

A Conceptual Framework for Collaborative Forecasting in the UK Food Supply Chain

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Abstract:

Collaborative Forecasting (CF) is a common practice in several industries by partners to forecast customers' demand accurately and to increase common profits. However, the success of CF depends on the partners' tight information-forecast relationships which is a challenge in the food industry. This study looks into manufacturer-retailer collaboration in the UK food supply chain, and aims to develop a preliminary conceptual framework by identifying the key factors that influence long term performance and accuracy of CF. Literature survey and semi-structured interviews were employed for data collection from academic literature and industry. A new model for Synchronized Information Forecast Collaboration (SIFC) was developed which includes two key components: Collaborative Information Sharing (CIS) and Reconciled Forecasting Process (RFP). CIS and RFP aim to achieve long-term and accurate CF respectively. The study uncovered that "Retailers' Shelf Tracking Performance" has an impact on CIS. Furthermore, it was found that "Retailers' Forecast Results" and "Judgmental Forecasting" influence RFP, while "Trust", "Retailer Driven Data Management" and "Promotion Types" affect both CIS and RFP interdependently.

Key-words: UK Food Supply Chain; Collaborative Forecasting; Information Sharing; Forecasting Process.

1. Introduction:

Collaborative Planning Forecasting and Replenishment (CPFR) is a concept that employed by supply chain partners to strengthen their relationships in process management and information sharing (Seifert, 2003). In addition to this, Collaborative Forecasting (CF) as an element of CPFR plays the bridge role among partners to strengthen their communication and to build joint forecasting for better demand visibility in the supply chains (Aviv, 2007).

In recent years, the CF approach has been examined from different perspectives. The extant literature highlight its importance on complex relationships with the capabilities of reducing exchanged costs, bullwhip effect, inventory loss and improving supply chain performance (Aviv, 2002, 2007; Chang et al, 2007; Fang and Meng, 2010). However, there are evidences illustrating the weaknesses of CF in the food supply chain (Aviv, 2001; Du et al., 2009). For instance, unachievable long-term and non-transparent CF within manufacturer-retailer relationships are reported as two main barriers for food practitioners (Vlachos and Bourlakis, 2006; Småros, 2007). The differences in organizational expectations and manufacturers' incompetence in information sharing (IS) have been claimed as major reasons of these barriers (Vlachos and Bourlakis, 2006; Småros, 2007). However, these reasons have been asserted from retailers' point of view in specific industries, so they cannot be generalized to the food industry. In this direction, the food supply chain needs more sustainable and applicable contributions assisting both manufacturers and retailers to improve CF performance (Aviv, 2001; Vlachos and Bourlakis, 2006; Småros, 2007; Aviv, 2007; Du et al., 2009).

This study aims to develop a conceptual framework to examine a manufacturer's collaboration with a number of retailers in the areas of information sharing and forecasting

processes in the UK food supply chain. Literature survey and semi-structured interviews are employed as data-gathering techniques. A preliminary conceptual framework was developed through systematic review of the extant literature identifying the key factors that affect performance of CF. The framework was then refined through informal interviews with supply chain director of a UK based manufacturer to increase validity of the framework.

The remainder of the paper is organized as follows. The next section provides a summary of the literature review and highlights the contributions of previous research. Research objectives and questions are presented subsequently followed by the research methods adopted to answer the research questions. Next the findings are discussed in depth. Finally, the paper is summarized with discussions and conclusions.

2. Literature Review:

2.1. Food Supply Chain and CF

Småros (2007) investigated CF in European grocery sector in a range of product categories including chemical, confectionary, dairy and meat products in retailer's collaboration with four different manufacturers. According to the author, retailers and manufacturers cannot implement large-scale CF relationships because, partners have different (yet overlapped) expectations and views in relation to mutual benefits, IS and forecasting approaches. The same problem has been encountered while Greek food supply chain was investigated by Vlachos and Bourlakis (2006). However, their findings illustrated that the collaborative factors of trust, commitment, information exchange management, category management and physical distribution have a positive impact on the effectiveness of collaboration, but duration of collaboration is not reported as an influencing factor in this regard. The role of retailers and their forecasting skill in CF were questioned in supply chain, and their beneficial influence has been demonstrated by Aviv (2001, 2002, 2007) and Taylor and Xiao (2010). Contrarily, Småros's (2007) study on meat products indicate that retailers' ineffective forecasts influence the CF negatively, but do not have any impact on the IS and partners' relation while CF is managed by manufacturers. This observation challenges the assumption on the role of retailers in CF.

CPFR was addressed in manufacturer-farmer collaboration by Du et al. (2009). They have integrated CPFR with Collaborative Transportation Management (CTM) and developed a new framework for perishable products. The aim of their study was to increase the forecast accuracy for these products in order to sell them to customers with better conditions. Their findings support that the developed framework reduces potential inefficiencies in transportation processes, and improves purchasing and communication relationships between

manufacturers and farmers. Their framework is quite complex and cannot be easily implemented by practitioners who deal with seasonal demand and short-life agricultural products, such as egg, milk, cake, meat, vegetables, seafood and fruits (Du et al., 2009).

The findings of the literature survey encourage further study on the main barriers of CF in the areas of inadequate large-scale CF and non-transparent forecast accuracy in the food supply chain with regard to dairy and/or short-shelf life of foods.

2.2. UK Food Supply Chain and Manufacturer-Retailer Collaboration

Småros (2007) demonstrate that manufacturers' long output intervals diminish the value of accessing timely information, such as POS data for new products. In addition, existence of inadequate internal integration in manufacturers leads to information loss during information transfer within manufacturers and between partners. For that reason, the author calls for further research to investigate the influence of manufacturers' production process and capacity, and partners' forecasting views on CF.

Fildes et al. (2009) analyzed judgmental forecasting between UK located partners to verify its impact on forecast accuracy. They reported that manufacturers and retailers cannot collaborate efficiently in the UK supply chain. Furthermore, other problems in the UK and/or European supply chain have already been revealed regarding manufacturer-retailer collaboration as: poorly managed demands, inadequate and irregular data transfer and lack of shelf availability (Småros, 2002; Taylor and Fearn, 2006).

Based on these evidences, the current research sets out to identify problems in collaboration between manufacturers and retailers in the UK food supply chain.

3. Research Objectives and Questions.

Many researchers have investigated the importance of IS within organizations and between partners during the CF (Aviv, 2001, 2007; Småros, 2007; Vlachos and Bourlakis, 2006; Zhou and Benton, 2007). In addition to positive contributions, significant challenges have been identified such as manufacturers' slow information transfer towards retailers (Aviv, 2007), missed information in manufacturers, and their incapability of using information shared by retailers (Småros, 2007). Furthermore, disagreement between manufacturers and retailers on IS has been identified as a major problem for CF. (Aviv, 2007; Vlachos and Bourlakis, 2006; Småros, 2007; Zhu, Mukhopadhyay and Yue, 2011). Accordingly, the first objective of this research is to identify potential bottlenecks leading to delays during internal information transfer between departments of an organization. Based on this objective we seek answers for this question:

Q.1. What are the bottlenecks of internal information sharing inside the manufacturer and retailers that lead to delays between departments?

It has been demonstrated that the information which is shared between departments and organizations may be subject to distortion (Taylor and Xiao, 2010). In addition, slow and irregular information transfer cannot be used timely and correctly (Aviv, 2001; Småros, 2002; Taylor and Fearn, 2006). These problems have been supported by evidences which illustrate demand-forecast information loss and inability of using them by manufacturers (Småros, 2007). Moreover, it has been verified that the content of information plays a significant role on the effectiveness of the supply chain (Zhou and Benton, 2007). Accordingly, we aim to explore the key factors influencing undistorted and/or consistent IS within the manufacturer and between partners. For that reason, we intend to answer this question:

Q.2. Which are the key factors that impact undistorted and/or consistent information sharing within the manufacturer and between the manufacturer and retailers?

Because, manufacturers and retailers cannot increase their mutual benefits with only efficient IS in collaboration (Aviv, 2007). It is imperative to explore the forecasting process of partners regarding its duration, the applied methods and term of forecasts. Moreover, partners who work closely during this process demonstrate more accurate forecasts and avail from CF effectively (Aviv, 2001; Siefert, 2003; Ireland and Crum, 2005; Taylor and Xiao, 2010). However, partners' incompatible approaches and/or needs prevent them from following the same forecast collaboration; so reliable CF cannot be exercised between them (Sanders and Manrodt, 2003; Vlachos and Bourlakis, 2006; Småros, 2007). From this point of view, it is aimed to explore the key parameters affecting forecasting process by addressing the following question:

Q.3. What are the factors that encourage the manufacturer and retailers to follow reconciled forecasting process in CF?

4. Methodology

A combination of secondary and primary research methods are applied in this research. Initially, we analyzed the literature in the area of food supply chain / supply-chain management (SCM), CPFR-CF / Forecasting Methods and IS to answer the research questions and to establish a preliminary conceptual framework to verify potential barriers of CF in practice. Subsequently, the findings were examined with a single UK food manufacturer in order to modify the conceptual framework. During this period informal and semi-structured interviews were implemented with the supply-chain director of the manufacturer. Further interviews are planned to be implemented in the next stage of the research in the marketing and supply chain departments of retailers as well as production, marketing and supply chain departments of the manufacturer to further refine the conceptual framework.

The main purpose of employing both literature survey and semi-structured interviews were to explore the CF challenges in both academia and practice, and on this base develop a comprehensive framework. A similar approach was also followed in similar studies which investigated the food industry to consolidate validity of their findings (Småros, 2007; Hill and Scudder, 2002). In addition, the study considered one manufacturer to investigate its different CF relationships with several retailers as suggested for future research in CF by Småros, (2007). The list of papers analyzed in this research along with the areas of their findings is presented in Table.1.

No	Papers	Application areas		
		Food Supply Chain / SCM	CPFR-CF / Forecasting Methods	IS
1	Aviv, 2001	✓	✓	
2	Aviv, 2002	✓	✓	
3	Aviv, 2007	✓	✓	✓
4	Chang et al., 2007	✓	✓	✓
5	Fang and Meng, 2010	✓	✓	✓
6	Fildes et al., 2009	✓	✓	
7	Ireland and Cum, 2005	✓	✓	
8	Kerr and Tindale, 2011		✓	
9	Mentzer, Min and Zacharia, 2000	✓		✓
10	Sanders and Manrodt, 2003		✓	
11	Siefert, 2003	✓	✓	
12	Småros, 2002	✓	✓	✓
13	Småros, 2007	✓	✓	✓
14	Synetos et al., 2009		✓	
15	Taylor and Fearn, 2006	✓	✓	✓
16	Taylor and Xiao, 2010	✓	✓	
17	Van Swol, 2011		✓	
18	Vlachos and Bourlakis, 2006	✓		✓
19	Zhou and Benton, 2007	✓		✓
20	Zotteri, Kalchschmid and Caniato, 2005		✓	

Table.1- List of papers analyzed for development of the Conceptual Framework

5. Findings

5.1. Infrastructure of the Conceptual Framework

Initially, an infrastructure of the conceptual framework was developed (as shown in Figure.1) to establish boundaries of the research and to seek individual factors having an impact on the CF performance in the manufacturer-retailer collaboration.

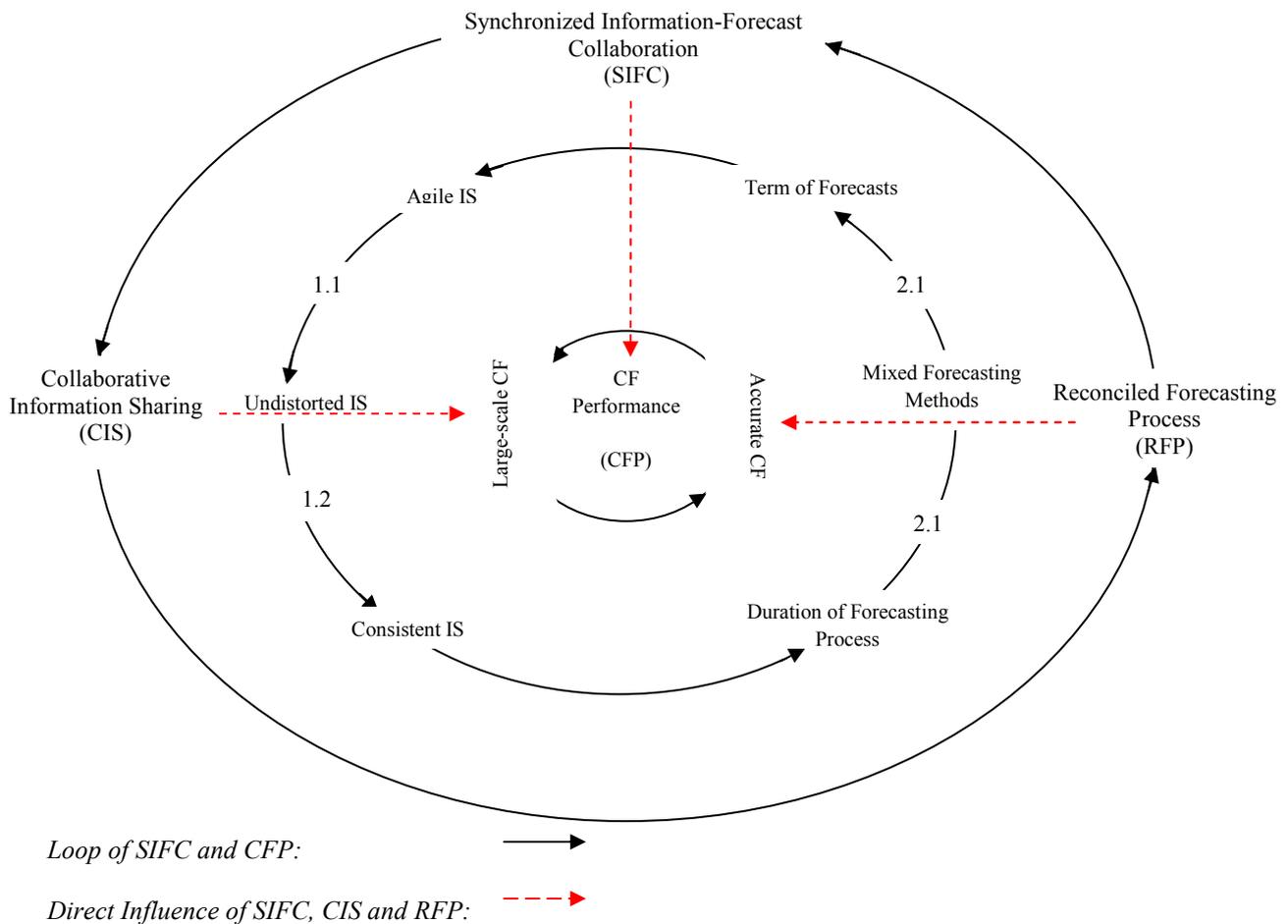


Figure.1- Infrastructure of the Conceptual Framework

The developed infrastructure points out the to the major research objectives improving the CF performance through long-term collaboration and accurate forecasts in the manufacturer-retailer collaboration. Accordingly, we considered the Synchronized Information-Forecast Collaboration (SIFC) and its underpinning bases including Collaborative Information Sharing (CIS) and Reconciled Forecasting Process (RFP) to achieve the research objectives.

Afterwards, key obligations were identified which should be made by both manufacturers and retailers to increase CF performance.

5.1.1. Synchronized Information-Forecast Collaboration (SIFC)

Different expectations by partners in regards to IS and forecasts restrict them to develop long-term and accurate CF (Vlachos and Bourlakis, 2006; Småros, 2007). It is argued that if partners do not have mutual objectives and willingness in their collaboration, they cannot pay sufficient attention to their CF relationships (Taylor and Fearné, 2006). In order to prepare a convenient environment for partners to have strong CF relationships we primarily assume that they need to build up information-forecast based collaboration and synchronize their relationships within the information sharing and forecasting processes by adopting common perspectives, which is named SIFC. Therefore, partners should collaboratively share information within their departments and between partners, called CIS; and then, to engage their forecasting processes via CIS sources, named RFP, for sustainable SIFC.

5.1.2. Collaborative Information Sharing (CIS)

CIS was selected as the first keystone for successful SIFC since, information transferred within and between organizations has a crucial impact on large-scale CF (Aviv, 2001, 2007; Småros, 2007; Fang and Meng 2010) and the effectiveness of the supply chain by increasing the demand visibility and reducing forecast errors in the supply chain (Zhou and Benton, 2007). For successful CIS we presume that IS should be agile, undistorted and consistent IS.

Relevant to agile IS, the response rate within organizations directly influences partners' forecast and production planning, and potential delays lead to uncertainties on shared information (Aviv, 2007). For instance, while partners make CF for dairy or similar goods,

information should arrive on time or earlier than expected to cope with demand uncertainties (Småros, 2002, Taylor and Fearn, 2006). For that reason, agile IS within organizations is assumed to be a primary requirement for CIS.

Next, manufacturers within their departments and retailers with manufacturers should implement undistorted IS. Manufacturers' departments should transfer information which is collected from retailers among each other without changing it; otherwise it may lead to information loss and thereby influence their forecasting and production negatively (Småros, 2007). On the other hand, it is known that information-forecast data sent by retailers have an invaluable role on manufacturers' production plan and inventory management. If the data is accurate, it influences manufacturers' profit level positively; otherwise it damages them (Taylor and Xiao, 2010). Moreover, it may trigger reluctance and different expectations between partners (Aviv, 2007). In order to maintain mutual benefits and boost forecast accuracy in collaboration, manufacturers within their departments and retailers towards manufacturers should transfer information without any change. Therefore, it can be argued that CIS should be supported by undistorted IS.

Lastly, CIS should be enforced with consistent IS by retailers. Manufacturers regularly would like to obtain required information from retailers to update their forecasting and production plans to increase forecast accuracy and mitigate inventory costs (Småros, 2002). Different planning horizons of manufacturers and retailers seem to be one of the barriers for consistent IS (Småros, 2007). However, in order to cope with demand uncertainties, as a result of seasonal or unpredictable events, retailers should inform manufacturers of any changes in demand consistently (Taylor and Fearn, 2006). In this way, consistent IS is suggested as complementary requirement to increase the success rate of CIS.

5.1.3. Reconciled Forecasting Process (RFP)

Several authors support that partners should focus on forecasting processes together to cope with demand uncertainties efficiently (Småros, 2002; Taylor and Fearn, 2006; Kerr and Tindale, 2011). Especially, when retailers are kept within this process, forecasts become more accurate (Aviv, 2001, 2002, 2007; Taylor and Xiao, 2010). In spite of counter views about retailers' role on forecasting process (Småros, 2007); there are evidences that strongly support the positive impact of group forecasting on the accuracy (Kerr and Tindale, 2011). For that reason, our study considered the RFP to improve forecast accuracy in SIFC. Within this phase, if manufacturers and retailers have the same viewpoint on the duration of the forecasting process, mixed forecasting methods and term of forecasts, their processes can be reconciled canorously.

In relation to duration of the forecasting process, existing evidence affirm that sharing required and usable information with partners reduces the time spent during the forecasting and increases the accuracy (Småros, 2002). Accordingly, we assume that partners initially should step by being agreed on the required time to generate forecasts, and then initiate following operations to take the required measurements on time for unexpected demand changes.

In addition to the duration of the forecasting process, employed methods in forecasting process have impact on the forecast results. The literature indicate better performance of the quantitative compared to qualitative methods because the former have less forecast errors; while they are attributed with disadvantages such as bias, optimism and wishful thinking (Sanders and Manrodt, 2003). Nevertheless, qualitative methods are employed in many industries to develop accurate forecasts (Sanders and Manrodt, 2003) because of forecasters'

experience (Småros, 2007), motivation and large amount of adjustments' positive effect on the forecast (Fildes et al., 2009). Furthermore, while forecasts are generated within short periods for intermittent demand, the efficiency of qualitative methods on the forecast accuracy increases (Synetos et al., 2009). As a consequence, we conjecture that mixed methods should be implemented in the RFP to avail from qualitative methods' features and boost forecast accuracy (Ireland and Cum, 2005; Siefert, 2003). In this way, both manufacturers and retailers can contribute to RFP and supplement one another: retailers' statistical and time-series methods together with manufacturers' judgmental method support their forecasting (Småros, 2002).

Finally, we think that manufacturers and retailers should agree on the term of forecasts in order to support the RFP's applicability and make it referable to various products in the food supply chain. During the collaboration, manufacturers usually give more weight to accuracy compared to retailers, and apply long term forecasts, such as weekly or monthly, because of long production lead times. On the other hand, retailers apply short term forecasts to manage their inventory effectively (Småros, 2002, 2007). Thus, the study was prompted to reveal key factors persuading partners to agree on the same term of forecasts and complete the RFP successfully.

After specifying the functions of SIFC bases (CIS, RFP) and their edge requirement to improve CF performance, the research sets out to explore vital factors strengthening or weakening the requirements' attainability in the SIFC. In this line, we aim to explore major parameters which indirectly, but remarkably have a significant role on the CF performance.

5.2. Literature-based Findings

During the literature analysis, we identified the factors with an impact on the CIS, RFP and both CIS and RFP interdependently. For that reason, they were explained under three different categories.

5.2.1. *Factors having an impact on the CIS*

This subsection addresses both first and second research questions with the aim of developing long-term CF within the manufacturer-retailer collaboration.

Retailers' Shelf Tracking Performance: Literature support that retailers' capability on shelf tracking has direct influence on the CIS. Pursuing the shelf availability information at different branches of retailers and transferring it to their responsible departments are vital activities to convey this information to manufacturers on time and accurately (Taylor and Fearnle, 2006). Thus, retailers' tracking performance appears to have an explicit impact on the agile and undistorted IS. In addition to this, when shelf life short products are considered in RFP, required data about shelf availability should arrive forecasters periodically to generate forecasts timely; otherwise, predictions may loss validity. For that reason, relevant circumstances strengthen the direct influence of retailers' shelf tracking performance on the consistent IS.

5.2.2. *Factors having an impact on the both CIS and RFP*

The factors presented in this subsection answer for all three research questions. We therefore assume that they have a significant role to develop both long-term and accurate CF.

Trust: Trust was explored as a primary factor that directly affects both CIS and RFP. In relation to the CIS, we presume that manufacturers and retailers should confide in each other to improve undistorted and consistent IS since, trust based collaboration increases partners' willingness to harmonize their relationships. Trust prompts partners to transfer information on regular basis without any change in order to obtain better profit from collaboration (Meltzer, Min and Zacharia, 2000; Chang et al., 2007; Vlachos and Bourlakis, 2006; Taylor and Xiao, 2010) . Accordingly, partners can build up long-term CF relationships.

On the other hand, we argue that trust factor has a remarkable impact on the RFP because; it provides a convenient environment for partners to take sustainable decisions about forecasts. If organizations have potential doubts against their partners, it triggers them to look for some opportunistic behavior within collaboration, which prevents to take the required decisions on time (Taylor and Fearn, 2006). Furthermore, while qualitative forecasting methods are employed between partners, they need a reciprocal trust to make effective judgments on the demand and term of forecasts (Van Swol, 2011).

Retailer Driven Data Management: This factor denotes the high responsibility of retailers sharing real customer and forecast information with manufacturers accurately and continuously. It can be hypothesized that if retailers undertake the data-management responsibility in the SIFC, it will allow manufacturers to obtain raw (undistorted) customer data during the CIS. Furthermore, retailers can share existing data with manufacturers regularly because of their existing power managing and sharing data in case of need. Notwithstanding the evidence supporting retailers' opportunistic behavior in IS (Taylor and Xiao, 2010), we assume that undertaken responsibility will increase the confidence of retailers to embrace SIFC, and it leads manufacturers to obtain undistorted data consistently (Taylor and Fearn, 2006; Aviv, 2007)

From the RFP side, the retailer driven data management factor can consolidate partners' CF relationships in order to produce more accurate forecasts. The reason is that while raw information is shared sufficiently, required time is not spent to filter it, so it obliquely reduces the forecast duration in the RFP (Aviv, 2001, 2002). Moreover, forecasters can be in agreement easily about employed methods and term of forecasts because of shared accurate data (Aviv, 2001, 2002, 2007; Taylor and Xiao, 2010). In doing so, both RFP requirements of mixed methods and the term of forecasts are indirectly influenced by the retailer driven management factor.

Promotion Types: Literature suggest that various promotions developed within manufacturer-retailer collaboration have an impact on the CIS and RFP. In the context of CIS, promotional activities in the food industry lead to variability of consumer demand, which in turn influences organizations' forecasting results (Taylor and Fearn, 2006). In order to cope with such challenges, retailers should obtain the data, which relates to the promotion, adequately within their branches and transfer to manufacturers directly. If the data is transferred late or inadequately, manufacturers cannot avail from it in their production, inventory and distribution management (Zotteri, Kalchschmind and Caniato, 2005; Taylor and Fearn, 2006). Accordingly, our assumption is that developed promotion types have direct influence on the agile, undistorted and consistent IS from the point of retailers' responsibilities on IS.

On the other hand, forecasters need adequate promotional data to generate accurate forecasts in the RF because, it orientates them to take sustainable decisions without spending too much time which leads to generate better forecast. For this reason, promotion types applied in SIFC appear to indirectly influence the duration of the forecasting process. From a different viewpoint, the duration of promotions and selected products have a direct impact on the RFP requirements of mixed methods and term of forecasts.

5.2.3. Factors having an impact on the RFP

We explored two important key factors enhancing the success level of RFP within the UK food supply chain in order to obtain more accurate forecasts. These factors provide answer to the third research question.

Retailers' Forecast Results: According to the literature and within the RFP, retailers' forecasts have a pivotal role on the accuracy of final forecasts. In spite of adverse views not believing the importance level of retailers' forecasts in CF (Småros, 2002, 2007), we assume it has a powerful impact. We argue that since, retailers' closeness to customers supports the reliability of collecting data; thus, it increases the quality of generated forecasts (Aviv, 2001, 2002, 2007; Taylor and Xiao, 2010). For that reason, retailers' final forecasts assist forecasters to apply mixed methods confidently and complete the process in shorter duration. In other words, it is assumed that retailers' forecast results directly influence the both forecast durations and the agreements on preferred methods.

Judgmental Forecasting: Literature suggest that this factor has a positive influence on the forecast accuracy however; organizations and demand characteristics have significant roles on its performance. (Synetos et al., 2009; Fildes et al., 2009). Normally, these forecasts have some disadvantages that increase forecast errors because of forecasters' bias, wishful thinking and partners' demand amplifications (Sanders and Manrodt, 2003). Nevertheless, it has notable capability on the intermittent and short-period demands, especially in the food supply chain (Synetos et al., 2009). Furthermore, experienced and motivated forecasters' different views can mitigate forecast errors and increase the accuracy (Småros, 2007, Fildes et al., 2009). In this direction, we assume that partners' agreement on the mixed methods and

specified terms are directly and positively influenced by judgmental forecasting. However, the role of forecasters should not be overlooked in that point.

Summary of the literature based findings and organizations' roles on these findings are shown in Table.2. The following section describes the preliminary conceptual framework built up by harmonizing all these findings.

The Role of Organizations on the Key Findings				Literature-based Factors													
				Retailers' Shelf Tracking Performance		Trust		Retailer Driven Data Management		Promotion Types		Retailers' Forecast Results		Judgmental Forecasting			
Manufacturers (M)				M	R	M	R	M	R	M	R	M	R				
Retailers (R)																	
CF Performance	(Accurate CF)	Synchronised Information-Forecast Collaboration (SIFC)	Collaborative Information Sharing (CIS)	Agile IS	-	✓	-	-	-	-	-	✓	-	-	-	-	
				Undistorted IS	-	✓	✓	✓	-	✓	-	✓	-	-	-	-	
				Consistent IS	-	✓	✓	✓	-	✓	-	✓	-	-	-	-	
	(Large-Scale CF)		Reconciled Forecasting Process (RFP)	Duration of Forecasting Process	-	-	✓	✓	-	✓	✓	✓	✓	-	✓	-	-
				Mixed Forecasting Methods	-	-	✓	✓	-	✓	✓	✓	✓	-	✓	✓	✓
				Term of Forecasts	-	-	✓	✓	-	✓	✓	✓	✓	-	-	✓	✓

No relationship: -

Direct Influence of Key Factors: ✓

Indirect Influence of Key Factors: ✓

Table.2- Literature-based factors and their correlation

5.3. Preliminary Conceptual Framework

At the end of the literature analysis identified findings generated the first shape of the framework. However, semi-structured interviews made with a food manufacturer played an important role to refine the framework. Because, investigating literature-based findings during the interviews and analyzing their validity in practice increased the quality of the framework. Figure 2 illustrates the refined conceptual framework, including the key factors and their direct and indirect correlations on the CF performance.

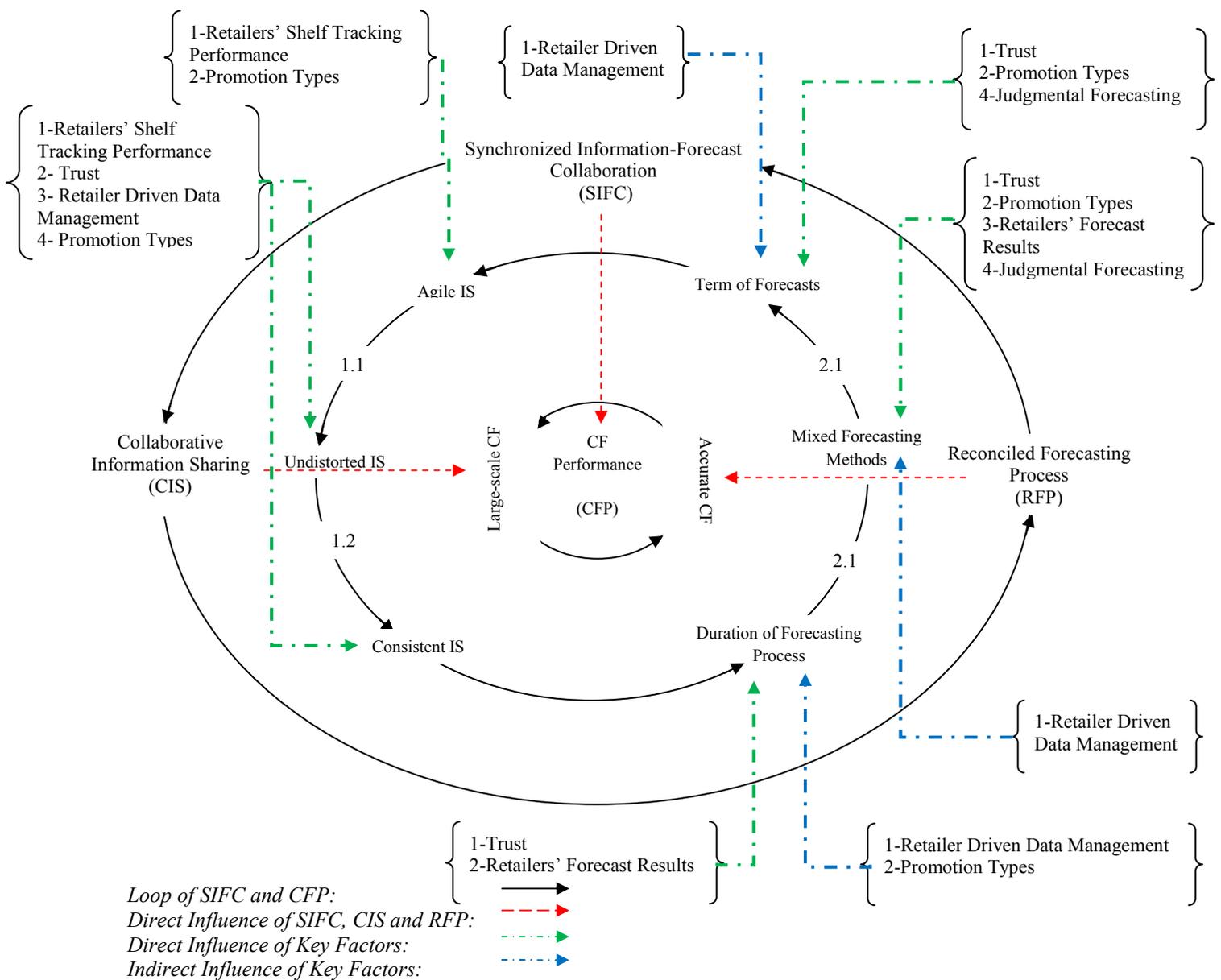


Figure.2- Preliminary Conceptual Framework

6. Discussions and Conclusions

The research aimed to identify the key factors which have an impact on the long-term and accurate CF. It develops a preliminary conceptual framework according to manufacturer-retailer collaboration in the UK food supply chain.

In this paper, we initially developed an infrastructure of collaboration called SIFC and its two bases as CIS and RFP to enhance the CF Performance by improving long-term and accurate CF. Afterwards, the backbones of CIF including agile, undistorted and consistent IS were identified that partners have to accomplish successfully to support large-scale CF between each other. On the other hand, the duration of the forecasting process, mixed methods and term of forecasts were explored under the RFP basis which partners should be in agreement on them to boost CF accuracy in the manufacturer-retailer collaboration.

Relevant to the first research question, retailers' shelf tracking performance and developed promotion types are identified as the key factors having an impact on the internal information sharing of organizations. In other words, both factors of retailers' tracking performance and promotion types can lead to delays within retailers. However, we didn't find evidence as to the existence of factor that lead to delays within manufacturer.

In terms of the second question, it was identified that retailers' shelf tracking performance, trust, promotion types and retailer driven data management factors have a direct impact on the undistorted and consistent IS between partners.

For the last question, the paper summarized 5 key factors that influence implementation of RFP.

From both manufacturers and retailers perspective, trust is a key factor with direct impact on the RFP, since it precisely influences all major requirements of RFP: duration of the forecasting process, mixed forecasting methods and term of forecasts.

On the other hand, retailer driven data management is shown as having an impact on the RFP, but only under the responsibility of retailers. The justification is that it indirectly influences the forecast durations, partners' agreements on the mixed methods and term of forecasts because; manufacturers should be satisfied in terms of sharing undistorted data on a regular basis by retailers

Furthermore, literature suggest that promotion types indirectly influence the duration of forecasting process because of retailers' important role in CIS by sharing promotional data with manufacturers timely. On the other hand, this factor directly influences both forecast methods and terms. The reason is that the decisions given about methods and forecast terms are given based on selected products and the duration of promotions.

In terms of retailers' forecasting results, the study identified that taken decisions about selected methods and terms of forecast directly relates to retailers' forecast. Because, there are evidence that support its positive influence on forecast accuracy and guidance role in taken decisions about forecasting.

Lastly, judgmental forecasting was identified a factor that has a direct impact on the mixed methods and term of forecasts from the viewpoint of satisfying manufacturers and retailers. The justification is that literatures' evidences illustrating its importance on forecast accuracy and harmony of partners in RFP.

The paper explored these findings by analysis of relevant literatures and implementation of informal semi-structured interviews with a UK based food manufacturer.

The next step of the study will seek further views from practitioners via semi-structured interviews to finalize data-gathering. After that and based on the final conceptual framework and derived hypotheses, survey will be designed to verify validity of the hypotheses. A pilot study will be exercised before distributing the questionnaires to the different branches of retailers and responsible departments of the manufacturer.

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