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Enhancing Supply Chain Integration (SCI) with Company (Crew) Resource Management (CRM): A Conceptual Framework Proposition

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Abstract

To employ company resources more effectively and efficiently, organizations must implement supply chain integration (SCI). A well-integrated supply chain is vital for both good customer service and business success. Companies require crew resource training to enhance crew performance and safety as well as to manage errors, particularly those in the aerospace and medical industries. CRM; encompasses a range of skills, knowledge, and dispositions like teamwork, leadership, communication, situational awareness, and problem-solving. A new conceptual framework and suggestions for future work with supply chain integration and crew resource management are presented as part of this study's main goal. This study attempts to present two significant original values: crew resource management was first applied mostly in the aviation industry. There aren't many studies in the literature that apply CRM to enterprises, and none that try to incorporate CRM into the supply chain. On the other hand, firms struggle with internal and external coordination, and team management is one of the most essential components to meet this issue. Better team coordination and an understanding of team member competencies will lead to improved organizational performance. Alternative theories are used for supply chain integration but the most vital feature of CRM that makes it different and important from other theories is its behavioral tendency.

Keywords: *Supply Chain Integration, Crew Resource Management, Firm Performance, Conceptual Framework*

Şirket (Ekip) Kaynak Yönetimi (EKY) İle Tedarik Zinciri Entegrasyonunun Güçlendirilmesi: Kavramsal Bir Çerçeve Önerisi

Öz

Tedarik zinciri entegrasyonu (TZE), işletmelerin kaynaklarını verimli ve etkili bir şekilde kullanabilmeleri için önem arz etmektedir. İşletme başarısı ve sağlıklı bir müşteri hizmetleri, iyi entegre edilmiş bir tedarik zinciri gerektirir. Özellikle havacılık ve tıp alanındakiler; ekip performansını iyileştirmek, güvenliği arttırmak ve hataları yönetmek için ekip kaynak yönetimi eğitimine ihtiyaç duymaktadır. EKY; iletişim, durumsal farkındalık, liderlik, problem çözme, karar verme ve ekip çalışması gibi çeşitli bilgi, yetenek ve tutumları içermektedir. Bu araştırmanın temel amacı, tedarik zinciri entegrasyonu ve ekip kaynak yönetimi ile yapılacak çalışmalar için yeni bir kavramsal çerçeve sunmaktır. Bu çalışma, iki yönden literatüre katkı sağlamayı amaçlamaktadır: Ekip kaynak yönetimi ağırlıklı olarak havacılık alanında kullanılmaktadır. EKY' yi işletmelere uygulayan çok az çalışma bulunmakla birlikte, literatürde EKY' yi tedarik zincirine entegre etmeyi amaçlayan hiçbir çalışmaya rastlanmamıştır. Öte yandan, şirketler, kendi firmaları içinde iç ve dış koordinasyonla mücadele etmektedir ve ekip yönetimi bu zorluğu aşmak için en önemli unsurlardan biridir. Ekip üyelerinin yetkinliklerini anlayarak aralarındaki koordinasyonu geliştirmek, daha iyi bir şirket performansıyla sonuçlanacaktır. Tedarik zinciri entegrasyonu için alternatif teoriler kullanılmaktadır, ancak EKY' yi diğer teorilerden farklı ve önemli kılan en hayati özelliği davranışsal eğilimidir.

Anahtar Kelimeler*: Tedarik Zinciri Entegrasyonu, Ekip Kaynak Yönetimi, Firma Performansı, Kavramsal Çerçeve*

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1. Introduction

Studies have reported that 70% of human-induced plane crashes are caused by a lack of team coordination and communication rather than technical inadequacy (Lautman & Gallimore, 1987; Çetingüç, 2016, p.410; Aktaş & Tekarslan, 2013). This has increased the need for a training program aimed at reducing accidents and improving safety. Crew Resource Management (CRM) is a training model that aims to minimize human errors and increase team effectiveness in its simplest definition.

The concept of CRM is a training model first designed for pilots in 1980 under cockpit resource management (Helmreich and Merritt, 2017). Over time, it was thought that this training program could be applied to increase the communication between the pilots and the entire flight crew and that this would be beneficial. Many studies have shown that CRM training is beneficial and that training affects team spirit in a good way. With this success, it was thought that this training could be applied wherever the team is. Although it is not known how it will be applied initially, it has been seen that this education can be an education method and a lifestyle, paradigm, and awareness method. Communication, leadership, situational awaraness, stress management, etc. are indispensable for a team. It is undeniable that it is among the elements. It was thought that this training model, which proved to be beneficial first in the cockpit and then to all airline employees, could be applied in other industries as well. For this reason, this education model has started to be implemented in the maritime, health, railway, petroleum, and finally automotive industries.

Originally known as "cockpit resource management," the idea later evolved into "team resource management" and is now known as "company resource management." Within this notion, management functions ranging from human resources to information technologies are assessed, and it is argued that each of them has a duty to manage a process effectively. When choosing team members, training them by the demands of the task, developing the process between them, and managing the operation and flow, the concept of team resource management can serve as an application guide for enterprises (Ordun, 2021, p.73,74).

On the other hand, the purpose of the supply chain is to integrate each chain's activities to create good quality and services for the customer. A supply chain is a broader concept than the company itself because there is no single company. Collaborating with other companies and boosting competitive advantage. Businesses should take a

comprehensive approach to everything they do, from raw materials to customers. To acquire a holistic perspective, each chain must integrate with the others.

When the studies on the concepts of supply chain integration and supply chain performance are examined, integration models have been tried to be developed and performance measures have been created in these studies. This study contends that by approaching supply chain integration from a different angle, integration may be made even stronger with good team management. The CRM model, which started out being employed in the aviation industry before spreading to other fields, has been recommended as a successful team model.

In the literature, several supply chain integration factors have been noted. Some of the most frequently mentioned aspects of supply chain integration include the following: internal integration, external integration, information integration, process integration and relationship integration. However, most of the studies approached supply chain integration internally and externally. While internal integration specifies the communication, and relationship between inter-departmental members, external integration covers both supplier and customer integration. In this study, the focus of supply chain integration is also external and internal integration. Communication, coordination, and effective leadership are listed by Basnet (2013) as the components of internal integration; CRM is made up of six sub-components (communication, situational awareness, leadership, problem-solving, decision-making, and teamwork). As can be seen, supply chain integration components and CRM components work well together. Additionally, CRM elements create a more thorough foundation. The literature describes a variety of supply chain integration strategies. Most of these are methods of strategic management. CRM was chosen mostly because it is behavior-based and delivers a variety of components all at once. Additionally, the teamwork of the CRM sub-components—is essential for integration. What makes this study special is that the authors' best knowledge of CRM has never been applied to supply chain integration in the manufacturing sector. Although there is no qualitative or quantitative application in this study, it lays the groundwork for many future research areas with the proposed conceptual framework.

This study (aims to) starts by giving information about CRM terminology (crew resource management), CRM training, and CRM applications in different fields. Later on, supply chain management, supply chain integration, and connection between CRM will be

discussed. Then, the conceptual framework will be shared. Lastly, the possible outcome of the result will be considered in the discussion and conclusion part.

2. Literature Review

2. 1. Crew Resource Management (CRM)

Aviation literature describes CRM as the optimal use of people and technology in possibly achieving top-notch safety levels (Northwest Airlines, 2005). CRM could be observed as a methodical training and behavioural change model which, through the use of pertinent and accessible resources, potentially reduces human error (Helmreich et al., 2010). CRM has always been focused on the attitude, behavior, and performance of individual pilots. The goal was to get rid of the "wrong stuff" pilot. A good CRM captain is one that promotes an environment in which crew members feel free to express themselves, ask questions, and challenge when required. The ultimate aim is not on eliminating the hierarchy but to enhance performance. This is achieved through increasing support for and guaranteeing the importance of all crew and to as well assert individual rights and responsibilities to be confident and speak up if anyone recognises a problem (Wakeman & Langham, 2018).

This method was built for performance optimisation to reduce the impact of lapses caused by humans through the utilisation of available resources (which include methods, technology, and people) in problem solving (Marshall, 2010). Detailing this, Marshall (2010) had three key pillars upon which he centred description of the program and these are outlined in the following. Marshall observed that a system is indicated by:

1. classifying the crew as a single body and not as a distinctive individual regarded as a common training entity;
2. concentrating on how safety could be affected by the attitudes and behaviours of the crew;
3. applying a technique of effective and pragmatic training, contingent on cooperation and shared learning;
4. involving leadership methodologies, work competencies and management of a team;
5. advocating the formation of participatory work groups, conserving power and order
6. giving individuals and groups the chance to scrutinize their respective accomplishments and accordingly recommend paths of progress.

CRM is in fact an education and training program across the globe in management expertise and competencies, grounded in evidence, as well as fashioned to advance quality of information sharing, prudent choices and agreement between team members in crucial circumstances (Salas et al., 2001 ; Shuffler et al., 2011). Originating from aviation, CRM focuses on several key process skills including; situation consciousness, information sharing skills, collaboration, task appropriation, and making of informed decision (U.S. FAA, 2004). The list of key processes and competencies differs among organisations and airlines in particular, however, all are fixated on definition of optimum social communication of crew members harmoniously working amidst an ever changing environment (Alavosius et al., 2017). The Operational Naval Instruction 1542.7C recognises the seven critical CRM skills as:

- Informed decisions – the capability of using rational and proper judgment to decide with recourse to facts available
- Assertiveness or Firmness – readiness to engage and take a stance until persuaded by evidence that better alternatives are available
- Mission inquiry – the capacity to come up with contingency plans (both interim and longer), and to integrate, designate, and supervise crew and resources of the flight
- Communication – the apparent and precise exchange of information, directions, and the like and giving valuable response
- Leadership – the competence to give direction and harmonise various pilot activities and that of the crew and to inspire them to work collectively as a unit
- Changeability – the skill to amend a general plan when there are alterations in circumstances or there is different information
- Situational consciousness – the wherewithal to discern a particular setting at a point in time, envision its present meaning, and envisage its future prospects.

2.1.1. Crew Resource Management Training

In the early 1980s, a variety of CRM courses began to appear. The earliest training concentrated on input elements, particularly in the domains of knowledge and attitudes. A focus on organizational difficulties and flight crew group processes, including reinforcement of effective process behavior, was not apparent in early efforts. Many early CRM courses were met with strong opposition from crew members, who expressed misgivings about the training's motivation and potential effects (Kanki et al., 2019).

The course objectives are: (Salas et al., 2001)

- To increase crew awareness and knowledge of human variables that can lead to safety or production-related issues.
- To acquire nontechnical abilities and attitudes that, when put into practice, can help prevent or lessen the effects of an accident or incident caused by human or technical errors.
- Incorporate CRM knowledge, abilities, and attitudes into daily work activities.

Presently, CRM programs encompass diverse courses that focus on key approaches depended on an outline consisting of three significant sections of work: leadership (administration, working environment and team management), Command (guidance, information sharing procedures and informed decisions), and resource management (overseeing resources, various tasks, and inquiry into circumstances). Preparatory CRM courses, undertaken by various airlines and government (via the air force section of the Armed Forces), mainly last minimum of two days but doesn't go beyond five. The courses are mostly run by pilots and psychotherapists who together develop them. Mode of teaching covers live exercises, discourse, case studies, in-character acting, and animated videos (Flin et al., 2002), amongst others. In as much as there exist no widely accepted approaches to develop the various courses, (Salas et al., 1999), they generally consider subjects such as direction, situational consciousness, information sharing, teamwork, informed decisions and personal weaknesses (Flin & Martin, 2001).

2.1.2. CRM in Different Fields

CRM should be aptly adapted not only to different fields of work but also to distinctive organizational cultures and operating environments (Boehm-Davis et al., 2001). Industries within the high-risk bracket have adapted. Research in CRM has broadly aimed at a particular element, and many of these studies are from the perspective of psychology. Focusing on three industries considered high-risk (viz medicine, aviation, and nuclear power), research relating to CRM's components have been reviewed below. This is to demonstrate the dissemination of CRM across HROs.

2.1.2.1. Oil

In accordance with the Industry of Oil and Gas Producers (IOGP, 2014a), a significant modification in advancement within the functional safety and efficacy of teams

engaged in well operations (that is, the complete scope of drilling, finishings, maintenance, and mediations) could be accomplished via efficiently developing and applying skills that are not technical, referred to as Crew Resource Management (CRM). Crew heads should not only be managing the technical sections (mainly engineering) of oil field operations (Flin et al., 2001) but also intertwine actions of team members under the expertise and competence of crew members that vary in respect of demands of the work. CRM could be deemed as a string of behavioural happenings where crew members and the head adequately use accessilble resources to (1) design work procedures, (2) apprise everyone on tasks/positions, (3) keep an eye on the procedures , (4) uncover and note discrepancies from the course of action, (5) disseminate corrections from the top down, (6) alter the required actions, (7) grant interviews at key moments (at substantial change or conclusion of work), and (8) try to make perfect the human-machine interplay (Alavosius et al., 2017).

2.1.2.2. Medicine

CRM was initially taken up by anaesthesiologists in medicine and labeled Anaesthesia Crisis Resource Management (ACRM). The main objective of ACRM was to introduce Crew Resource Management into medicine and instruct anaesthesiologists in handling critical scenarios while working on teams from multidisciplinary backgrounds. To train Anaesthesia Crisis Resource Management make use of high-fidelity simulators. Unlike in aviation where there is just one person and an instructor, in ACRM, there are large simulated operating rooms capable of accommodating many teams including nurses, physicians, and technicians alike (Howard et al., 1992). Although the significant application of ACRM in medicine is over the years cannot be overlooked, there are no empirical studies demonstrating the impact of ACRM on patient care (Zeltser & Nash, 2010).

Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) could be singled out as the contemporary utilization of CRM assumptions and methods in medicine. The main focus of TeamSTEPPS is instructing four essential competencies (namely shared support, situation control, leadership, and communication) to boost the overall safety and care of patients by professionals working within a progressive environment (Epps & Levin, 2015).

2.1.2.3. Nuclear Power

The incorporation of CRM into the nuclear industry was fundamental to integrating technological dispensations, human and process by perfecting adept behaviour within these

systems. Hamilton et al., (2013) posited a methodical approach to human elements and safety including the unification of engineering data as well as human error data. Appraisal methods within the nuclear industry include the examination of tasks to ascertain critical behaviours, analysis of an operator's expertise, and prudent allotment of resources.

2.2. Supply Chain Integration (SCI)

"All value-creating activities work together to offer the highest level of client value," in well-conducted supply chains." (Pagell, 2004, p. 460). Although there are many different definitions of the supply chain process in the literature, the common point of all is that an ideal supply chain should cover all actions before production (production planning and control process) and after production (distribution and logistics process) (Beamon, 1998: 282). Hill (2000) uses four phases to describe the creation and evolution of supply chains:

- The integration of the phases within the internal supply chain,
- From procurement to final goods production, and the forging of collaboration between the steps
- Coordinating activity planning and execution across the supply chain
- Organizing operations among companies

According to Swanson et al. (2018), one way to explain the identity of a discipline is to describe major issues specific to that area. Their research about SCM by topics indicated that the focus of SCM research is as follows; relationships and collaboration, purchasing and supply management, strategy, customer service strategy, inventory and sustainability (Swanson et al., 2018. Integration is the planning and organization of material and information flows; coordination is the expression of the forward and backward flow of information and forward material flow in logistics processes (Romano, 2003: 121). One of the most significant concepts in today's supply chain management is "integration," which entails the cooperation, commitment, coordination, communication, and information exchange of various stakeholders in order to reach mutually acceptable outcomes (Narasimhan and Kim, 2002; Flynn et al., 2010; Fawcett, S. E., & Magnan, G. M. (2002); Basnet, C. (2013); Zhang et al., 2015). In today's competitive business world, supply chain integration is one of the most widely accepted corporate techniques for improving performance. (Narasimhan and Das, 2001: 593). According to studies, companies must first accomplish internal integration before applying supply chain management (Gimenez and Ventura, 2003; Stevens, 1989).

Mostly the concept of supply chain integration has been examined as two main components: internal and external integration. While internal integration focuses on the relationship between the firm's own internal units, the concept of external integration includes both customers and suppliers.

Supply chain integration literature has mainly concentrated on the relationship between integration and firm performance. Some of the previous research are demonstrated in Table 1. As it can be seen in the table, most of the studies focused on internal and external integration together.

Table 1: The Selected Literature of Supply Chain Integration and Performance

The Authors & Years	**Only II**	**Only EI**	**II and EI**	**LI**	**LCSCI**	**FP**	**OP**	**LP**
Ellinger et al. (2000)				+		+		
Narasimhan & Kim (2002)			+			+		
Fawcett & Magnan (2002)								
Stank et al. (2001)			+	+				+
Droge et al. (2004)			+			+		
Gimenez & Ventura (2005)			+					+
Cousin and Menguc (2006)		+					+	
Chen et al. (2007)				+		+		
Flynn et al. (2010)			+			+	+	
Prajogo & Olhager (2012)				+			+	
Basnet (2013)	+							
Lee et al. (2016)			+					+
Liu et al. (2020)					+	+		
Tarigan et al. (2021)			+			+		
Tian et al. (2021)			+			+		
Zhu et al. (2022)			+			+	+	

II: internal integration; EI: external integration (customer and supplier integration); LI: logistics integration; LCSCI: low carbon supply chain integration; FP: firm performance; OP: operational performance; LP: logistics performance

2.2.1. The Approaches to Supply Chain Integration

There are numerous methods for integrating the supply chain, some of which include:

Resource-Based View (RBV) Approach: This strategy focuses on enhancing and utilizing the resources and skills of all the supply chain partners to gain a competitive edge. The RBV strategy emphasizes the value of creating lasting relationships with suppliers, sharing knowledge and resources, and working together towards shared goals (Solesvik, 2018).

Transaction Cost Economics (TCE): According to the TCE strategy, supply chain integration can lower the transaction costs involved in buying and selling goods and services. The strategy emphasizes minimizing transaction costs by increasing transaction volume, decreasing transaction complexity, and decreasing transaction number (Carlson and Bitsch, 2019).

Agency Theory Approach: Concentrates on coordinating the interactions between various supply chain partners in order to align their incentives and goals. The agency theory method places a strong emphasis on building trust, keeping track of performance, and creating incentives to make sure that each partner contributes to the supply chain's overall objectives (Butt, 2016).

Institutional Theory Approach: Supply chain integration is seen as a reaction to institutional factors like legal obligations, customer expectations, and social standards in the institutional theory approach. To maintain compliance and legitimacy, the supply chain must be in line with the larger institutional context (Zhang and Dhaliwal, 2009).

The contingency approach stresses that there is no one-size-fits-all remedy for SCI and that the ideal course of action will vary on the particular circumstances. This method stresses how critical it is to assess the situation and modify the SCI strategy to fit the organization's unique requirements, taking into account elements like the organization's size, the industry, and the surrounding competitive climate (Flynn et al., 2010).

The configuration approach highlights the significance of matching the supply chain's structure to the organizational strategic goals, such as cost cutting, product innovation, or customer response. As part of the configuration method, each participant in the supply chain must have a clear awareness of their roles and responsibilities. Additionally,

tools and processes must be created to encourage collaboration, coordination, and communication between the partners (Flynn et al., 2010).

2.2.2. The Importance of Team Management in SCI

A team could concentrate on the following to discuss how CRM relates to the strength of supply chain integration:

Communication: Both CRM and SCI require effective communication. Every stakeholder must communicate clearly and promptly in order for supply chains to be well-integrated. Teams can boost internal communication using CRM concepts, which can lead to better collaboration with supply chain stakeholders outside the group.

Collaboration is essential to a well-integrated supply chain, and this includes suppliers, manufacturers, distributors, and customers. In order to effectively collaborate throughout the supply chain and work together to solve problems and make decisions, teams must first cultivate cooperation within their own teams.

Making decisions: Using CRM principles, teams assess all available possibilities and establish priorities according to feedback from all team members. Parallel to this, integrated supply chains make an effort to take into account the interests and requirements of all stakeholders when making choices. Teams can acquire the knowledge and dispositions required for efficient supply chain decision-making.

Continuous Improvement: Teams continually assess their performance by recognizing areas for enhancement using CRM principles. On the other side, supply chains look for ways to optimize processes, cut costs, and boost customer satisfaction in order to continuously improve. Teams develop an environment of continuous improvement within their teams in an effort to integrate the supply chain effectively.

In conclusion, by implementing CRM principles within their teams, teams can develop the knowledge and attitudes necessary for successful supply chain integration.

3. The Relationship Between CRM and SCI

Enhancing collaboration, communication, and decision-making in demanding environments like the aviation or healthcare industries is the aim of crew resource management (CRM). CRM seeks to improve safety and effectiveness by making sure that everyone on a team is working together effectively.

Supply chain integration necessitates the coordination and cooperation of all parties involved in the supply chain, from raw material suppliers to final consumers. By combining these numerous supply chain elements, businesses can save costs, increase efficiency, and increase customer satisfaction.

So how do these two concepts relate to how well firms perform? Here are some potential benefits of each:

Table 2: Potential Benefits of CRM and SCI

Crew Resource Management	**Supply Chain Integration**
Improved **cooperation and communication** can lower mistakes and increase safety, which can lower costs related to accidents or rework.	Reduced lead times and inventory levels can save costs and increase efficiency. This is accomplished through improving **coordination and collaboration.**
Better decision-making can result in more effective resource management, which can boost output and **profitability.**	By identifying and fixing any bottlenecks or inefficiencies in the supply chain, businesses can increase production and **profitability.**
Team morale can improve with more mutual trust and respect, which can result in higher employee retention and lower turnover costs.	Customer satisfaction can be raised by better matching supply chain activities to customer needs. This can increase sales and profitability.

Authors' best knowledge no study was found that adopt CRM model in SCI in the manufacturing sector. However, the author believes it would be beneficial to look into SCI process from a different perspective than CRM. As briefly explained in the literature part, CRM is a training model to decrease the error occurred by a human in which teams are the main focus. CRM is a valuable tool wherever the team is. Since CRM and SCI have common dimensions, CRM compassed a wider tool for integration. In previous studies, some of the strategic management approaches have been applied to SCI which is briefly explained above. Such as; Contingency and Configuration approaches (Flynn et al., 2010); Transaction cost economics theory (Dekkers et al., 2020); Resource-based view (Ganbold et al., 2021; Wong et al., 2017); Institutional theory (Yang et al., 2020). Relational view (Abdallah et al., 2017); Information processing theory (Flynn et al., 2016); Social Exchange Theory (Singh and Power, 2014); Social Network Perspective (Liu et al., 2020); organizational capability (Huo, 2012) were also examined while assessing supply chain integration. One of the main differences between CRM and these approaches is the focus of CRM which is behavior-based.

4. Research Proposition

In previous studies, SCI has been found positive impact on organization performance and logistics performance (Flynn et al. (2010); Huo (2012); Stank et al. (2001); Ellinger et

al., (2000)). In parallel with the literature, this study predicts that SCI will positively affect firm and logistics performance. It is thought that CRM will strengthen the relationship between SCI and firm/logistics performance.

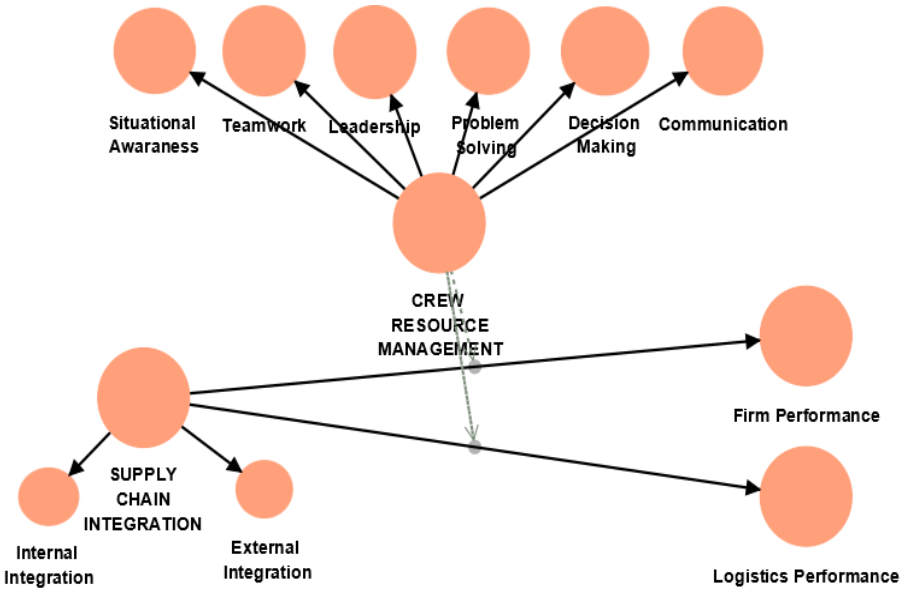

Figure 1: Conceptual Framework

It is advised to gather data (survey) from unit chiefs, middle, or senior managers working in the operation, supply chain, quality, or production departments of manufacturing companies in order to test the conceptual framework shown in Figure 1. The data should then be analyzed using structural equation modeling. Using Smart-pls software in addition to Amos will be more useful to measure the moderating variable.

5. Discussion and Conclusion

The starting point of CRM education model was to increase communication between pilots in order to prevent human-induced plane crashes. Over time, this training model has been applied to many different industries, and its effectiveness and efficiency have been proven in many different areas. The number of incidents and the general level of safety of air medical programs may both be significantly reduced and increased by employing effective crew resource management (CRM) (Fisher et al., 2000). For patients who needed to be transferred to the intensive care unit, enhanced collaboration and performance were the consequence of targeted crew resource management training for the team leader (Siems et al., 2017). The most basic purpose is to minimize the errors caused by not being an effective team and try to be a perfect team. Considering the companies' supply chain, there are many actors ranging from the suppliers to the customers. To manage this network very well, a

strong communication network should be established until each ring is integrated into another ring. By incorporating CRM practices into supply chain operations, companies may be better able to optimize the use of available resources, improve communication and collaboration among supply chain partners, and make more effective decisions.

This study offers the positive effect of supply chain integration on performance with the CRM model. In this research, which focuses on both internal and external supply chain integration, it is thought that a more integrated supply chain can be possible with an effective team management model. We believe CRM will also accelerate the level of integration and will bring a new perspective to the integration by adding new dimensions.

The fact that this work has not yet been tested is its most significant limitation. This study, which is simply suggested here, can be improved by incorporating it into several sectors. Although CRM principles can be very effective in enhancing team dynamics and facilitating supply chain integration, it's vital to remember that they might not be enough to ensure optimal performance on their own. The effectiveness of a supply chain integration endeavor can also be influenced by other elements, including the standard of technology and equipment, the accessibility of resources, and the overall business strategy.

This proposed conceptual framework can be used both for qualitative and quantitative research. Since such a study has not been conducted before, it would be more beneficial to apply a qualitative study first. Then, the implementation of a quantitative study would be more appropriate. The variables of CRM vary according to the application area, that’s why CRM variables can be adapted according to the Company Resource Management, adding new items if needed, and developing Company Resource Management scale. While creating scale, not only crew resource but also alternative team management models can be used. Before creating the scale, it can be discussed which items of the CRM should be addressed by conducting a focus group study with experts from academia or industry (both CRM and SC experts). By proceeding consistent with the literature, frequently tested sub-factors of each variable can be eliminated. After all, the proposed conceptual framework can be tested in different industries starting with manufacturing companies, the logistics sector and many other areas.

Overall, the suggested framework seems to be an appealing field for additional study and application. A more effective team can be built by integrating CRM principles into supply chain management, which will improve the company's performance as a whole.

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