.1 INTRODUCTION

For any company with a product to sell, how to make that product available to the intended customers can be as crucial a strategic issue as developing the product it self (Tasay and Agrawal, 2004). Channel design and channel optimization was and is still one of the most important core competencies that a company must have to maintain sustainable growth in the new globalized market. It is still a subject to a lot of researchers and new books are available every year (Rangan 2006).The introduction of the E-commerce as a new channel added to the already tense channel structure more complexity.

In the consumer electronics sector in Egypt, the growing demand in the hypermarkets sectors attracts all suppliers to sell their products in these markets, putting their traditional wholesale channels and other channels in a conflicting situation. The conflict arise because the hypermarkets are not always looking for maximizing profit from a specific item, but rather they are looking to maximize total profit from the whole sales in the hyper. In the promotion events especially they are using a consumer product price reduction that they put in their advertisement to attract the maximum number of customers to the hyper to purchase the discounted item as well as other items.

The hyper measures the success of the promotion by the number of pieces sold from that item not from its profit from that item. They even sell the product with no profit at all. They also measure the profit from the whole purchase of the customer who purchased that discounted item in the promotion. But the discounted low priced item in the hypermarket promotion make a price discrepancy with other suppliers channels especially traditional wholesalers who suffer a drop in sales due to the promotion. It can reach the extent that the price of the discounted item becomes lower or equal to the price that the wholesaler sell with to the retailer.

As the number of hypermarkets increases the number of promotions increases The situation reached is that there is no calendar month that pass with out at least one promotion in each of the

Hypermarkets. This promotion lasts for at least a weeks. Also there are seasonal promotions like the back to school promotion, the Ramadan promotion, the summer promotion, the mothers' day, the hypermarket anniversary and other events.

The supplier find himself in a situation where he is obliged to participate in the promotion to increase his brand image, create sales volume, and have existence in the top consumer market place that targets the top wealthy consumers. On the other hand, the supplier has his wholesalers who are responsible for the steady large bulk of inventory, they find these promotions, and the whole supplier business with the Hyper a destructive action that leads to a lot of channel conflict. So the supplier need to carefully design and manage channel structure in order to achieve the required objective of maximizing profit, revenue, or market share, (according to the supplier strategic objective) .

3.2 PROBLEM DEFINITION:

There are many sources of channel conflict; the conflict generated from the Hypermarket marketing actions, the conflict generated from introducing new channel member in the wholesalers or hypermarkets, or other types of channels, conflict generated from parallel trading, and conflict from price discrepancy. All of them cause the channel structure to be loose, and affect the revenue generated from each channel, this combined with the low overall economic growth, and the competitors aggressive actions, it can reach the situation of wholesalers to breakdown the relation, or even law-suits. The supplier needs to optimize this situation to gain the benefit of multi-channel to increase profits without having the risk of high channel conflict and its consequences.

3.3 RESEARCH OBJECTIVE:

This research objective is to build a model that help to optimize channel design by adjusting the prices, quantities, promotion rates and other controllable variables that the supplier can control to achieve the company objective (maximize profit, maximize revenue, or maximize market share)
More specifically, the research objectives are:

1. Identify the main variables that affect the level of performance of each channel, and its effect on the overall performance of the whole channel performance.
2. To develop system dynamics model to manage channel conflict in different marketing channels.
3. To set strategy for consumer electronics suppliers to better manage their distribution channels, to achieve maximum profits with the lowest possible channel conflict in the Egyptian market, in the existence of the Hypermarket as an active channel.

3.4 THEORETICAL FRAMEWORK:

3.4.1 Overview

A system dynamics model is used to tackle the optimization problem for the consumer electronics supplier in the Egyptian market, the objective is to build a model to facilitate for decision maker to take decision and policies that when well implemented lead to (maximize profit, revenue, or market share) by utilizing all channels, through minimizing channel conflict. It is aimed that the model would identify and build policies to support their decisions while managing the distribution channels, simulation models will be developed to create "what-if" scenarios to reflect the effect of channel conflict on various types of channels and the future demand for the producer based on better understanding to the big picture and the overall channel map.

The choice of system dynamics as a framework, comes from the fact that the distribution channel structure and its associated conflicts are complex, and changing one controllable variable in one channel ,can have an impact on another channel that tackle a different segment .

The framework identifies the most effective variables that are affecting the channel structure of a multi-channel supplier of consumer electronics in Egypt .

3.4.2 The Supply and demand causal loop

The framework is based on the supply and demand famous loops of Adam Smith (Sterman, 2000). (Adam Smith Invisible Hand and The Feedback Structure of Markets) as shown in figure 3.1

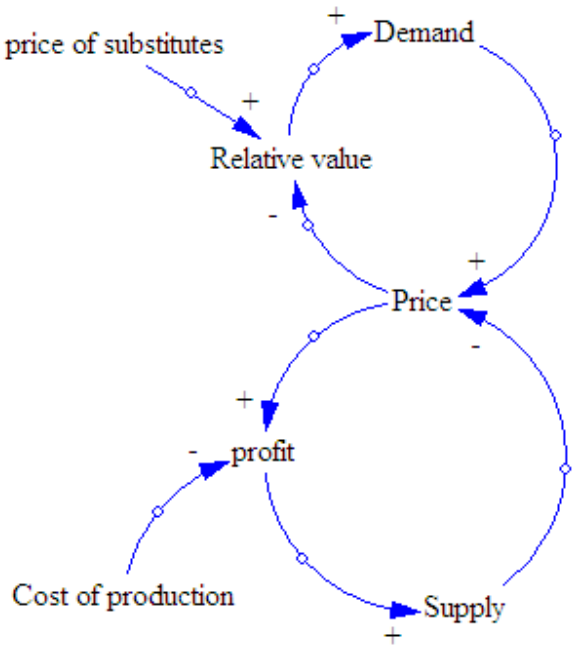

Figure 3.1Adam Smith Invisible Hand and The Feedback Structure of Markets

(Source:Sterman,2004)

Adam Smith invisible hand is one of the most famous metaphors in the English language (Sterman). Smith realized the negative feedback loops that cause the prices and profits to be self-regulating in the free market. Smith did not use system dynamics but his description about the supply and demand is best represented with system dynamics tools. Smith described the supply and demand of any commodity, and how the price of a commodity rise if the demand increase while the supply is remained constant, But suppliers do not leave the situation like this they want to take advantage of the high price, so they or other new entrants who are tempted by the high profits, introduce more stock to the market. This quantity will soon be enough to make the balance again and the price will fall to its normal equilibrium.

Smith was great in seeing that when prices rise above natural level, suppliers or producers who are eager to maximize their profits will enter the market until the price will goes down till it reaches the point where the return on their capital is not higher that that of another industry. Smith concluded

that every individual tries to employ his capital to produce the maximum profitability. He is not interested in the society welfare, but in trying to maximize profit he is led by an invisible hand to promote an end which was not part of his intention.

By pursuing his own interest he frequently promotes that of society more effectually that he really intends to promote it. It is important to note that this scenario is only in a free market with no monopoly, trade secrets, and government restrictions.

When price increases above the natural price, less buyers will be willing to give more, and consumers will seek substitutes. As demand falls, prices will be bid down forming a negative loop. When prices are high, it attracts new entrants to the market, and encourage current producers to increase output (supply). This increase in supply will bid the price down. These are two negative feedback loops causing the price of any product to adjust, in the absence of external shocks.

In the case of consumer electronics, the wholesales market, the hypermarkets, the E-commerce and direct sales all tackle different markets. This is because of the difference in the buying behavior of the consumers, their life style and their geographic location, making four different markets with four supply and demand balancing loops. The supply and demand loops are existing for each channel as each channel is tackling a different market segment, Figures 3.2, 3.3, 3.4, 3.5 shows the supply and demand loops for the Wholesalers ,Hypermarkets, E-commerce, and the showrooms and direct sales respectively.

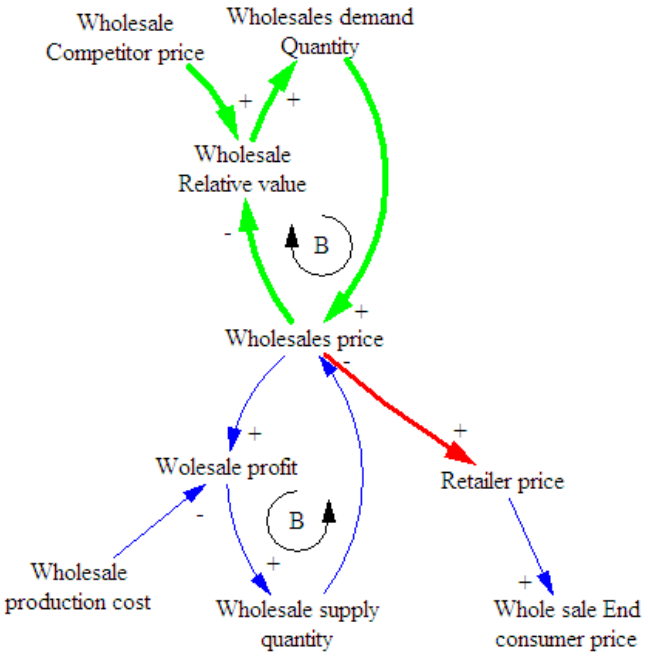

Figure 3.2 Supply and demand in the Wholesalers market - Conceptual Framework

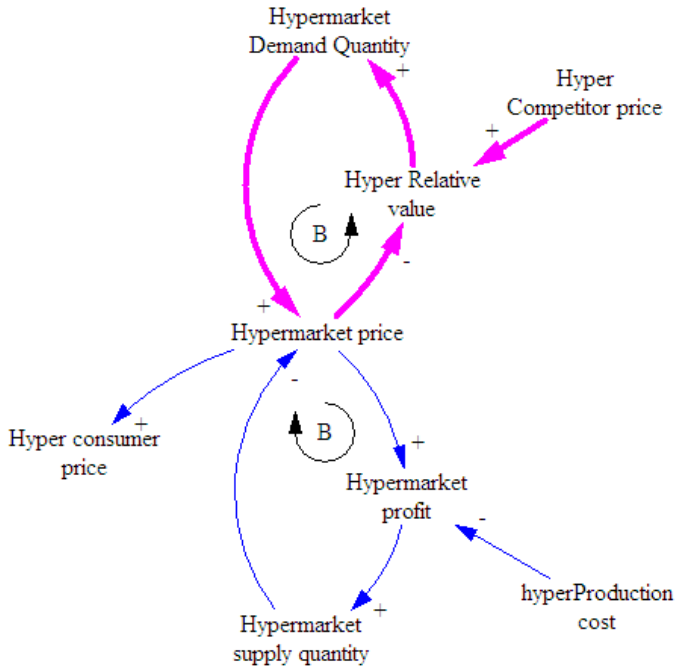

Figure 3.3 Supply and demand in the Hypermarkets market - Conceptual Framework

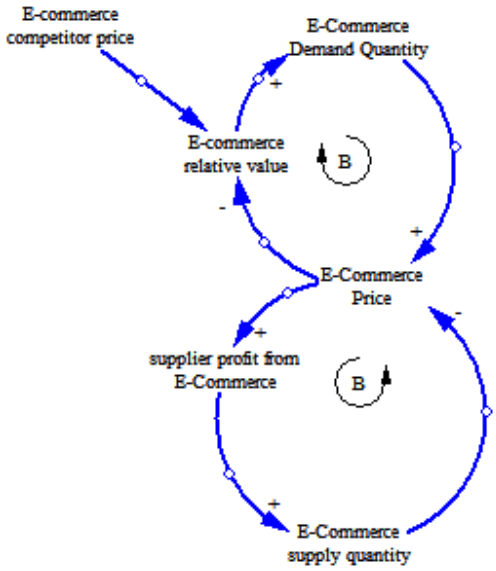

Figure 3.4 Supply and demand in the E-Commerce market - Conceptual Framework

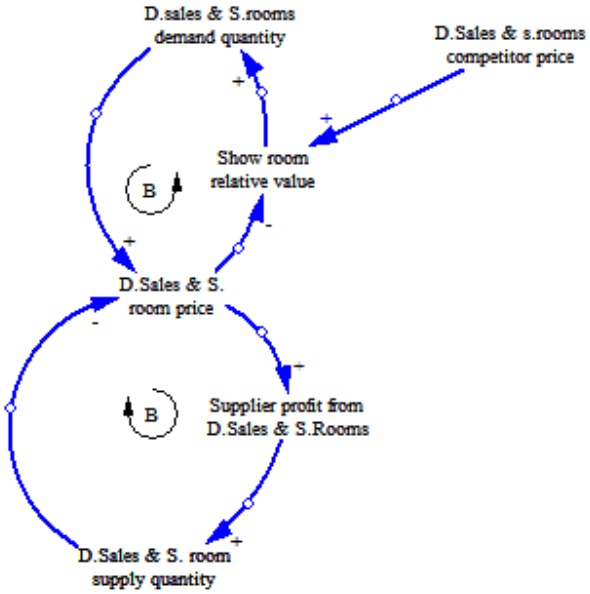

Figure 3.5 Supply and demand in the Show rooms and Direct Sales market - Conceptual Framework

The total market is the sum of all markets with the demand in any market equal the supplier market share*total demand in that market as shown in Figure 3.6, and the production capacity of the suppliers is the constrain that determine the quantity supplied for each of the four channels as shown in Figure 3.7.

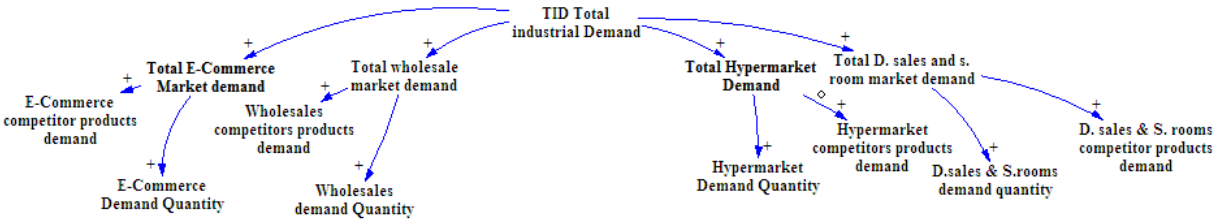

Figure 3.6 Total industrial demand TID - Conceptual Framework

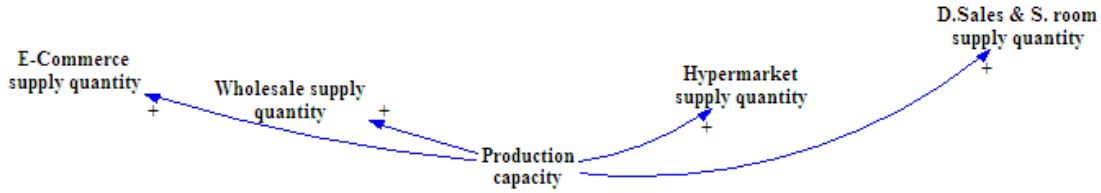

Figure 3.7 Production capacity- Conceptual Framework

The Product cost is constant and the product profit in any channel equal (Channel price – product cost). The Supplier total profit is the sum of profits of all channels .

Channel conflict is divided to different sources, as mentioned by (Webb,2001) like goals incompatibility, domain dissensus, and differing perception of reality. The domain dissensus is divided to four elements: the population to be served, the territory to be covered, the functions or tasks to be performed, and the technology employed. Adding new channel members to an existing channel, promotions done by another channel leading to price discrepancy, or parallel trading are from the main causes of channel conflict in the consumer electronics market. As shown in figure 3.8. the two main types of conflicts are wholesales conflict and hypermarket conflicts. The direct sales and E-commerce have their own conflicts also, but they are internal, and can be more controlled by

the supplier, than the conflict generated in channels like wholesales or hypermarkets.

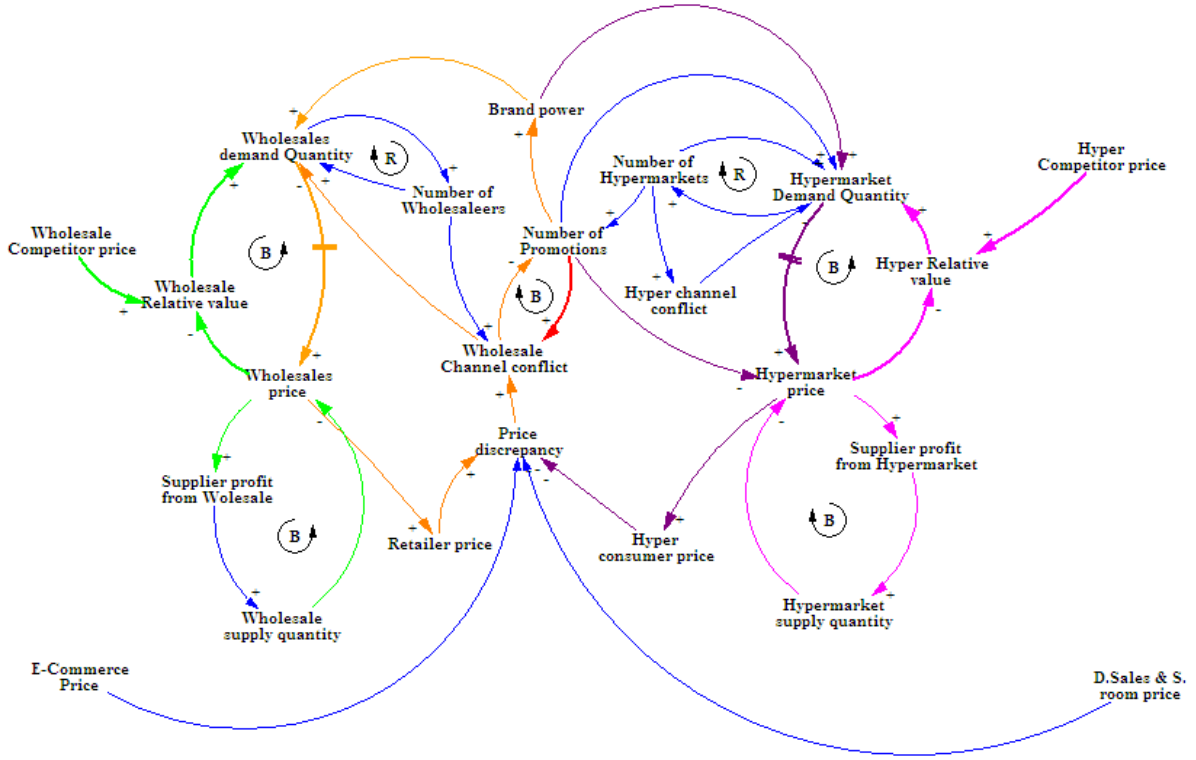

Figure 3.8 Promotion and price discrepancy- Conceptual Framework

As shown in figure 3.8 when the hypermarkets increase the promotion rate, the hypermarket demand quantity increase, but in the same time the wholesales channel conflict increases, which decreases the wholesales demand quantity. Also when assigning a new member in any of the two channels, the demand of that channel will be increased, but a feedback on the demand will be from the channel conflict that will increase by this new member. Thus, decreasing the demand. The total system is shown in figure 3.9 with a total of 50 variables.

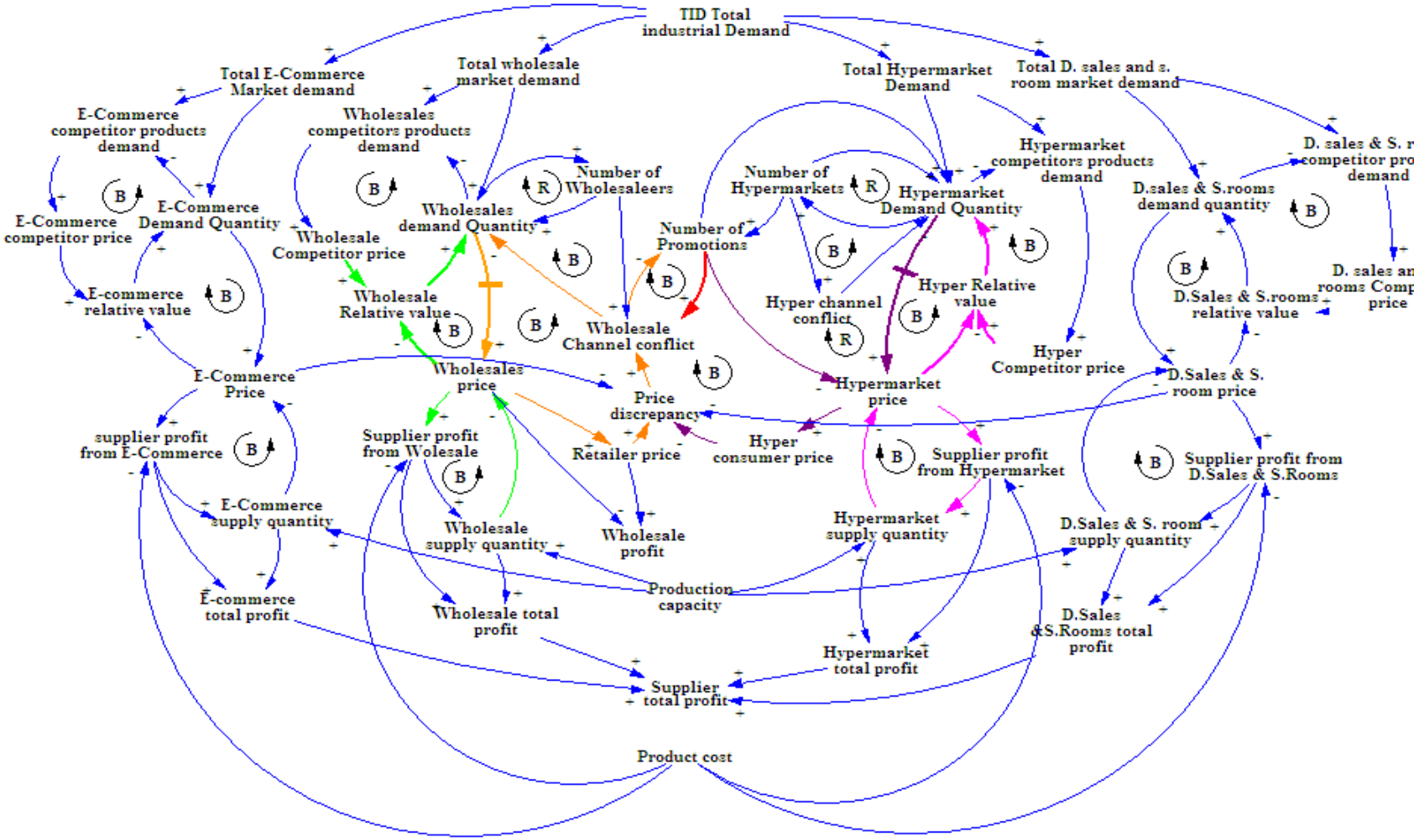

Figure 3.9 Total system causal loop- Conceptual Framework

3.4.3 The stock and flow :

The stock and flow structure is based on the model proposed by (Sterman, 2000) to tackle the supply and demand loops described above the model is shown in figure 3.10

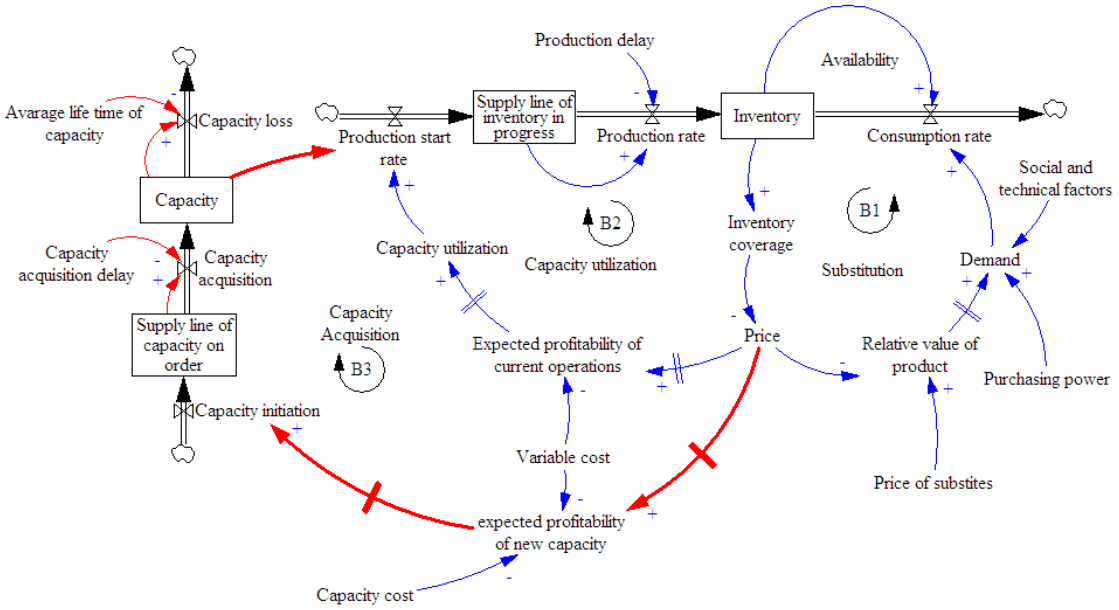

Figure 3.10 Stock and flow- Conceptual Framework (Source: Sterman, 2000)

The model shows the stock and flow structure of a commodity production and perceptual and administrative delays in the main behavioral decision processes. The stock and flow of production and inventory with prices are at top, while the long term stock and flow of capacity and investment is at left. Sterman claims that the model can be applied on products very differentiated as well as commodities as long as the market is free, and there is no government intervention. He says it can be applied (from Zinc to Aircrafts).

For the stock and flow of the production capacity the capacity acquisition increases the production capacity, while the capacity depreciation decreases production capacity. Capacity acquisition normally involves delays, as it requires strategic top management decisions in investments.

For the production, available inventory increases by production and decreases by consumption. On the demand side the demand of any product or commodity, as mentioned in the Adam smith model

depends on its price relative to the substitutes, the number and the purchasing power of consumers, as well as social and technical factors not related to price (trends, fashion,health…).high prices reduce the relative value of the product causing demand to fall through the substitution loop B1. On the supplier side higher prices urges top management to utilize existing capacity more loop B2 increasing production shortly by maximum capacity utilization loop B2, and in long term by capacity acquisition loop B3. Sterman used an important variable that causes the price to change which is the inventory coverage, it is the balance between the supply and the demand, the current supply is the available stock or inventory and the current demand is the order rate or consumption rate. So the equation of the inventory coverage is equal to the inventory divided by the consumption, and it has the units of time (month, or year).

For our case in the multi-channel, we have different channels that serve different markets each has its own demand and supply, and each has its own price. A product that is sold in a five star hyper market is different in price to the same product sold in big quantities by the wholesalers to retailers. Also, in the case of managing the channels, and reducing channel conflict it is a short or medium term issue (the time domain is in months, or maximum a year or two), and long term decisions like the acquisitions to increase capacity has a long time span that can reach ten years.

So we will not be interested in the capacity acquisition, because it is not applicable in our situation. Also we will leave the production capacity to be a decision variable in the hand of the supplier firm top management to produce the capacity required, as well as to allocate the inventory in different channels in a way that will result in the highest profit and lowest channel conflict. The complete stock and flow structure is shown in figure 3.11.

For the channel conflict, it involves the conflict in the wholesales market and in the hyper markets, as these two types of conflicts are external to the supplier organization, and it has lower control over them compared to the E-commerce or Direct sales. The wholesales channel conflict is caused by adding a new wholesaler, the promotions done by the hypermarkets, the price discrepancy, and parallel trading, while the hyper market channel conflict is caused by adding a new hypermarket, and promotions done by other hypermarkets. The stock and flow of channel conflict is shown in figure 3.12.

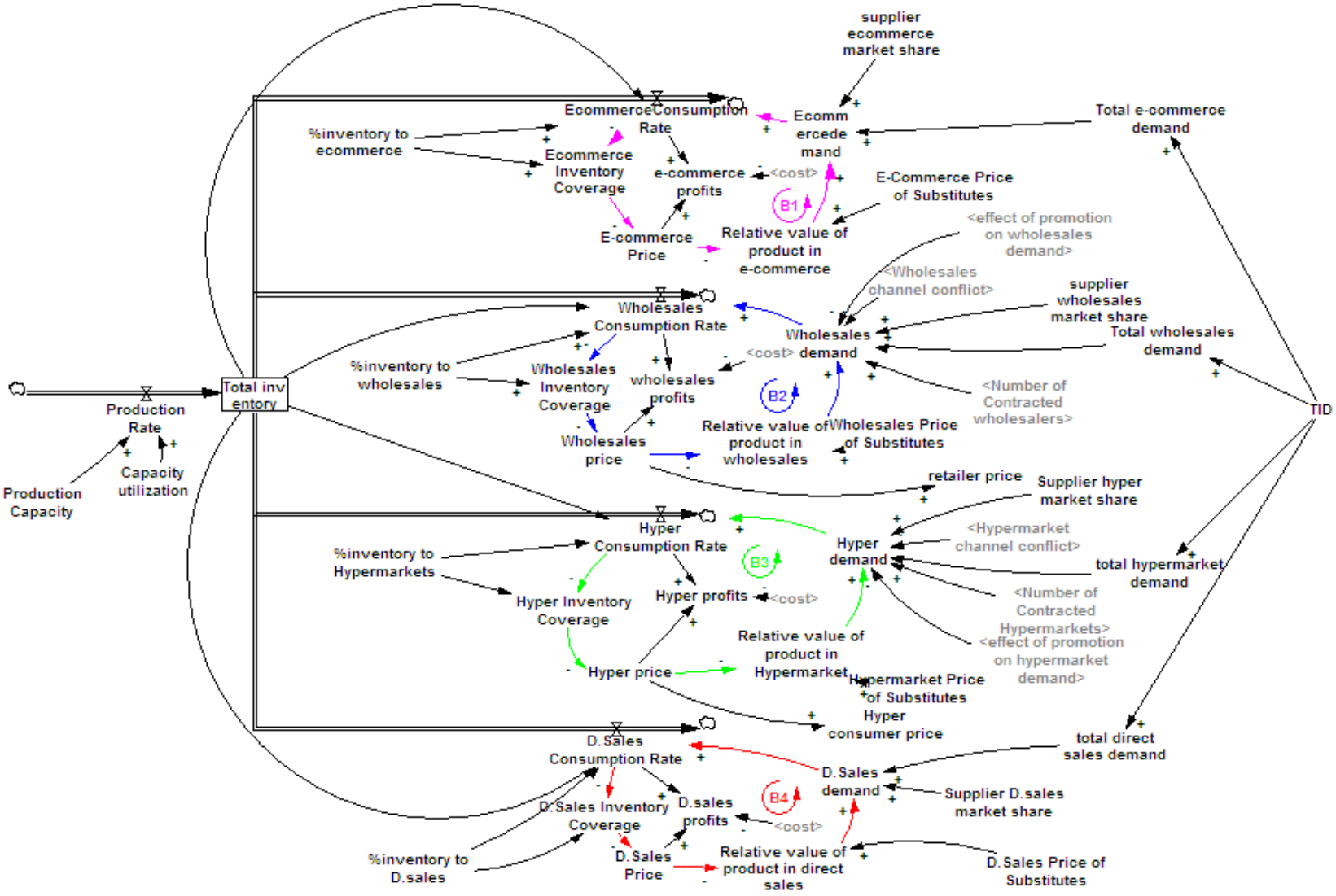

Figure 3.11 Stock and flow- four channel model -Conceptual Framework

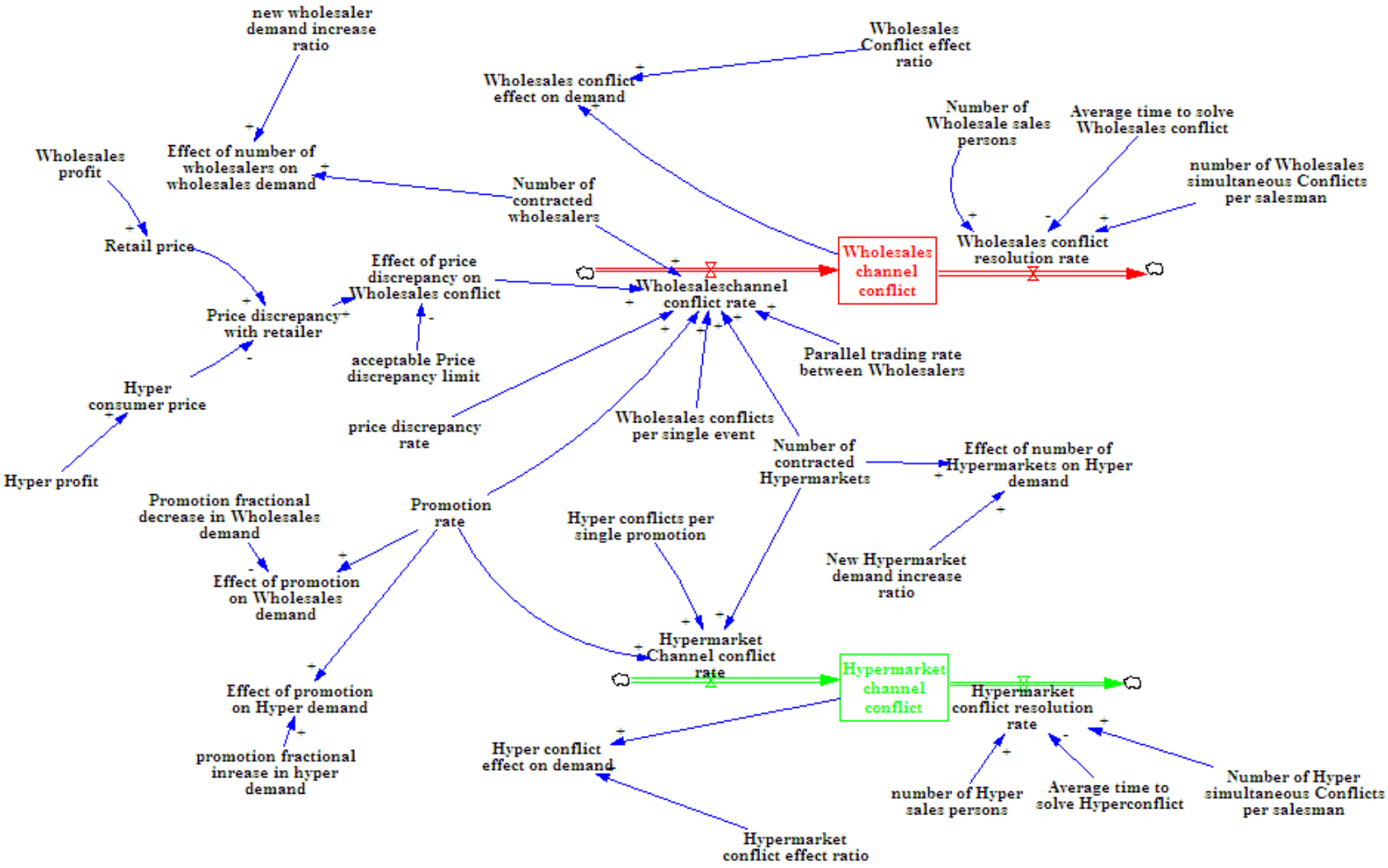

Figure 3.12 Stock and flow- Channel conflict -Conceptual Framework

3.4.4 Dependent Variable:

Table 3.1 below, identifies the key dependent variables, the definition and its inter-relationship among the variables.

Table 3.1 Dependent Variable

Serial	Variable	Definition	Possible Effect
1	Wholesale Channel conflict	Channel conflict between wholesalers or between wholesalers and the supplier	leads to a decrease in the Quantity demanded by the wholesalers
2	Hyper channel conflict	Conflict between Hypermarkets or between Hypermarkets and the supplier	leads to a decrease in the Quantity demanded by the Hyper market
3	Wholesales total profit	Profit from wholesales operations	Increase total profit ,and cause the organization to achieve its goals
3	Hypermarket total profit	Profit from Hypermarkets operations	Increase total profit, and cause the organization to achieve its goals
3	Supplier total profit	The Sum of total profits from all channels	

3.4.5 Independent Variable:

Table 3.2 below, identifies and describes the different independent variables, the definition and its inter-relationship among the variables.

Table 3.2 Independent Variable

Serial	Variable	Definition	Possible Effect
1	Number of Hypermarkets	The number of hypermarkets that sell supplier products	Increase Hypermarket demand quantity, Increase Hypermarket channel conflict , increase promotion activities and brand power
2	Number of Wholesalers	The number of Wholesalers that sell supplier products to retailers	Increase Wholesalers demand quantity, Increase Wholesalers channel conflict .
3	D.Sales & S. room price	Price of unit sold by direct sales and direct show rooms	Increase supplier profit of D.Sales & S. rooms
4	D.Sales & S. room supply quantity	Quantity of the product supplied to the D.Sales & S. room channel	Increase D.Sales & S. room total profit , and decrease D.Sales & S. room price
5	E-Commerce Price	Price of unit sold by E-commerce	Increase supplier profit of E-commerce
6	E-Commerce supply quantity	Quantity of the product supplied to the E-Commerce channel	Increase E-Commerce total profit , and decrease E-Commerce price
7	Hypermarkets price	Price of unit sold to Hypermarket	Increase supplier profit of Hypermarkets

Serial	Variable	Definition	Possible Effect
8	Hypermarkets supply quantity	Quantity of the product supplied to the Hypermarkets channel	Increase Hypermarkets total profit , and decrease Hypermarkets price
9	Wholesales price	Price of unit sold to Wholesalers	Increase supplier profit from Wholesalers
10	Wholesale supply quantity	Quantity of the product supplied to the Wholesales channel	Increase Wholesalers total profit , and decrease Wholesalers price
11	Product Capacity	The total number of units that the supplier can supply to all marketing channels	Increase in the supplied quantities in each market channel.
12	TID	Total industry demand of the consumer product	Leads to an increase of the Total demand in each market channel .

3.4.6 Casual Loop Variables:

The causal loop diagram is made of 50 variables, which could mainly be categorized as supply and demand variables for each channel (from the Adam Smith model) ,and variables that are common for all loops like production capacity and total market, and external channel conflict variables (channel conflict in the wholesales and the hypermarkets) . Using Vensim computer software, Table 3.3 below shows loop variable, each variable description, cause-effect relationship and total number of loops where the variable appeared.

Table 3.3: Causal Loop List of all Variables

Serial	Variable	Definition	Possible Effect	No. of loops
1	Brand Power	The level of end consumer recognition for the supplier brand	Increase the demand quantity in all the channels	6
2	D. sales & S. rooms competitor products demand	The demand on similar competitors products through their direct show rooms or direct sales	Increase the price of D. sales & S. rooms of competitor products	1
3	D. sales and S. rooms Competitor price	The selling price of competitor products at their Show rooms and through direct sales	Increase the relative value of the supplier D. sales and S. rooms .	1
4	D.Sales & S. room price	Price of unit sold by direct sales and direct show rooms	Increase supplier profit of D.Sales & S. rooms	3
5	D.Sales & S. room supply quantity	Quantity of the product supplied to the D.Sales & S. room channel	Increase D.Sales & S. room total profit , and decrease D.Sales & S. room price	1
6	D.sales & S.rooms demand quantity	The Quantity demanded by D.sales & S.rooms to achieve their market clearance	Increase D.sales & S.rooms price	3

Serial	Variable	Definition	Possible Effect	No. of loops
7	D.Sales & S.rooms relative value	The value of the supplier product compared to the competitor product at the D.Sales & S.rooms	Increase the D.Sales & S.rooms demand quantity	2
8	D.Sales &S.Rooms total profit	Equal to the unit profit from D.Sales &S.Rooms multiplied by total quantity supplied	Increase Supplier total profit	0
9	E-Commerce competitor price	The selling price of competitor products at their E-commerce web site	Increase the relative value of the supplier E-commerce product	1
10	E-Commerce competitor products demand	The demand on similar competitors products through their E-commerce web site	Increase the price of E-commerce web site of competitor products	1
11	E-Commerce Demand Quantity	The Quantity demanded by E-Commerce web site to achieve its market clearance	Increase E-Commerce price	3
12	E-Commerce Price	Price of unit sold by E-commerce	Increase supplier profit of E-commerce	3
13	E-commerce relative	The value of the supplier product compared to the competitor product at	Increase the E-commerce demand quantity	2

Serial	Variable	Definition	Possible Effect	No. of loops
	value	the e-commerce market		
14	E-Commerce supply quantity	Quantity of the product supplied to the E-Commerce channel	Increase E-Commerce total profit , and decrease E-Commerce price	1
15	E-commerce total profit	Equal to the unit profit from E-commerce multiplied by total quantity supplied	Increase Supplier total profit	0
16	Hyper channel conflict	Conflict between Hypermarkets or between Hypermarkets and the supplier	leads to a decrease in the Quantity demanded by the Hyper market	1
17	Hyper Competitor price	The selling price of competitor products at the Hypermarkets	Increase the relative value of the supplier product at the Hypermarket	1
18	Hyper consumer price	The Price by which the Hypermarket sell the supplier product to end consumer	Decrease price discrepancy with other channels	3
19	Hyper Relative value	The value of the supplier product compared to the competitor product at the Hyper market	Increase the Hypermarkets demand quantity	3

Serial	Variable	Definition	Possible Effect	No. of loops
20	Hypermarket competitors products demand	The demand on similar competitors products at the Hypermarket	Increase the Hypermarket price of competitor products	1
21	Hypermarket Demand Quantity	The Quantity demanded by Hypermarket to achieve its market clearance	Increase Hypermarket price	9
22	Hypermarkets price	Price of unit sold to Hypermarket	Increase supplier profit of Hypermarkets	6
23	Hypermarkets supply quantity	Quantity of the product supplied to the Hypermarkets channel	Increase Hypermarkets total profit , and decrease Hypermarkets price	1
24	Hypermarket total profit	Equal to the unit profit from Hypermarket multiplied by total quantity supplied	Increase Supplier total profit	0
25	Number of Hypermarkets	The number of hypermarkets that sell supplier products	Increase Hypermarket demand quantity, Increase Hypermarket channel conflict , increase promotion activities and brand power	5

Serial	Variable	Definition	Possible Effect	No. of loops
26	Number of Promotions	The number of promotions done by the Hypermarkets	Increase brand power ,and demand quantity at Hypermarket	10
27	Number of Wholesalers	The number of Wholesalers that sell supplier products to retailers	Increase Wholesalers demand quantity, Increase Wholesalers channel conflict .	3
28	Price discrepancy	Difference in the same product price in different markets	Increase wholesalers channel conflict	7
29	Product cost	The Supplier cost for producing a unit of the product	Decrease supplier profit in each channel	0
30	Product Capacity	The total number of units that the supplier can supply to all marketing channels	Increase in the supplied quantities in each market channel.	0
31	Retailer price	The price by which the retailers (wholesalers customers)purchase the product	Increase the wholesales price discrepancy	2
32	Supplier profit from D.Sales & S.Rooms	The profit per unit that the supplier get from selling a unit through D.Sales & S.Rooms	Increase D.Sales & S.Rooms total profit, and increase D.Sales & S.Rooms supply quantity	1

Serial	Variable	Definition	Possible Effect	No. of loops
33	supplier profit from E-Commerce	The profit per unit that the supplier get from selling a unit through E-Commerce	Increase E-Commerce total profit, and increase E-Commerce supply quantity	1
34	Supplier profit from Hypermarket	The profit per unit that the supplier get from selling a unit to Hypermarket	Increase Hypermarket total profit, and increase Hypermarket supply quantity	1
35	Supplier profit from Wholesale	The profit per unit that the supplier get from selling a unit to Wholesalers	Increase Wholesale total profit, and increase Wholesale supply quantity	1
36	Supplier total profit	The Sum of total profits from all channels		0
37	TID	Total industry demand of the consumer product	Leads to an increase of the Total demand in each market channel .	0
38	Total D. sales and s. room market demand	The total market demand in the show rooms and direct sales, for the supplier plus the competitors	Increase in the demand quantity for both the Supplier and competitors D. sales and s. room	0

Serial	Variable	Definition	Possible Effect	No. of loops
39	Total E-Commerce Market demand	The total market demand in E-Commerce website , for the supplier plus the competitors	Increase in the demand quantity for both the Supplier and competitors in the E-Commerce website	0
40	Total Hypermarket Demand	The total market demand in all Hypermarkets , for the supplier plus the competitors	Increase in the demand quantity for both the Supplier and competitors in all Hypermarkets	0
41	Total wholesale market demand	The total market demand for all wholesalers , for the supplier plus the competitors	Increase in the demand quantity for both the Supplier and competitors for all wholesalers	0
42	Wholesale Channel conflict	Channel conflict between wholesalers or between wholesalers and the supplier	leads to a decrease in the Quantity demanded by the wholesalers	9
43	Wholesale Competitor price	The selling price of competitor products by wholesalers to retailers	Increase the relative value of the supplier product at the wholesalers market	1
44	Wholesale profit	The wholesaler profit from selling supplier product to retailers		0

Serial	Variable	Definition	Possible Effect	No. of loops
45	Wholesale Relative value	The value of the supplier product compared to the competitor product at the Wholesalers market	Increase the wholesalers demand quantity	2
46	Wholesale supply quantity	Quantity of the product supplied to the Wholesales channel	Increase Wholesalers total profit , and decrease Wholesalers price	1
47	Wholesale total profit	Equal to the unit profit from wholesalers multiplied by total quantity supplied to wholesalers	Increase Supplier total profit	0
48	Wholesales competitors products demand	The demand on similar competitors products at the wholesalers market	Increase the wholesalers price of competitor products	1
49	Wholesales demand Quantity	The Quantity demanded by all wholesalers to achieve its market clearance	Increase wholesalers price	7
50	Wholesales price	Price of unit sold to wholesalers	Increase supplier profit from wholesalers	4

3.4.7Research Assumptions:

A1: No significant change in the external environmental factors (Political, Economic, Social, and Technological) over the time of the study.

A2: Price is constant for members of the same channel.

A3: Suppler have full control over the direct sales, direct show rooms, and E-Commerce.

A4: Hypermarkets are the only source of promotions.

A5: A relationship exists between model variables

A6: The TID indicated does not include telecom Egypt demand as the supplier provides it with a different sales and through different production line.

A7: The consumer electronics market in Egypt is a free market ,there is no government intervention to affect this freedom.

3.4.8 Research Limitations:

L1: The research is limited to external channels conflict and does not tackle the effect of internal channel conflict between different departments inside the supplier organization responsible for different channels.

3.5 RESEARCH QUESTIONS:

3.5.1 Major Research Questions:

The research's global aim to determine an optimization method that can be utilized by a consumer electronic supplier to achieve the goal of maximizing the total profit of all channels ,and minimizing channel conflict. The major research questions are:

1. What factors could affect the channel conflict among the various channel members of a supplier in the Egyptian consumer electronics?
2. To what extend does Channel conflict affect supplier total profit?
3. How can the supplier optimize its channels to achieve maximum profit?(Max. revenue, or market share can be the objective also)

3.5.2 Minor Research Questions:

Considering the cause-effect relationships among different elements, minor research questions such as but not limited to, the following could be extracted from the conceptual framework described above:

1)Is there a relation between the channel conflict ,profitability and the TID?

2)Could the producer change strategy according to various demand and supply scenarios?

3.6 RESEARCH METHODOLOGY:

3.6.1 Research Type:

The purpose of this research is to determine an optimization channels structure with price, quantities and number of channel members as main independent variables, the research is considered to be of the analytical type, product relative values are qualitative subjects by nature. The research is applied to the case channel conflict in the Egyptian consumer Electronics distribution channels, therefore the research is applied.

Finally since the study is based on conceptual framework, from which a mental model will be built and tested via computer simulation, the research is considered to be of the deductive type.

3.6.2 Data collection Instrument and Sources:

The research was designed based on best practices locally and globally, experts opinion (Suppliers and channel owners) was taken through semi-structured interviews, followed by structured ones.
The data required was identified and collected. Data availability on some variables which considered know-how and due its natural confidentiality were not available, due to the fact of confidentiality and know how concept, the researcher followed the "reverse engineering" methodology to reach uncovered variable values and on other used assumption.

CHAPTER FOUR
DATA ANALYSIS, DYNAMIC MODELING, AND FINDINGS

4.1 THE LOCAL CASE: THE EGYPTIAN TELEPHONE COMPANY - QUICKTEL

The Egyptian telephone company -Quicktel- was established in the early sixties of the last century by the Egyptian government for the manufacturing of public switches and telephone sets in cooperation with Ericsson of Sweden. The company was fully owned by the government and it continued to produce various telecom products that serve the demand of the land line phone operator in Egypt Telecom Egypt. In the late nineties Egypt started the privatization plan, and the company was from the first to be privatized.

Today the company is a private company with Telecom Egypt, the national bank of Egypt and other foreign and local investors as the main share holders. The company is producing a range of telecom products starting from different models of telephone sets with different features, ADSL modems, telecom switches, and recently GSM mobile phones, the company has a good existence in the Africa and the Arab region, countries like Kenya, Iraq, Sudan, and Algeria, have a regular form of foreign representation, the total revenue achieved in 2006 was three hundred and fifty million Egyptian pounds.

For a long time Quicktel telephone sets were well known to the Egyptian consumer, as Telecom Egypt was always supplying the telephone set with the land line as a mandatory issue, the Egyptians tried the set and found it very reliable, and a trust for the brand of Quicktel was built by the time, the company always tries to update its products introducing new features that fulfill the customer demands, features like the caller number display (CID), automatic redial, and 250 non erasable phone book memory are just examples.The company also introduced cordless phones with different technologies. One of the company core success factors is that it has a reputable after sales service and customer support centers, with support service centers in 20 governorates all over Egypt always located in the governorate largest local exchange.

In recent years , the company tried to expand sales in the local market out side Telecom Egypt, it was faced with the existence of two main categories of competitors , the low priced, low quality Chinese brands like Gaoxinqi, and the high quality high cost famous brands like Panasonic ,Siemens, and Alcatel. The company enjoys a position in the middle of both categories with respect to price and a high quality position similar to the famous brands with respect to the quality and reliability, as sown in figure 4.1.

In its attempt to tackle the local market the company faced the inevitable scenario of channel conflict, as the top management wants to not only depend on its traditional wholesalers who are doing a good job in their market (selling to retailers), but also to target the growing wealthy segments who are always purchasing from the large hypermarkets that became a trend in the last few years. As it was mentioned, the hypermarket customers are the wealthy 8% of the Egyptian population, they are having a very high purchasing and consumption power. This sector is growing, Carrefour, Spinney's, and Hyper One are having branches mainly in Cairo, and expanding now in Alexandria , and other big cities.

Channel conflict arises from the price discrepancy, promotions done by the Hypermarkets, different goals between the wholesalers and the hypermarkets, also the producer activity of adding a new member in any of channel to increase sales from that channel is another reason of conflict. The company has a family of telephone sets with different features, starting from a basic telephone set with no screen, to a low end set with screen to show caller number, to a full featured set with a large screen to show names and numbers with a speaker phone. Figure 4.1 shows the perceived quality and price position of the company telephone sets compared to the key competitors.

The company does not sell through its web site , and directs any lead to one of its wholesalers , so the company does not have E-commerce channel, nor direct sales channel. And so in our business dynamics model we will not consider the two types of channels, and we will only have the Hypermarkets, and the Wholesales, with a demand of 8% and 92% of the total industry demand (TID) which is estimated to range from 1 million to 1.2 million telephone sets per year.

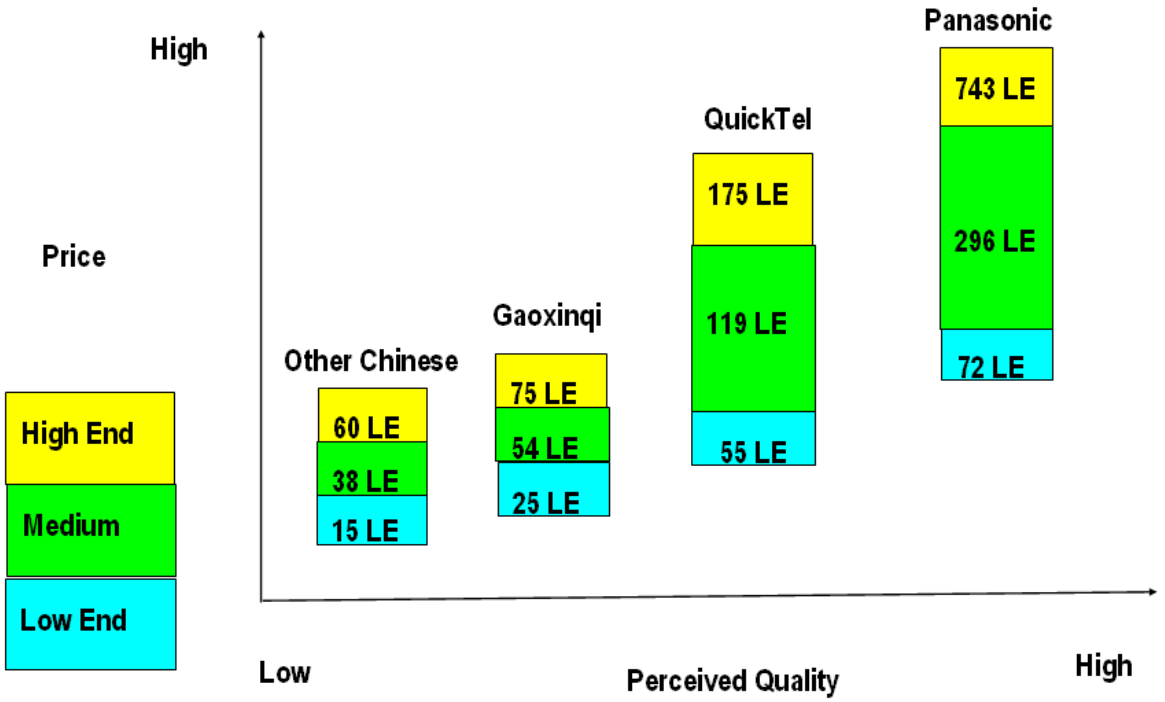

Figure 4.1: The Egyptian telephone company products position

(Source: Quicktel)

4.2 SIMULATION MODEL FORMULATION

4.2.1 Assumptions and Data Input to the Model

Table 4.1 below, shows assumed variables and parameters, initial values and ranges used in the stock and flow stage. Some new parameters and variables were introduced for the sake of building the stock and flow diagram. Figure 4.2,4.3 below show the Stock and Flow Diagram.

Table 4.1: Reference Mode Input Parameter

No.	Variable / Parameter	Units	Value / Range
1	Production capacity	Unit/month	30,000
2	% allocated to wholesales	Percentage	1 to 100

3	% allocated to Hypermarket	Percentage	1 to 100
4	Number of contracted wholesalers	Dim	2
5	Number of contracted Hyper markets	Dim	4
6	Promotion rate	Pro/month	1to 4
7	Supplier wholesales market share	percentage	10
8	Supplier Hypermarket market share	percentage	20
9	TID	Unit/month	120,000

4.2.2 Stock and Flow diagrams

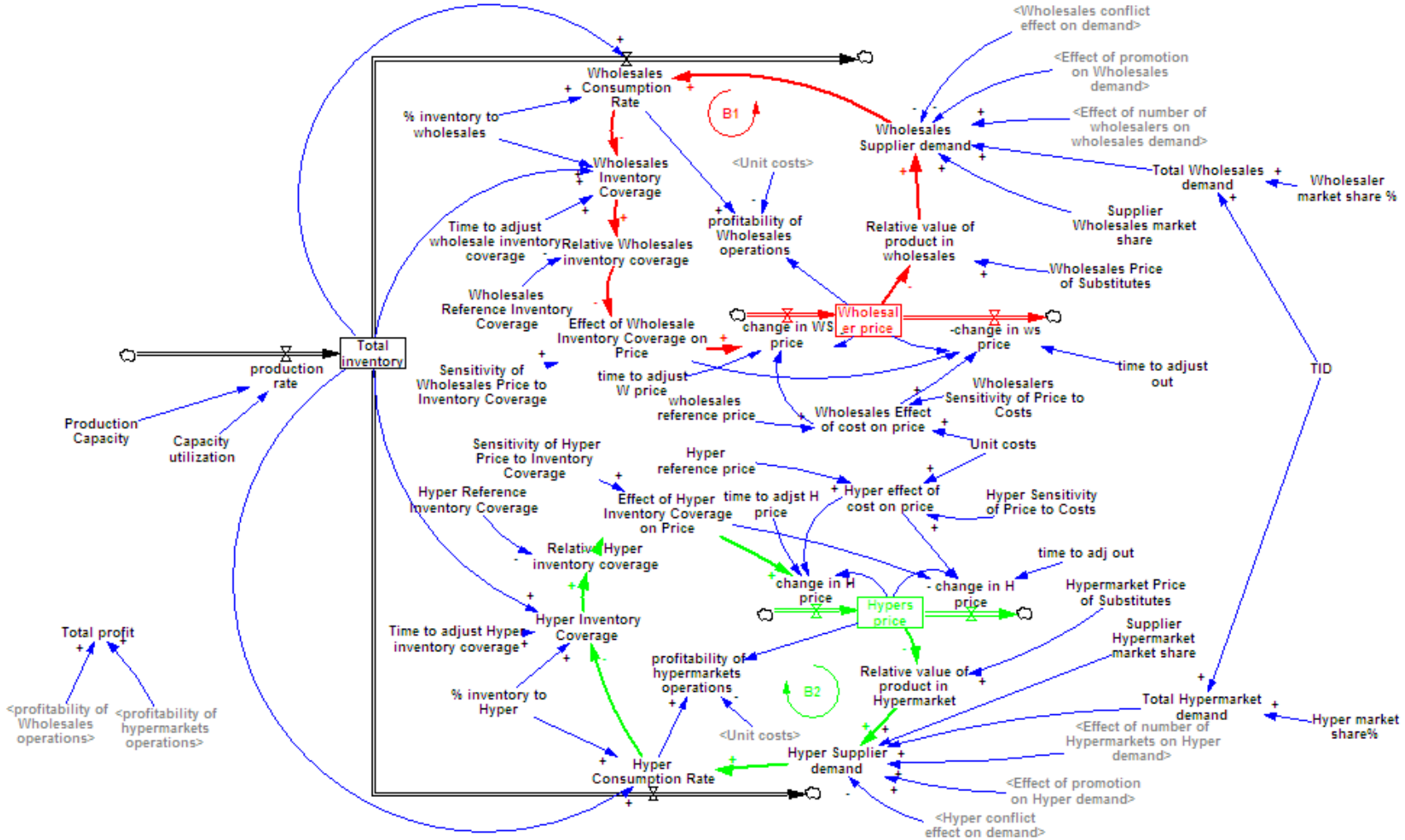

Figure 4.2: Stock and Flow Diagram –supply and demand

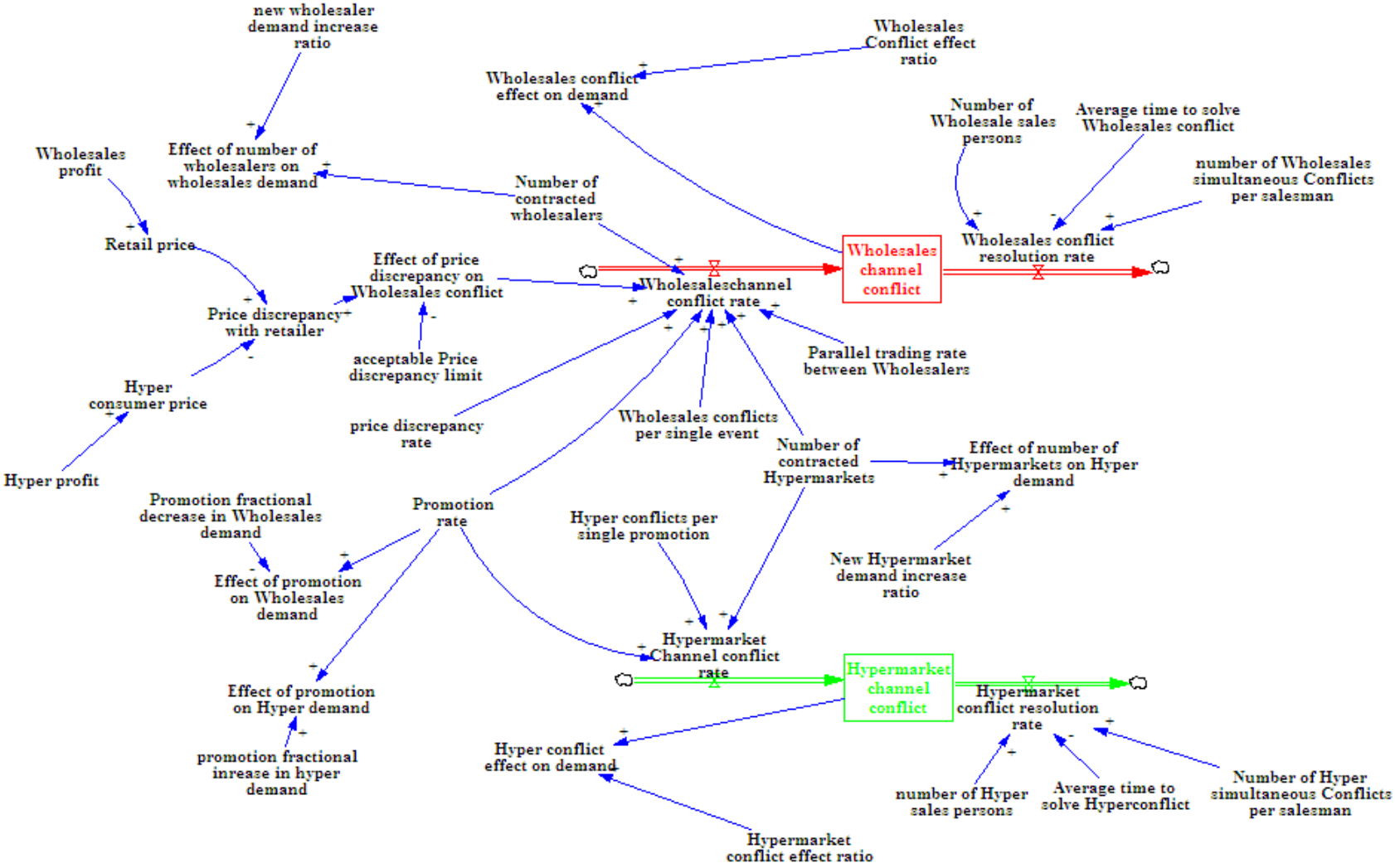

Figure 4.3: Stock and Flow Diagram –Channel conflict

4.2.3 Clarifications of all variables

Table 4.2: Stock and flow variables list

S/N	Variable name	Description	Equation	unit
1	Production capacity	Production capacity is determined by max. possible productivity by the existing resources.	Constant	Unit/month
2	Capacity utilization	The percentage of utilization of the full capacity	constant	Dimensionless
3	Production Rate	The number of units produced per month	Capacity utilization* Production capacity	Unit/month
4	Total inventory	The level of finished goods inventory in the plant.	Production Rate-(Wholesales Consumption Rate+ Hyper Consumption Rate)	Unit
5	Profitability of Wholesales operations	Total profit from selling in the Wholesaler market	(Wholesales price-Unit Costs)*Wholesales consumption rate	$/Unit
6	Hyper Inventory Coverage	Inventory coverage is given by the ratio of inventory to shipments.	Time to adjust Hyper inventory coverage*Total inventory*"% inventory to Hyper"/Hyper Consumption Rate	month
7	Wholesales Inventory Coverage	Inventory coverage is given by the ratio of inventory to shipments.	(Time to adjust wholesale inventory coverage*Total inventory*"% inventory to wholesales")/Wholesales Consumption Rate Consumption Rate	month
8	"% inventory to wholesales"	percentage of inventory allocated to wholesales	constant	1/month
9	"% inventory to Hyper"	percentage of inventory allocated to Hypermarkets	Constant	1/month
10	Wholesales	The total number of units	MIN("% inventory to	Units/month

S/N	Variable name	Description	Equation	unit
	Consumption Rate	consumed by the wholesales channel per month.	wholesales"*Total inventory, Wholesales Supplier demand)	
11	Price discrepancy with retailer	The discrepancy is the difference between retailer price and Hyper consumer price	retailer price-Hyper consumer price	$/Unit
12	Promotion rate	The number of promotions done by all Hyper per month	Constant	1/month
13	Hypermarket Channel conflict rate	The number of hypermarkets channel conflict per month	Number of contracted Hypermarkets*Promotion rate*Hyper conflicts per single promotion	conflict/month
14	Hypermarket channel conflict	The number of conflicts between supplier and hypers that are not resolved	IF THEN ELSE(Wholesaleschannel conflict rate-Wholesales conflict resolution rate>0, Wholesaleschannel conflict rate-Wholesales conflict resolution rate , 0)	conflict
15	price discrepancy rate	The number of times wholesalers experience price discrepancy with Hypermarket per month	Constant	1/month
16	Number of contracted wholesalers	The number of active wholesalers who are assigned to sell to retailers	Constant	Dimensionless
17	Wholesales channel conflict rate	The total number of channel conflicts in the wholesales channel per month	Number of contracted wholesalers*Wholesales conflicts per single event*(Number of contracted Hypermarkets*Promotion rate +Parallel trading rate between Wholesalers+Effect of	conflict/month

S/N	Variable name	Description	Equation	unit
			price discrepancy on Wholesales conflict *price discrepancy rate)	
18	Wholesales channel conflict	The number of conflicts between supplier and Wholesalers that are not resolved	IF THEN ELSE(Wholesaleschannel conflict rate-Wholesales conflict resolution rate>0, Wholesaleschannel conflict rate-Wholesales conflict resolution rate , 0)	conflict
19	Parallel trading rate between Wholesalers	number of incidents that a wholesaler sell to another wholesaler's retailers	Constant	1/month
20	Average time to solve Wholesales conflict	The Average time taken by Wholesales team to resolve the conflict	Constant	month
21	Average time to solve Hyper conflict	The Average time taken by Hypermarket team to resolve the conflict	Constant	month
22	TID (total industrial demand)	The total number of units demanded by the whole market per year	Constant	Units/month
23	"Hyper market share%"	The percentage of the Hyper market to the total market	Constant	Dimensionless
24	"Wholesaler market share %"	The percentage of the Wholesales market to the total market	Constant	Dimensionless
25	Total Wholesales demand	The total number of units demanded in the Wholesales market	TID*"Wholesaler market share %"	Unit/month
26	Supplier Wholesales market share	The Supplier market share in the Wholesales market	Constant	Dimensionless
27	Supplier hypermarket market share	The Supplier market share in the hypermarket market	Constant	Dimensionless
28	Wholesales Conflict effect ratio	The ratio by which channel conflict affect total wholesales	Constant	1/conflict

S/N	Variable name	Description	Equation	unit
		demand		
29	Wholesales conflict effect on demand	The percentage of decrease in demand due to wholesales conflict	Wholesales channel conflict*Wholesales Conflict effect ratio	Dimensionless
30	Hypermarket conflict effect ratio	The ratio by which channel conflict affect total Hypermarket demand	Constant	1/conflict
31	Hyper conflict effect on demand	The percentage of decrease in demand due to Hypermarkets conflict	Hypermarket channel conflict*Hypermarket conflict effect ratio	Dimensionless
32	Promotion fractional decrease in Wholesales demand	the fraction of decrease in Wholesales demand due to Hyper promotion	Constant	month
33	Effect of promotion on Wholesales demand	The effect of Hyper promotion on the Wholesales total demand	Promotion rate*Promotion fractional decrease in Wholesales demand	Dimensionless
34	Effect of promotion on Hyper demand	The total effect of promotion on Hypermarket total demand	promotion fractional increase in hyper demand*Promotion rate	Dimensionless
35	promotion fractional increase in hyper demand	the fraction of increase in Hypermarket demand due to Hyper promotion	Constant	month
36	Wholesales Supplier demand	The total demand from the Wholesales channel ,taking into consideration various effects	Total Wholesales demand*Supplier Wholesales market share*ABS(1+Effect of number of wholesalers on wholesales demand+Relative value of product in wholesales-Effect of promotion on Wholesales demand-Wholesales conflict effect on demand)	Units/month
37	Hyper Supplier demand	The total demand from the Hypermarket channel ,taking	Total Hypermarket demand*Supplier	Unit/month

S/N	Variable name	Description	Equation	unit
		into consideration various effects	Hypermarket market share*ABS(1+Effect of number of Hypermarkets on Hyper demand+Effect of promotion on Hyper demand +Relative value of product in Hypermarket-Hyper conflict effect on demand)	
38	Relative Hyper inventory coverage	Relative inventory coverage relative to the normal level needed to ensure desired service levels in the Hyper market.	Hyper Inventory Coverage/Hyper Reference Inventory Coverage	Dimensionless
39	Relative Wholesales inventory coverage	Relative inventory coverage relative to the normal level needed to ensure desired service levels in the Wholesales market.	Wholesales Inventory Coverage/Wholesales Reference Inventory Coverage	Dimensionless
40	Wholesales Reference Inventory Coverage	The normal inventory coverage required to ensure desired levels of service (the desired ability to fill orders).	Constant	Month
41	Hyper Reference Inventory Coverage	The normal inventory coverage required to ensure desired levels of service (the desired ability to fill orders).	Constant	Month
42	Sensitivity of Wholesales Price to Inventory Coverage	Controls the response of Wholesales price to inventory coverage. Must be negative for high inventory to lead to lower prices. Higher absolute values lead to greater price changes for any given inventory coverage level.	Constant	Dimensionless
43	Sensitivity of Hyper Price to Inventory	Controls the response of Hyper price to inventory coverage.	Constant	Dimensionless

S/N	Variable name	Description	Equation	unit
	Coverage	Must be negative for high inventory to lead to lower prices. Higher absolute values lead to greater price changes for any given inventory coverage level.		
44	Effect of Wholesale Inventory Coverage on Price	Price rises when inventory coverage is less than normal, and falls when it is greater. The Sensitivity of Price to Inventory Coverage controls the magnitude of the response.	Relative Wholesales inventory coverage^Sensitivity of Wholesales Price to Inventory Coverage	Dimensionless
45	Effect of Hyper Inventory Coverage on Price	Price rises when inventory coverage is less than normal, and falls when it is greater. The Sensitivity of Price to Inventory Coverage controls the magnitude of the response.	Relative Hyper inventory coverage^Sensitivity of Hyper Price to Inventory Coverage	Dimensionless
46	wholesales reference price	The Average price that dominate in the Wholesale market	Constant	$/Unit
47	Hyper reference price	The Average price that dominate in the Hyper market	Constant	$/Unit
48	Unit costs	The cost include fixed and variable cost	Constant	$/Unit
49	Wholesalers Sensitivity of Price to Costs	Controls the response of price to discrepancies between the expected price and the expected cost of production in Wholesales market.	Constant	Dimensionless
50	Hyper Sensitivity of Price to Costs	Controls the response of price to discrepancies between the expected price and the expected cost of production in Hypermarkets.	Constant	Dimensionless
51	Wholesales Effect of	Price responds to the gap	1+Wholesalers Sensitivity	Dimensionless

S/N	Variable name	Description	Equation	unit
	cost on price	between wholesalers' beliefs about the underlying equilibrium price and their beliefs about the costs of production. When expected costs rise above the expected price, prices tend to rise, and vice versa.	of Price to Costs*((Unit costs/wholesales reference price)-1)	
52	Hyper effect of cost on price	Price responds to the gap between Hypermarkets' beliefs about the underlying equilibrium price and their beliefs about the costs of production. When expected costs rise above the expected price, prices tend to rise, and vice versa.	1+Hyper Sensitivity of Price to Costs*((Unit costs/Hyper reference price)-1)	Dimensionless
53	Wholesaler price	Wholesalers set prices by adjusting their belief about the underlying equilibrium price in response to market pressures such as the supply/demand balance, here represented by inventory coverage relative to the normal level, and unit costs.	INTEG(change in WS price-"-change in ws price")	$/Unit
54	Hypers price	Hypermarkets set prices by adjusting their belief about the underlying equilibrium price in response to market pressures such as the supply/demand balance, here represented by inventory coverage relative to the normal level, and unit costs.	INTEG(change in H price-"- change in H price")	$/Unit
55	Wholesales Price of Substitutes	The Average price of competing product in wholesales market	Constant	$/Unit
56	Hypermarket Price of	The Average price of competing	Constant	$/Unit

S/N	Variable name	Description	Equation	unit
	Substitutes	product in Hyper market		
57	Relative value of product in wholesales	The value of supplier product compared to the competitor products in Wholesales market	Wholesales Price of Substitutes/Wholesales price	Dimensionless
58	Relative value of product in Hypermarket	The value of supplier product compared to the competitor products in the end consumer eyes, in the Hyper market	Hypermarket Price of Substitutes/Hyper price	Dimensionless
59	Retail price	The unit price with which wholesaler sell to retailer	Wholesales price*(1+Wholesales profit)	$/Unit
60	Hyper consumer price	The unit price with which Hypermarket sell to end consumer	Hyper price*(1+Hyper profit)	$/Unit
61	Wholesales profit	The wholesaler profit per unit	Constant	Dimensionless
62	Hyper profit	The Hypermarket profit per unit	Constant	Dimensionless
63	Number of Wholesale sales persons	The number of Sales team of the Wholesales sector	Constant	person
64	number of Hyper sales persons	The number of the sales team in the Hypermarket sector	Constant	person
65	Average time to solve Hyper conflict	The Average time taken by Hyper team to resolve the conflict	Constant	month
66	Average time to solve Wholesales conflict	The Average time taken by Wholesales team to resolve the conflict	Constant	month
67	number of Wholesales simultaneous Conflicts per salesman	The number of conflicts that can be handled by a sales person at the same time in the wholesales sector	Constant	conflict/person
68	Number of Hyper simultaneous Conflicts per salesman	The number of conflicts that can be handled by a sales person simultaneously in the hyper sector	Constant	conflict/person
69	change in WS price	The rate with which wholesales	Wholesaler price*Effect of	$/Unit/month

S/N	Variable name	Description	Equation	unit
		price increases	Wholesale Inventory Coverage on Price*Wholesales Effect of cost on price/time to adjust W price	
70	change in H price	The rate with which Hypermarket price increases	Hypers price*Effect of Hyper Inventory Coverage on Price*Hyper effect of cost on price/time to adjst H price	$/Unit/month
71	"-change in ws price"	The rate with which wholesales price decreases	Wholesaler price*Effect of Wholesale Inventory Coverage on Price*Wholesales Effect of cost on price/time to adjust out	$/Unit/month
72	"- change in H price"	The rate with which Hypermarket price increases	Hypers price*Effect of Hyper Inventory Coverage on Price*Hyper effect of cost on price/time to adj out	$/Unit/month
73	Effect of number of wholesalers on wholesales demand	The total effect of adding a new reseller on demand	Number of contracted wholesalers*(1+new wholesaler demand increase ratio)	Dimensionless
74	Effect of number of Hypermarkets on Hyper demand	The total effect of adding a new Hypermarket on Hypermarket total demand	Number of contracted Hypermarkets*(1+New Hypermarket demand increase ratio)	Dimensionless
75	Wholesales Consumption Rate	The total number of units consumed by the wholesales channel per month	MIN("% inventory to wholesales"*Total inventory, Wholesales Supplier demand)	Unit/month
76	Number of contracted Hypermarkets	The number of active contracted Hypermarkets	constant	Dimensionless
77	new wholesaler demand	The Ratio with which the	constant	Dimensionless

S/N	Variable name	Description	Equation	unit
	increase ratio	Supplier Wholesales demand will increase by adding a new wholesaler		
78	New Hypermarket demand increase ratio	The Ratio with which the Supplier Hypermarket demand will increase by adding a new Hypermarket	constant	Dimensionless
79	Wholesales conflict resolution rate	The rate with which the Supplier solve Wholesales conflict	Number of Wholesale sales persons*number of Wholesales simultaneous Conflicts per salesman/Average time to solve Wholesales conflict	conflict/month
80	Wholesales conflicts per single event	The number of conflicts generated per single event that is upnormal (hyper promotion, parallel trading ,price discrepancy)	Constant	conflict
81	time to adjust W price	Time to adjust wholesales increase in price	constant	month
82	time to adjust H price	Time to adjust hypermarket increase in price	constant	month
83	time to adjust W out	Time to adjust wholesales decrease in price	constant	month
84	time to adj. H out	Time to adjust Hypermarket decrease in price	constant	month
85	Time to adjust Hyper inventory coverage	The time that is needed to realize inventory coverage	constant	month
86	profitability of hypermarkets operations	total profit from selling to Hypermarkets per month	(Hypers price-Unit costs)*Hyper Consumption Rate	$/month
87	Hypermarket conflict resolution rate	The rate with which the Supplier solve Hyper markets conflict	number of Hyper sales persons*Number of Hyper simultaneous Conflicts per salesman/Average time to solve Hyperconflict	conflict/month

S/N	Variable name	Description	Equation	unit
88	Hypermarket conflict effect ratio	The ratio by which channel conflict affect total Hypermarket demand	Constant	1/conflict

The wholesales price and the Hyper price were changed to socks and not auxiliary variables because when running a model which includes a closed loop with all of its variables set to be auxiliary variables, this causes the model not to run and gives a simultaneous equation error, this is normal as the variables in the loop will depend on one another, so any variable depend on its previous variable thus the system needs an initial value for one of the loop variables to start calculating from. That variable is the price and the initial value is the wholesales reference price, and the hyper reference price.

4.3 SIMULATION MODEL VALIDATION

4.3.1 Model validation and initial run:

Data are validated using three initial runs with extreme initial run values for "production capacity ", "TID", and "promotion rate" ,and in order to ensure model behavior over time when those variables are varied over a reasonable range, the output verifies the model validity and analysis different policies to answer research questions.

The Real life condition (Reference mode): TID 120,000 unit/month , production capacity 30,000 unit per month.

The following tests were performed:

Production capacity set to min at 10,000 and to max. at 120,000

1. Effect of varying "Production Capacity" on "Wholesales price".
2. Effect of varying " Production Capacity " on "Hypermarket price".
3. Effect of varying " Production Capacity " on "Relative value of product in wholesales".
4. Effect of varying "Production Capacity" on "Relative value of product in Hypermarkets ".
5. Effect of varying "Production Capacity " on "Wholesales supplier demand".
6. Effect of varying " Production Capacity " Hyper supplier demand"

The following tests were performed at production capacity =30,000 unit/month and TID varies from 10,000 to 250,000 unit /month

7. Effect of varying " TID " on "Wholesales price".
8. Effect of varying "TID" on "Hypermarket price".
9. Effect of varying "TID" on "Relative value of product in wholesales".
10. Effect of varying "TID" on "Relative value of product in Hypermarkets ".
11. Effect of varying "Promotion rate" on the "Whole sales channel conflict ".
12. Effect of varying "Promotion rate" on the "Hyper market channel conflict ".
13. Effect of varying "Promotion rate" on the "Whole sales Demand ".
14. Effect of varying "Promotion rate" on the "Hypermarket demand ".

Figure 4.4: The effect of maximum and minimum production capacity on Wholesales price

As shown in figure 4.4 the model was tested and its equations responded with reliable outputs that agree with the rational by increasing the production from a minimum of 10,000 unit/month to a maximum of 120,000 unit/month the whole sales price will decrease. The price will hits a very high level of 752 $/unit if the production capacity is left at that low level at the end of the third year, the price will stabilize at a level of 120 $/unit if the production capacity reaches the level of 120,000 unit/month. The price is in between the two extremes when producing at a level of 30,000. This is matching with the Adam Smith rational, and the causal loop diagrams discussed in chapter 3, that by increasing production the quantity supplied increase and so the price decrease.

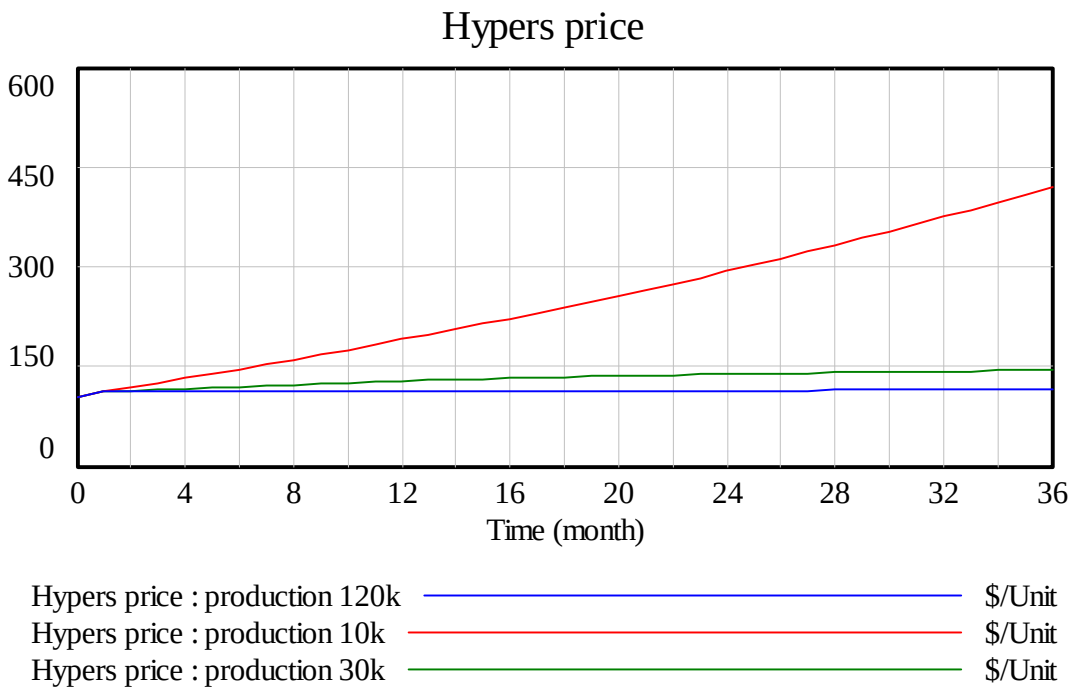

Figure 4.5: The effect of maximum and minimum production capacity on Hypermarket price

As shown in figure 4.5 the model was tested and its equations responded with reliable outputs, that agrees with the rational that was claimed before in the stock and flow, which is based on the Adam Smith invisible hand is validated, as the production increase and jumps from 10,000 unit/month to 120,000 unit/month the price of Hypermarket goes down from a maximum of 420 $/unit at the end of the third year the level of 144 $/unit if producing at a rate of 30,000 unit/month, to the low price of 114 $/month if producing at 120,000 $/month, this is realistic, as we increase the production, the supplied quantity increase and so the price goes down.

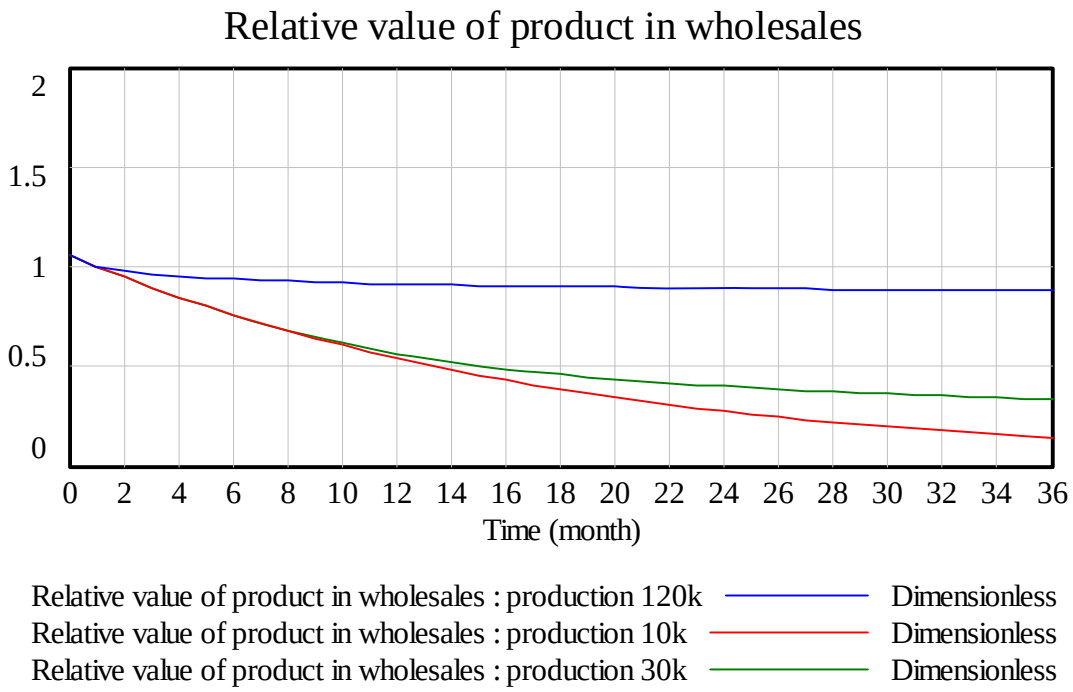

Figure 4.6: The effect of maximum and minimum production capacity on relative value of product in wholesales market

Figure 4.6 complies with the rational mentioned in the causal loop diagram discussed in chapter 3, as the production increases (from 10,000 unit/month to 120,000 unit /month) the quantity supplied in the wholesales market increases, so the price will decrease as shown in the previous figures, and this will lead to the increase in the relative value of the supplier product in the eyes of the consumer compared to the value of the substitutes. The rational is that as the price decrease the relative value of the product increase. The relative value of the product started with a value of 1.06 at the three production levels it reaches 0.87 at the 120,000 unit/month scenario, it reaches a level of 0.33 at the 30.000 unit/month scenario, while it reaches the level of 0.14 in the 10,000 unit/month scenario.

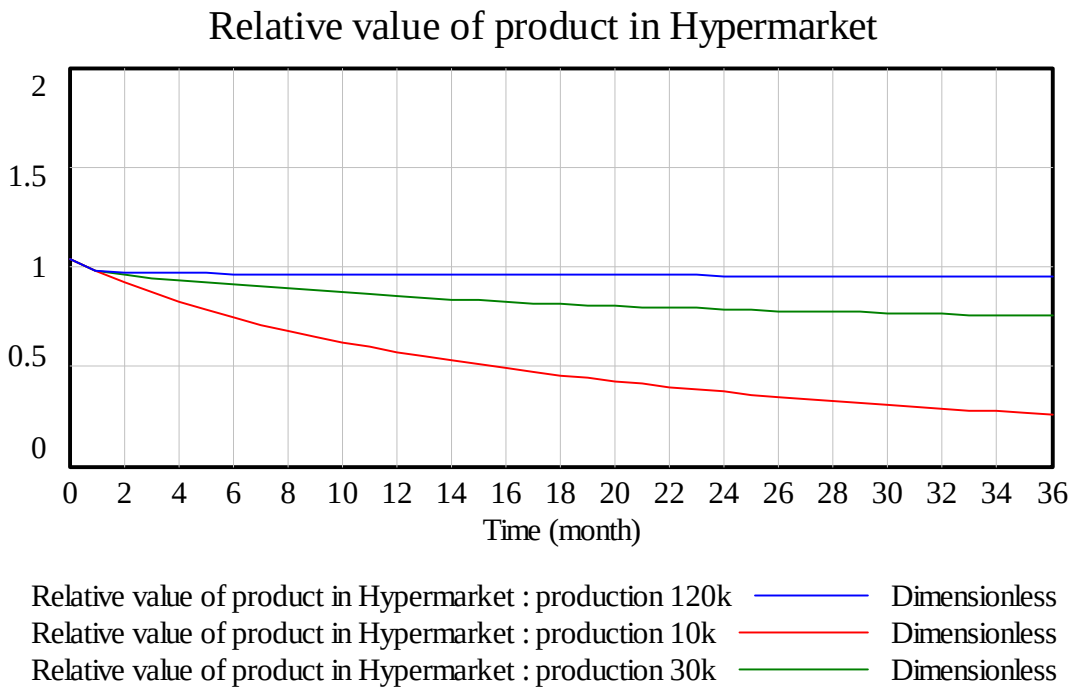

Figure 4.7: The effect of maximum and minimum production capacity on relative value of product in Hypermarket

A similar case takes place in the hypermarket, as shown in figure 4.7,the model out put is realistic, like the case in the wholesaler market, as the production increased from 10,000 unit/month to 120,000 unit/month, the relative value of the product (in the eyes of the end consumer) increased, this is due to the fact that the increasing the production increased the supply which lowered the price and so increased the relative value compared to the substitutes products. The value started at a level of 1.03 for the three production levels, and ended at a the values of 0.95, 0.75, and 0.25 for the production capacities of 120,000, 30,000, and 10,000 respectively. This output is complying with the Adam Smith supply and demand rational that increasing the production, will increase the supply, decreasing the price, and so increase the relative value of the product in the eyes of the consumers.

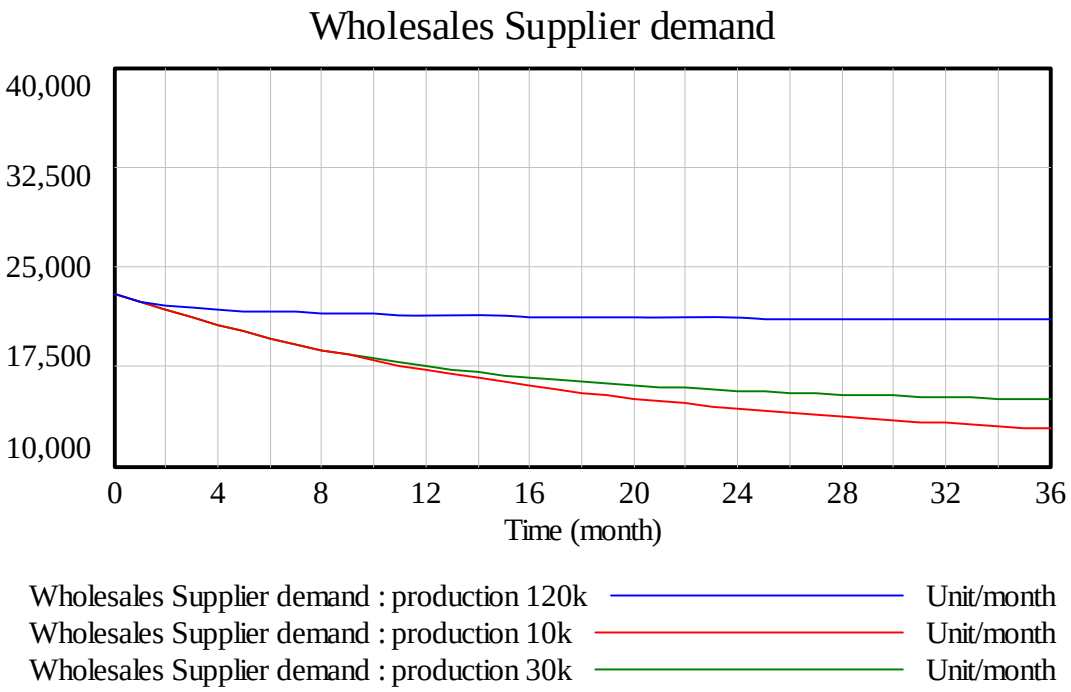

Figure 4.8: The effect of maximum and minimum production capacity on Wholesales Supplier demand

In figure 4.8 the model proves it passes the test once again ,and proves it is valid, as the production increased from 10,000 unit/month to 120,000 unit/month the price will decrease as it was shown in the causal loop diagram of the Adam Smith invisible hand, so the wholesales demand will be increased from the levels of twelve thousand at production capacity of 10,000 unit/month, till it reach the level of 21,000 unit/month at the end of the 36 month in the 120,000 unit/month case. And this is the expected behavior validating the model, and proving that increasing production and supply will end up in decreasing price, and so increasing demand.

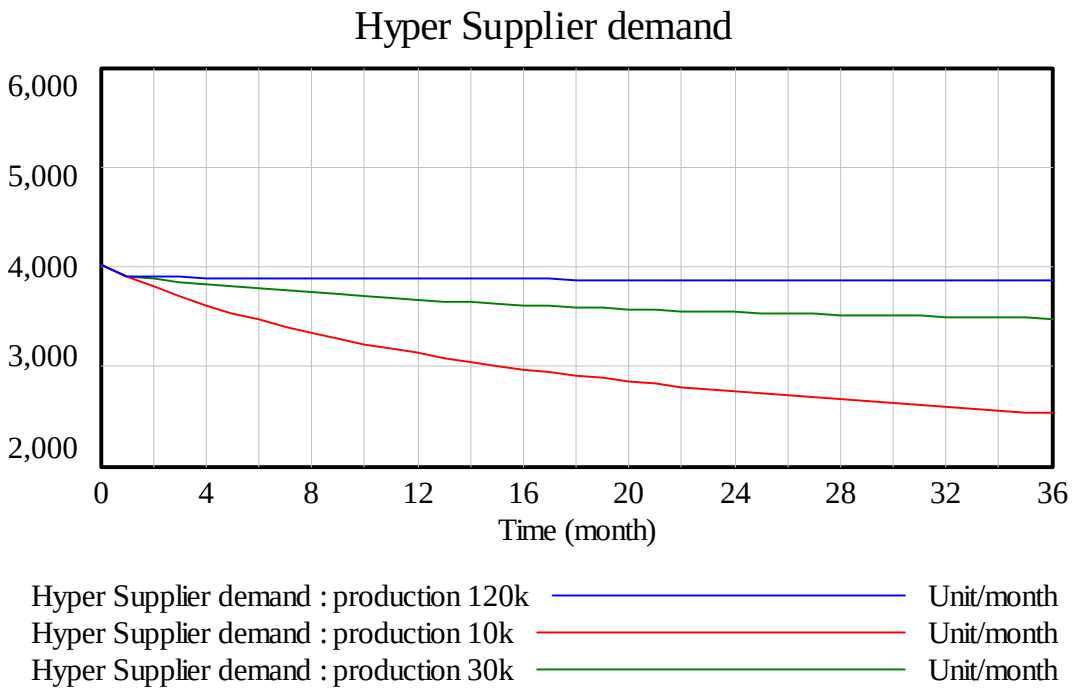

Figure 4.9: The effect of maximum and minimum production capacity on Hypermarket Supplier demand

As shown if figure 4.9 the model was tested and its equations responded with reliable outputs. As the causal loop diagram discussed above indicated, the increase in the production, increase the supply which in turn causes the price of the product to goes down, leading to the increase in the demand in the hypermarkets market as it was the case in the wholesales market. The demand at the production capacity of 120,000 unit/month is at the level of 3,900 units /month while at the production capacity of 30,000 it drops to 3,400 unit/month and reaches a minimum of 2,500 unit/month for the production capacity of 10,000 unit/month. Thus the model was tested and its equations responded with reliable outputs that agrees with the mentioned rational.

Figure 4.10: The effect of maximum and minimum TID on Wholesales price

The model output of Figure 4.10 shows the effect of pushing the Total industry demand TID to a minimum level of 10,000 unit/month and to a maximum level of 250,000 unit/month, and the effect that the change in demand has on the product price in the wholesales market, as it was indicated before in the causal loop diagram, the model responded with a realistic output that agree with the rational of the Adam Smith invisible hand, as the total demand was increased, the demand on the supplier product was increased, this led to an increase in the price that jumped from the 109 4/unit level to the unrealistic figure of 752 $ /unit at the end of the third year, if all the other variables kept un changed during that period.

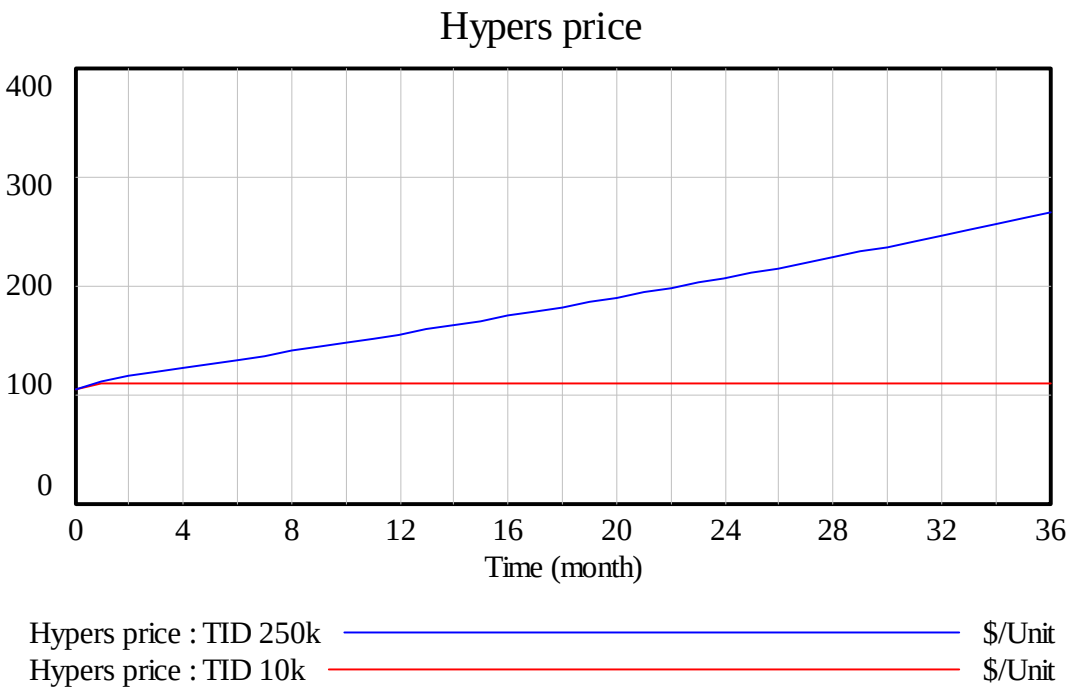

Figure 4.11: The effect of maximum and minimum TID on Hypermarket price

As shown in figure 4.11 the model was tested and its equations responded with reliable outputs, the figure is showing that the hypermarket price increased due to the increase in the total industrial demand, as the total industrial demand increased from 10,000 unit/month to an extreme of 250,000 unit/month, the price jumps up as shown in figure. From a level of 110$/unit to an extreme of 266 $/unit at the end of the third year, if all other variables kept unchanged. This once more proves that the validity of the model and that it is responding to the change in demand, as the causal loop diagram discussed in chapter 3 predicted.

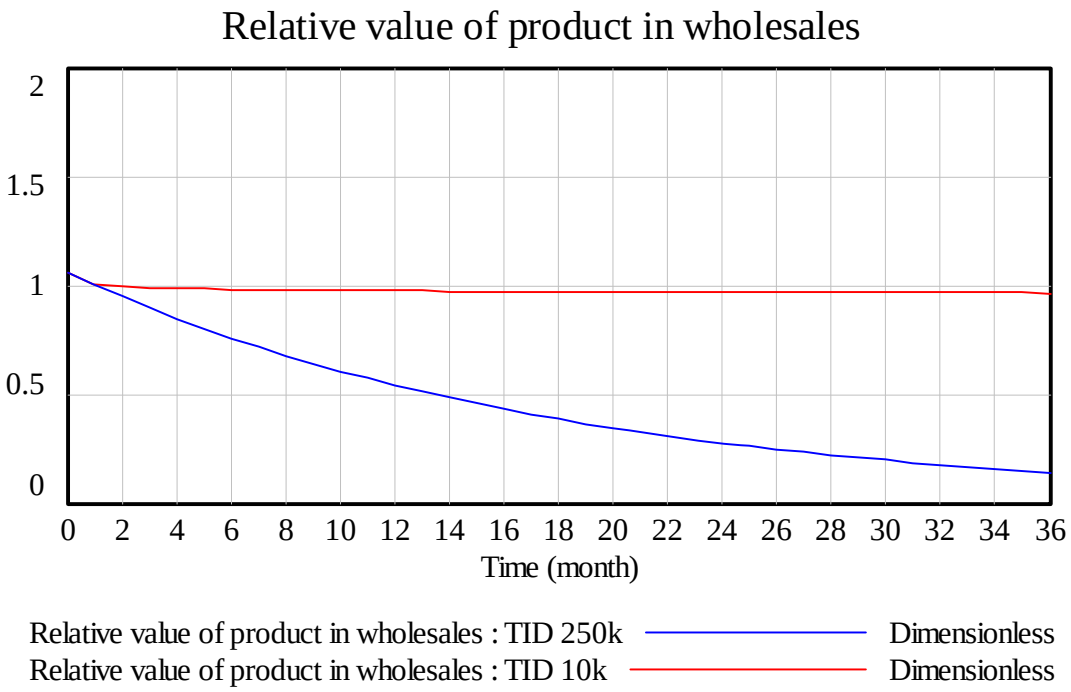

Figure 4.12: The effect of maximum and minimum TID on relative value of product in wholesales market

The output of the model shown in figure 4.12 complies with the Adam Smith rational shown in the causal loop diagram in chapter3, as the demand increases the price goes up and so the relative value of the product goes down, the relative value is stable starting at a value of 1.06 and end at a value of 0.96 at the end of the third year when the demand was 10,000 unit/month, but when the demand was increased to 250,000 unit/month, the price of the product according to the rational rises, leading to lowering the product relative value in the eyes of consumer compared to its substitutes, Thus at 250,000 unit/month demand the relative value drops from t a value of 1.06, to ends at a value of 0.14 at the end of the third year.

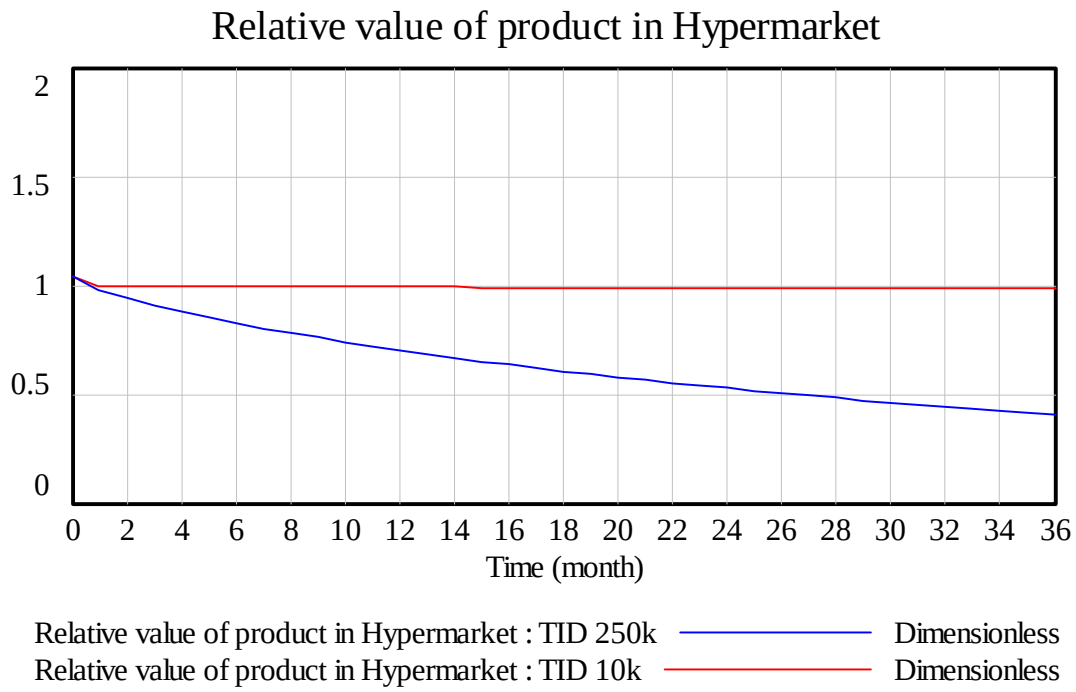

Figure 4.13: The effect of maximum and minimum TID on relative value of product in Hypermarket market

As shown in figure 4.13 the model was tested and its equations responded with reliable outputs, that agrees with the rational that if the total industry demand increases the price of the product will increase, thus the relative value of the product in the eyes of the consumer will decrease compared to the substitutes. The model shows a realistic figure of the relative value of the product in the hypermarkets , in the two extreme industry demand causes (10,000 unit/month, and 250,000 unit /month), the model comply with the supply and demand rational of Adam Smith causal loop diagram shown in chapter 3. The relative value is at 1 in the 10,000 unit/month scenario, while it drops dramatically to a value of 0.4 at the end of the third year in the 250,000 unit /month scenario.

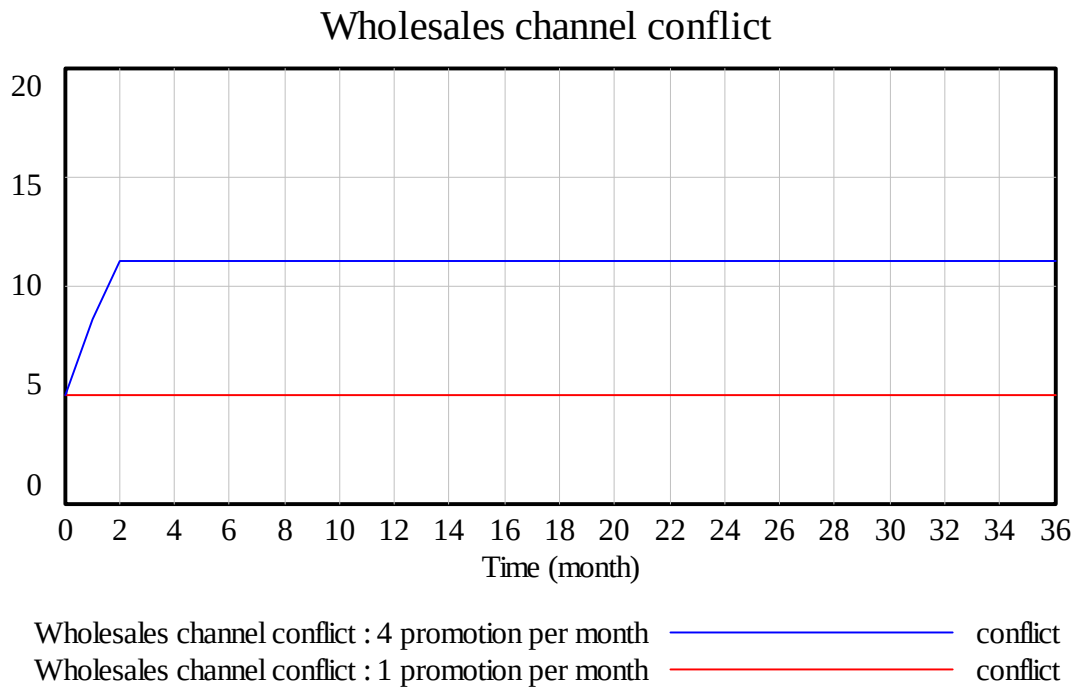

Figure 4.14: The effect of maximum and minimum promotion rate on Wholesales channel conflict

As shown in figure 4.14 the model was tested and its equations responded with reliable outputs, that agrees with the rational that the wholesales channel conflict increases when the promotion rate increases, so when the promotion rate is four promotions per month the conflict reaches 11 simultaneous conflicts, compared to a lower figure of five in the case of a single promotion per month, the model proves the rational that as the promotion rate increase, the conflict in the wholesales channel increases, the number of conflicts is affected by the number of sales persons and the number of simultaneous conflicts that can be handled by a single sales man, and the average time to solve a conflict within the supplier organization, which depend on the top management.

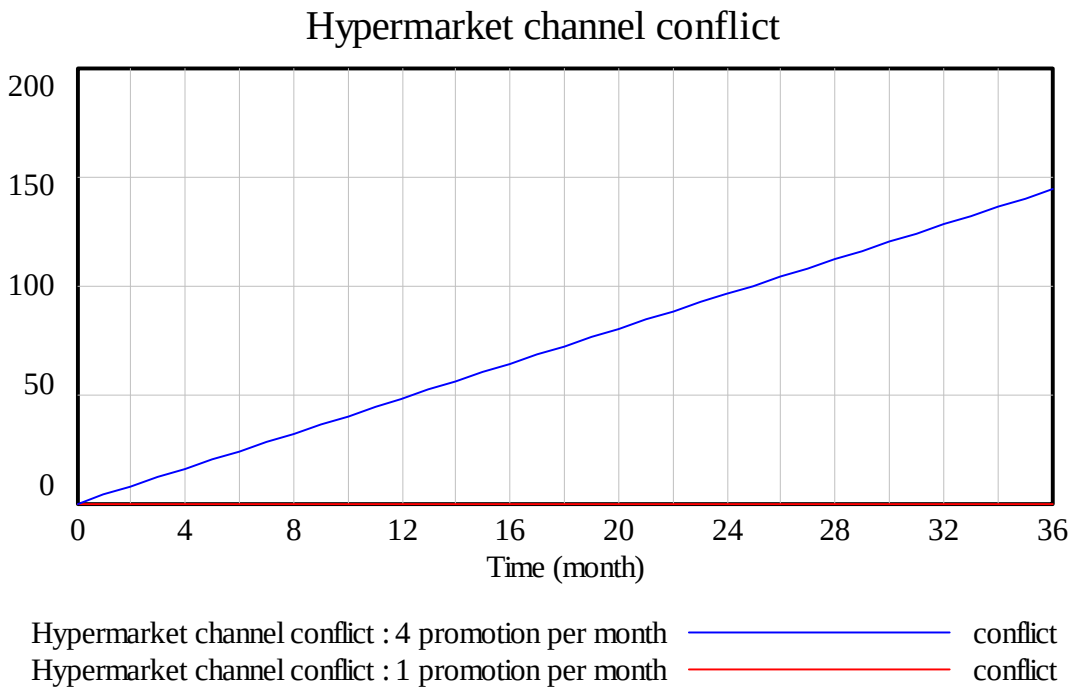

Figure 4.15: The effect of maximum and minimum promotion rate on Hypermarket channel conflict

As shown in figure 4.15 the model was tested and its equations responded with reliable outputs, that agrees with the rational, when the promotion rate done by the hypermarkets was low, the conflicts we minimum, but when the promotion rate increased the conflict increased reaching about 140 conflict when the promotion rate was four promotions per month at the end of the third year, compared to zero conflict when we have a single promotion per month. This complies with the rational that as the promotion rate increases conflict in the hypermarket increases. It is important to know that the number of conflicts can be lowered by increasing the sales persons dedicated to the hypermarkets, lowering the time taken by the supplier to resolve the conflict, or increasing the ability of each sales man to handle more than one conflict simultaneously, by giving them more specialized sales and time management trainings.

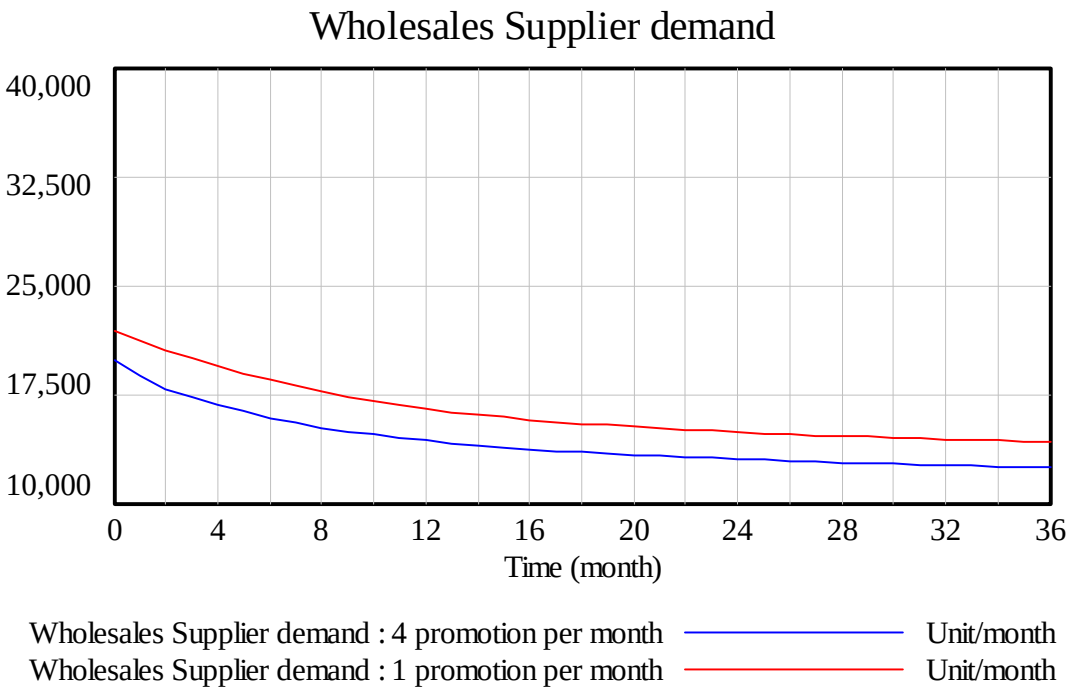

Figure 4.16: The effect of maximum and minimum promotion rate on Wholesales supplier demand

As shown in figure 4.16, the model was tested and its equations responded with reliable output, the figure was realistic, by increasing the promotion rate in the hypermarkets, the wholesales market suffer from these promotions, and the price discrepancy that may be associated, this lead to a decrease in the wholesales supplier demand, as shown in figure, when the rate of promotion was low (once per month), the demand Curve is always higher than when increasing the promotion rate to four promotions per month. When applying one promotion the wholesales demand starts at a value of 21,793 unit/month and ends at a value of 14,230 unit/month at the end of the third year. But when applying an aggressive four promotions per month the demand starts at a value of 19,805 unit/month and end at a value of 12,459 unit/month. The output of the model comply with the rational that the increase in the promotion rate in the hypermarkets leads to the decrease in the demand of the wholesales market.

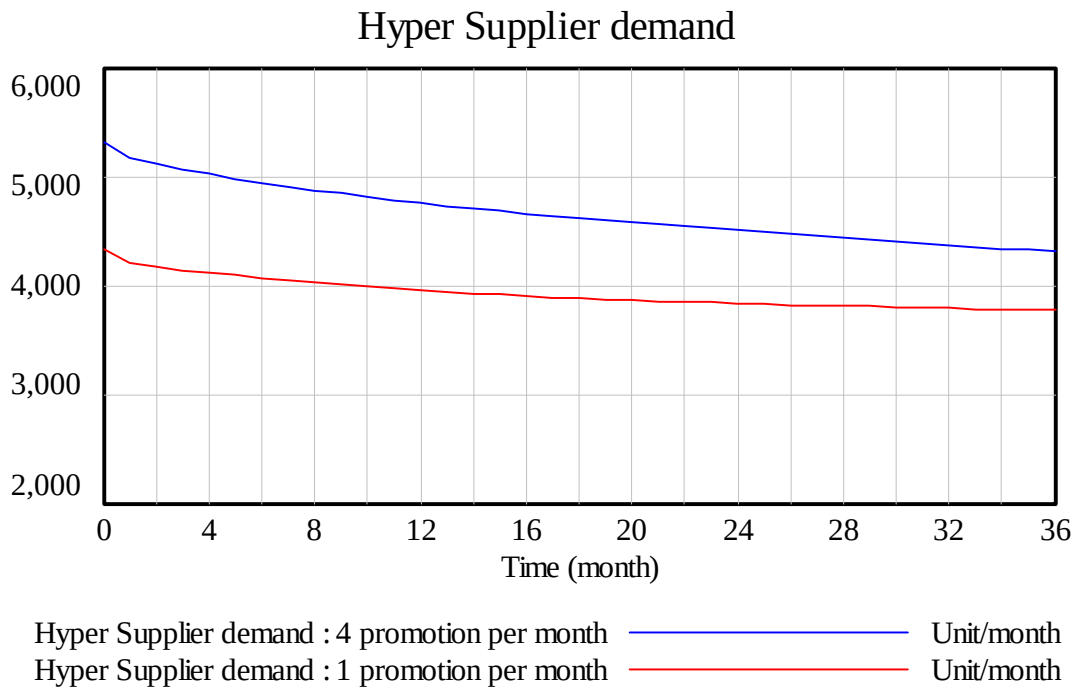

Figure 4.17: The effect of maximum and minimum promotion rate on Hypermarkets supplier demand

As shown in figure 4.17, the model responded with reliable output to the effect of hypermarkets promotions on the hypermarket demand, as the rational implies, the increase in promotions done by the hypermarkets will attract the consumers, and so will increase the hypermarket demand, the demand starts at a value of 5,303 unit/month and ends the third year at a value of 4,306 unit/month in the case of four promotions per month, while starts at a level of 4,324 unit /month, then decrease to reach 3,772 unit/month in the case of one promotion per quarter.

Important issues to note that, as shown in figure the demand in both scenarios decrease with time; this is because of the effect of channel conflict, and price discrepancy that increases especially in the four promotion scenario.

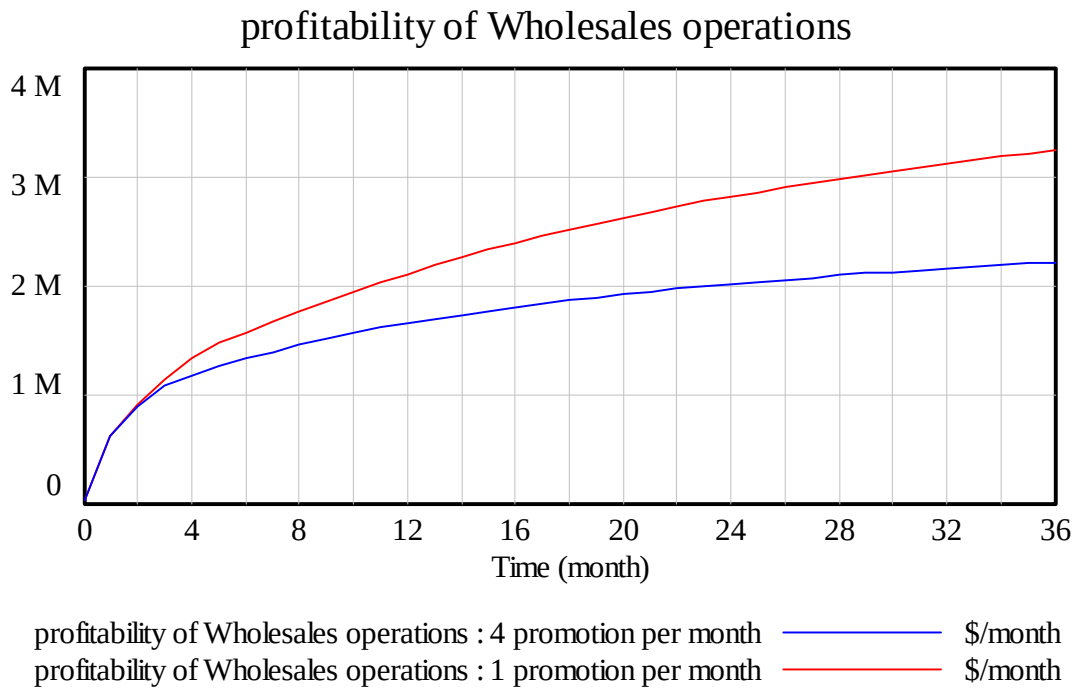

Figure 4.18: The effect of maximum and minimum promotion rate on profitability of wholesales operation

As shown in Figure 4.18, the model was tested and its equations responded with reliable outputs, the figure was realistic by increasing the promotion rate of the hypermarkets, the profitability in the wholesales drops dramatically from levels of 3.2 million $/month at a promotion rate of one promotion per month to a value of 2.2 million $/month at the rate of four promotions per month, at the end of the third year. The model output agrees with the rational that as the hypermarket promotion rate increases the total profitability of wholesales operations decreases, as these promotions decreases the wholesales demand.

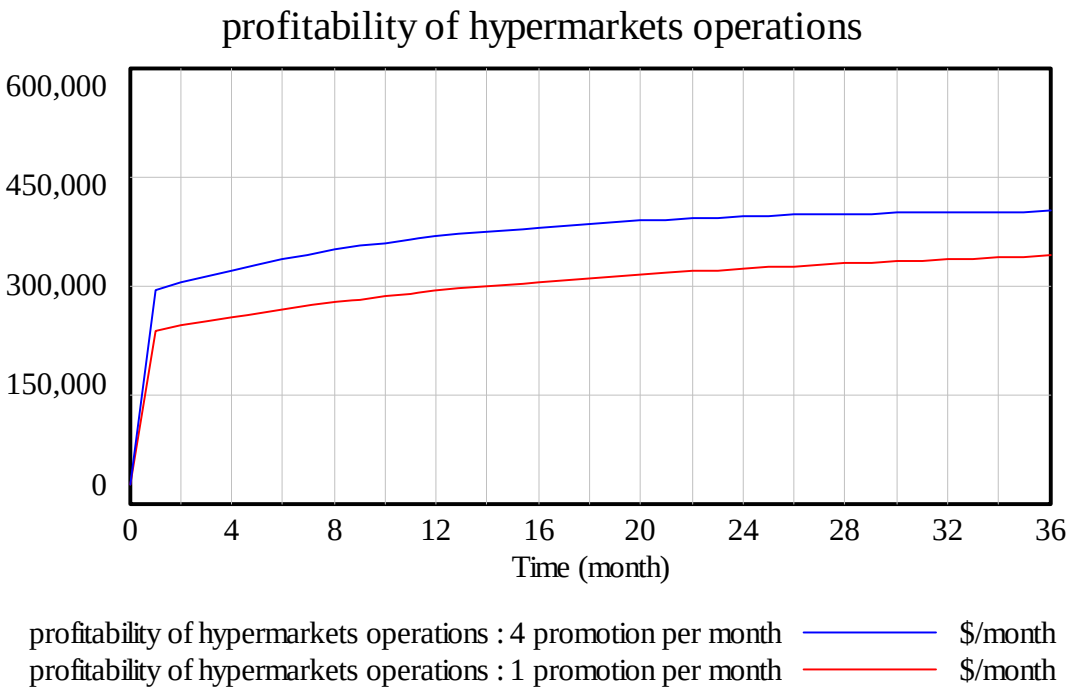

Figure 4.19: The effect of maximum and minimum promotion rate on profitability of Hypermarkets operation

As shown in figure 4.19 the model responded with reliable output, the figures were realistic, by increasing the promotion rate (from one promotion per quarter to four promotions per month)the total profitability per month in the hypermarket increases from a level of 340,000 $/month to a level of 401,000 $/month at the end of the third year. The model agrees with the rational that increasing the promotion rate in the hypermarket will increase the profits from hyper markets operations.

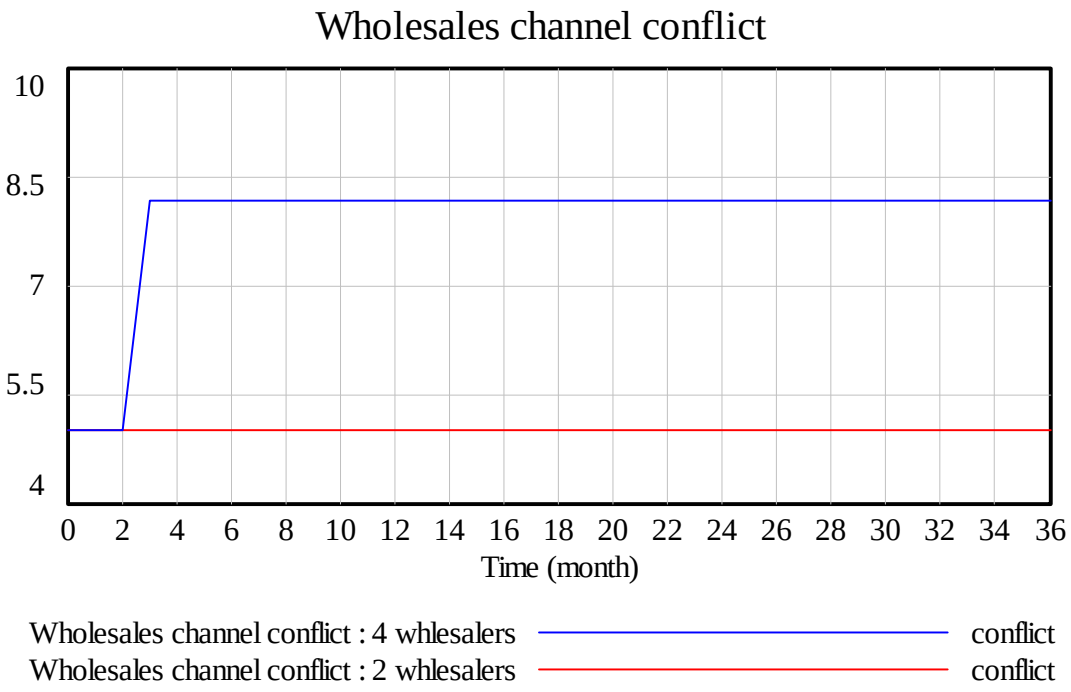

Figure 4.20: The effect of increasing the number of wholesalers on wholesalers channel conflict

As shown in figure 4.20 when increasing the number of contracted wholesalers the channel conflict will increase from a level of 5 simultaneous channel conflicts, to the level of 8 simultaneous channel conflicts. It should be mentioned that the demand and profits is very slightly changed as the conflict generated removed any increase in demand.

4.4 POLICY ANALYSIS **AND SCENARIOS**

4.2.1 Scenario Planning

In order to analyze the effect of changing some variables on the behavior of the system; and in order to answer the optimization questions of maximizing profit, we will make some scenarios with different values of "% allocated to wholesales", "% allocated to Hypermarket" and "promotion rate" and assess the total profit and the conflict associated in each case.

When the simulation runs. All the model parameters are left constant except the ones that are mentioned. So in the coming Scenarios the values of the TID and production capacity are kept constant at (TID=120,000 unit/month, Capacity 30,000 unit/month)

The Scenarios are summarized in the following table:

Table 4.3: Scenarios summery list

Run	% Inventory to wholesales	% Inventory to Hypermarkets	Promotion rate
1	25	75	1 per month
2	50	50	1 per month
3	75	25	1 per month
4	25	75	4 per month
5	50	50	4 per month
6	75	25	4 per month

The model gives the supplier the choice to allocate the inventory between the two channels, and apply the hypermarket promotion rate with all possibilities, and it will give data that facilitate to the decision maker how to allocate the inventory in the real life to achieve the goal of maximum profit, and low level conflict.

We will start by applying a one promotion per month as a promotion rate and test it with different inventory allocations, then apply a high promotion rate and test it also with different inventory allocations.

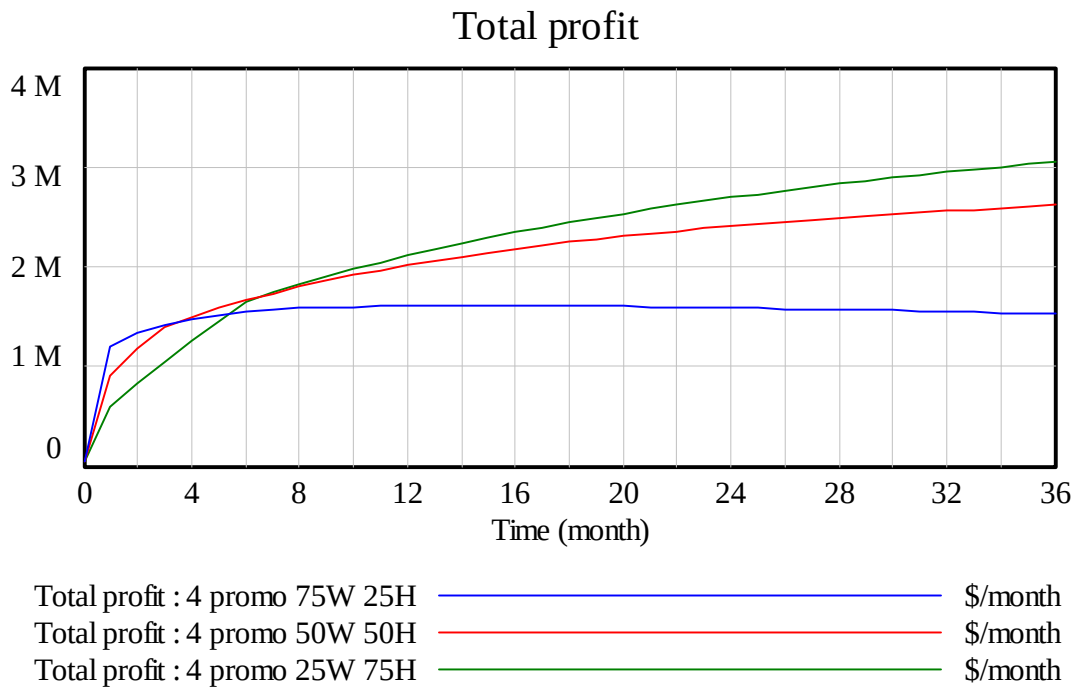

Figure 4.21: Total profits in Scenario of 4 promotions per month with various inventory allocations

As shown in Figure 4.21, when applying a high rate of promotion (four per month), this will lead to increase in demand in the hypermarket, and so the best scenario then is allocating high level of inventory to the hypermarket, this is shown in the figure, the total profits generated from the 75% hyper inventory is the maximum compared to the profit generated from other inventory allocation ratios.

So in conclusion, if the hypermarket promotion rate is high, so the optimum allocation is to allocate more inventory in the hyper channel than that to the wholesales channel. The 75% hyper inventory allocation has a total profit of over 2 million $/month starting the tenth month ,and reaches the value of 3.05 million $/month at the end of the third year. This compared to an average of 1.6 million in the scenario of 25% inventory to the hypermarket. And a total profit that ranges from 1 million to 2.6 million in the 50% wholesales 50% hypermarket inventory allocation.

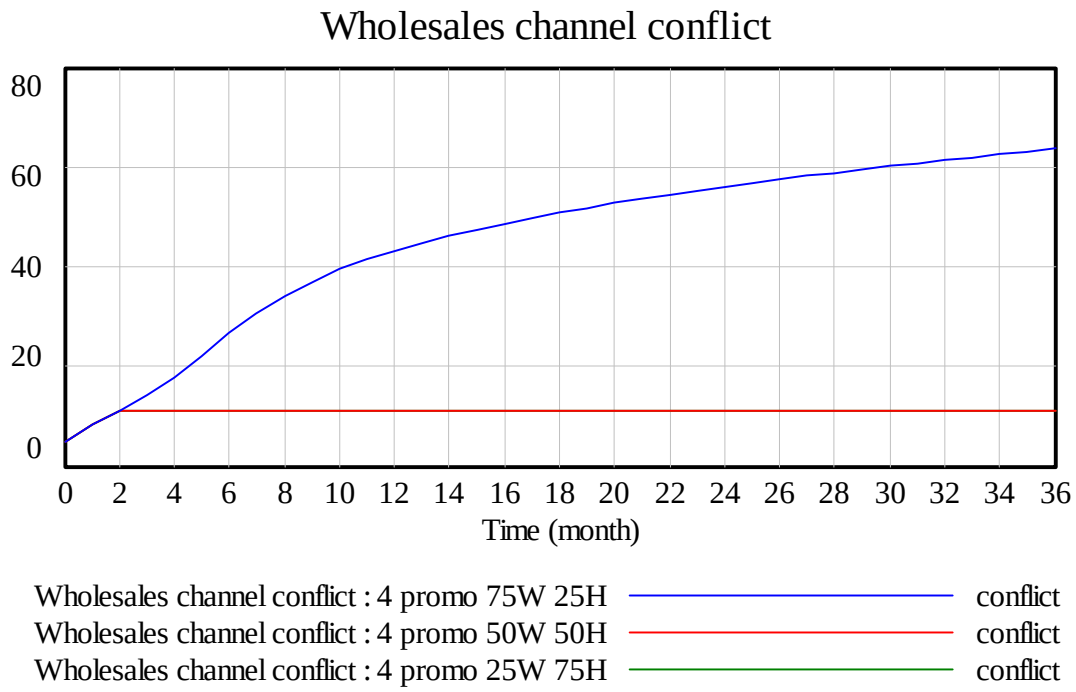

Figure 4.22: Wholesales conflict in Scenario of 4 promotions per month with various inventory allocations

Figure 4.22 shows the wholesales conflict rate in case of applying four hyper promotions per month, the model responded with realistic output, as the wholesales inventory allocation is low 25%, 50% the conflict is low with a level of 11 simultaneous conflicts, but as the inventory allocated to the wholesales increases to the level of 75% with this high promotion rate in the hypermarkets, conflicts will normally increases, as selling the increased inventory becomes more difficult in the wholesales market, the conflict reaches a level of 63 simultaneous conflicts in the case of a 75% inventory allocation to the wholesales at the end of the third year.

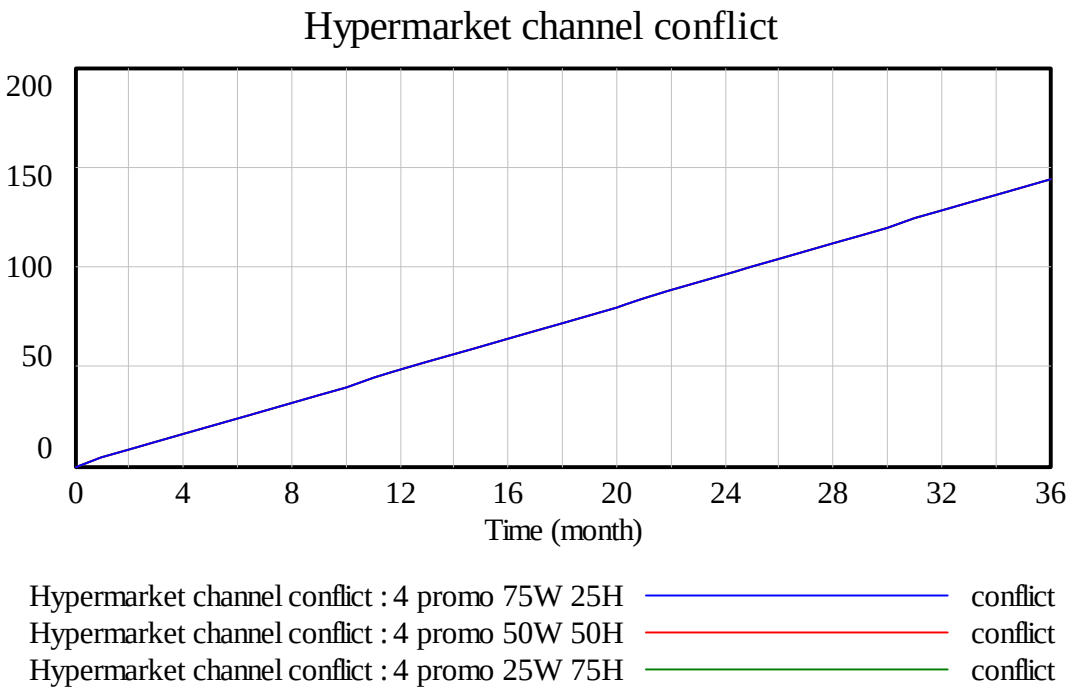

Figure 4.23: Hypermarket conflict in Scenario of 4 promotions per month with various inventory allocations

As shown in figure 4.23, the model shows that when we applied a massive promotion of four promotions per month, the hyper market conflict will be of equal magnitude regardless the inventory allocation, because the effect of high promotion rate will dominate the effect of the inventory allocation. The number of conflicts starts from zero and increases till it reach a maximum of 144 conflicts at the end of the third year. This can be reduced by the supplier increase of sales persons, or decreasing the time to resolve a conflict or increase the sales people efficiency.

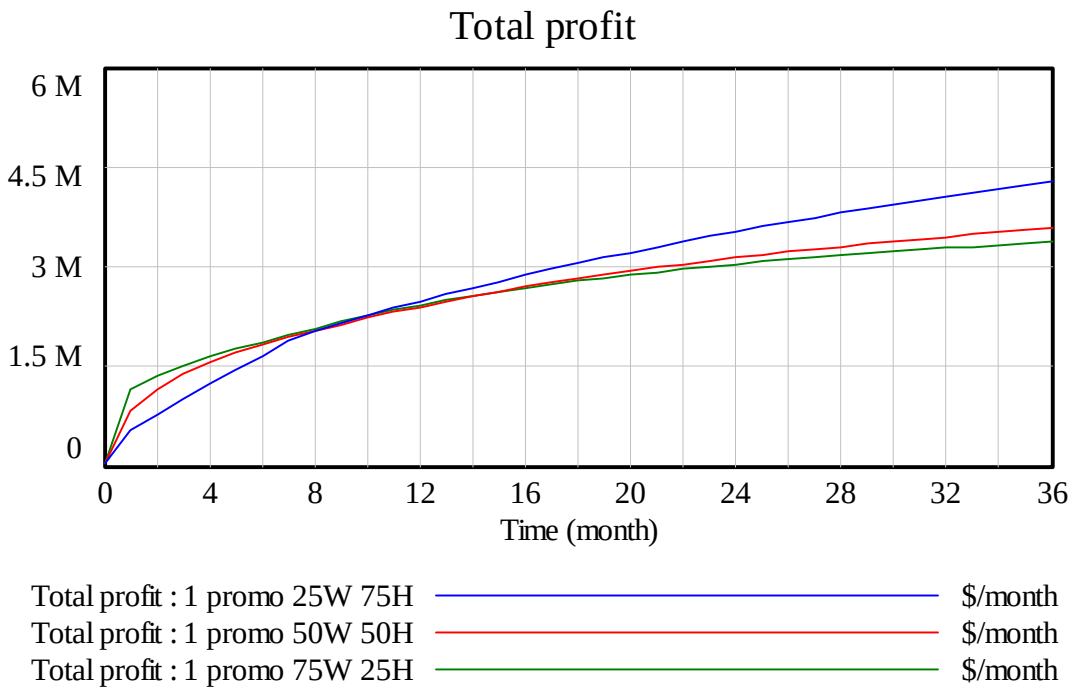

Figure 4.24: Total profits in Scenario of 1 promotion per month with various inventory allocations

As shown in figure 4.24 when applying a single promotion per month in the hypermarkets the profits rises in all inventory allocations, but as it is shown the profits is the highest when applying an inventory allocation of 75% to Hypermarket and 25% to the wholesales, in spite that 75% of the inventory was allocated in the hypermarket, most profits come from wholesales as the price there rises so high to reach a value of 353 $/unit because of the huge demand and low supply in that scenario, this scenario (25% for wholesales) is not so realistic, as the price can not rise so high in the wholesales, as parallel trading will take place, also there is a huge demand in the wholesales that make it not realistic for the hyper market to take 75% of inventory with only one promotion per month. So the 50% allocation to each channel is the second best choice as it gives better profits than the 75% allocation for the wholesales.

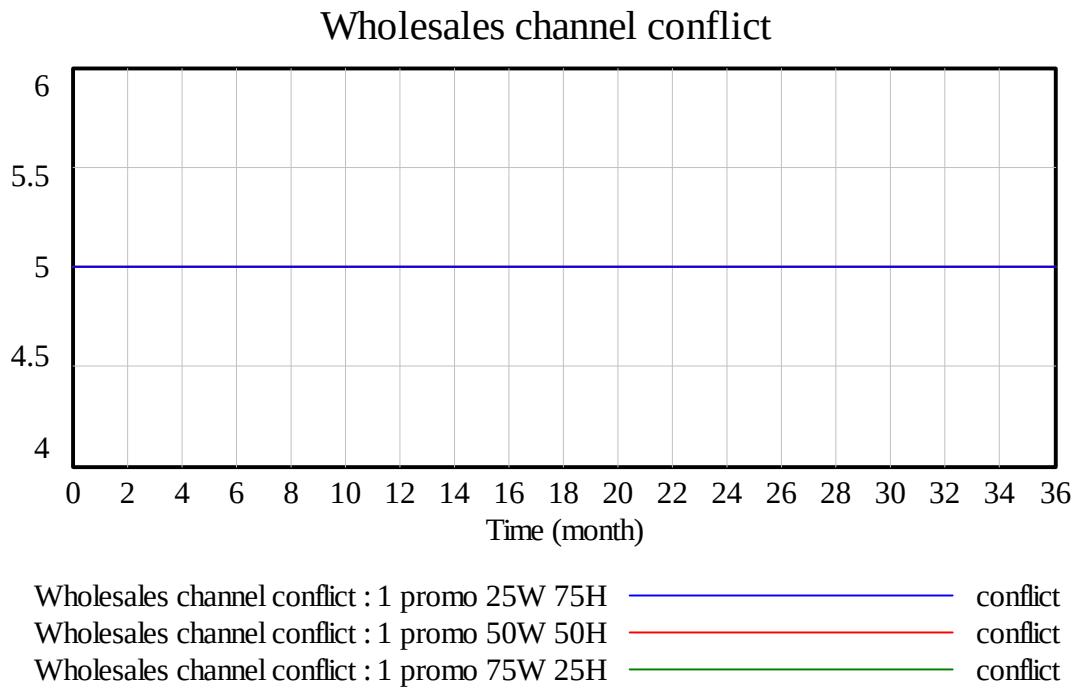

Figure 4.25: Conflict in Scenario of 1 promotion per month with various inventory allocations

As shown in figure 4.25 the model responded with the same conflict levels of 5 simultaneous conflicts for a single promotion per month, at different inventory allocation, which is a normal situation, because at the rate of one per month, the number of simultaneous conflicts is acceptable in the wholesales market because the promotions are not so high in rate, for the supplier to decrease this conflict, either he increase the sales people of decrease the time to resolve conflict, of train the sales people more with training courses in conflict management, time management and channel conflict.

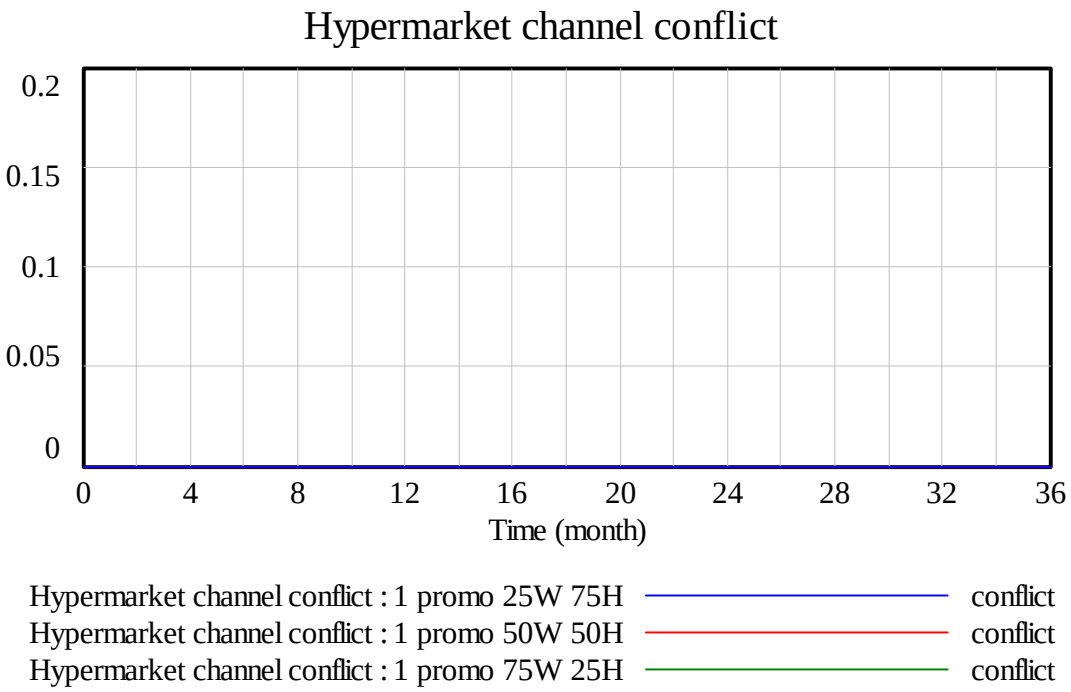

Figure 4.26: Conflict in Scenario of 1 promotion per month with various inventory allocations

As shown in figure 4.26 the conflict is very minimal in the hyper market channel in the scenario of a single promotion per month, as this rate is low for Hyper channel conflict to take place. The model responded with the expected minimal conflict when the promotion rate is low.

From the two scenarios above it is obvious that applying a single promotion per month with a an inventory allocation of 50% to each channel produces the highest total profits than applying four promotions per month, or applying other inventory allocations.

4.5 DISCUSSION AND FINDINGS:

Goal incompatibility, Domain Dissensus, and differing perception of reality are the three different types of channel conflict (stern et al, 2001), the goal incompatibility is very obvious between the two channels Hypermarkets, and wholesalers, the hypermarkets can reach the extent of selling the product with the same price with which it purchased or put a minimum profit in the promotion period in its attempt to attract customers to visit it, these customers when they purchase the promoted item they most of the time also purchase other items that the hypermarkets makes high profits from. So the hypermarket is using the supplier product as a tool to attract the customer to visit and purchase the item, as well as other items which will make high profits to it.

If we compare the hypermarket mentioned goal of attracting consumers, to the wholesales goal of maximizing profits we find goal incompatibility which will result in channel conflict in wholesales that increases by the hypermarket promotion rate, this agrees with the findings in the model Figure 4.21 that at the rate of four promotions per month the wholesales channel conflict reaches the value of 63 simultaneous conflicts, compared to an acceptable level of only five simultaneous conflicts in the case of a single promotion.

The supplier can reduce the channel conflict, as shown in the model by increasing the number of sales persons assigned to serve the channel, reduce the time taken to resolve the conflict, or increase the ability of sales persons to handle more than one conflict in the same time.

For the supplier to reduce the time taken to resolve a channel conflict, the top management should have fast response when having a complain from a channel member, giving compensation and incentives to the wholesalers is a decision that requires top management approvals, this process should be as fast as possible in order not to leave the level of conflicts high for long period which will lead to decrease in the channel demand.

Another method to decrease the conflict, is to increase the number of simultaneous conflicts that the salesman can handle, this is done by increasing the salespersons skills and capabilities to handle multiple tasks, time management courses, channel conflict courses and other training courses will be of great result in this field.

Webb (2001) divided the domain dissensus to four elements: the population to be served, the territory to be covered, the functions or tasks to be performed, and the technology employed. Adding a new wholesaler will without doubt increase channel conflict as it is shown in figure 4.19, because this new channel member will compete with the old members on the population to be served. Which will lead to variation in the demand that can be of negative effect, rather that the intended positive effect. So this decision should be taken after an intensive study, and simulating the model to see if this new channel member will end up adding profits, and the conflict generated from his adding is not so huge.

As the population to be served is price oriented, a recognized price discrepancy between the hypermarket consumer price and the price with which the wholesalers sell to the retailers can cause a huge conflict. Also conflict is due to the fact that the population to be served is mainly the wealthy 8% that all of the hypermarkets are targeting and also some times elite traditional retailers that purchase the products from the wholesalers.

The model built its conflict calculation based on (Coughlan et al., 2001) formula for measuring conflict that is widely used the formula measures the channel conflict as follow:

$$\text{Conflict} = \sum_{i=1}^{N} \text{Importance}_i \times \text{Frequency}_i \times \text{Intensity}_i$$

All types of conflict mentioned (adding new channel member, Hypermarket promotions, price discrepancy, and parallel trading) are of high importance and high intensity. The frequency of promotion is measured by the promotion rate.

The decision maker should put in his consideration a lot of factors involving demand in both channels, total profitability, the price, and channel conflict before taking and strategic decision that will change the channel design, the problem is that these decisions should be taken very fast , and there is no time for a deep study of the situation , and the consequences of that channel decision. The model is a very useful tool that should give the decision maker a great support in taking the right decision in a small time period.

Although channel management and design are the role of the channel sales and marketing people it is always having interference from the top management, because of the issue importance, and that a mistake in this area is very costly from the financial point of view. Top management involvement in the channel decision making process is not always of good outcomes (Rangan ,2006).They are not fully aware of the details of the channel structure prices, demand, consumption, competition, conflict, and other important issues, so the model is a very useful tool that can help them in taking critical channel decisions like adding new channel member, or even adding a new channel like E-commerce or direct sales.

Also the model can help top management in brainstorming sessions before taking strategic decisions concerning channel design, because the expected impact of such strategic decision on all the channel structure will be shown, and this enables the company to reach the right decision.

In summery, tactical and strategic decisions to be taken by the channel manager and top managers in the supplier organization concerning channel structures, inventory allocations, and hiring more sales people, can be assessed using the model to see the impact that such decision will have on the equilibrium of the channel structure, and if it will generate the required benefit that the organization wants.

It has been shown from the model simulation that the company should only apply in the existing situation a single promotion rate and make a 50% balance in inventory allocation between the two channels to achieve a maximum profit with the lowest possible channel conflicts.

CHAPTER FIVE
CONCLUSION, RECOMMENDATIONS AND FUTURE RESEARCH WORK

5.1 CONCLUSION

Sustainable competitive advantage can no longer be achieved only by cost leadership or product differentiation due to the globalization and easy of copying, they are important but not sufficient, and the channel strategy and particularly the multi-channel strategy will continue to enjoy increased attention as a means for gaining a sustainable competitive advantage, because a well established channel strategy is more difficult for competitors to copy quickly. It requires long time commitment and investment in infrastructure involving capital and human skills.

But channel conflict is an inevitable fact of multi-channel marketing structure. Decisions in that area are very critical and can be a cause of success or failure for the whole organization. The decisions should be accurate and fast, and sometimes top management involvement without knowing the whole situation causes it to be more complex. Also the existence of a lot of variables that are always dynamically changing in that complex market structure makes it more difficult.

The objective of the research was to develop a business dynamics simulation model that will help the decision maker in ta consumer electronics supplier firm to take strategic decisions that should be taken fast, but their impact are very critical on the firm. As the decisions will affect total profitability, channel conflict, and the supply and demand of the product.

The model was based on the supply and demand causal loop model that is related to Adam Smith. A stock and flow structure was built, with two category of variables that interact, variables for the supply and demand, and variables for channel conflict.

The model was tested by applying very high and very low production capacities to see the effect of increasing and decreasing of the supply, then applying high and low TID (total industry demand)

,high and low promotion rates, and finally varying the inventory allocation and promotion rates. The results were compatible with the supply and demand rational, which states that the increase of supply decrease the price, and the increase in demand will rise the price, the model also proved that the increase in the hypermarket promotion rate will increase channel conflict in both channels, and that if this promotion rate is increased very high, it can makes a significant drop in the wholesales demand, because of the channel conflict associated

The model shows that the promotion rate that the supplier should apply in the hypermarket should be calculated based on the profit expected from these promotions, the percentage of inventory allocated to both the wholesales and the hypermarkets, also the other variables that are involved like the production rate and prices.

When applying a high promotion rate , it should be associated with allocating most inventory to the hypermarket channel as the profits will increase in this scenario, and the conflict will be in an acceptable range.

Also the model gives the decision maker an estimate to the number of sales persons that are required to handle each of the channels and keep the channel conflict in an acceptable range. It is obvious that allocating more inventory in a channel will imply the allocation of more salespersons in that channel to take care of the channel members, and fulfill their requirements.

One important factor that the model highlighted is the time taken to solve a conflict (Average time to solve Hyper conflict, and Average time to solve wholesales conflict) in most of the real life cases the resolution of the conflict requires top management intervention as, there will be a compensation or discount, and if this time taken is large it will keep the conflict level high and thus lower the demand and the profits from that channel.

Also the model addressed the effect of adding a new channel member to the channel structure and its effect in increasing conflict and increasing demand. Thus the decision maker should see the whole picture and decide based on quantitative data like profits , demand and conflicts , rather than just guessing , what will be the reaction of adding a new channel member.

For the specific case in hand the model came to the result that a promotion rate of one promotion per month in the hypermarket, and an inventory allocation of 50% distribution for each channel, profit reaches a maximum level, with an acceptable low level of channel conflict in both channels.

5.2 RECOMMENDATIONS:

Multi-channel design and management is an issue that the supplier should always perceive as a critical success factor, the supplier should invest in the channel sales and marketing management both human and capital investment. The existence of the right number of efficient sales men that are handling both channels is also a very important factor that will lead to decrease channel conflict and so increase profits.

The supplier should take care of a very important variable which is the average time to solve a conflict in both channels, as this variable measures how fast top management respond to channel conflict, it is highly recommended that this time is kept low by giving the channel manager authority to give discounts and compensation in cases of clear channel conflict, of course there should be monitoring for the channel manager actions, but this monitoring should not cause an increase in the average time to solve the conflict.

Supplier should carefully choose the number of channel members based on the total profits, the increase in demand, and the channel conflict that will be associated. Other factors should also be considered.

Only high promotion rates should be applied if the supplier is allocating high percentage of the inventory to the hypermarket, which is a dangerous situation, as the relation of the hypermarkets is not as strong as the relation with the wholesalers and the hypermarket can easily change to substitutes.

So it is highly recommended to keep a low promotion rate in the hypermarkets as long as the wholesalers are doing their job well, because the relation with those wholesalers were built through years and should not be put in a dangerous situation for the sake of a temporary increase in the hypermarket sales or profits.

It is highly recommend that the supplier adjust margins difference between channels as tight as possible, to avoid cross selling parallel trading and price discrepancy,.

If the supplier have a variety of products, it can assign a product exclusively (100% inventory allocation) during the promotion period to the hypermarket that will execute the promotion, and not to supply any of the other channels or hypermarkets with that product during the promotion, and a period of time before the promotion, to make sure that there will be no conflict due to that promotion. Also a promotion is better to be performed on a product that is either in its end of life cycle or a very new product, but not on a product that has a stable demand .

As mentioned in most literature communicating the channel strategy with all channel members is a very good way to reduce channel conflict and to increase ties with the channel members, it is highly recommended that the supplier organize a strategy session for all the wholesalers and hypermarkets to communicate its strategy and get the feedback from various channel members.

5.3 FUTURE WORK

The objective of this research was to help the decision maker to optimize the channel structure to be able to maximize the profits and minimize the channel conflict, mainly caused by the hypermarkets promotions as well as other activities. The hypermarkets are a new trend in Egypt that need more research efforts to understand the buying behavior of its customers. Especially because it is expanding and its customers are the wealthy part of the Egyptian society.

A future work need to be done to include a dynamic model for the competitor activity to be integrated with the existing model, as the model assumed the price of substitutes a constant.

The model was verified and tested form the consumer electronics prospective, and the researcher suggests that a future work could be done in different areas of marketing channels rather than the consumer electronics.

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APPENDIX A: MODEL FUNCTIONS AND EQUATIONS

(01) "% inventory to Hyper"=

0.25

Units: 1/month

percentage of inventory allocated to Hypermarkets

(02) "% inventory to wholesales"=

0.75

Units: 1/month

percentage of inventory allocated to wholesales

(03) "- change in H price"=

Hypers price*Effect of Hyper Inventory Coverage on Price*Hyper effect of cost on price

/time to adj out

Units: $/Unit/month

(04) "-change in ws price"=

Wholesaler price*Effect of Wholesale Inventory Coverage on Price*Wholesales Effect of cost on price

/time to adjust out

Units: $/Unit/month

(05) acceptable Price discrepancy limit=

2

Units: $/Unit

The max. Acceptable discrepancy that will not generate conflict

(06) Average time to solve Hyperconflict=

0.25

Units: month

The Average time taken by Hyper team to resolve the conflict

(07) Average time to solve Wholesales conflict=

0.15

Units: month

The Average time taken by Wholesales team to resolve the conflict

(08) Capacity utilization=

0.8

Units: Dimensionless

The percentage of utilization of the full capacity

(09) change in H price=

Hypers price*Effect of Hyper Inventory Coverage on Price*Hyper effect of cost on price

/time to adjst H price

Units: $/Unit/month

(10) change in WS price=

Wholesaler price*Effect of Wholesale Inventory Coverage on Price*Wholesales Effect of cost on price

/time to adjust W price

Units: $/Unit/month

(11) Effect of Hyper Inventory Coverage on Price=

Relative Hyper inventory coverage^Sensitivity of Hyper Price to Inventory Coverage

Units: Dimensionless

Price rises when inventory coverage is less than normal, and

falls when it is greater. The Sensitivity of Price to Inventory

Coverage controls the magnitude of the response.

(12) Effect of number of Hypermarkets on Hyper demand=

Number of contracted Hypermarkets*(1+New Hypermarket demand increase ratio)/100

Units: Dimensionless

The total effect of adding a new Hypermarket on Hypermarket total demand

(13) Effect of number of wholesalers on wholesales demand=

Number of contracted wholesalers*(1+new wholesaler demand increase ratio) /100

Units: Dimensionless

The total effect of adding a new reseller on demand

(14) Effect of price discrepancy on Wholesales conflict=

1-acceptable Price discrepancy limit/Price discrepancy with retailer

Units: Dimensionless

(15) Effect of promotion on Hyper demand=

promotion fractional inrease in hyper demand*Promotion rate/10

Units: Dimensionless

The total effect of promotion on Hypermarket total demand

(16) Effect of promotion on Wholesales demand=

Promotion rate*Promotion fractional decrease in Wholesales demand/10

Units: Dimensionless

The effect of Hyper promotion on the Wholesales total demand

(17) Effect of Wholesale Inventory Coverage on Price=

Relative Wholesales inventory coverage^Sensitivity of Wholesales Price to Inventory Coverage

Units: Dimensionless

Price rises when inventory coverage is less than normal, and falls when it is greater. The Sensitivity of Price to Inventory Coverage controls the magnitude of the response.

(18) FINAL TIME = 36

Units: month

The final time for the simulation.

(19) Hyper conflict effect on demand=

Hypermarket channel conflict*Hypermarket conflict effect ratio/10

Units: Dimensionless

The percentage of decrease in demand due to Hypermarkets conflict

(20) Hyper conflicts per single promotion=

1

Units: conflict

The number of conflicts generated per promotion

(21) Hyper consumer price=

Hypers price*(1+Hyper profit)

Units: $/Unit

The unit price with which Hypermarket sell to end consumer

(22) Hyper Consumption Rate=

MIN("% inventory to Hyper"*Total inventory,Hyper Supplier demand)

Units: Unit/month

The total number of units consumed by the wHypermarkets channel per year.

(23) Hyper effect of cost on price=

1+Hyper Sensitivity of Price to Costs*((Unit costs/Hyper reference price) -1)

Units: Dimensionless

Price responds to the gap between Hypermarkets' beliefs about the underlying equilibrium price and their beliefs about the

costs of production. When expected costs rise above the expected price, prices tend to rise, and vice versa.

(24) Hyper Inventory Coverage=

Time to adjust Hyper inventory coverage*Total inventory*"% inventory to Hyper" /Hyper Consumption Rate

Units: month

Inventory coverage is given by the ratio of inventory to shipments.

(25) "Hyper market share%"=

0.08

Units: Dimensionless

The percentage of the Hyper market to the total market

(26) Hyper profit=

0.07

Units: Dimensionless

The Hypermarket profit per unit

(27) Hyper Reference Inventory Coverage=

0.8

Units: month

The normal inventory coverage required to ensure desired levels of service (the desired ability to fill orders).

(28) Hyper reference price=

105

Units: $/Unit

The Average price that dominate in the Hyper market

(29) Hyper Sensitivity of Price to Costs=

0.15

Units: Dimensionless

Controls the response of price to discrepancies between the

expected price and the expected cost of production.

(30) Hyper Supplier demand=

Total Hypermarket demand*Supplier Hypermarket market share*ABS(1+Effect of number of Hypermarkets on Hyper demand

+Effect of promotion on Hyper demand

+Relative value of product in Hypermarket-Hyper conflict effect on demand

)

Units: Unit/month

The total demand from the Hypermarket channel ,taking into

consideration various effects

(31) Hypermarket channel conflict= INTEG (

IF THEN ELSE(Hypermarket Channel conflict rate-Hypermarket conflict resolution rate

>0, Hypermarket Channel conflict rate-Hypermarket conflict resolution rate

, 0),

0)

Units: conflict

The number of conflicts between supplier and hypers that are not

resolved

(32) Hypermarket Channel conflict rate=

Number of contracted Hypermarkets*Promotion rate*Hyper conflicts per single promotion

Units: conflict/month

The number of hypermarkets channel conflict per year

(33) Hypermarket conflict effect ratio=

0.015

Units: 1/conflict

The ratio by which channel conflict affect total Hypermarket denmand

(34) Hypermarket conflict resolution rate=

number of Hyper sales persons*Number of Hyper simultaneous Conflicts per salesman

/Average time to solve Hyperconflict

Units: conflict/month

(35) Hypermarket Price of Substitutes=

109

Units: $/Unit

The Aveage price of competing product in Hyper market

(36) Hypers price= INTEG (

change in H price-"- change in H price",

Hyper reference price)

Units: $/Unit

(37) INITIAL TIME = 0

Units: month

The initial time for the simulation.

(38) New Hypermarket demand increase ratio=

0.1

Units: Dimensionless

The Ratio with which the Supplier Hypermarket demand will increase by adding a new Hypermarket

(39) new wholesaler demand increase ratio=

0.2

Units: Dimensionless

The Ratio with which the Supplier Wholesales demand will increase by adding a new wholesaler

(40) Number of contracted Hypermarkets=

4

Units: Dimensionless

The number of active contracted Hypermarkets

(41) Number of contracted wholesalers=

2

Units: Dimensionless

The number of active wholesalers who are assigned to sell to retailers

(42) number of Hyper sales persons=

2

Units: person

The number of the sales team in the Hypermarket sector

(43) Number of Hyper simultaneous Conflicts per salesman=

1.5

Units: conflict/person

The number of conflicts that can be handeled by a sales person simultaniously

(44) Number of Wholesale sales persons=

3

Units: person

The number of Sales team of the Wholesales sector

(45) number of Wholesales simultaneous Conflicts per salesman=

2

Units: conflict/person

The number of conflicts that can be handeled by a sales person at the same time

(46) Parallel trading rate between Wholesalers=

2

Units: 1/month

number of incidents that a wholesaler sell to another wholesaler's retailers

(47) price discrepancy rate=

2

Units: 1/month

The number of times wholesalers experience price discrepancy with Hypermarket per year

(48) Price discrepancy with retailer=

Retail price-Hyper consumer price

Units: $/Unit

The discrepancy is the difference between retailer price and Hyper consumer price

(49) Production Capacity=

30000

Units: Unit/month

(50) production rate=

Capacity utilization*Production Capacity

Units: Unit/month

The production rate is equal to the capacity * utilization

(51) profitability of hypermarkets operations=

(Hypers price-Unit costs)*Hyper Consumption Rate

Units: $/month

total profit from selling to Hypermarkets

(52) profitability of Wholesales operations=

(Wholesaler price-Unit costs)*Wholesales Consumption Rate

Units: $/month

total profit from selling to Wholesalers

(53) Promotion fractional decrease in Wholesales demand=

0.6

Units: month

the fraction of decrease in Wholesales demand due to Hyperpromotion

(54) promotion fractional inrease in hyper demand=

1.7

Units: month

the fraction of increase in Hypermarket demand due to Hyper promotion

(55) Promotion rate=

4

Units: 1/month

The number of promotions done by all Hyper per year

(56) Relative Hyper inventory coverage=

Hyper Inventory Coverage/Hyper Reference Inventory Coverage

Units: Dimensionless

Relative inventory coverage relative to the normal level needed

to ensure desired service levels in the market.

(57) Relative value of product in Hypermarket=

Hypermarket Price of Substitutes/Hypers price

Units: Dimensionless

The value of supplier product compared to the competitor products in Hyper market

(58) Relative value of product in wholesales=

Wholesales Price of Substitutes/Wholesaler price

Units: Dimensionless

The value of supplier product compared to the competitor products in Wholesales market

(59) Relative Wholesales inventory coverage=

Wholesales Inventory Coverage/Wholesales Reference Inventory Coverage

Units: Dimensionless

(60) Retail price=

Wholesaler price*(1+Wholesales profit)

Units: $/Unit

The unit price with which wholesaler sell to retailer

(61) SAVEPER =

TIME STEP

Units: month

The frequency with which output is stored.

(62) Sensitivity of Hyper Price to Inventory Coverage=

-1

Units: Dimensionless

Controls the response of Hyper price to inventory coverage. Must

be negative for high inventory to lead to lower prices. Higher absolute values lead to greater price changes for any given inventory coverage level.

(63) Sensitivity of Wholesales Price to Inventory Coverage=

-1

Units: Dimensionless

Controls the response of Wholesales price to inventory coverage.

Must be negative for high inventory to lead to lower prices. Higher absolute values lead to greater price changes for any given inventory coverage level.

(64) Supplier Hypermarket market share=

0.2

Units: Dimensionless

The Supplier market share in the Hypermarket market

(65) Supplier Wholesales market share=

0.1

Units: Dimensionless

The Supplier market share in the Wholesales market

(66) TID=

120000

Units: Unit/month

The total number of units demanded by the whole market per year

(67) TIME STEP = 1

Units: month

The time step for the simulation.

(68) time to adj out=

6

Units: month

(69) time to adjst H price=

4

Units: month

(70) Time to adjust Hyper inventory coverage=

1

Units: month

The time that is needed to realize inventory coverage

(71) time to adjust out=

6

Units: month

(72) time to adjust W price=

4

Units: month

(73) Time to adjust wholesale inventory coverage=

1

Units: month

The time that is needed to realize inventory coverage

(74) Total Hypermarket demand=

"Hyper market share%"*TID

Units: Unit/month

The total number of units demanded in the Hyper market

(75) Total inventory= INTEG (

production rate-(Wholesales Consumption Rate+Hyper Consumption Rate),

1000)

Units: Units

The level of finished goods inventory in the plant. Increased by production and decreased by shipments. Initially set to the desired inventory level.

(76) Total profit=

profitability of hypermarkets operations+profitability of Wholesales operations

Units: $/month

(77) Total Wholesales demand=

TID*"Wholesaler market share %"

Units: Unit/month

The total number of units demanded in the Wholesales market

(78) Unit costs=

55

Units: $/Unit

The cost include fixed and variable cost

(79) "Wholesaler market share %"=

0.92

Units: Dimensionless

The percentage of the Wholesales market to the total market

(80) Wholesaler price= INTEG (

change in WS price-"-change in ws price",

wholesales reference price)

Units: $/Unit

(81) Wholesalers Sensitivity of Price to Costs=

0.3

Units: Dimensionless

Controls the response of price to discrepancies between the

expected price and the expected cost of production.

(82) Wholesales channel conflict= INTEG (

IF THEN ELSE(Wholesaleschannel conflict rate-Wholesales conflict resolution rate >0, Wholesaleschannel conflict rate-Wholesales conflict resolution rate ,

0),

5)

Units: conflict

The number of conflicts between supplier and Wholesalers that

are not resolved

(83) Wholesales conflict effect on demand=

Wholesales channel conflict*Wholesales Conflict effect ratio/10

Units: Dimensionless

The percentage of decrease in demand due to wholesales conflict

(84) Wholesales Conflict effect ratio=

0.1

Units: 1/conflict

The ratio by which channel conflict affect total wholesales

denmand

(85) Wholesales conflict resolution rate=

Number of Wholesale sales persons*number of Wholesales simultaneous Conflicts per salesman

/Average time to solve Wholesales conflict

Units: conflict/month

The rate with which the Supplier solve Wholesales conflict

(86) Wholesales conflicts per single event=

1

Units: conflict

The number of conflicts generated per single event that is upnormal (hyper promotion,parallel trading ,price discrepancy)

(87) Wholesales Consumption Rate=

MIN("% inventory to wholesales"*Total inventory, Wholesales Supplier demand)

Units: Unit/month

The total number of units consumed by the wholesales channel per year.

(88) Wholesales Effect of cost on price=

1+Wholesalers Sensitivity of Price to Costs*((Unit costs/wholesales reference price)-1)

Units: Dimensionless

Price responds to the gap between wholesalers' beliefs about the underlying equilibrium price and their beliefs about the costs of production. When expected costs rise above the expected price, prices tend to rise, and vice versa.

(89) Wholesales Inventory Coverage=

(Time to adjust wholesale inventory coverage*Total inventory*"% inventory to wholesales")/Wholesales Consumption Rate

Units: month

Inventory coverage is given by the ratio of inventory to shipments.

(90) Wholesales Price of Substitutes=

106

Units: $/Unit

The Avarage price of competing product in wholesales market

(91) Wholesales profit=

0.1

Units: Dimensionless

The wholesaler profit per unit

(92) Wholesales Reference Inventory Coverage=

0.8

Units: month

The normal inventory coverage required to ensure desired levels of service (the desired ability to fill orders).

(93) wholesales reference price=

100

Units: $/Unit

The Avarage price that dominate in the Wholesale market

(94) Wholesales Supplier demand=

Total Wholesales demand*Supplier Wholesales market share*ABS(1+Effect of number of wholesalers on wholesales demand

+Relative value of product in wholesales-Effect of promotion on Wholesales demand

-Wholesales conflict effect on demand)

Units: Unit/month

The total demand from the Wholesales channel ,taking into consideration various effects

(95) Wholesaleschannel conflict rate=

Number of contracted wholesalers*Wholesales conflicts per single event*(Number of contracted Hypermarkets

*Promotion rate

+Parallel trading rate between Wholesalers+Effect of price discrepancy on Wholesales conflict

*price discrepancy rate)

Units: conflict/month

The total number of channel conflicts per year

BIOGRAPHY

The researcher was born in Cairo in July 18th 1974, attained his Bachelor Degree in Communication Engineering from Ain Shams University in June 1997, Egypt. The researcher then started his professional career in the telecommunication Industry as field engineer in Lucent technologies in Egypt, in January 2002 he moved to TEDATA and joined the sales team as a senior sales, where he acquired sales knowledge and experiences in the sales techniques, he joined Nile on Line in January 2004 as Channel Sales Manager, in September he moved to The Egyptian Telephone company (Quicktel) to be the local sales manager where he is still occupying that position.