

Research on demand and supply integration:

A practical case study framework

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Introduction:

Economics is considered the fundamental social science that studies the choices of the entire societies' stakeholders, including individuals, businesses and governments, with respect to allocating scarce resources. In particular, microeconomics is the branch of economics that covers individual households and businesses behaviors regarding the allocation of their limited resources. These choices of resources' allocation affect markets prices, thus, supply and demand of goods and services (Parkin, 2012; Marchan, and Snell 2007). Balancing supply and demand has been the main concern of economists for decades.

On the micro level, firms strive to successfully manage supply and demand which requires extensive integration between demand and supply functions and activities. Research suggests two primary sets of processes of moving goods and information through supply chains through which the firm creates value for its customers. These processes are, namely, demand-focused and supply-focused processes. Organizations have historically invested resources to develop competitive advantages in these fields. The major problem resides in planning each side separately resulting in conflicts between demand (what customers want) and supply (capacity) (Esper *et al.*, 2010).

Empirical research on the concept of market orientation has long suggested that inter-functional coordination is key to achieving the main goal of marketing, the creation of superior customer value (Jaworski and Kohli, 1993; Kohli and Jaworski, 1990). Although inter-functional integration was strongly supported in scholarly work, very little empirical research has been done on integrating the demand side managed by marketers and the supply side managed by the supply chain department within businesses (Oliva and Watson, 2011; Esper *et al.*, 2010; Juettner *et al.*, 2007).

This research, based on empirical study related to industry's best practices, proposes a framework to conceptualize the functional integration between demand and supply sides within an organisation. It suggests that successfully managing such integration requires extensive research on demand-focused and supply-focused processes. This integration facilitates forecasting and planning of real-time customer demand and ongoing supply capacity constraints (Esper *et al.*, 2010).

This study is a part of a work in progress which at this stage aims at presenting a procedural framework to integrate demand and supply sides based on empirical study related to four Fast Moving Consumer Goods' (FMCGs) industry global leading companies. Therefore, the structure of this paper is organized as follows. First, an analytical literature review on the development supply chain management (SCM) concept which facilitated the integration between demand-focused and supply-focused processes, namely, marketing and supply chain (SC) departments. Next, an inductive methodological approach is followed to map the integration process. Then, findings alongside the suggested framework are drawn. Finally, suggestions for future research and conclusions are outlined.

Literature Review

The literature review aims at facilitating the understanding of the complexity of SCM, its inter-functional and cross-organizational domains. This sequence will enable the reader to logically reach the functional perspective of demand-based and supply-based integration processes, which is the focus of this paper.

The principle of having the right product in the right place at the right time is the reason why SCM influence increased in the originally considered areas of the marketing domain and marketing channel management. Meanwhile, however, it also stimulated synergies between both disciplines (Juettner *et al.*, 2007). In order for this synergy to take place, an effective process design should be functioning in organizations. A process is a set of multiple activities that are inter-functional and interconnected in a value chain which are hard to collectively duplicate and compete against (Barney, 1991; Porter, 1996).

Origins and development of the concept of SCM

In order to clearly understand why SCM is considered the owner of the procedural inter-functional and cross-organizational integration, it is important to get a glance on its origin and development.

SCM is defined as:

‘the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole’ (Mentzer *et al.* 2001).

The discipline of SCM was first introduced in the literature in the mid-1980s and was widely used in the 1990s (Mentzer *et al.*, 2001). Many scholars wrote about the origins of SCM, either as a development of the term Logistics or as an old concept already existing in scholarly work. Cooper *et al.* (1997) and Chopra and Meindl (2004) suggested that it is based upon fundamental assumptions of handling inter-organizational operations, which is decades old and can be referred back to channels and systems integration research in the 1960s and in more recent work on information sharing and overall inventory management.

The scope of logistics is being limited to the boundaries intra-organizational (inbound) functions and is primarily concerned with specific activities not involving much coordination and planning, which was not the early view. Moreover SCM contains logistics activities in terms of inter-functional (inbound) activities and also management and coordination of inter-organizational (outbound) activities. Even functions like purchasing, production and marketing are now included under the SCM scope (Ballou, 2007). Consequently, SCM became responsible for major firms functions and thus is judged for the level of performance. Thus SCM has to involve a high degree of intra- and inter-organizational integration.

SCM has evolved over time becoming more multidisciplinary in nature which enabled it to profit from a lot of concepts developed in a variety of disciplines as marketing, information systems, system dynamics, economics logistics, operations management, and operations research. SCM is being considered as a strategic factor in strategy for creating value for customers (Juettner *et al.*, 2007). A significant amount of interest for SCM has been generated by managers and researchers.

More attention is given to SCM in research as supply chain integration presented a challenge. The Council of Supply Chain Management Professionals (CSCMP) ended the debate by publishing a professional unified definition of SCM in 2007:

Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies.

SCM incorporates many activities and practices common with the concept and practices of marketing. As the CSCMP describes the integration of supply and demand as a fundamental objective for SCM throughout the supply chain (Mentzer and Gundlach, 2010), the demand side in an attempt to create value and customer satisfaction, is believed to be the main domain of marketing.

Integration views and perspectives

After reviewing a significant number of papers discussing the integration of marketing and supply chain (e.g. Lambert and Cooper, 2000; Alvarado and Kotzab, 2001; Flint, 2004; Juettner *et al.*, 2007; Mentzer and Gundlach, 2010; Juettner *et al.*, 2010), and in particular papers describing and analyzing the existing body of knowledge on the integration aspect (e.g. Knoppen *et al.*, 2010; Juettner *et al.*, 2010), this paper uses the classification of one of the most recent and comprehensive paper, conceptualizing the integration from a strategic perspective by Juettner *et al.* (2010). Lambert and Cooper (2000) who are major contributors to the marketing/SCM integration perspective, identify two aspects of integration which are **the inter-functional aspect and the cross-organizational aspect**. This classification has been supported since then by scholars and by the CSCMP. Juettner *et al.* (2010) further divided the current research carried out on the integration into three perspectives, namely, an **inter-functional perspective, a process perspective and the perspective of integrating business concepts**.

The main focus of this paper will be on the **inter-functional perspective** which mainly refers to the close connection between marketing and SCM domains i.e. logistics (physical distribution services, purchasing/sourcing, inventory management, transportation etc.) and manufacturing. SCM has evolved from the logistics concept while logistics was originated as the physical side of distribution, which is a main pillar of the marketing concept. Hence, logistics and marketing are inextricably linked (Alvarado and Kotzab, 2001; Flint, 2004).

Within the marketing discipline distribution channels are interchangeably called marketing channels (intermediaries i.e. distributors, wholesalers and retailers), mainly downstream the supply chain, as they are a vital connection between the company and its customers (Kotler and Armstrong, 2011). Accordingly, logistics helps optimizing marketing strategies in terms of transforming the marketing mix (product, price, place and promotion) into value delivered to customers throughout the supply chain. This is realized through effective and efficient logistics management when the products are delivered at the right time, at the right place for the right price and still in the appropriate condition (Flint, 2004). Therefore, this inter-functional link, particularly delivery, positively affects customer service performance and delivers customer value, thus more satisfied customers (Juettner *et al.*, 2010).

Developing on the current body of knowledge, it is logical to conclude that the interface between marketing and SCM, on an inter-functional level or cross-organizational, is mainly concerned with market or customer orientation, in terms of creating customer value and customer satisfaction. Unfortunately, while this concept is clearly sound on a conceptual level, very little empirical study has been done to observe and map the actual procedural implementation. These literature review findings directed and triggered the researchers to close this gap in scholarly work through investigating the integration processes of four Fast Moving Consumer Goods' (FMCGs) industry global leading companies.

Research methodology

As highlighted before, this area of integration is understudied in research. This research is exploratory in nature and requires qualitative methods to identify the relevant constructs and develop a framework reflecting the integration. An inductive reasoning approach is followed as this research is mainly based on qualitative methods. Hence, the researchers will be able to generate substantive understanding and knowledge about this new concept. As SCM research has often been criticized of following the positivist approaches, while qualitative and interpretative research is rather scarce (Kotzab, 2000), the findings of this study will later on be analysed and validated by more quantitative techniques. As a result, a balanced approach of triangulation will be achieved.

The initial methodology of this study focuses on examining exploratory data through observations, company records and semi-structured interviews with strategic and tactical managers from four Fast Moving Consumer Goods (FMCG) industry best practices including Proctor and Gamble and Unilever as shown in Table 1.

Given the nature of the research the interviews were of the semi-structure format. The intention was to explore and gain more insights into the process implementation. This semi-structured protocol was not rigid i.e. questions have change over time as interviewee offered more insight and enabled the research to elaborate more with the succeeding participants. Throughout the interviews more elements of the planning process were uncovered. This ongoing expansion and improvement of the interview protocol is a part of the process of grounded theory development (Glaser and Strauss, 1967).

Table1: FMCGs' companies covered in this study

Company	Global coverage and scale	Industry and Egyptian market shares 2012	The Gartner Supply Chain Top 25 for 2012 (Global and Europe)
Unilever Mashreq	Multinational operating in 148 countries, brands are being sold in 180 countries	Holds 46.3% of the Egyptian home and personal care, tea and bouillon market value	Global ranking: 10 th place in the top 25 rankings and 3 rd FMCG Europe: 1 st place
Proctor and Gamble Egypt	Multinational operating in around 75 countries, brands are being sold in 180 countries	Holds 7.5% of the Egyptian Hair care and deodorant market value	Global ranking: 3 rd place in the top 25 rankings and 1 st FMCG Not on the European list.
Soft drinks company	Multinational company operating and brands being sold in around 200 countries	Holds more than 30% of the Egyptian soft drinks' market value	Listed in the top 15 ranks of Gartner Not on the European list.
Sweet and savory snacks company	Multinational company operating and brands being sold in around 200 countries	Holds more than 50% of the Egyptian sweet and savory snacks value	Listed in the top 15 ranks of Gartner Not on the European list.
Sweet snacks company (Chocolate Confectionery and ice cream)	Multinational company operating in around 73 countries	Holds more than 20% of the Egyptian Chocolate Confectionery and ice cream market values	Not listed on the Gartner Supply Chain Top 25 for 2012

Source: (Euromonitor Passport report, 2012; Retail audit report, 2012; Gartner Supply Chain Top 25, 2012; Unilever company records; P&G company records).

The research is following the case study approach as it is believed to be the most appropriate approach to observe and report this phenomenon (Yin, 2003). The five case studies are following the Sales and Operation (SnOP) planning process which is becoming more common for managing supply chain planning (Chen *et al.*, 2006; Lapide, 2005; Van Landeghem and Vanmaele, 2002).

Findings:

The integrated planning process, referred to in the practitioner literature as SnOP aims preliminarily to facilitate master planning, demand planning, and the flow of information between them. A strategic level, master planning is initially concerned with the coordination of the supply side of the organization and seeks the most efficient way to fulfill demand forecasts over the medium term (Oliva and Watson, 2011; Lapide, 2005) up to 24 months ahead. The efficiency of the process results in enabling the more detailed tactical levels of planning such as purchasing and materials requirements, production, and distribution planning.

As comprehended from the interviews regarding the customer-facing side of the organization, demand planning is responsible for predicting future demand from placed customer orders, historical trends, prevailing market conditions and demand generating activities (e.g. advertising and new innovations) of the firm, as well as, its competitors. A basic SnOP process facilitates the transfer of information from demand planning to master planning (Oliva and Watson, 2011).

Esper *et al.* (2010) argues that although SnOP usefulness as a tool for improving practical integration, has been verified, it still does not reach the goal of common understanding. This perspective is supported by Moon (2006) who agrees that SnOP is a tactical process that usually involves mid-level managers generating a simple balance between demand forecasts and production capacity. Moreover, Esper *et al.* (2010) claims that the majority of the SnOP processes concentrate on operational plans for guiding short- to mid-term production, logistics, and procurement activities.

In contrast, other practitioners and academics argue that these processes can become more advanced to move beyond the superficial synchronization of master and demand planning to sophisticated joint planning (Oliva and Watson, 2011; Chen *et al.*, 2006; Lapide, 2005; Van Landeghem and Vanmaele, 2002). The scarcity of empirical scrutiny for supporting the development of a process perspective on supply chain planning, presents the gap for these contrasting perspective to continue debating. This gap shall initially be at least initially narrowed based on empirical studies such the one presented here. Furthermore, the SnOP process is a practical phenomenon that is subject of ongoing research on its potential integrative capabilities which makes good candidates for inductive research.

Based on the findings of the empirical study both perspectives can be considered, as practices of the implementation of the SnOP planning process vary from a simple balancing of demand forecasts with production capacity to a very mature strategically integrated planning system involving the whole organization from strategic up to operational drawdown. Lapide (2005) presented four stages of the SnOP process maturity shown in Figure 1 which supports that not all

companies implementing the SnOP ideology are fully integrating their demand-based and supply-based functions.

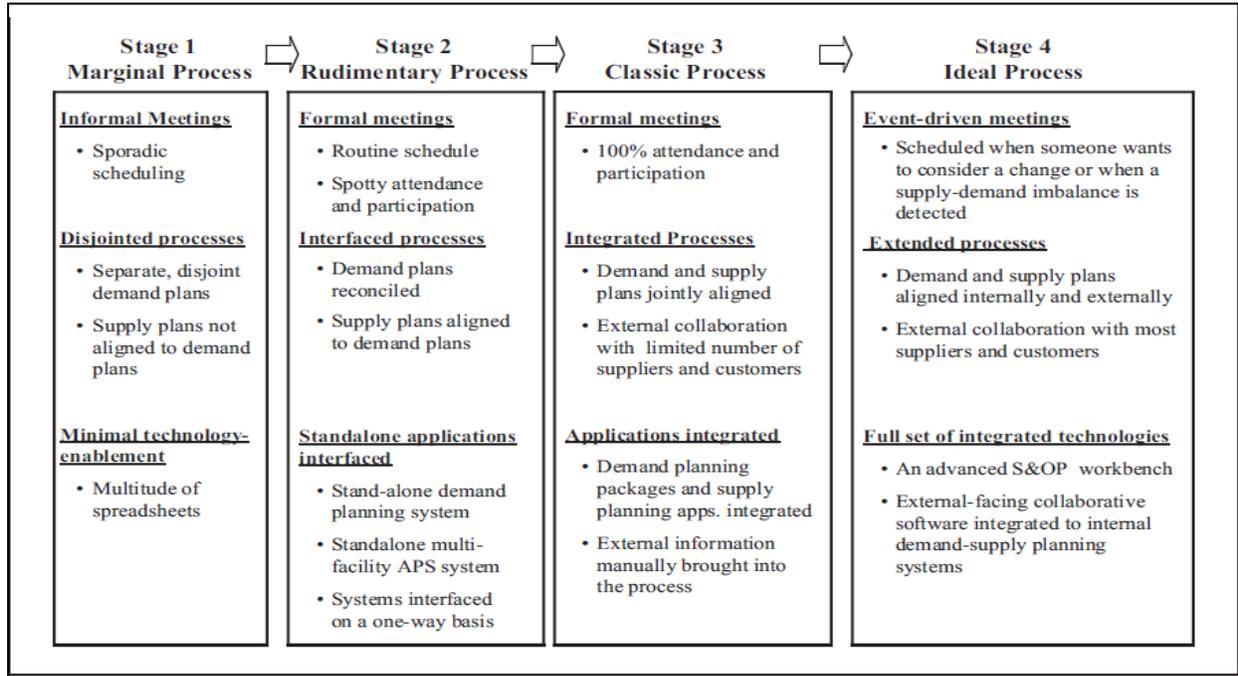


Figure 1: A four stage SnOP process maturity model

(Source: Lapide, L., 2005)

The five case studies are implementing SnOP planning technique but each company is at a different maturity stage. Moving from a stage to another forward on this Figure is not typically easy as process innovation and change are always difficult in any organization. It considers changing the decision-making process, the informational analysis used for decision-making, the scope of duties and the skilled workforce involved (Lapide, 2005).

Conceptual framework:

Opposed to Lapide (2002) who claimed that implementing the SnOP process is supposed to result in enhanced firm performance, Esper *et al.* (2010) proposed a conceptual framework referred to as the Demand and Supply Integration (DSI) framework. Esper *et al.* (2010) argued that DSI framework moves beyond this tactical balancing of demand with supply, and lifts the concept of integration to a more strategic perspective. They declare the DSI drives to a common interpretation of demand and supply, which leads to mutual understanding across the organization, and superior strategic decision-making and execution.

The framework shown in Figure 2 conceptualize how enterprises covered in our research, intend to integrate DSI framework proposed by Esper *et al.* (2010) into a strategically managed SnOP supporting strategic managers in decision making, broken down into tactical and operational plans for effective and efficient execution, and ultimately customer value creation. This justifies Lapide's SnOP process maturity model i.e. enterprises at stage three and four of the maturity model tend to integrated the DSI framework into their SnOP processes.

The proposed framework (Figure 2) highlights key inter-functional processes undertaken by the case studies to match demand and supply. It presents a process integration of supply chain planning across multiple highly differentiated areas. Two companies, namely, Unilever Mashreq and P&G Egypt are believed to be at moving towards stage four (ideal process) of Lapide's SnOP process maturity model. The overall companies planning and operations are functioning around the SnOP process supported by an Integrated Supply-Demand Planning Technology Architecture that is needed to fully support this ideal SnOP process. In these case studies the technology architecture used is designed by SAP and its planning software is referred to as Advanced Planning Optimizer (APO). The integration of their demand-focused and supply focused processes is conceptualized in Figure 2.

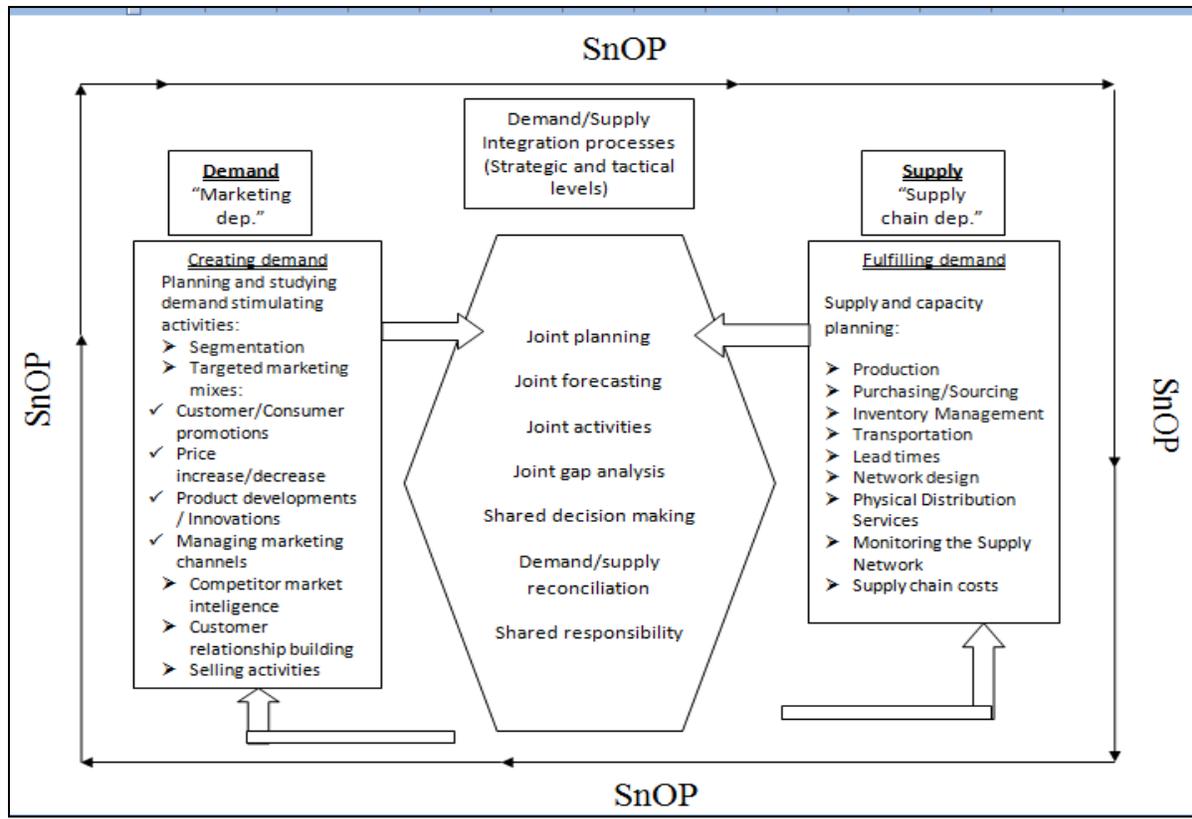


Figure 2: A customer value creation framework through supply and demand integration

As the above framework incorporates the DSI framework and SnOP process used by the case studies, it clearly conceptualizes the integrations of the demand-based activities and supply based activities. The framework is developed based on the case studies methodologies for creating customer value and rendering overall enhanced business performance.

As shown in Figure 2 marketing's domain and strength remain in understanding customers' perceived value (obtaining market and customer knowledge), dividing customer with similar needs and wants into distinct groups (market/customer segmentation), transforming these needs and wants into product and service packages to meeting the different desires (targeted marketing mixes) and marketing channels design (Juetner *et al.*, 2007). These are the demand-focused activities owned by the marketing and sales departments. On the supply side, the SC department is concerned with meeting and fulfilling the forecasted demand within the available capacity. Moreover, sourcing plans, inventory management, transportation, lead times calculations, physical distribution and lowering supply chain costs are come at the top functional SCM priorities.

The middle shape in Figure 2 conceptualizes the integration between the supply side and the demand side through periodically scheduled joint planning, forecasting, activities' and innovations' planning and gaps' analysis (business Key Performance Indicators (KPIs) performance) and shared decision making meetings. The meetings are preciously scheduled on a monthly, quarterly and annual basis depending on the level of details and decisions needed to be taken. It also depends on the level of management to attend the meetings. Tactical middle line managers from both sides initiate and attend the preliminary monthly planning and forecasting

meetings, while, the strategic top level managers attend the gaps' analysis and decision making meetings. The directors from both sides and the CEO discuss the gap in terms of the previously set KPIs' targets versus the actual results and their impact on business performance. They take joint decisions and thus the responsibility for the business performance KPIs is shared.

The reported SnOP integration process developed by our case studies enable marketers to align with SCM to create new go-to market strategies, get a better idea on translating marketing initiatives into supply chain drivers and fully understand the firm's operational constraints. The proposed integration process ensures the involvement of SCM in the marketing planning at an earlier stage, as well as, becoming a partner in decision making. SnOP process is an initiate the SCM concept and is owned in terms of maintaining meetings cycle, by the SC department. Thus the SnOP in perceived by our case studies as a SCM process that focuses on the efficient matching of supply with demand from strategic management levels down to tactical and operational levels. SnOP process appears to be highlighting supply chain advantages such as better meeting customer demand while at the same time resulting in reduced inventories and minimized supply chain operating costs (Lapide, 2005).

Partial evidence of positive impact of the SnOP on KPIs

The following part presents some evidence that the successful and comprehensive implementation of demand and supply integration model, through the SnOP planning process, can render positive results on business performance.

The case study participant interviewees considered the SnOP process reasonably successful and they believe it is a main contributor to the continuous improvement in the forecasting accuracy KPIs and in other integrative KPIs (e.g. Perfect order fulfillment, sales etc.). The organization that granted access to its KPIs was Unilever Mahshreq (Figure 3). After the initial analysis of the history and development of Unilever's integration processes, its demand-focused functions, supply focused-functions, forecasting mechanism and company records, the assumption that the current integrative SnOP process has positively affected business performance (improvement in KPIs) was supported.

This analysis, however, did not make clear whether performance and forecast accuracy improved solely because of the improved integration system, or whether other external factors have had an impact as well. It is worth mentioning that although Egypt is facing a very difficult political and economic situation, Unilever's forecasts, sales values and perfect order fulfillment KPIs continue to improve, which is believed to be the effect of the integrated forecasting and planning process. The below Figure 3 shows trends of Unilever's KPI but does not indicate any real numbers as the numbers have been disguised for the company's confidentiality.

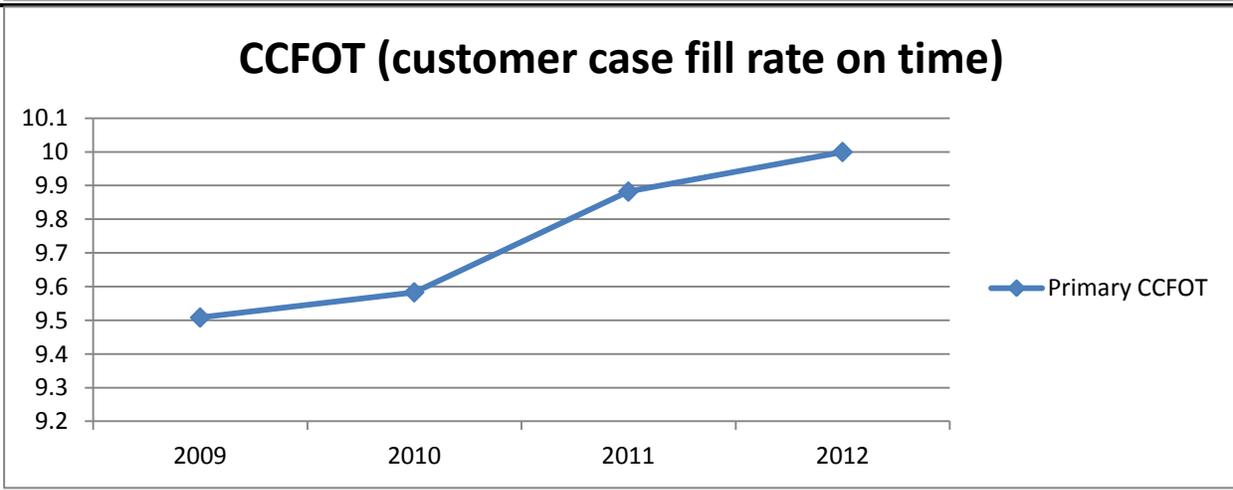
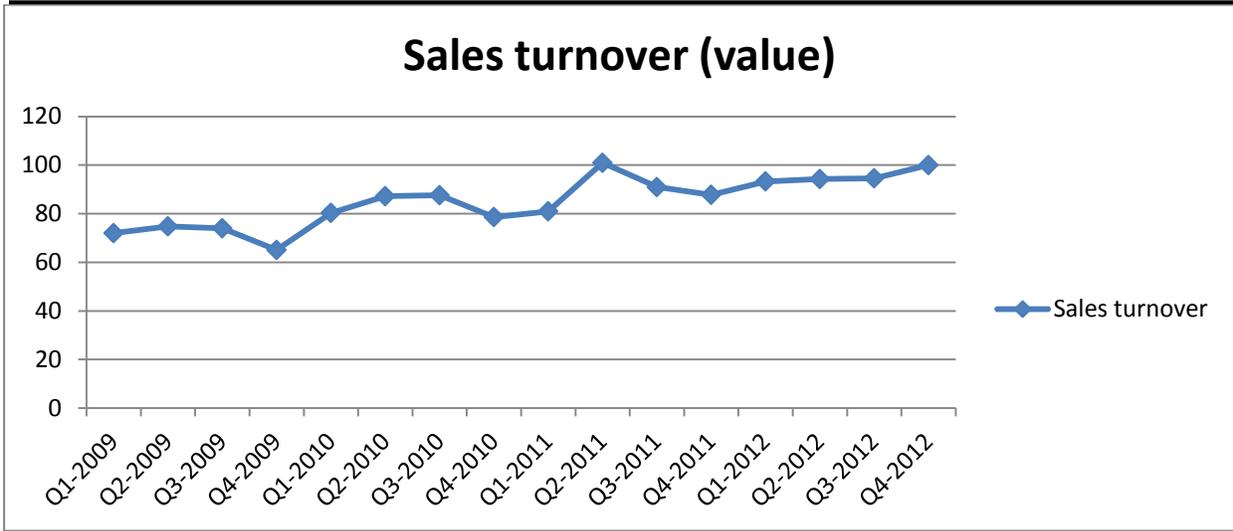
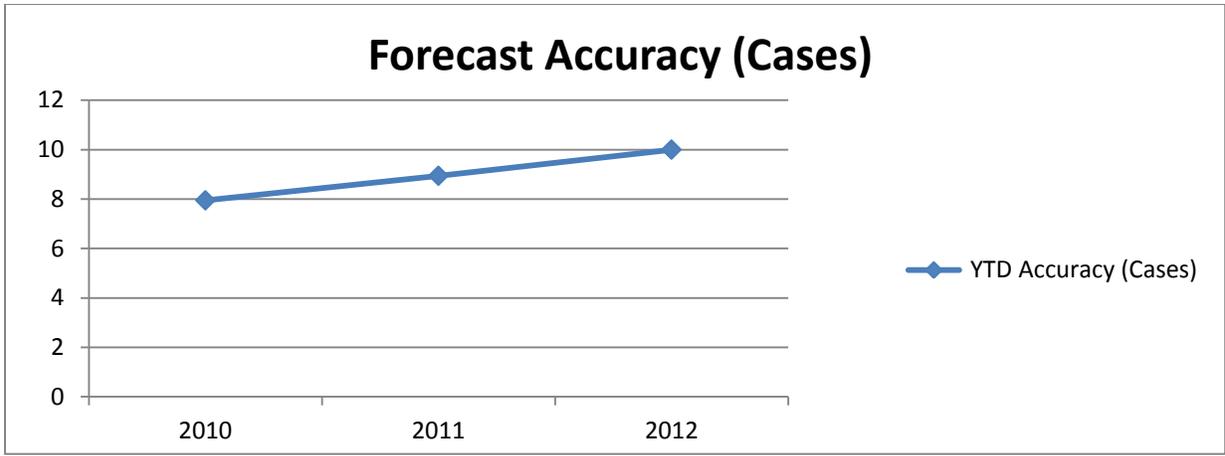


Figure 3: Integrative KPIs of Unilever Mashreq
 (Source: Unilever Mashreq company records, 2012)

According to Juettner *et al.* (2007) the functional KPIs appear to be a major barrier to collective integration goals. He argues based on his empirical study functional KPIs prohibits tactical managers from aiming at the overall company goals and narrow their efforts towards functional goals. As an alternative, integrative KPIs are designed to cover broader set of collective company objectives rather than assessing functions on isolated or conflicting performance measures. The KPIs presented here are considered integrative or collaborative KPIs evaluating the impact of the integration between marketing and supply chain. Integrative KPIs, their design and identification is another part of the research work in progress.

Conclusion and directions for further research

Little empirical research has been traced on the integration between demand-focused (marketing) and supply-focused (SCM) processes. Based on SnOP planning and forecasting process, this paper tends to close this gap in literature and practice. The purpose is not to argue the usefulness of a specific solution but rather to develop an explanation for observed phenomenon which seems to have implications for theory and practice (Yin, 2003). The contribution of this research is mainly reflected in helping academics and practitioners identify the suitable SCM integration process that would assist in balancing customer value creation with the existing resource scarcity.

In the existing highly competitive markets, possessing clear customers' insights and responding effectively to their different needs, through the coordination and integration of marketing and SCM, can be a source of a superior competitive advantage. This paper proposed a SCM integration model, referred to as SnOP, which combines the strengths of marketing and SCM through aligning demand and supply focused planning, forecasting, decision making and responsibility. The complexity and depth of the implementation depends on individual companies' practices.

Marketing is traditionally market oriented, concerned with customer value creation, while SCM has had an internal focus, mainly, concerned with the efficient use of resources in implementing marketing decisions. Marketing and SCM integration is a process of demand creation and fulfillment. Hence, the proposed framework, based on empirical research, proves that customer value creation and improved business performance cannot be achieved unless efforts are integrated from the demand side (marketing) and supply side (SCM). The case studies in this research presented partial evidence of the positive impact of the successful Demand/Supply integration, through SnOP processes, on business integrative rather than functional KPIs.

Further research should be done to cover more case studies to investigate the usefulness of the integration processes between marketing and SCM, in particular, through the SnOP planning and forecasting model. In addition, research needs to be carried out to identify collaborative and integrative KPIs, capable of evaluating the impact of this integration, rather than functional KPI focusing on the assessment or narrow functional efficiencies.

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