

Print ISSN: 2233-4165 / Online ISSN: 2233-5382  
 doi:http://dx.doi.org/10.13106/ijidb.2019.vol10.no4.13

## Come fly with ME: The Impact of 3PLs within the aircraft Manufacturing, Repair and Overhaul Industry in the United Arab Emirates

Fatima Hassan\*, Carrie Amani Annabi\*\*

Received: February 27, 2019. Revised: April 02, 2019. Accepted: April 05, 2019.

### Abstract

**Purpose** – This research explores the impacts of third-party logistics (3PLs) within the aircraft Maintenance, Repair and Overhaul (MRO) industry in the United Arab Emirates (UAE) to explore the role of collaborative relationships for improving outsourcing. Globalization and time based competition have changed business environments and challenged the conventional management strategies that are related to core competencies and operational models. Organizations are forced to devise innovative practices in which logistics outsourcing to 3PLs offers significant advantages.

**Research design, data, and methodology** – This case study was conducted within a leading global aircraft MRO organization whose reach spans across Europe, the Middle East, Asia and the Americas. The methods used face to face semi-structured interviews, validated through further focus group discussions.

**Results** – These findings highlight the effectiveness of collaborative relationships on their role to improve outsourcing and also demonstrated that MROs gain several advantages from 3PL arrangements. However, any gaps in outsourcing management elevates potential risks to organizations as well, which could result in reputational, operational and financial losses.

**Conclusions** – Although generalizability is not possible due to the case study approach, generality suggests that in order to reduce reputational, operational and financial risks, enhanced collaboration with 3PLs is recommended to optimize outsourcing arrangements.

**Keywords:** Third-Party Logistics, 3PLs, Outsourcing, United Arab Emirates, UAE, Maintenance Repair and Overhaul, MRO, Collaboration.

**JEL Classifications:** L84, L91, M10, O53.

### 1. Introduction

Globalization has resulted in diversified logistics requirements for organizations. The third-party logistics (3PLs) industry is marked by aggressive mergers, acquisitions and increasingly new entrants into the market, widening the geographical coverage and range of activities offered by them. The majority of the organizations outsource logistics at some point in their supply chain. 3PLs are considered a megatrend, and will continue to grow within

contemporary business environments (Hsiao, Kemp, Van Der Vorst, & Omta, 2011; Zacharia, Sanders, & Nix, 2011). However, outsourcing is a sensitive decision which has direct implications on organization's operating costs and performance.

Like all other industries, the aircraft Maintenance Repair and Overhaul (MRO) industry is a regular customer of logistics services. Maintenance is a crucial aftermarket support for the aviation sector, in which MRO organizations play an important role (Samaranayake & Kiridena, 2012; Vieira & Loures, 2016). MRO activities form between 10 to 15% of the total airline budget (Al-Kaabi, Potter, & Naim, 2007). Due to intense competition within the MRO industry, MROs are experiencing market pressure to reduce costs while expanding their operations as the numbers of airlines are growing, giving this sector potential to grow. This implies

\* First Author, Adjunct Faculty, School of Sciences, Heriot-Watt University Dubai, UAE.

\*\* Corresponding Author, Dr. Carrie Amani Annabi, Assistant professor, School of Sciences, Heriot-Watt University Dubai, UAE.  
 Tel: +91-4-435-8740, E-mail: c.annabi@hw.ac.uk

optimization of logistics activities for spare parts delivery, as logistics is the key factor to improve the efficiency and performance of an MRO supply chain.

The research explores how outsourcing logistics effects the aircraft MRO industry and reviews some of the contributing factors. Secondly, the research analyzes the impact of collaborative relationships as a tool to optimize outsourcing arrangements. Collaborative relationships can improve supply chain processes between supply chain members (Govindan & Chaudhuri, 2016; Hofenk, Schipper, Semeijn, & Gelderman, 2011; Pradabwong, Braziotis, Tannock, & Pawar, 2017; Ramanathan & Gunasekaran, 2014). These areas will be explored in this study.

## 2. Literature Review

Marasco (2008) highlighted that 3PL roles lack a consistent definition in literature among authors. For example, definitions cover the length of the relationship between parties, the number of logistics activities outsourced and the position of the logistics service providers in their client's supply chain (Selviaridis & Spring, 2007). Extensive literature exists in relation to the unprecedented growth of the 3PL industry (Hsiao et al., 2011; Murphy & Poist, 2000; Selviaridis & Spring, 2007; Wu, 2012). The recent trend of focusing on core competencies has led to the outsourcing of logistics activities (Barclay, 2005; Yeung, Zhou, Yeung, & Cheng, 2012). Moreover, outsourcing logistics to support supply chain flexibility is becoming a common practice (Naim, Aryee, & Potter, 2008) as flexibility helps organizations to respond to the changing business requirements (Wadhwa, Saxena, & Chen, 2008). There has been a relative paucity of regional studies relating to logistics within in the UAE (see for e.g. Annabi, Hassan, & Amer, 2018; Fernandes & Rodrigues, 2009; Sohail, Anwar, Chowdhury, & Farhat, 2005) so this research bridges a research gap.

In the context of this study, we offer the definition that 3PLs refers to: *Outsourcing of complete logistics management or part of any logistics activity to an outside organization irrespective of the length of contract or supply chain activity.*

### 2.1. Impacts of Third-Party Logistics (3PLs)

Literature provides a range of motivational reasons which galvanize an organization to consider outsourcing. These motives are generally either cost based or service based (Mello, Stank, & Esper, 2008) and are perceived at both strategic and operational levels (Selviaridis, Spring, Profillidis, & Botzoris, 2008). One of the main driving factors behind logistics outsourcing is reduction in logistics costs (Yang, 2014). Logistics appears to be an important management

area for costs reduction (Engblom, Solakivi, Toyli, & Ojala, 2012; Sahay & Mohan, 2006). 3PLs often offer lower costs than in-house operations, by taking advantage of economies of scale and scope (Cheong, Bhatnager, & Graves, 2007).

Logistics is widely considered a strategic tool to leverage service level improvements (Beresford, Pettit, & Whittaker, 2005; Christopher, 2011; McGinnis & Kohn, 2002). Accurate, economical and timely deliveries of product or service by the 3PLs reduce lead time, cycle time, inventory management costs and other distribution costs leading to fewer customer complaints. 3PLs provide better quality of service and management as 3PLs have a higher tendency to implement quality management programs as compared to individual organizations themselves (Gotzamani, Longinidis, & Vouzas, 2010; Jharkharia & Shankar, 2007).

Successful globalized organizations have long since been recognized as being supported by complex and sophisticated logistics networks. To gain access to international networks, organizations outsource logistics (Bask, 2001; Selviaridis & Spring, 2007). Through mergers and acquisition in the 3PL industry, 3PLs cover global markets and provide door to door services (Maloni & Carter, 2006; Stefansson, 2006; Rodrigue, 2012). Moreover, logistics outsourcing is considered as prerequisite in the expansion of an organization (Selviaridis & Spring, 2007). Organizations reduce lead time and minimize resources through either developing their logistic networks or through the elimination of barriers to market entry via the use of outsourcing.

Another motive for outsourcing logistics is the improvement in organization's performance by taking advantage of 3PLs' better logistics expertise, technology and infrastructure (Rahman, 2011). 3PLs continuously update, innovate and change their assets and equipment to serve customers better which helps 3PLs integrate logistics processes efficiently (Lin, 2008).

For organizations wishing to implement sustainability it would necessitate commensurate investment in order to subscribe to green initiatives, especially as this often requires logistics network redesigning. Organizations outsource to 3PLs to access these ready-made sustainability initiatives (Martinsen & Björklund, 2012). Reverse logistics has also been increasingly outsourced to 3PLs (Murphy, 2007). Accountability is also more easily realized through outsourcing, as organizations can keep a better account of logistics costs through transactions (Selviaridis et al., 2008).

#### 2.1.1. Risks in Outsourcing

However, outsourcing logistics activities can also offer some risks (Selviaridis et al., 2008) which can register from minor setbacks to calamitous consequences. Cost and service advantages from 3PLs may not always be achieved. One of the major risks of outsourcing is loss of control over the organization's logistics process (Stojanovic, 2012) especially if the full range of logistics management is

outsourced. Organizations also rely on 3PLs to obtain the data necessary to determine the efficiency and service level of the outsourced function (Wentworth, 2003) rather than seek this independently, thereby rendering the information open to potential bias. This leaves the organization open to opportunistic exploitation (Huo, Ye, & Zhao, 2015).

Another risk of outsourcing is poor customer service (Selviaridis & Spring, 2007). Logistics performance directly affects customer service (Leuschner, Lambert, & Knemeyer, 2012; Wong & Karia, 2006). If service is compromised by 3PLs, it has serious consequences for customer satisfaction. Analyses reveal that the 3PL industry still needs to improve their quality of service (Govindan & Chaudhuri, 2016). Direct contact with customers is mandatory to better address customers' needs. By outsourcing, organizations lose direct contact with their customers (Chopra, Meindl, & Kalra, 2006; Selviaridis & Spring, 2007). If timely information is not available to the organization regarding service failures or quality issues because it is delayed, protected or obscured by the 3PL, then issues may well arise over recovery from such service failures or responsiveness to customer needs (Ellinger, Keller, & Bas, 2010). If complex activities are outsourced, the lack of information deters the organization from having strategic knowledge of process excellence (Hoecht & Trott, 2006). The complexity of logistics processes increases as outsourcing management itself is a multifarious process (Bhoyar, Bhone, Chawale, & Jogi, 2013). The selection of the right 3PL, conducting cost analysis and identifying core and non-core activities, alongside managing contracts with the 3PL is both expensive and time consuming.

#### 2.1.2. Cost Reduction through Outsourcing

Logistics outsourcing does not always reduce costs. There is some evidence of increasing costs when logistics is outsourced (Selviaridis & Spring, 2007). One reason behind this is the lack of strategic analysis of costs before outsourcing (Gadde & Hulthén, 2009). Even lack of proper planning, implementation and management of outsourcing can result in hidden costs.

#### 2.1.3. Growing Dependence on 3PLs

A further associated risk is dependence on 3PLs (Lai, Chu, Wang, & Fan, 2013). Due to the range of services provided by 3PLs, organizations are integrating them in the width and breadth of their supply chain and becoming more dependent on them. This implies more commitment and process alignment (Lai et al., 2013).

It is feasible that in outsourcing logistics, organizations lose internal logistics capabilities (Selviaridis & Spring, 2007). Core activities of the organization change over time in the same way as the business environment and organizational objectives are fluid and dynamic (Harland, Knight, Lamming, & Walker, 2005). If a specific non-core activity becomes

sensible for in-house delivery, organizations may have insufficient capacity to do that (Leavy, 2004).

Organizations may also face the risk of double outsourcing in outsourcing practice (Selviaridis & Spring, 2007; Selviaridis et al., 2008). Most 3PLs subcontract similar activities to the second tier service organizations parties, which creates tiers of suppliers in the supply chains which are more prone to supply chain disruptions.

#### 2.1.4. Sharing Sensitive Information with 3PLs

One risk of outsourcing is the leakage of sensitive information to 3PLs (Selviaridis & Spring, 2007; Selviaridis et al., 2008). This disadvantage increases with the growing number of activities outsourced, or if outsourcing is innovation based (Hoecht & Trott, 2006). If the 3PL is a supplier to the organization's competitors, there is a threat of information outflow to competitors.

#### 2.1.5. The Human Factor

Employees may resist change, if logistics is outsourced (Selviaridis & Spring, 2007). In the realignment of duties post outsourcing, some employees are either laid off or deployed to other internal departments (Belcourt, 2006). This creates job insecurity and loss of employee morale which affects employee's performance.

### 2.2. Managing 3PLs through Collaboration

Successful outsourcing relationships require collaboration between parties involved to deliver value to customers other than cost reductions (Halldorsson & Skjoett-Larsen, 2004; Hofenk et al., 2011; Large, Kramer, & Hartmann, 2011; Ramanathan & Gunasekaran, 2014). Marasco (2008) analyzed literature review written on 3PLs between 1989-2006 and concluded that effective collaboration can provide economic, financial and organizational benefits that reduces organizational costs and improves customer service.

Sink and Langley (1997) suggested a stepped procedure to manage outsourcing, starting from the need to outsource, to the assessment of process outcomes. However, the focus of this research is to explore the impacts of relational aspects for outsourced logistics processes already under commission.

Literature emphasized that closer relationships can benefit both the contracted 3PL organizations and the supply chain customers (e.g. Rajesh, Pugazhendhi, Ganesh, Yves, Lenny, & Muralidharan, 2011). Collaboration includes relationships that nurture sharing of information and process coordination (Chen, Tian, Alexander, & Daugherty, 2010). Managing effective relationship and information flows with 3PLs are key areas which help to effectively manage outsourcing (Grahl, 2011; Gupta, Ali, & Dubey, 2011; Murphy & Poist, 2000; Selviaridis & Spring, 2007; Sraboti & Ruzzier, 2012).

However, Davis-Sramek, Fugate, and Omar (2007) argued that devoting time, efforts and resources for a relationship should be carefully aligned with the type of outsourcing arrangement.

Andersson and Norrman (2002) stated that as complexity of outsourced activity increases, the need to form strategic alliances with 3PLs also grows. Commercial and financial arrangements, key management strategies and commitment to work and investments are important considerations for sustaining relationships. Other important factors for successful relationships are trust (Fatma & Mahjoub, 2013; Huo et al., 2015) and involvement of senior management (Vissak, 2008; Yeung et al., 2012). As part of collaboration, exchange of information between 3PLs and their customer is crucial for outsourcing success (Gadde & Hulthen 2009; Grahl, 2011; Jayaram & Tan, 2010; Qureshi, Kumar, & Kumar, 2007; Sraboti & Ruzzier, 2012; Vissak, 2008).

### 3. Research Methodology

The research philosophy followed for this project is interpretivism which states that all knowledge is just a matter of interpretation (Quinlan, 2011). Thus, this philosophy relies on the subjective perceptions and interpretations of individuals about social actions and focuses on processes rather than objects (Saunders, Lewis, & Thornhill, 2012). The management of outsourcing process is directly related to respondents' experience, observations and perceptions who are managing it. Interpretivism underpins mostly qualitative research approach (Denzin & Lincoln, 2005; Saunders, Lewis, & Thornhill, 2012).

A case study is most appropriate for this research as the examination relates to a bounded entity, a specific incident or related to a particular place or space (Quinlan, 2011). Secondly, a case study helps to explore existing theory (Saunders, Lewis, & Thornhill, 2012) and is relevant if detailed understanding of processes is required (Eisenhardt & Graebner, 2007; Yin, 2009). The single case is fitting as there are very few aircraft MROs operational in the UAE. The organization in this study provides global services on aircraft maintenance, engineering, refurbishments and charter services. Due to the organization's wide geographical coverage, large workforce (in excess of 4,000 staff) and multiple sub facilities in other regions, this single case was considered sufficient to explore the research questions. The knowledge gap on 3PLs in the UAE also warrants the single source case study approach. For confidentiality purposes the organization has been named simply as Company A and for ethical reasons the interviewees' details are not disclosed.

One-to-One interviews were conducted with 24 employees from Company A. The respondents were taken from the management hierarchy from the quality assurance, warehousing and logistics, engineering, procurement and

sales and marketing departments. In qualitative research, purposive sampling is recommended (Quinlan, 2011; Teddlie & Yu, 2007), and this was the approach employed to select the respondents. A focus group was conducted with eight of the original respondents. The interviews and focus group meeting collected qualitative data over the period of seven months.

The interviews were semi-structured, where a semi formalized list of questions was asked to the respondents. For example, the questions covered themes such as perceptions on logistics costs and scope of outsourcing, customer service and quality, core competencies and 3PL expertise. The questions for the semi-structured interviews were derived from the literature review. Examples of the questions asked to respondents included: How have outsourcing logistics impacted upon your core activities? This would then be developed in order to look at the type of core competency this outsourcing interfaced with, if any. Another example was asking: In what way do you think 3PLs offer expertise, technology and/or infrastructure capacity? The initial answers were then unpacked further to find out the respondents' views of 3PL expertise. To illustrate how these were developed for focus group questions can be evidenced by the extension of the 3PL expertise enquiry wherein the focus group was asked to detail their your experiences with 3PLs in relation to things such as: Product/Service availability Rates, On Time Deliveries, Order Accuracy, Lead Times, Technology of 3PL's Equipment and Technology of 3PL's Information Systems. The resultant thematic analysis was conducted on the resultant data, as is consistent with the advice of Quinlan (2011).

### 4. Results and Discussions

Company A was selected as a single case study because it has a worldwide network of MRO Services facilities throughout Europe, the Middle East, Asia and the Americas. Company A has over 40 years of experience in providing comprehensive MRO services and holds significant industry esteem for both its strong reputation for delivering the highest quality service whilst also meeting stringent industry safety standards. It is accepted that generalizability is not possible through one case study. However, due to the fact that Company A operate in a similar way throughout their global activities, spanning 10 locations, it is conceivable that similarities between the findings of this case study are realistically applicable to the other nine locations operated by Company A. This is important because it follows the writing of Flyvbjerg (2006) who mentioned that case study is ideal for validating critical reflexivity in social science, from which future generalizability then gains a certain stature and validity. Ridder (2017) highlighted the strength of a case

study which mirrors findings aligned to previous literature as it scaffolds the emergence of the constructs which are comparable to previous iteration of theory and theoretical arguments. Whilst a case study does not support generalizability, it is indicative of generality.

The MRO supply chain is complex. Owing to thousands of aircraft spare parts, also known as stock keeping units (SKUs), limited spare parts are stored at the warehouse repair site, and most parts are shipped in exact quantities on a just-in-time basis. The upstream activities of MRO can consist of SKUs from over thousands of Original Equipment Manufacturer (OEMs) located globally; which in Company A's case are in excess of 200. Based upon the demand uncertainty and thousands of aircrafts components, different MROs also trade spare parts with other MROs, both buying and selling these parts with each other. This provides another source of supply where an MRO can additionally act as a supplier to other MROs and private jet owners.

MROs also send repairable items back to OEMs for warranty or repair purposes forming a closed-loop supply chain. Closed loop supply chains (CLSC) are supply chain networks that include the returns, repair or reworking processes to allow the capturing additional value of the product (Guide, Jayaraman, & Linton, 2003).

In the case of Company A, everything except for warehousing is outsourced to 3PLs managing both upstream and downstream distribution processes. This approach held true for the local, regional and international network of customers and suppliers.

Aircraft maintenance is either corrective or preventive. The type of maintenance affects the demand for logistics and the way 3PLs are used in MRO supply chains. This is illustrated by Figure 1.

Logistics	3PL Selection Criteria	Demand Responsiveness	Cost Efficiency
	Demand	<ul style="list-style-type: none"> <li>• Unpredictable</li> <li>• Volatile</li> <li>• Short Delivery Time</li> </ul>	<ul style="list-style-type: none"> <li>• Predictable</li> <li>• Stable</li> <li>• Moderate Delivery Time</li> </ul>
		Corrective/Unscheduled	Preventive/Scheduled
	Maintenance		

Figure 1: Maintenance type and logistics requirements

Preventive maintenance is one that is planned after a certain period of time (Fritzsche & Lasch, 2012). This maintenance involves replacing aircraft part after its lifetime is over or providing routine maintenance. Corrective maintenance takes place once a component fails or develops defect (Fritzsche & Lasch, 2012). It is also called unplanned or reactive maintenance and may results from accidents or technical failures and requires quick maintenance. The spare item may or may not be available in inventory. Due to the urgent requirement of the item,

logistics demand is unplanned and is based upon short delivery times.

Company A reported that it is challenging for MRO organizations to optimize the distribution network of spare parts because the requirements of logistics for this industry are differentiated. An aircraft requires thousands of parts, from bolts to engines, which require specialist handling, transportation and storage. Parts are repaired numerous times, and this process forms a CLSC for the MRO industry, which demands further inventory management challenges. In addition, the requirements of the aviation authorities for each part to have airworthy certification and quality assurance further impacts the way parts are stored and transported. The complex characteristics of MRO inventory and its implication on logistics network planning and demand are highlighted in Figure 2.

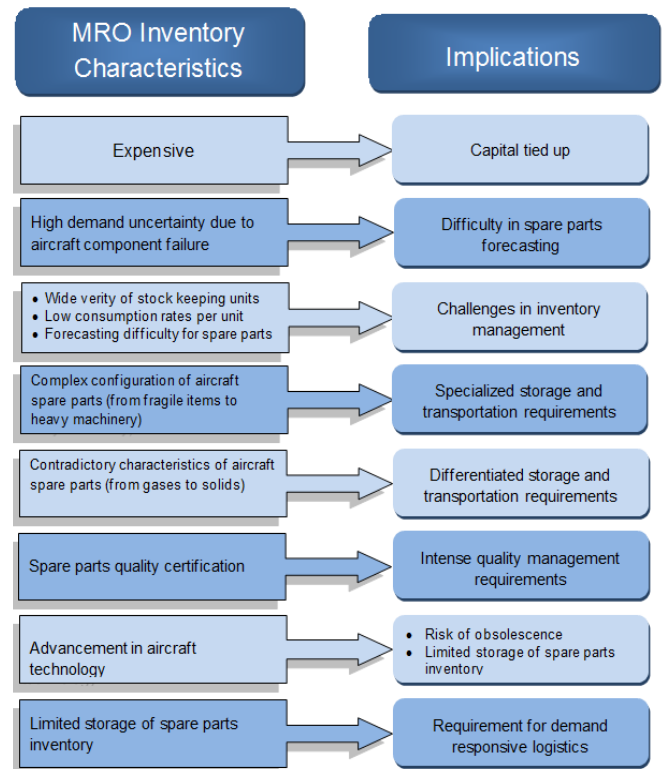


Figure 2: MRO Inventory Characteristics and its Implications on Logistics Network Planning

#### 4.1. Impacts of Third-Part Logistics

##### 4.1.1. The Benefits of 3PLs

Due to stochastic logistics requirements, 3PLs benefited Company A by providing flexibility in terms of logistics demand and operations. The demand for spare parts is highly volatile and there is always time pressures for parts delivery required for corrective maintenance. It was apparent

that the business coming from corrective maintenance is far greater than that coming for preventative maintenance, although due to the confidential nature of the industry, Company A was not prepared to share the precise details of this apportionment with the researchers. Once an aircraft has been inspected for a defect, parts are ordered from suppliers on an expedited just-in-time basis. Responsiveness is met well by 3PLs in the UAE despite the extremely short delivery times demanded.

Outsourcing has also lowered logistics costs for Company A in the UAE region. MROs have a wide global network of suppliers and customers which requires intense logistics investments. Despite the fact that Company A operates globally, the volume of logistics requirements for Company A is too low to justify the high costs which would be incurred for a company to own and run an in-house logistics network solution. In providing door to door services, the contracted 3PLs absorbed all the costs from global shipments, custom clearance duty at different UAE airports, to the cost of hiring subcontractors, for parts pickup and delivery anywhere in the world. This provided cost reductions estimated to be 30-40% of those if the logistics was in-house. An MRO falls in the category of business aviation, therefore it is a highly customer-centric industry. Logistics outsourcing acquires expert 3PL services, which maintain service levels. Except

for warehousing, logistics has been consistently outsourced for Company A since it established in the UAE.

Another important benefit of 3PLs is the access to the international logistics network. Company A relies on the local, regional and international networks of 3PLs to reach customers and suppliers taking advantage of 3PLs' knowledge of regional markets and government regulations. The 3PLs also absorb the wide variations in logistics demand, due to the dynamic nature of corrective maintenance in the MRO sector. This is a strong incentive also for MRO's downstream activities, where logistics network planning is almost impossible, due to the unknown customer base as an aircraft can have technical problems anywhere, anytime.

While accessing new markets, Company A considers relevant regional 3PL capabilities to be a significant importance. Risk mitigations are also provided by 3PLs. The respondents noted that they experienced smooth outsourcing processes due to the investment their 3PL suppliers have made in enhanced technology, customized services and standardized contracts. The processes are all automated, allowing for accurate shipments and fast commissioning of ad hoc services. It was apparent that several factors underpinned the benefits of 3PLs for Company A. These are depicted in Figure 3.

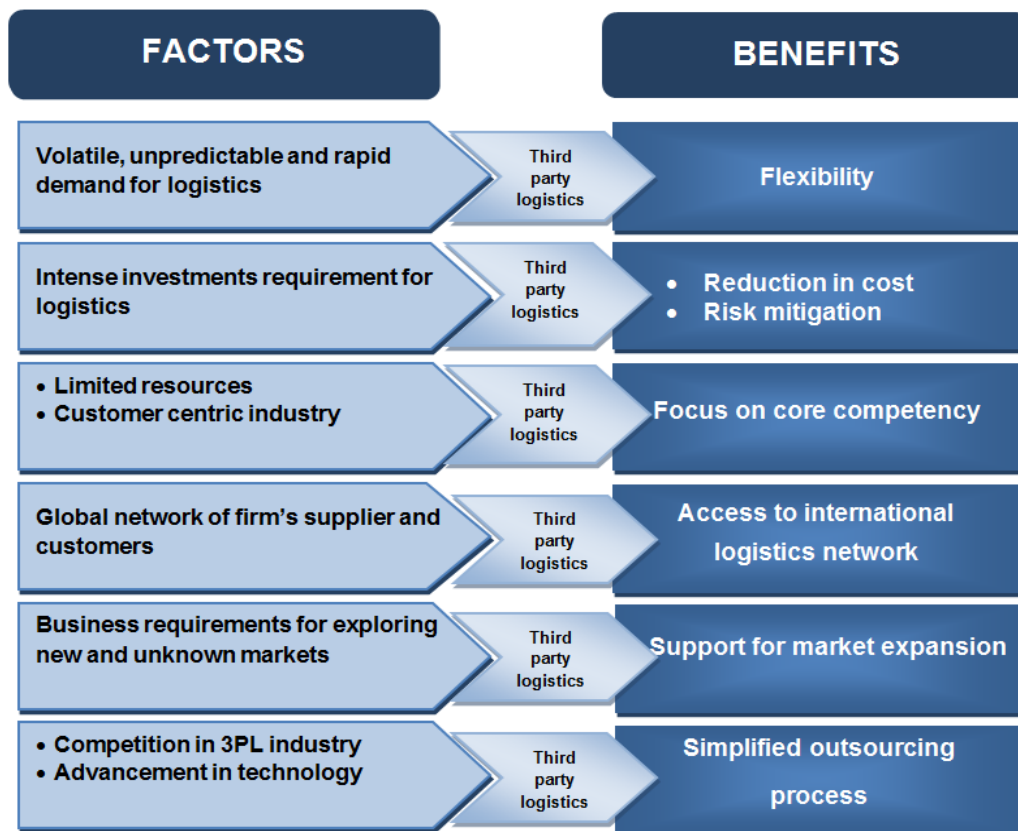


Figure 3: Factors Underpinning Benefits from Third-Party Logistics

#### 4.1.2 The Downsides of 3PLs

The main downsides raised by Company A of using 3PLs included maintaining good service levels and quality. Problems occasionally surfaced due to lack of on-time deliveries or product damaged during shipping. Late delivery problems occurred most often when 3PLs experience peak seasonal demands or supply chain disruptions from their own sub contracted suppliers.

Spare parts are ordered on an expedited just-in-time basis and any delay in receiving these SKUs impacts on the aircraft maintenance schedule. If customers are seeking corrective maintenance, which is the main stay of Company A's business operations, this increases pressure. It was reported that customers have less tolerance of delays during corrective maintenance, probably owing to the ad hoc nature of the operational downtime. Whilst preventative maintenance schedules can prepare for most likely occurrences, this is not the case for corrective maintenance.

The respondents additionally reported that control over logistics is lost during outsourcing. Spare parts need special control and management. For this reason, Company A did not outsource warehousing. Company A has a better control of high value inventory which differs in attributes, shape and size, ranging from gases to solids, parts to subassemblies and perishable to repairable. The respondents believed that because 3PLs aggregate warehousing for multiple clients,

their own diverse inventory requirements presented challenges that were unlikely to be met effectively by 3PLs. Furthermore, loss of control implies lack of transparency of process, which directly effects the accurate scheduling of maintenance activities. Moreover, Company A was dependent on 3PLs for all activities outsourced. This dependency left Company A more vulnerable to supply chain disruption. The underlying factors for these risks are outlined in Figure 4.

#### 4.2. Outsourcing Management

Company A has annual contracts with seven 3PL companies. Hence Company A manages an extensive supplier base of 3PLs. Respondents indicated that there were no cross functional teams or senior management involvement for ongoing outsource management. Senior management was only involved in outsourcing planning and implementation. Company A acknowledged that the relationship management efforts with 3PLs should be of strategic significance but it lacks resources to manage these relationships. The limited resources are focused towards end customers and OEMs.

Moreover, logistics costs constituted only a fraction of the total costs, given the values of high value aircraft spare parts. Perhaps as a consequence, little incentive was allocated

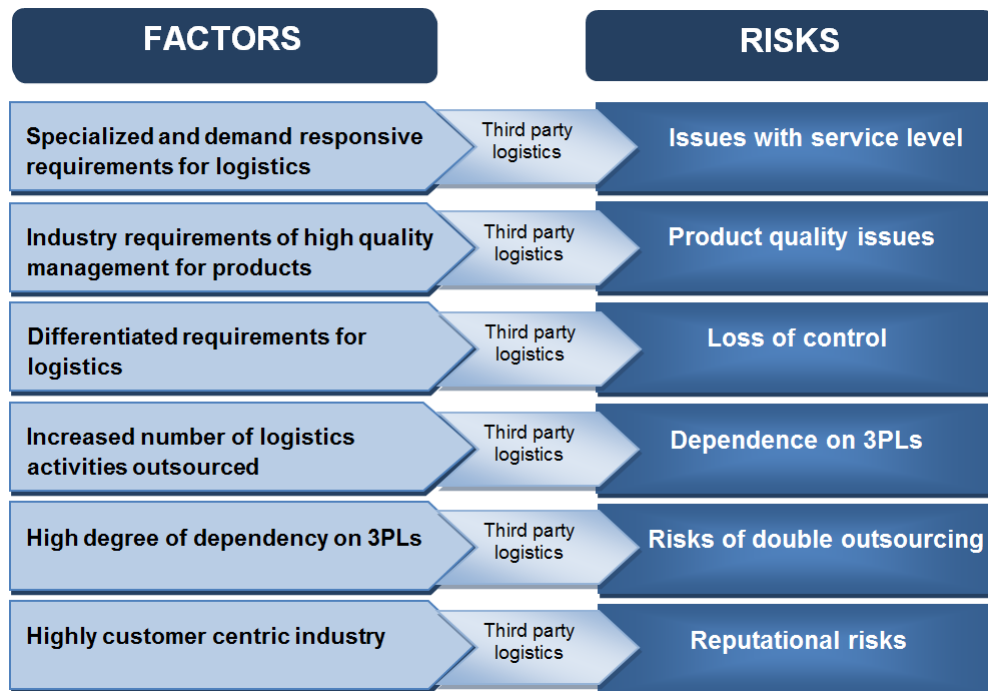


Figure 4: Factors Underpinning the Risks from Third-Party Logistics

to relationship management with 3PLs. However, we argue that logistics optimization may still capture direct cost reductions if strategic emphasis was put on these relationships. For example, best practice scenarios of collaborative relationships need to be explored given the high hourly dollar costs of failure to supply on time. This would support enhanced service levels to end customers by reducing the iterative processes resulting from inefficiencies in late or damaged parts.

The information shared between Company A and 3PLs is typically based on standard protocols for product shipment only. Company A currently commissions a number of 3PLs, therefore it has not integrated internal information systems with all of them. There is a definite case to be made for exploring reducing the number of 3PLs used but increasing the collaborative and contractual interplay. The outsourcing

relationships would benefit from greater information exchange to allow Company A's 3PLs to understand their distinct logistics requirements. There was also evidence that assumptions, as opposed to knowledge, underpinned decisions. There is also no qualitative feedback system between Company A and their 3PLs, this would be a starting place to investigate the rationale for service level issues and identifying improvement KPIs. There were sufficient issues identified in the relationship management between Company A and their 3PLs. It has been observed that seeing outsourcing as a tactical and not a strategic relationship had added to operational costs. Figure 5 highlights the gaps in outsourcing management and suggests a framework to improve the outsourcing process via collaboration.

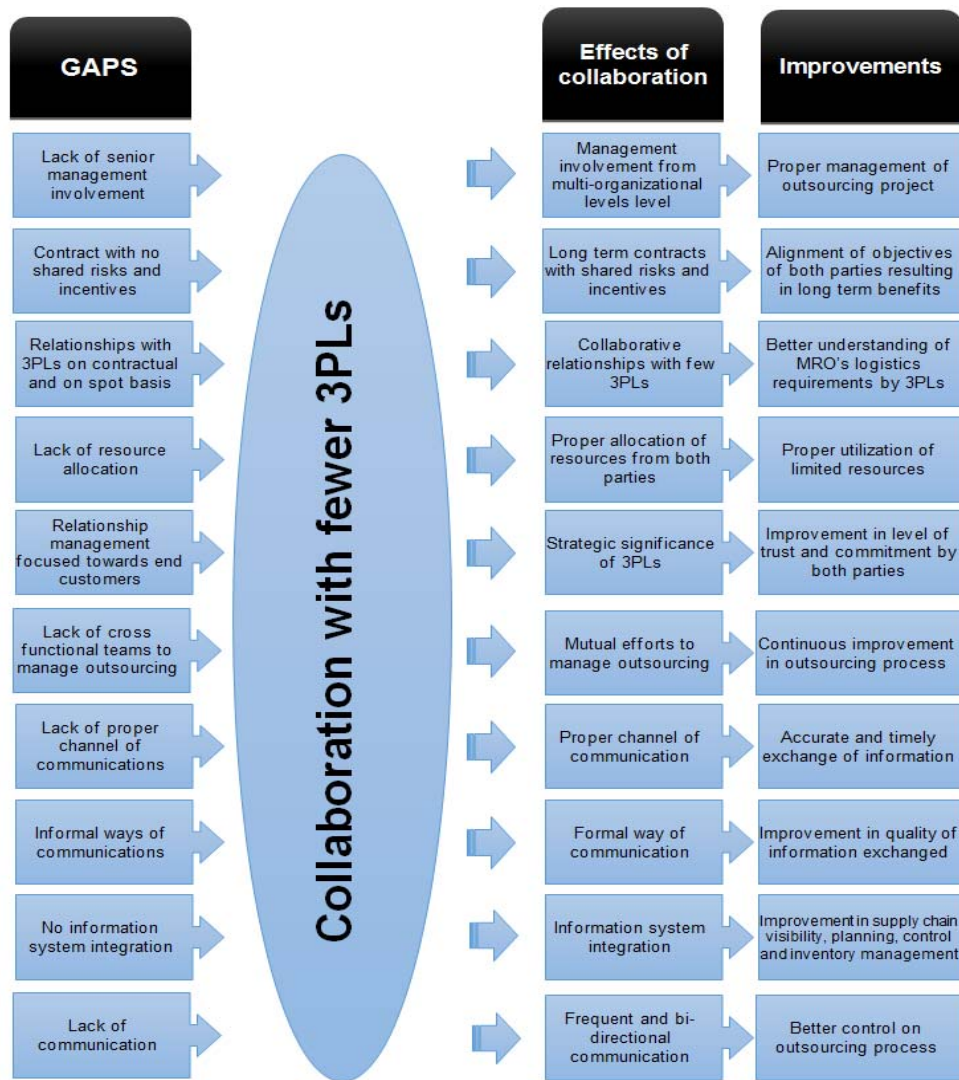


Figure 5: Framework to improve the outsourcing process via collaboration.



## 5. Conclusion and Recommendations

Organizations should optimize the benefits from 3PL relationships which go beyond cost cutting and should lead to competitive advantage. The distinct logistics requirements of an aircraft MRO industry for just-in time deliveries, flexibility and wide geographical coverage makes 3PL contracting sensible as it is not core. On-time and ad hoc SKU delivery is fundamental to reducing the high operational costs of downtime, when parts are unavailable. As a result, managing collaborative outsourcing takes strategic significance. The impacts of 3PL activity differ according to the size of the organization, type of the industry and supply chain therein. However, it becomes apparent that where on-time delivery is a fundamental requirement for efficient resource utilization, and thus impacts on the bottom line, it is imperative that 3PL relationships are nurtured and become strategic collaborative alliances.

## References

- Al-Kaabi, H., Potter, A., & Naim, M. (2007). An outsourcing decision model for airlines' MRO activities. *Journal of Quality in Maintenance Engineering*, 13(3), 217-227
- Andersson, D., & Norrman, A. (2002). Procurement of Logistics Services. A Minute's Work or a Multi-Year Project? *European Journal of Purchasing and Supply Management*, 8(1), 3-14.
- Annabi, C. A., Hassan, F., & Amer, I. (2018). The Blind Men and the Soft Drinks Industry in the United Arab Emirates. *International Journal of Distribution & Business*, 9(10), 21-37.
- Barclay, I. (2005). Supply Chain Management in SMEs-benchmarking Best Practice Core Competency. *Journal of General Management*, 30(3), 35-50.
- Bask, A. H. (2001). Relationships between 3PL providers and members of supply chains – a strategic perspective. *Journal of Business and Industrial Marketing*, 16(6), 470-86.
- Belcourt, M. (2006). Outsourcing – The Benefits and the Risks. *Human Resource Management Review*, 16(2), 269-279.
- Beresford, A. K. C., Pettit, S. J., & Whittaker, W. (2005). Improving Supply Chain Performance through Quality Management in a Global Distribution Environment. *International Journal of Services and Operations Management*, 1(1), 75-89.
- Bhoyar, V. V., Bhone, N. P., Chawale, S. B., & Jogi, N. G. (2013). Third-Party Logistical Obstacles in Manufacturing Industries. *International Journal of Engineering Science and Innovative Technology*, 2(3), 190-194.
- Chen, H., Tian, Y., Alexander, E. E., & Daugherty, P. J. (2010). Managing Logistics Outsourcing Relationships: An Empirical Investigation in China. *Journal of Business Logistics*, 31(2), 279-299
- Cheong, M. L. F., Bhatnagar, R., & Graves, S.C. (2007). Logistics Network Design with Supplier Consolidation Hubs and Multiple Shipment options. *Journal of Industrial and Management Optimization*, 3(1), 51-69.
- Chopra, S., Meindl, P., & Kalra, D. V. (2006). *Supply Chain Management: Strategy, Planning and Operation* (3<sup>rd</sup>ed.). NewDelhi, India: Pearson Education Inc.
- Christopher, M. (2011). *Logistics and Supply Chain Management* (4<sup>th</sup>ed.). London, England: Prentice Hall.
- Davis-Sramek, B., Fugate, B. S., & Omar, A. (2007). Functional / Dysfunctional Supply Chain Exchanges. *International Journal of Physical Distribution and Logistics Management*, 37(1), 43-63.
- Denzin, N. K., & Lincoln, Y. S. (2005). *The Sage Handbook of Qualitative Research* (3<sup>rd</sup>ed.), London, England: Sage Publications.
- Eisenhardt, K. M., & Graebner, M. E. (2007). Theory Building from Cases: Opportunities and Challenges. *Academy of Management Journal*, 50(1), 25-32.
- Ellinger, A. E., Keller, S. B., & Bas, A. B. E. (2010). The Empowerment of Frontline Service Staff in 3PL Companies. *Journal of Business Logistics*, 31(1), 79-98.
- Engblom, J., Solakivi, T., Töyli, J., & Ojala, L. (2012). Multiple-method analysis of logistics costs. *International Journal of Production Economics*, 137(1), 29-35.
- Fatma, C., & Mahjoub, D. M. (2013). Logistics Outsourcing Partnerships: Conceptual Model. *International Journal of Economics, Finance and Management Sciences*, 1(2), 81-88.
- Fernandes, C., & Rodrigues, G. (2009). Dubai's Potential as an Integrated Logistics Hub. *Journal of Applied Business Research*, 25(3), 77-92.
- Fritzsche, R., & Lasch, R. (2012). An Integrated Logistics Model of Spare Parts Maintenance Planning within the Aviation Industry. *World Academy of Science, Engineering and Technology*, 68(1), 1-10.
- Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative Inquiry*, 12(2), 219-245.
- Gadde, L. E., & Hulthén, K. (2009). Improving Logistics Outsourcing through increasing Buyer-Provider Interaction. *Industrial Marketing Management*, 38(6), 633-640.
- Gotzamani, K., Longinidis, P., & Vouzas, F. (2010). The Logistics Services Outsourcing Dilemma: Quality Management and Financial Performance Perspectives. *Supply Chain Management: An International Journal*, 15(6), 438-453.
- Govindan, K., & Chaudhuri, A. (2016). Interrelationships of risks faced by third party logistics service providers: A DEMATEL based approach. *Transportation Research Part E*, 90, 177-195.

- Grahl, A. D. (2011). *Success Factors in Logistics Outsourcing* (1<sup>st</sup>ed.). Wiesbaden, Germany: Gabler Verlag.
- Guide, V. D. R. Jr., Jayaraman, V., & Linton, J. D. (2003). Building contingency planning for closed-loop supply chains with product recovery. *Journal of Operations Management*, 21(3), 259-279.
- Gupta, O. K., Ali, S. S., & Dubey, R. (2011). Third-Party Logistics: Key Success Factors and Growth Strategies. *International Journal of Strategic Decision Sciences*, 2(4), 29-60.
- Halldorsson, A., & Skjoett-Larsen, T. (2004). Developing Logistics Competencies through Third-Party Logistics Relationships. *International Journal of Operations and Production Management*, 24(2), 192-206.
- Harland, C., Knight, L., Lamming, R. & Walker, H. (2005). Outsourcing: Assessing the Risks and Benefits for Organisations, Sectors and Nations. *International Journal of Operations and Production Management*, 25(9), 831-850.
- Hoecht, A., & Trott, P. (2006). Innovation Risks of Strategic Outsourcing. *Technovation*, 26(5-6), 672-681.
- Hofenk, D., Schipper, R., Semeijn, J., & Gelderman, C. (2011). The Influence of Contractual Land Relational Factors on the Effectiveness of Third Party Logistics Relationships. *Journal of Purchasing and Supply Management*, 17(3), 167-175.
- Hsiao, H. I., Kemp, R. G. M., Van der Vorst, J. G. A. J., & Omta, S. W. F. (2011). Logistics Outsourcing by Taiwanese and Dutch Food Processing Industries. *British Food Journal*, 113(4), 550-576.
- Huo, B., Ye, Y., & Zhao, X. (2015). The impacts of trust and contracts on opportunism in the 3PL industry: The moderating role of demand uncertainty. *International Journal of Production Economics*, 170(A), 160-170
- Jayaram, J., & Tan, K. C. (2010). Supply Chain Integration with Third-Party Logistics Providers. *International Journal of Production Economics*, 125(2), 262-271.
- Jharkharia, S., & Shankar, R. (2007). Selection of Logistics Service Provider: An Analytic Network Process (ANP) approach. *Omega*, 35(3), 274-289.
- Lai, F., Chu, Z., Wang, Q., & Fan, C. (2013). Managing Dependence in Logistics Outsourcing Relationships: Evidence from China. *International Journal of Production Research*, 51(10), 3037-3054.
- Large, R. O., Kramer, N., & Hartmann, R. K. (2011). Customer-Specific Adaptation by Providers and Their Perception of 3PL-Relationship Success. *International Journal of Physical Distribution and Logistics Management*, 41(9), 822-838.
- Leavy, B. (2004). Outsourcing Strategies: Opportunities and Risks. *Strategy and Leadership*, 32(6), 20-25.
- Leuschner, R., Lambert, D. M., & Knemeyer, A. M. (2012). Logistics Performance, Customer Satisfaction, and Share of Business: A Comparison of Primary and Secondary Suppliers. *Journal of Business Logistics*, 33(3), 210-226.
- Lin, C. Y. (2008). Determinants of the Adoption of Technological Innovations by Logistics Service Providers in China. *International Journal of Technology Management and Sustainable Development*, 7(1), 19-38.
- Maloni, M. J., & Carter, C. R. (2006). Opportunities for Research in Third-Party Logistics. *Transportation Journal*, 45(2), 23-38.
- Marasco, A. (2008). Third-Party Logistics: A Literature Review. *International Journal of Production Economics*, 113(1), 127-147.
- Martinsen, U., & Björklund, M. (2012). Matches and Gaps in the Green Logistics Market. *International Journal of Physical Distribution and Logistics Management*, 42(6), 562-583.
- McGinnis, M. A., & Kohn, J. W. (2002). Logistics Strategy-Revisited. *Journal of Business Logistics*, 23(2), 1-17.
- Mello, J. E., Stank, T. P., & Esper, T. L. (2008). A Model of Logistics Outsourcing Strategy. *Transportation Journal*, 47(4), 5-25.
- Murphy, J. V. (2007). Best Practices in Reverse Logistics Can Ease the Pain of Product Returns. *Global Logistics and Supply Chain Strategies*, 11(10), 38-43.
- Murphy, P. R., & Poist, R. F. (2000). Third-Party Logistics: Some User versus Provider Perspectives. *Journal of Business Logistics*, 21(1), 121-133.
- Naim, M., Aryee, G., & Potter, A. (2010). Determining a Logistics Provider's Flexibility Capability. *International Journal of Production Economics*, 127(1), 39-45.
- Pradabwong, J., Braziotis, C., Tannock, J. D. T., & Pawar, K. S. (2017). Business process management and supply chain collaboration: Effects on performance and competitiveness. *Supply Chain Management: An International Journal*, 22(2), 107-121.
- Quinlan, C. (2011). *Business Research Methods*. Hampshire, England: Cengage Learning.
- Qureshi, M. N., Kumar, D., & Kumar, P. (2007). Modeling the logistics outsourcing relationship variables to enhance shippers' productivity and competitiveness in logistical supply chain. *International Journal of Productivity and Performance Management*, 56(8), 689-714.
- Rahman, S. (2011). An Exploratory Study of Outsourcing 3PL Services: An Australian Perspective. *Benchmarking: An International Journal*, 18(3), 342-358.
- Rajesh, R., Pugazhendhi, S., Ganesh, K., Yves, D., Lenny, S.C., & Muralidharan, C. (2011). Perceptions of service providers and customers of key success factors of third-party logistics relationships-an empirical study. *International Journal of Logistics Research and Applications*, 14(4), 221-250.

- Ramanathan, U., & Gunasekaran, A. (2014). Supply chain collaboration: Impact of success in long-term partnerships. *International Journal of Production Economics Volume, 147(B)*, 252-259.
- Ridder, H. G. (2017). The theory contribution of case study research designs. *Business Research, 10(2)*, 281-305.
- Rodrigue, J. P. (2012). The Geography of Global Supply Chains: Evidence from Third-Party Logistics. *The Journal of Supply Chain Management, 48(3)*, 15-23.
- Sahay, B. S., & Mohan, R. (2006). Managing 3PL relationships. *International Journal of Integrated Supply Management, 2(1/2)*, 69-90.
- Samaranayake, P., & Kiridena, S. (2012). Aircraft Maintenance, Planning and Scheduling: An Integrated Framework. *Journal of Quality in Maintenance Engineering, 18(4)*, 432-453.
- Saunders, M. N. K., Lewis P., & Thornhill, A. (2012). *Research Methods for Business Students* (6<sup>th</sup>ed.). Harlow, England: Pearson Education Limited.
- Selviaridis, K., & Spring, M. (2007). Third Party Logistics: A Literature Review and Research Agenda. *International Journal of Logistics Management, 18(1)*, 125-150.
- Selviaridis, K., Spring, M., Profillidis, V., & Botzoris, G. N. (2008). Benefits, Risks, Selection Criteria and Success Factors for Third-Party Logistics Services. *Maritime Economics and Logistics, 10(4)*, 380-392.
- Sink, H. L., & Langley, C. J. Jr. (1997). A managerial framework for the acquisition of third-party logistics services. *Journal of Business Logistics, 18(2)*, 163-190.
- Sohail, M. S., Anwar, S. A., Chowdhury, J., & Farhat, N. R. (2005). Logistics Outsourcing in the United Arab Emirates: Evidence and Managerial Implications. *Journal of Marketing Channels, 13(1)*, 21-36.
- Sraboti, A., & Ruzzier, M. (2012). Logistics Outsourcing: Lessons from Case Studies. *Managing Global Transitions, 10(2)*, 205-225.
- Stefansson, G. (2006). Collaborative logistics management and the role of third-party service providers. *International Journal of Physical Distribution & Logistics Management, 36(2)*, 76-92.
- Stojanovic, D. (2012). Paradoxes and Opportunities in Logistic Outsourcing Research. *Transport Logistics Review, 24(6)*, 525-533.
- Teddle, C., & Yu, F. (2007). Mixed Methods Sampling: A Typology With Examples. *Journal of Mixed Methods Research, 1(1)*, 77-100.
- Vieira, D. R., & Loures, P. L. (2016). Maintenance, Repair and Overhaul (MRO) Fundamentals and Strategies: An Aeronautical Industry Overview. *International Journal of Computer Applications, 135(12)*, 21-29.
- Vissak, T. (2008). Achieving Success in Logistics Services Outsourcing: Some Recommendations. *Management of Organizations: Systematic Research, 46(2008)*, 149-162.
- Wadhwa, S., Saxena, A., & Chan, F. T. S. (2008). Framework for Flexibility in Dynamic Supply Chain Management. *International Journal of Production Research, 46(6)*, 1373-1404.
- Wentworth, F. (2003). Outsourcing Services: The Case Against. *Journal of the Institute of Logistics and Transport, 5(2)*, 57-59.
- Wong, C. Y., & Karia, N. (2009). Explaining the Competitive Advantage of Logistics Service Providers: A Resource-Based View Approach. *International Journal of Production Economics, 128(1)*, 51-67.
- Wu, Y. (2012). A Dual-Response Strategy for Global Logistics under Uncertainty: A Case Study of a Third-Party Logistics Company International. *Transactions in Operational Researches, 19(3)*, 397-419.
- Yang, X. (2014). Status of Third Party Logistics – A Comprehensive Review. *Journal of Logistics Management, 3(1)*, 17-20.
- Yeung, K., Zhou, H., Yeung, A. C. L., & Cheng, T. C. E. (2012). The Impact of Third-Party Logistics Providers, Capabilities on Exporters Performance. *International Journal of Production Economics, 135(2)*, 741-753.
- Yin, R. K. (2009). *Case Study Research: Design and Method* (4<sup>th</sup>ed.). London, England: Sage Publications.
- Zacharia, Z. G., Sanders, N. R., & Nix, N. W. (2011). The Emerging Role of the Third-Party Logistics Provider (3PL) as an Orchestrator. *Journal of Business Logistics, 32(1)*, 40-54.

**Appendix A: The Semi-Structured Interview Questions**

Semi-Structured Questions	Area Covered
<ul style="list-style-type: none"> <li>Which activities are outsourced to 3PLs?</li> <li>Is there an impact of outsourcing on logistics costs?</li> <li>Do the actual logistics costs vary from your estimates? And if so, in what way?</li> </ul>	Logistics costs and scope of outsourcing
<ul style="list-style-type: none"> <li>Do you measure how 3PLs meet the service and quality criteria as agreed upon in contracts? If yes, what are the findings?</li> <li>Are there any impacts on customer contact caused by outsourcing? If yes, what are the main impacts?</li> </ul>	Customer service and quality
<ul style="list-style-type: none"> <li>Has outsourcing logistics impacted on your core activities?</li> <li>Do 3PLs offer specific expertise, technology and infrastructure?</li> </ul>	Core competency Expertise of 3PLs
<ul style="list-style-type: none"> <li>Were any changes noticed in relation to processes after any logistical service was outsourced?</li> <li>Were there labor lay-offs or changes in capital? If yes, what issues did you faced in that regard?</li> <li>Did you find any complexity arising from the outsourcing process?</li> </ul>	Control over logistics processes
<ul style="list-style-type: none"> <li>Did 3PLs help meet the variation in demand for logistics activities?</li> <li>In what way did 3PLs support your responsiveness during any dynamic market change?</li> </ul>	Flexibility
<ul style="list-style-type: none"> <li>Has your MRO expanded or plan to expand its logistics network in new markets?</li> <li>Will 3PLs have a role within your planned expansion?</li> </ul>	Market expansion
<ul style="list-style-type: none"> <li>Do you consider any environmental issues when hiring 3PLs?</li> <li>If yes, please specify which offerings you utilize and how, or what initiatives attracted you?</li> </ul>	Green initiatives of 3PLs

**Appendix A: The Semi-Structured Interview Questions**

Semi-Structured Questions	Area Covered
<ul style="list-style-type: none"> <li>What are your experiences with 3PLs as far as information confidentiality is concerned?</li> <li>Are you happy with the 3PLs service in general? For example, have 3PLs increased costs or provided poor service to a level that concerned you? Are there any other issues that you have encountered connected to this area?</li> </ul>	Information confidentiality Supplier opportunism
<ul style="list-style-type: none"> <li>Have you ever experienced any disruptions in logistics operations because of 3PLs?</li> </ul>	Double outsourcing
<ul style="list-style-type: none"> <li>What is the typical length of the contracts with 3PLs?</li> <li>Do you see your relationships with the 3PLs of strategic significance?</li> <li>Do you share risks, rewards and resources with 3PLs?</li> <li>Do you have cross-functional teams to manage outsourcing?</li> </ul>	Relationship Management
<ul style="list-style-type: none"> <li>How you exchange information with 3PLs?</li> <li>What practices have been adopted to facilitate information management with 3PLs?</li> </ul>	Information sharing

**Appendix B: Questions for Focus Group**

- Q1: In what ways do 3PLs provide operational flexibility?
- Q2: What procedures are used to obtain data from 3PLs on customer feedback and efficiency of an operation?
- Q3: What are your experiences with 3PLs as far as the following areas:
  - a) Product/Service availability Rates.
  - b) On Time deliveries.
  - c) Order accuracy.
  - d) Lead times.
  - e) Technology of 3PL's equipment.
  - f) Technology of 3PL's information systems.
- Q4: What is the level of expertise 3PLs provide for handling and delivering a product?
- Q5: What are the reasons for disruptions in operations by 3PLs (if they occur) and how do 3PLs respond with their own resource utilization to cope with these disruptions?
- Q6: How has logistics outsourcing influenced the visibility, accountability and complexity of logistics operations?
- Q7: How can improvements be made to the outsourcing process?