

Demand Planning Information Sharing: N ZAR

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Abstract: Organisations are currently faced with difficulties in effectively aligning demand plans to the volatile environments in which they operate. While operating environments and consumer needs change, capacity capabilities often do not reflect the demand plans. The absence of alignment results in inaccurate forecasts, thus putting the long-term sustainability of a business at risk. The focus and aim of the study is to understand how demand planning information are shared at N ZAR for optimal performance. A quantitative explorative case study research design is being used and data was collected through a structured self-administered questionnaire in this study. The sample size was 86, which comprised of employees from Demand and Supply Planning, Finance and Control, Sales and Marketing divisions. The sample includes top management, middle management, first level management and non-management. Data analysis uses descriptive and multivariate statistics. The study findings show most of the participants responded positively to the statements that information sharing achieves demand chain coordination. This study recommended that top management should provide full support to information sharing initiatives to facilitate the demand planning process.

Keywords: Capacity, constraints, demand chain, forecasting, information sharing.

INTRODUCTION

The continually changing marketplace puts a great deal of pressure on businesses to meet the demands of their customers, while at the same time achieving their projected targets. With increasing competition and fluctuating demand, companies more than ever need to increase their level of accuracy when it comes to demand planning (Grimson & Pyke 2007, 354). Increased competition and economic instability result in a continuously fluctuating demand. This places pressure on companies to develop new strategies to improve the level of efficiency in their supply chains while reducing overall costs (Browning and Heath, 2009). Demand chain management needs to be managed in an environment characterised by uncertainty, dynamism and complexity, for instance the fast-moving consumer goods industry. Demand chain management has been highlighted to be a strategy in business that allows the alignment of demand and supply from the customer, supply chain partners and supply chain channels (Deshmukh & Mohan, 2016, 20), hence resources must be effectively utilised. It makes sense for businesses to have prior plans and decisions on how to trade, conduct their business and retain customer base. This means that at every point in a supply chain, the demand requirements need to be addressed to create a successful business synergy. Organisations need to review their operating models to ensure that they are responsive to the increasingly complex demand of business (Loretto, 2014, 5). While

effective capacity planning is one mechanism that can be used to achieve efficiency and reduced costs (Bakke & Hellberg 1993, 254), one of the main challenges of achieving effective demand planning is information sharing within a company.

The focus of demand chain management is ensuring the customers' needs are ensured and handled well, hence facilitating a lasting relationship. In delivering customer's needs, organisations put varied plans in place to meet up set objectives. According to Szozda, and Werbinska-Wpjcichowska (2013) quality of demand planning depicts a business performance. Trust and loyalty can be built with customers, and this prompts the quality and type of information that is shared. This information must be accessed by every supply chain partners and even within the entire company information can be shared harmoniously to ensure right decisions are made. The type of information shared can assist retailers to make decisions on forecasting, quantity of goods to keep and time to launch products to the market. Agrawal (2012, 203) echoed that demand chain management focuses on the instant flow of demand-associated information from the end customers to the point where it is used (the vendors) with the notion of optimally using the marketing functions of distribution to ensure that value is created in the supply chain. However, as the 21st century continues to evolve, the environments in which organisations operate are characterised by increasing competitiveness, globalisation pressures and sustainability requirements. These put pressure on companies to implement strategies to meet the demand with minimal resources and at the lowest cost to the business. Nonetheless, some organisations have

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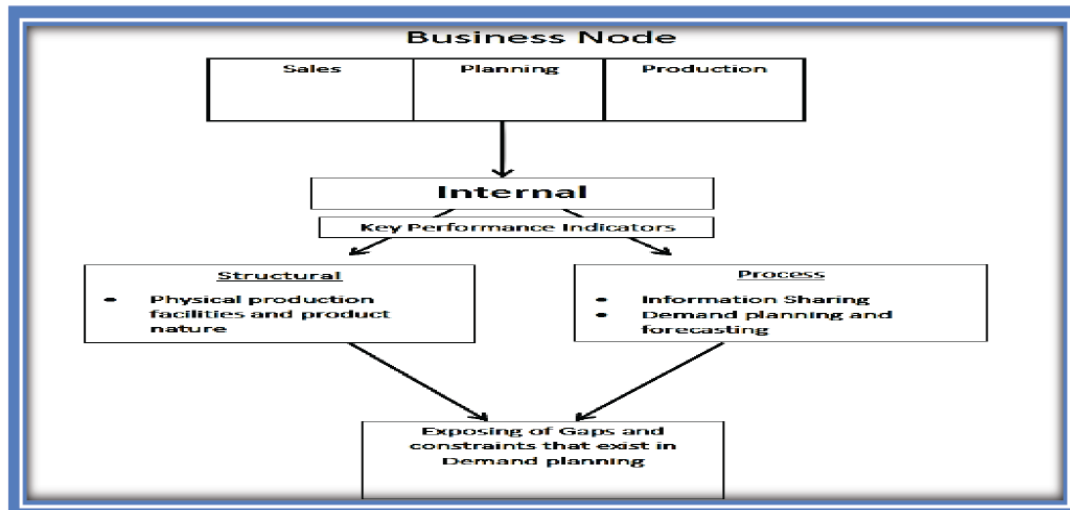


Figure 1: Holistic Demand Planning Approach.

Source: Nielsen & Steger-Jensen (2006).

trouble in effectively sharing information on demand planning. The lack of information is likely to result in unreliable and inaccurate forecasting, increased supply chain cost ultimately putting the long-term viability of the business at risk. This study aims to investigate the extent at which information on demand planning is shared to improve the demand chain performance. To be successful, a business must have reliable plans and accurate forecasts in place, not only to identify potential business opportunities, but also to have the capability to exploit these opportunities. One of the biggest challenges to an organisation is being able to accommodate variability in demand and match supply with demand. And as such be able to share vital information to forecast demand optimally. The question then is, what is the extent of sharing demand planning information to improve demand chain performance? The significance of this study lies in the fact that there is dearth of information on demand chain management and as such, this study will attempt to address the gap.

THEORETICAL FRAMEWORK

Holistic Demand Planning Framework (HDPP)

The Holistic Demand Planning approach has been derived from the Hierarchical Demand Planning Approach (HDPA), first presented 1975 by Hax and Meal and further developed in 2006 by Nielsen and Steger-Jensen to tailor demand plans to multiple perspectives and objectives with demand planning success occurring when there is a match between systems. The Holistic Demand Planning (HDP) theory links both internal and external structures and process and should be coordinated by identifying several

relevant stakeholders, considering the external context as well as various objectives (Nielsen & Steger-Jensen 2006, 6).

LITERATURE REVIEW

N ZAR

This investigation is on a company known as N ZAR, which is a South African FMCG company that manufactures quality products for human consumption. It is one of the world's leading nutrition, health and wellness company. N ZAR has been in existence for a long time and is one of the leading companies in consumable goods. It has had a dependably strong market presence and is characterised by ever growing and changing product lines that aim to meet consumer demands. In recent years, however, N ZAR has been faced with challenges related to sharing of demand planning information that can assist to meet the demand of its customers.

Dynamics of Chain Management

To ensure demand chain management, employment and integration of technology tools is required in order to consolidate demand and share data amongst planning and control functions (Frohlich & Westbrook 2002, 732). By doing so, organisations can be more responsive to demand and reduce waste and returns (Christopher & Rayls 2014, 29). The shift in supply chains to demand chains is highly driven by market forces and development in new technologies (Christopher & Rayls 2014, 29), and the advancement of technology and internet have made this integration a

possibility, providing access to real time demand information and information visibility (Frohlich & Westbrook 2002, 729). Integrated business planning is an enabler for much closer alignment of supply and demand (Smith, Andraski & Fawcett 2011, 5; Stank *et al.* 2012, 179). It is thus important that there is a control in place for the distortion of information as it is amplified moving up the supply chain (Lee *et al.* 2004, 1882). One way to mitigate this risk is by balancing supply and demand across the supply chain, this requires flow of data between the integrated suppliers and buyers (Frohlich, 2002, 539; Chan & Chan 2009, 2).

Demand Planning

In a business, planning towards demand is the first step to subsequent process, including purchasing, production and distribution (Szozda *et al.* 2013, 77). One of the main issues within supply chain is predicting future demand, as the information that the upstream has, is not always what is necessarily required in the downstream. Supply chain performance is largely dependent on the quality of demand plans (Szozda *et al.* 2013, 77). For instance, Jung & Jeong (2012, 5416) identified that there is a relationship between the levels of early information received and forecasting performance, as well as the amount of investment obtained thereafter. Furthermore, (Triple point technologies 2012) conducted research on reducing the level of risk in the demand planning process, and found out that developing a feasible, constrained and profitable demand plan, is essential in the current environment. Demand planning is thus a representation of procedures and information sharing mechanisms used to fully optimise forecast in the demand planning process (Vickova & Patak 2011,1000), hence improving decisions made on size of production, inventory levels, the utilisation of resources and capacity, leads to an organisation's profit maximisation. The importance of demand planning is ever so increasing as it is a differentiating factor of customer relationship management and supply chain management (Kilger & Wagner 2010,135). Therefore, demand planning can be a strategic process that ensures that the right product is available at the right time and place.

Information Sharing

Sharing information in any organisation is vital to the success of the business. information sharing cascades from the downstream side of the supply

chain (end customers) to the upstream side (suppliers). A good enough information shared reduces the cost of holding inventory and shrinkage in businesses such as the FMCG industry. Hence, it is important that the number of inventories to be held by businesses, is planned for. It is in planning towards what to buy and how to trade such, that businesses forecast optimally. Planned information on demand improves the management of inventory. Information sharing can be used to access vital information on the status of products and materials in terms of flow, on the supply chain (Jonsson & Mattson 2013,3). Although advancements in technology have propelled the opportunity of information sharing, variables of aligned vision amongst planning partners, communication, trust, reciprocity, power amongst members and support from all levels of management need to be considered as influences in the quality of the information shared amongst supply chain partners (Wu *et al.* 2014, 123). In contrast to this, Shou, Yang, Zhang & Su (2013, 2137) explains that in markets that are characterised with abundant opportunity, firms become motivated to share information with partners in order to capture opportunities for market growth. Low levels of information sharing within companies, occur as a result of inefficient coordination of actions amongst business units (Lotfi *et al.* 2013, 298). The greatest value of information sharing is the benefits that are gained, which outweigh the associated costs (Li *et al.* 2001, 34).

Influencers on Information Sharing

Various factors influence the information that is shared in businesses and is discussed below

Inventory Control Policies

Policies on replenishing inventory in businesses such as FMCG is known as the main cause of bullwhip effect (Constantino, Di Gravio, Shaban & Tronci 2014, 292). It is expected that a constant check is made on the available inventory to plan a future purchase. Inventory control policy ensures that everything that has to do with inventory management is abided to, such as purchasing of materials and goods.

Interaction between Demand Planners

Demand planners must interact with each other hence the essence of information sharing is achieved. Information should be grasped on the instance that it is delivered so that the actual benefit is shared. Kumar, Singh & Shankar (2014) highlighted that when

organisations network with suppliers and customers, and have frequent departmental meeting enhances collaboration.

Shared Vision between Demand Planning Partners

All supply chain partners must have a common objective for the business. An objective that can be shared and can be beneficial to every member in the chain. When it comes to the demand planners, it is important that information on the capacity of resources, inventory level and how to offer better services to customers, is shared. This information allows for better demand forecast.

Trust

Virtually information shared is assumed to be safe with the recipient. Relationships are improved when trust is in place (Abdullah & Musa 2014, 266). A literature evidence indicates that trust and collaboration positively associate with information sharing and will reduce supply chain bullwhip effect (De Almeida, Marings, Salgado, Santos & Da Silva 2017, 203).

Top Management Support

Top management ensures that every decision taken are initiated throughout the organisations. In enabling success in information sharing, management communicates their vision for the business hence building trust in the organisation (Septer 2013). Management must be committed to share information amongst employees. Disseminating information to lower level employees is important as their services is directly related to the business customers.

Managing Demand Planning Collaboration Through Reliable Information Sharing

Information exchange is the key to managing physical product flow through the supply chain, as well as reducing costs and improving service performance of enterprises (Wu, Chuang, & Hsu 2014, 125). It is an indispensable tool for survival of businesses and an enabler of supply chain integration (Lotfi, Mukhtar, Sahran & Zadeh 2013, 298). In a supply chain, a prominent dominating issue regarding collaboration is the level and type of information that can be shared amongst partners (Montoya-Torres & Ortiz-Vargas 2014, 347).

Several authors (Lotfi *et al.* 2013, 299; Kocoglu, Imamoglu & Keskin 2011, 1630) have identified benefits of information sharing, such as better understanding of the customer and having the ability to

anticipate potential market changes. Supply chain leaders are currently using information integration to produce significant performance improvements. This includes faster product developments, reduced lead times and higher flexibility in supply (Cachon & Fisher 2000; Clark & Hammond 1997; Fawcett, Magnan, & McCarter 2008; Frohlich 2002; Hong & Rao 2010; Hult, Ketchen, & Slater 2004; Radjou 2003). The integration of information allows for connectivity in the supply chain but does not guarantee the protection of information that is shared (Zhu *et al.* 2014, 7). Partners are more willing to provide information on forecast and sales but are hesitant to share some strategic and sensitive information, as supply chain members may choose to use it to their advantage (Fawcett, Wallin, Allred & Magnan 2009, 224). The unwillingness to share such information, contravene the benefits that arise from investments made from information sharing and relationships, as there is unclear decision-making quality (Fawcett, Wallin, Allred, Fawcett & Magnan 2011, 39).

Integrating the Supply Chain for Collaborative Relationships

Collaboration is critical to the success of any supply chain (Chong, Ooi, & Sohal 2009, 154). Collaboration in the supply chain is established when there is a level of trust, communication, information sharing and interdependence amongst members of the supply chain (Wu & Chaung 2010, 304 Chong *et al.* 2009, 315). This collaborative relationship creates the opportunity for supply chain partners to share information on forecast data (Chong *et al.* 2009, 315). Researchers (Wu & Chuang 2010; Chong & Ooi 2008; Chong *et al.* 2009 & Tsung 2002) recognised that information sharing and integrating the supply chain, is a vital prerequisite for a collaborative relationship to be developed. A collaborative relationship is a combination structure that entails a few relationship attributes such as peer pressure, transaction climate and level of uncertainty (Wu & Chang 2010, 306). Research has shown that a firm needs to integrate information systems with key supply chain partners, in order to facilitate improved information sharing and data exchange (Hult, Ketchen, & Arrfelt 2007, 1037). The external integration with customers and suppliers is concurrently related to the internal integration commitment to these customers and suppliers (Zhao, Huo, Selen & Yeung 2011, 22). This means that internal integration makes external integration possible through developing capabilities to integrate systems, data and processes. Once this has been achieved,

external integration can occur (Zhao *et al.* 2011, 22). Information sharing can thus be applied for both internal and external integration (Montoya-Torres & Ortiz-Vargas, 2014; Zhao *et al.* 2011).

Research Strategy and Techniques

This article combines the use of theoretical framework with field investigations. Based on this the research approach chosen was quantitative. This study therefore used non-probability sampling, where the elements in the population do not have any probabilities associated with being selected as sample subjects (Sekaran & Bougie, 2013, 132). The target sample size is 155 with target population of 256. This study used an exploratory case study design which assisted in demand planning information sharing in N ZAR. It therefore seemed beneficial to incorporate the case study into the research design as it assisted the researcher in understanding the underlying issues in the study. This design was relevant to this study objective, as the impact of information sharing on outcomes of demand plans is not a widely explored phenomenon and very little literature is available on this topic. It adopted purposive convenience sampling technique, which involves selecting those participants who are accessible and in the best position to provide the required information on demand planning operations (Sekaran & Bougie 2013, 132). For the purposes of this study, the research was conducted at N ZAR Head Offices based in Bryanston, Johannesburg, in the Gauteng region, including its factories and distribution centres. Data was gathered using questionnaire to elicit responses. The SPSS programme was used to analyse the findings. N ZAR is based in five provinces, including Gauteng, KwaZulu-Natal, Eastern Cape, Western Cape and North West Province. The population of the study included all

employees in three divisions, who were working in Gauteng at the time of this study: Demand and Supply Planning (26), Finance and Control (200) and Sales and Marketing (30). Of the population of 256, a recommended minimum sample size was 155, deduced from (Sekaran & Bougie 2013, 22) table. However, only 86 respondents submitted a completed questionnaires. Cronbach's Alpha coefficient was used to measure reliability and the value was 0.84 which is regarded as acceptable.

Data Analysis

This item intended to establish the factors respondents perceived as the most critical factors that influence information sharing in the organisations. Top management support is a critical factor that influences information sharing in the organisations. Other variables that followed include shared vision between demand planning partners, trust among internal and external partners, frequent interaction between demand planners and difference in inventory control policies.

Information Sharing

From the order of response, quality information sharing contributes positively to higher demand accuracy. Others responses that followed include: integrated electronic demand chain management systems improve information sharing, information sharing achieves demand chain coordination and improves collaborative demand planning, information velocity improves functional information flow on demand planning process, adequate Information technology IT infrastructure (structural) to facilitate information sharing across stake holders and finally, quality data inputs required for demand plans are received from relevant stake holders.

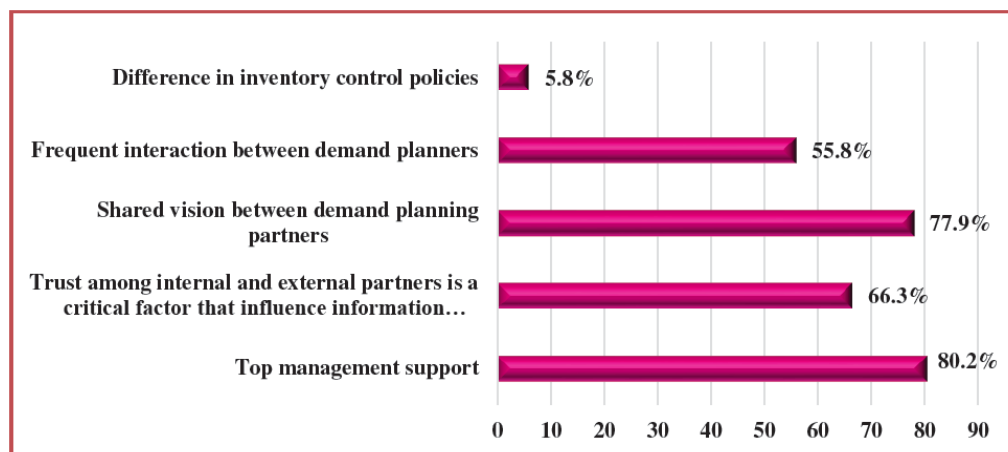


Figure 2: Critical factors influencing information sharing in the organisation.

Table 1: Information Sharing

	SD		D		N		A		SA	
	F	%	F	%	F	%	F	%	F	%
Information sharing achieves demand chain coordination and improves collaborative demand planning	1	1.2	0	0	7	8.1	32	37.2	46	53.5
Quality information sharing contributes positively to higher demand planning accuracy	1	1.2	0	0	1	1.2	15	17.4	69	80.2
Integrated electronic demand chain management systems improve information sharing	1	1.2	0	0	9	10.5	50	58.1	26	30.2
Information velocity improves functional information flow on demand planning processes	1	1.2	1	1.2	21	24.4	45	52.3	18	20.9
Adequate IT infrastructure (Structural) to facilitate information sharing across stakeholders (Planners, Sales and Production)	1	1.2	4	4.7	21	24.7	41	48.2	18	21.2
Quality data inputs required for demand plans are received from relevant stakeholders	3	3.5	25	29.1	18	20.9	33	38.4	7	8.1

Perceptions on Demand Chain Planning

The respondents had an option of selecting yes or no in response to the items on general perceptions on demand chain planning. The results were skewed to one side with the majority of the respondents perceiving demand chain planning positively (See Table 2). All the participants (100%; n=86) responded positively to the item that the advancement of technology have made internal network integration accessible to real time demand information visibility. About 98.8% (85) indicated that the extent of sharing

demand planning information improves demand chain performance and 98% (n=84) stated that collaborative planning and replenishment links sales and marketing information to demand chain planning and execution processes. About 97.7% (n=84) stated that collaborative demand planning utilises information shared by different functions in an organisation to achieve a one number forecast amongst the functions. About 96.5% (n=82) of the responded stated that collaborative planning and replenishment in your company is a tool used to achieve lower inventories, logistical costs and create efficiencies and that capacity decisions

Table 2: General Perceptions of Demand Chain Planning

	Yes	
	Freq.	%
The process of demand planning determines the capabilities of physical production facilities	69	80.2
The extent of sharing demand planning information improves demand chain performance	85	98.8
The effectiveness of collaborative demand planning and forecasting influences the capability and utilisation of business capacity	80	93.0
The company is able to link customers and suppliers together into closely integrated networks through demand chain management	73	84.9
Demand chain management is a practice that manages collaboration and coordinates planning and forecasting activities	64	74.4
The advancement of technology have made internal network integration accessible to real time demand information visibility	86	100.0
Demand planning is the process of forecasting how a product will sell and meet customer needs	78	90.7
Demand planning is a business process that predetermines future demand for both products and service levels	81	94.2
Demand planning is the business that assists in the aligning of production and distribution capabilities	80	93.0
Demand planning is the business that assists in the aligning of production and distribution capabilities.	65	75.6
Demand planning is the mechanism by which an organisation can foresee potential risks in the supply chain	79	91.9
Demand planning provides a company with an opportunity to redesign its forecasting process	72	83.7

generally determine capital requirements, which take up a share of a company's fixed costs, and also indicated that the company is able to formulate their demand plans collaboratively to improve the accuracy of their forecasts.

About 94.2% (n=81) stated that demand planning is a business process that predetermines future demand for both products and service levels. Ninety-three percent (n=80) stated that demand planning is the business that assists in the aligning of production and distribution capabilities. About 92.9 % (n=79) stated that demand planning is the mechanism by which an organisation can foresee potential risks in the supply chain. About 90.7% (78) of the respondents indicated that demand planning is the process of forecasting how a product will sell and meet customer needs.

RESEARCH RESULT DISCUSSION

The extent to which sharing demand planning information improves demand chain performance.

Factors that Influence Information Sharing

Many of the respondents had strong views on two factors that influence information sharing in the organisation: level of information sharing and support from top management. Trust amongst internal and external partners as well as frequent interactions between demands planners were strongly supported as influencing factors. This indicates that to facilitate information sharing in the organisations top managements should provide enough support and a shared vision should exist amongst demand planning partners. Variables of aligned vision amongst planning partners, communication, trust, reciprocity and power amongst members and support from all levels of management need to be considered as influences in the quality of the information shared amongst supply chain partners (Wu *et al.* 2014, 123). Lotfi *et al.* (2013, 298) also support the view that communication amongst partners and efficient coordination amongst business units is important to achieve valuable information sharing. In contrast, Shou *et al.* (2013, 2137) states that in markets that are characterised with abundant opportunity, focus is less on the influencing factors and information sharing is highly motivated by opportunities of achieving market growth.

Information Sharing in the Demand Planning Process

Under general perceptions of demand planning process, several variables were taken into

consideration that relate to information sharing. Wu *et al.* (2014, 123) states that in the demand chain, the advancement of technology has propelled the level of information sharing amongst planning partners. In today's operating environment, to improve the level of competitive advantage, supply chain partners have adopted networking concepts in order to facilitate information sharing (Ho *et al.*, 2002, 4418). Promoting quality information sharing in the planning process produces significant performance improvements, this includes faster product developments, reduced lead times and higher flexibility in supply (Cachon and Fisher, 2000; Clark & Hammond, 1997; Fawcett *et al.*, 2008; Frohlich, 2002; Hong & Rao, 2010; Hult *et al.*, 2004; Radjou, 2003). Research has shown that a firm needs to integrate information systems with key supply chain partners in order to facilitate improved information sharing and data exchange (Hult *et al.*, 2007, 1037). Evidently, this was also supported through the results as a hundred percent are of the vies that advancement of technology have made internal network integration accessible to real time demand information visibility.

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Perceptions on Information Sharing

Respondents mostly agreed that information sharing achieves demand chain coordination and

improves collaborative demand planning. With customers becoming more aware of their improved choices and demanding faster response times, shorter product cycle times and competitive products/services, business goals may be difficult to achieve if business units and supply chain partners continue to work in silos (Zhu, Gavirneni, & Kapuscinski 2010, 175). This indicates that the benefits of information sharing and collaboration amongst planning partners can highly improve demand chain performance as organisations can provide what the customer wants. Another group of respondents agreed that an integrated electronic demand chain management system improves information sharing and an adequate IT infrastructure (Structural) was necessary to facilitate information sharing across stake holders (Planners, Sales and Production). The advancement of technology has mitigated the costs associated with information sharing and developments such as Enterprise Resource Planning (ERP) and Web technologies have improved the way in which this sharing can occur (Lotfi *et al.* 2013, 299). It is important to note that, partners in businesses are more willing to provide information on forecast and sales but are hesitant to share data on strategic and sensitive information, as supply chain members may choose to use it to their advantage (Fawcett *et al.* 2009, 224). The unwillingness to share such information contravene the benefits that arise from investments made for information sharing and relationships as there is unclear decision-making quality (Fawcett *et al.* 2011, 39).

CONTRIBUTIONS OF STUDY TO KNOWLEDGE

The study has been conducted to offer insight on demand chain planning operations within capacity constraints. Results may be valuable for role players as there are limited studies that focused on multiple variables in this field of supply chain management. Although there were no significant associations between the variables of interest in this study, the differences in the responses by the different categories depending on the position in the organisation silently communicates a message of some disjuncture between the views of those at operational level and those at leadership level.

RECOMMENDATIONS ON THE ORGANISATION

- Top management should provide full support to information sharing initiatives to facilitate the demand planning process
- Build a consensus demand plan amongst key stake holders
- Improved quality of information shared is required from external stakeholders for input in demand plans
- Plan capacity through time horizons (short, medium and long term) to allow better capacity flexibility in medium- and long-term horizon

STUDY IMPLICATIONS AND SUGGESTIONS FOR FUTURE INVESTIGATION

The implication of this study rest on that fact that organisations must do all in their power to share quality information based on trust with their partners, collaborating on demand to align forecast and gain a positive demand performance. The unique contribution of this study is that little has been done on demand chain management and this study bridges the gap in relation to information shared on demand planning. Future research is suggested that will include all the provinces where N ZAR operates. The tool used for data collection in this study will have to be revisited and subjected to the scrutiny of the practitioners in supply chain management, those in operational level and in academic institutions to ensure that the terminology used will be understood in an almost similar manner.

CONCLUSION

The focus was heavily placed on how the management of supply chains has changed, organisations and supply chain partners have chosen to take a demand chain management approach to running organisations. It was made evident that quality information sharing is a facilitator of the demand planning process and provides an opportunity to improve demand planning accuracy through the various stakeholders. Though information allows for connectivity in the demand chain, but it does not guarantee the protection of information that is shared. This factor prohibits partners to provide information freely. Quality of information shared is highly influenced by a shared vision amongst demand planning partners and top management support. Trust amongst internal and external partners as well as frequent interactions between demands planners were also noted as supporting factors to facilitating information sharing. The objective was to understand extent does sharing demand planning information improves demand chain performance. A collaborative demand plan that utilises information shared by various functions will ultimately

result in an aligned forecast and improve demand chain performance. Highly positive views were expressed towards the statement that information sharing achieves demand chain coordination. This suggests that the benefits of information sharing and collaboration amongst planning partners can highly improve demand chain performance as organisations can provide what the customer wants. Therefore, it is essential for chain partner to actively provide information on factors that may influence demand.

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