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The Mediatory Role of Supply Chain Collaboration between Human Resource Management Practices and Port Performance

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Abstract--- *The main objective of the study to investigate the mediating role of supply chain collaboration (SCC) between human resource management practices (HRMP) and port performance (PP) in Kingdome of Saudi Arabia (KSA) ports based on the assumption of Maslow hierarchy needs and Adams 'equity theories. The 221 data a has collected from different firms which are engaged with KSA ports logistics. The data has investigated to apply smartpls-3. The study found the full mediation role of SCC between HRMP and PP. Furthermore, the study revealed the positive and significant relationship between HRMP and SCC. However, the SCC is very important for effective implementation of HRMP and as well as for positive performance of posts in KSA. The future studies should validate current study framework in other context specifically in developing countries to validate the study.*

Keywords--- *Human Resource Management Practice, Supply Chain Collaboration, Port Performance, Kingdome of Saudi Arabia, Smartpls-3.*

I. INTRODUCTION

In this digital era, the role of port in supply chain management cannot ignored. The port has progressed from the traditional functions of cargo handling and storage to become an essential part of global supply chain (Paixão & Bernard Marlow, 2003). The high demand of logistics services is increasing the competitions between ports; however, the ports should cooperate with supply chain partners for providing the value-added services to port users (K Bichou & Gray, 2005). There are many studies have discussed the important role of port in supply chain management. Nonetheless, the mediating role of supply chain collaboration between HRM practices and port performance is limited, specifically in context of Kingdom of Saudi Arabia (KSA).

As of now, KSA is the leading oil exporting country. In this regard, KSA should have efficient and equipped ports, which can import and export the cargo on time and safely. These ports are contributing in KSA in term of GDP, employment. According to Mira, Choong, and Thim (2019)nine major ports are working in KSA, which are dealing about 95% of the exports and imports of commodities. Notwithstanding the positive contribution in GDP of KSA, still the cargo overstock is the main concern. Basically, the overstock of cargo is increased the cargo handling price up to 200%, are resulted lack of HRM practices such as employee skills, employee incentives and employee participation and supply chain collaboration (Han, 2018).

As past studies stated that ports are the significant player in global supply chain management, which is handling and transported the 90% volume of cargo (Seo, Dinwoodie, & Roe, 2015). However, the present is considering the

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supply chain collaboration as mediatory between HRM practices and port performance. This study will try to give the answer of following question.

Do supply chain collaboration plying the mediatory role between HRM practices and port performance?

Do HRM practices influences the port performance?

The remaining part of the study will cover the literature review, hypothesis, research framework, research methods, data analysis, results discussion and conclusion of the study.

II. LITERATURE REVIEW

This section will discuss the past literature on study variables such as HRM practices, supply chain collaboration and port performance. Furthermore, this section will propose the hypothesis on the basis on past relationship between the study variables.

Port Performance

The evaluation of any firm performance is required for economic activity (Seo, Dinwoodie, & Roe, 2016). The literature review presented the different conceptual definitions of performance, such as the performance of any firm stated as the investigation of effectiveness and efficiency of given activity to accomplishment the goals and objectives(Marlow & Casaca, 2003). More specifically, in respect of port industry, according to Talley (2006) that port performance evaluated by comparing their actual and optimum throughputs, in other meaning, the measured in tonnage or number of containers handled. As in detail, the companies such as port authorities and terminal operators are used different methods to measure port performance such as quality, cost-effectiveness and profitability of their operations(Kia, Shayan, & Ghotb, 2000). One more study stated that port performance (container port and container terminal performance) in term of efficiency have been studied deeply in the literature. The most recent study has taken the cost, quality and responsiveness of port performance as measures(Han, 2018).

However, there are many factors which are directly and indirectly influences the port performance. Anyhow this current study is going to investigate the influences of supply chain collaboration and human resources practices on port performance in KSA context. Their relationship is discussed below.

Human Resource Management Practices and Port Performance

Human resource management practices (HRMP) is about involvement of employees those are working for organization and employer(Si & Li, 2012). HRM is the art of managing the employees and making working environment within organisation, in which the employees can work effectively(Jackson, Renwick, Jabbour, & Muller-Camen, 2011). Basically, HRM is recruiting the right person for right task, secondly providing the training to recruited employees and polishing their skill up to standard (Price, 2007). Moreover, the HRM assigning the task to employees on daily basis and evaluating their performance, on this performance evaluation result, HRM is also giving the promotion and incentives to higher performed employees (Gelade & Ivery, 2003).

However, the HRM is the multidimension construct, there are many practices of HRM. Anyhow the present study is taking the more effective and contributing HRM practices in port performance of KSA, such as employee

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skills, incentives and employee participation. As many studies stressed that HRM practices generated higher firm performance in three aspect such as when employee is well skilled, when employees are well motivated to apply their skill at job and when platform provided to employees to contribute their efforts(Huo, Han, Chen, & Zhao, 2015). However, in this study we follow the Batt (2002) model to follow the three main HRM practices such as employee skills, employee incentives and employee participation.

Employee skill refer to techniques, competency that enable employees to complete the given tasks on time(Lee & Bruvold, 2003). These kinds of skills either can acquired or only select the specific required persons at the time recruitment or also can developed the through the training. In this HRM practices, the employer must hire the employees through selective hiring and secondly developed their skills through subsequent training programs. However, employee skills can influence the port performance, as we discussed, employee skill is totally task oriented practices.

Employee incentives are developed to motivate the employees to apply their skills at workplace and accomplish company goals(Colvin & Boswell, 2007). As per past literature review, there are many types of incentives strategies such as performance base, process and goal-based incentives. However, more effective and famous strategies is performance-based incentives. Furthermore, some of studies stressed on goal-based incentives strategies. Basically, goal-based incentives strategy is more effective in manufacturing companies and rapid services firms such as port, where the dynamic environment required employee should flexible and discover creative ways to deal with complex situations(van der Lugt, Dooms, & Parola, 2013). Consequently, the current study believes that the employee incentives practice can positively influence to port performance, where operations are changing on daily basis. This kind of practice can motivate to employee to deals effectively port operations on-time.

Last practice, employee participation stated that firm should give the values to employee's opinions and introduce the mechanism in which employees can understand that how their job can be improved (Chen, Tang, Jin, Li, & Paillé, 2015). According to Peñarroja, Orengo, Zornoza, Sánchez, and Ripoll (2015) that the problem-solving group and feedback information are two effective steps to improve the employee participation. As per past literature review, problem solving groups encouraging the employee opinions by providing ways for employee to communicate and devote their intelligence. On other hands, the feedback information allows employees to improve their performance by offering them information that can be used to adjust their efforts (Anseel, Beatty, Shen, Lievens, & Sackett, 2015). Thus, the employee participation indicated that how employees involved in organizational operations. However, this study believes that employee participation can be the effective practice to improve the port performance in KSA. Therefore, on the basis on above discussion the following hypothesis are proposed.

H1: The HRM practices are positively influencing the port performance.

H1a: The HRM employee skill practice is positively influencing the port performance.

H1b: The HRM employee incentive practice is positively influencing the port performance.

H1c: The HRM employee participation practice is positively influencing the port performance.

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Mediating Role of Supply Chain Collaboration (SCC)

Supply chain management (SCM) have reshaped the logistic chains, promoting collaborative management between ports and ports users in which logistics is the key components(Huo et al., 2015). Supply chain collaboration (SCC) engages the both ports and ports users. Conceptually SCC explained as two or more firms working and cooperating to plan, manage and execute supply chain operations and improving performance and creating value for end customers and stakeholders (Seo et al., 2016). As past studies stated that SCC has brought cost reduction, revenue enhancements, operational flexibility and improved the service performance(Seo et al., 2015).

In term of SCC measurement, it is second order construct. This is divided into five dimensions such as information sharing (IS), knowledge creation (KC), goal similarity (GS), decision harmonization (DH), joint supply chain performance measurement (JPM).However, the more common way to implement collaboration is on low cost to share the information regarding the status of container, availability of port facilities, port traffic data, berth occupancy, pilot requirement, navigation(Merkel, 2015). Besides, the first dimension of SCC refers to information sharing, which is sharing information between ports and port users, contributing to visibility and sharing frequent relevant and accurate information that may assist to whole port supply chain(Khalid Bichou, 2006).

Secondly the knowledge creation stated as the ports and port users develop and create knowledge that may be useful for them by working together (Möller & Svahn, 2006). The third dimension, global similarity presented that similar goals between ports and port users and pursued to increase the efficiency and effectiveness of whole port supply chain(Woo, Pettit, & Beresford, 2013). The fourth, decision harmonization defines as the processes whereby ports and port users jointly harmonize decision in arranging the transport plans and operations to optimize supply chains (Dooms, Haezendonck, & Verbeke, 2015). The last, joint supply chain performance measurement represents the desire to jointly measure and manage supply chain performance in common with port supply chain partners (Min et al., 2005).

Furthermore, the link between HRM and SCM are interrelated, some of researchers suggested that development of SCM modelled great challenge for HRM and that HRM practices contributed to building and facilitating supply chain relationship and collaboration. On this link, HRM practices are very important for effective SCC implementation. However, the HRM practices having main role in SCC (Huo et al., 2015). More simplify that right employee incentives could leads to desire supply chain behaviour (Jabbour & de Sousa Jabbour, 2016). The employee skills and employee participation as enablers of SCM. Nevertheless, some of studies found that HRM practices can improve the SCC performance through employee participations and team formations.

Moreover, as past studies presented that port acted as integral part of supply chain. As we know, port performance measures involving various factors such as port operations, port users which reflect to stockholder interests in port supply chain(Imran, Hamid, Aziz, & Hameed, 2019). As per past studies, there are many factors influencing port performance such as safety and security, efficient operations, cost efficiency, reliability and convenience of port users (Rodrigue, 2010). More specifically, most of studies presented that SCC could increase the port performance (Seo et al., 2015, 2016). As in explanation, the SCC approach that port may gain better use of port capacity by adopting this approach. The rising need for greater collaboration reflects the salience of relationship

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between among ports and port users, which can contribute to the efficiency of port logistics systems (Ng et al., 2014). Anyhow, large number of studies stressed that direct impact or indirect impact of SCC on port performance can give the sustainable advantage. Therefore, SCC could cry the influence of HRM practices to port performance. Thus, this study proposed the following hypothesis.

H2: The HRM practices are positively influencing the supply chain collaboration (SCC).

H3: The supply chain collaboration (SCC) is positively influencing the port performance.

H3a: The information sharing (IS) is positively influencing the port performance.

H3b: The knowledge creation (KC) is positively influencing the port performance.

H3c: The goal similarity (GS) is positively influencing the port performance.

H3d: The decision harmonization (DH) is positively influencing the port performance.

H3e: The joint supply chain performance measurement (JPM) is positively influencing the port performance.

H4: The supply chain collaboration mediated between HRM practices and port performance.

Research Framework

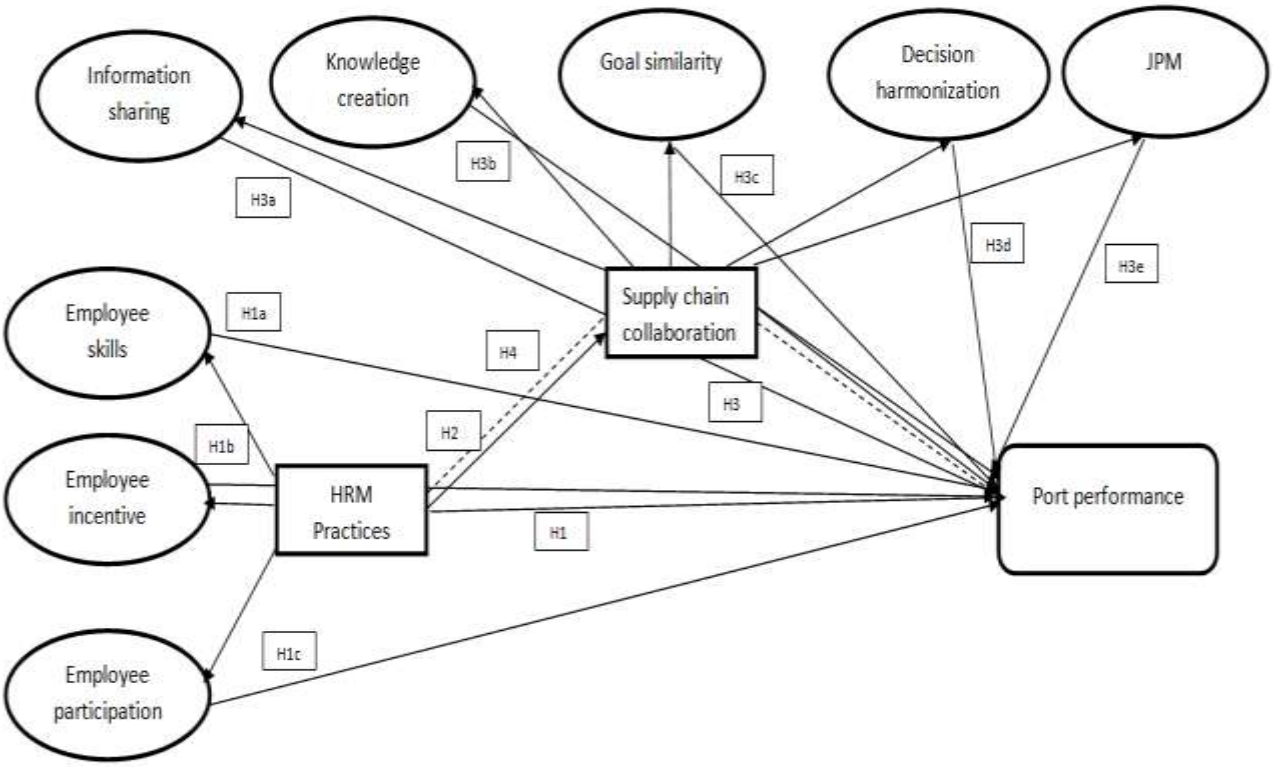

Figure 1

Research Methods

The current study has selected the companies which are engaged in logistics with KSA ports. However, present study chooses the directory of port authority KSA to identify the companies such as shipping lines, freight forwards,

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terminal operators, inland transport, ship management firms and third part logistics companies. Though, these firms were taken as proxy for balance between HRMP, SCC and PP users (Khalid Bichou & Bell, 2007). The study target population is spread in KSA nine major ports such as Jeddah Islamic Port, King Abdulaziz Port Dammam, King Fahad Industrial Port Yanbu, King Fahad Industrial Port Jubail, Jubai Commercial Port, Yanbu Commercial Port, Jizan Port, Dhiba Port, Ras Al-Khair Port. The current study distributed the 600-web base questionnaire among the targeted firms. The reminder mails, emails and telephone calls has been made to increase the response rate of the study. However, the present study has collected the 221 useable responses at response rate of 36%.

The scale of the study has adopted from the past studies, such as the questionnaire of HRMP has adopted from the study of Huo et al. (2015). The scale of SCC and PP has adopted from the study of Seo et al. (2016). The detail of scale has provided in end of the study as well. The seven Likert scale is used in this study.

III. Data Analysis and Findings of the Study

The present study is used the partial least square structural equation modeling (PLS-SEM). The PLS-SEM has evaluated through smartPLS-3 statistical software. PLS-SEM is evaluated into two step such as measurement model and structural model.

Measurement Model

In this step examined the data internal and external validity. I this regard, the Cronbach alpha, composite reliability should be not more than 0.70and average variable extracted (AVE) should be more not less than 0.50, hence, the present study found the data within the proposed limits, their findings can be seen in table (1) as well as in figure (2) and figure (3).

Table 1: Findings of Measurement Model (Internal Validity)

Constructs	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
DS	0.908	0.931	0.730
EI	0.851	0.899	0.691
EP	0.186	0.708	0.55
ES	0.900	0.913	0.569
GS	0.662	0.853	0.744
IS	0.810	0.838	0.524
JPM	0.899	0.926	0.714
KC	0.892	0.949	0.902
PP	0.887	0.909	0.505
HRMP	0.734	0.831	0.623
SCC	0.891	0.919	0.694

Note: employee skills (ES), employee incentive (EI), employee participation (EP), information sharing (IS), knowledge creation (KC), goal similarity (GS), decision harmonization (DH), joint supply chain performance measurement (JPM), human resource management practices (HRMP), supply chain collaboration (SCC), port performance (PP)

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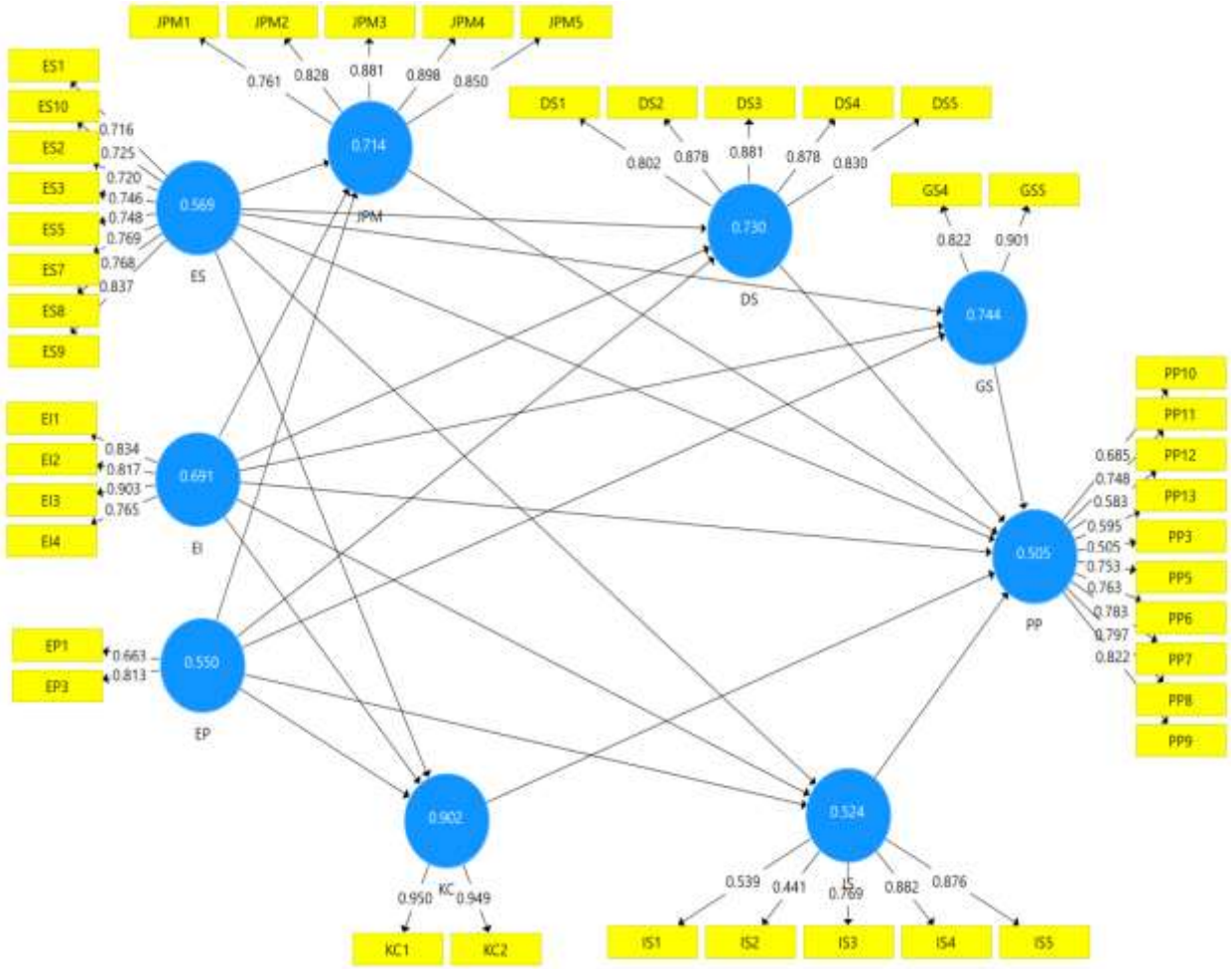

Figure 2: Measurement Model (1st order)

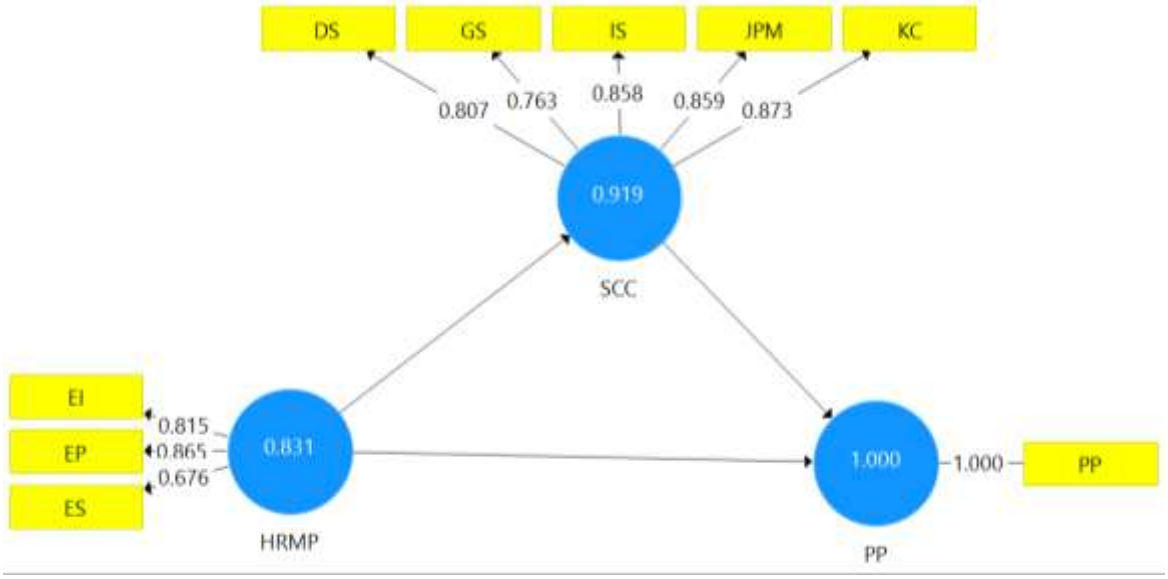

Figure 3: Measurement Model (2nd order)

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Heterotrait-Monotrait Ratio (HTMT) is used to evaluate the external validity of data. The values of HTMT should be less than 1.0. However, this study found the all HTMT values less than 1, the findings can be seen in table (2). Hence, measurement model is validating the validity of data, after this assumption, the present study can proceed the structural model.

Table 2: Findings of Measurement Model (External Validity)

Constructs	DS	EI	EP	ES	GS	IS	JPM	KC	PP
DS									
EI	0.137								
EP	0.240	0.843							
ES	0.064	0.772	0.911						
GS	0.943	0.118	0.425	0.085					
IS	0.524	0.114	0.461	0.09	0.610				
JPM	0.763	0.066	0.268	0.073	0.718	0.656			
KC	0.609	0.153	0.403	0.104	0.698	0.773	0.719		
PP	0.490	0.130	0.375	0.087	0.507	0.581	0.649	0.657	

Note: employee skills (ES), employee incentive (EI), employee participation (EP), information sharing (IS), knowledge creation (KC), goal similarity (GS), decision harmonization (DH), joint supply chain performance measurement (JPM), human resource management practices (HRMP), supply chain collaboration (SCC), port performance (PP)

Structural Model

The path co-efficient, Coefficient of Determination (R^2) and effect size (f^2)to examine the structural model of the study to conclude the results of the study.

According to Hair Jr, Hult, Ringle, and Sarstedt (2016)path co-efficient should run at 5000 sub-samples on t-values 1.96 with 0.05 significance level to determine the hypothesis acceptance and rejection. However, this study has run the boot strapping at 5000 sub-samples on 1.96 t-statistics with 0.05 significate level and found the following results, which can see in table (3) as well as in figure (4) and (5).

Furthermore, the study has tested the mediation role of SCC between HRMP and PP, hence, the study found the full mediation, the result can be seen in table (4).

Table 3: Direct Relationship

Hypothesis	Beta	Standard Deviation	T Statistics	P Values	Decision
H1: HRMP -> PP	0.140	0.078	1.791	0.074	Reject
H1a: ES -> PP	0.054	0.139	0.389	0.697	Reject
H1b: EI -> PP	0.091	0.107	0.851	0.395	Reject
H1c: EP -> PP	0.109	0.067	1.631	0.104	Accept
H2: HRMP -> SCC	0.161	0.074	2.191	0.029	Accept
H3: SCC -> PP	0.640	0.045	14.196	0.000	Accept
H3a: IS -> PP	0.251	0.094	2.677	0.008	Accept
H3b: KC -> PP	0.183	0.101	1.810	0.071	Reject
H3c: GS -> PP	0.003	0.081	0.034	0.973	Reject
H3d: DS -> PP	0.038	0.094	0.403	0.687	Reject
H3e: JPM -> PP	0.276	0.079	3.480	0.001	Accept

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Note: employee skills (ES), employee incentive (EI), employee participation (EP), information sharing (IS), knowledge creation (KC), goal similarity (GS), decision harmonization (DH), joint supply chain performance measurement (JPM), human resource management practices (HRMP), supply chain collaboration (SCC), port performance (PP)

Table 4: Indirect Relationship (Mediation)

Hypothesis	Beta	Standard Deviation	T Statistics	P Values	Decision
H4: HRMP -> SCC -> PP	0.103	0.048	2.146	0.032	Accept

In respect of Coefficient of Determination (R2) and effect size (f2), the values of R2 is represented the variance of independent variable into dependent variable. The values of R2 = 0.25 is considered weak, 0.50 is considered moderate and 0.75 is considered excellent. Hence the present found the moderate R2, the result can be seen in table (5).

The effect size (f^2) is presented individual independent variance into dependent variable. The values considered small (0.02), medium (0.15) and large (0.35) respectively. The results of effect size can be seen in table (6).

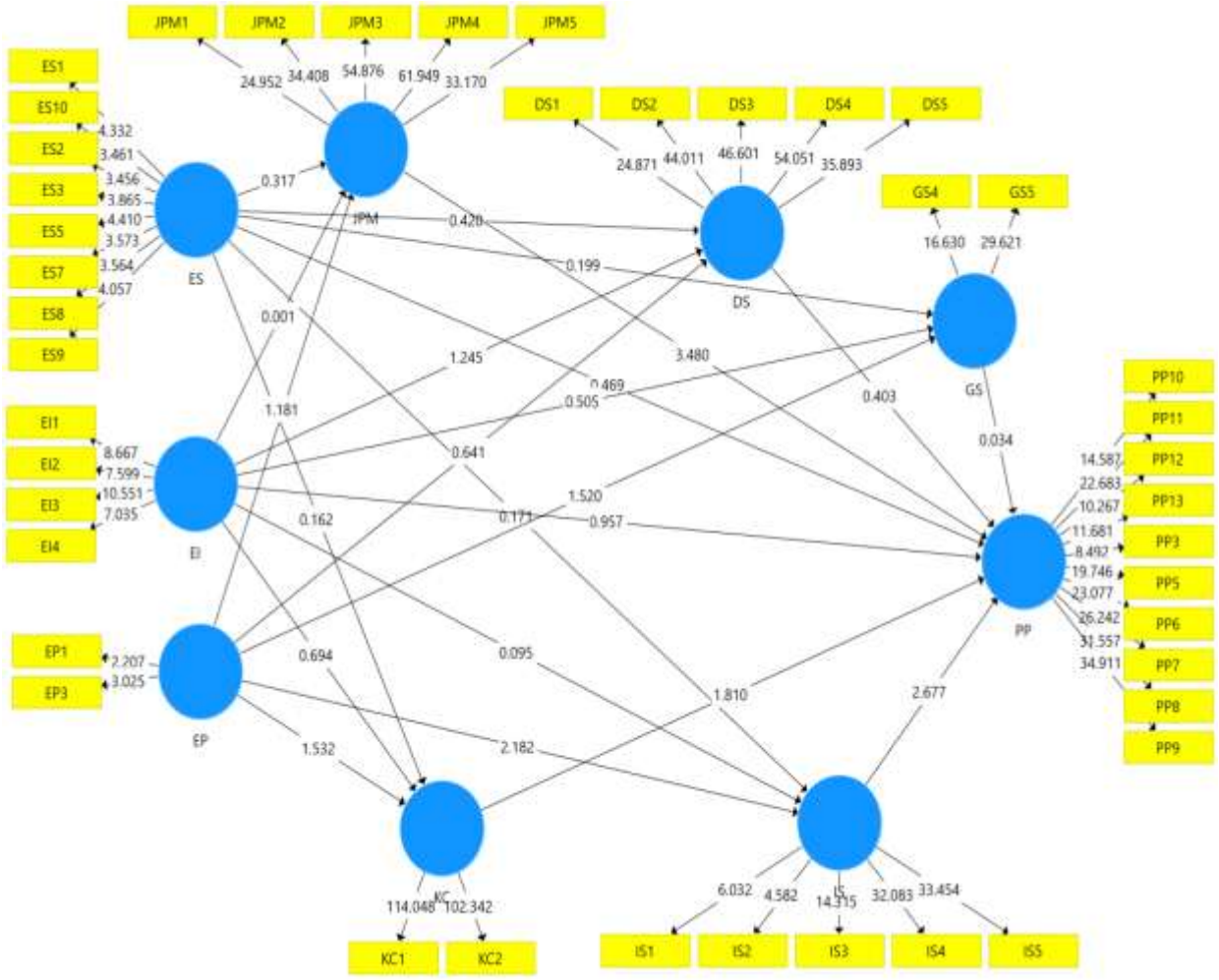

Figure 4: Structural Model (1st order)

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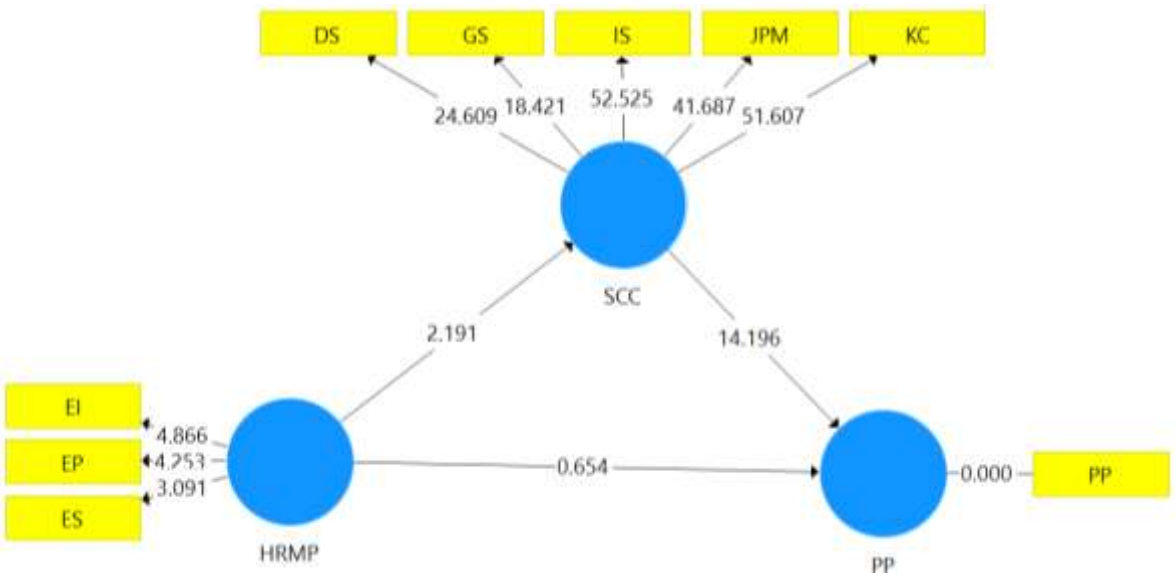

Figure 5: Structural Model (2nd order)

Table 5: Coefficient of Determination (R^2)

Construct	R Square	R Square Adjusted
PP	0.419	0.413
SCC	0.026	0.022

Table 6: Effect size (f^2)

Construct	HRMP	PP	SCC
HRMP		0.002	0.027
PP			
SCC		0.686	

IV. Discussion and Conclusion of Study

The present study has investigated the mediating role of supply chain collaboration between human resources management practices and port performance. The total hypothesis was proposed around 4th second order and 8th first order, in other words, the direct relationship between HRPM dimensions and PP,and between SCC dimensions and PP. The two-stage approach has been adopted to evaluate the first and second order hypothesis separately. Hence, the study found the positive significant relationship between SCC and PP, hypothesis 3 is accepted, on the other hand, the present study has found no relationship between HRMP and PP and rejected the hypothesis H1. Furthermore, the current study found the significant and positive relationship between HRMP and SCC, accepted the hypothesis 2.

In respect of mediation, this study found the full mediatory role of SCC between HRMP and PP, hence the hypothesis 4 is accepted confidently. Moreover, in term of first order construct relationship with PP, the study found the positive and significant relationship between employee participation, information sharing, joint supply chain performance measurement and port performance, hence the study accepted the H1c, H3a, H3e hypothesis. On the other hands, the study found the insignificant relationship between ES, EI, KC, GS, DS and PP, thus, rejected the H1a, H1b, H3b, H3c, H3d hypothesis.

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Therefore, the present study concluded that the SCC has main role in positive port performance and as well effective implementation of HRM practices in KSA ports. Furthermore, the current stressed that the dimensions of HRMP and SCC have weak influence on PP, thus the studies should take the HRMP and SCC as second order variable to check the influence on PP. As the study found that HRM practices are very important for supply chain collaboration as well specifically in in context of KSA, whereas HRM practices implementation recorded less effective.

In respect of limitations, the current study has taken the cross-sectional approach to call the data, the future study should adopt the longitudinal approach for better understanding. Moreover, the future studies should include the different variables in proposed research framework and as well as the study should conduct in different context.

Scale of the Study

Human resource practices (HRMP)		
Employee skills (ES1)	we use attitude/desire to work in a team as a criterion in employee selection	Huo et al. (2015)
ES2	we use work values and behavioral attitudes as a criterion in employee selection	
ES3	we select employees who can provide ideas to improve the manufacturing process	
ES4	we select employees who can work well in small groups	
ES5	employees at this plant have skills that are above average in this industry	
ES6	our employees are highly skilled, in this plant	
ES7	employees receive training to perform multiple tasks	
ES8	employees at this plant learn how to perform a variety of tasks/jobs	
ES9	employees are cross-trained at this plant so that they can fill in for others if necessary	
ES10	at this plant, employees only learn how to do one job/task	
Employee incentive (EI1)	our incentive system encourages us to vigorously pursue plant objectives	
EI2	the incentive system at this plant is fair at rewarding people who accomplish plant objectives	
EI3	our reward system really recognizes the people who contribute the most to our plant	
EI4	our incentive system at this plant encourages us to reach plant goals	
Employee participation (EP1)	our plant forms teams to solve problems	
EP2	in the past 3 years, many problems have been solved through small group sessions	
EP3	problem-solving teams have helped improve manufacturing processes at this plant	
EP4	charts showing defect rates are posted on the shop floor	
EP5	charts showing schedule compliance are posted on the shop floor	
EP6	charts plotting the frequency of machine breakdowns are posted on the shop floor	
EP7	information on quality performance is readily available to employees	
EP8	information on productivity is readily available to employees	
Supply chain collaboration (SCC)		
Information sharing (IS1)	provide any information that might help within our port supply chain.	Seo et al. (2016)
IS2	frequently exchange information within our port supply chain.	
IS3	have informed each other of changing needs in advance within our port supply chain.	
IS4	keep each other informed about events or changes that may affect our port supply chain.	

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IS5	exchange accurate information within our port supply chain.	
Knowledge creation (KC1)	search and acquire new and relevant knowledge within our port supply chain.	
KC2	assimilate and apply relevant knowledge within our port supply chain.	
KC3	identify customer needs for our port supply chain.	
KC4	discover new technology for our port supply chain.	
KC5	learn the intentions and capabilities of other port supply chains in competition.	
Goal similarity (GS1)	pursue efficient multi-modal transport of container cargoes for our port supply chain.	
GS2	stress the importance of collaboration within our port supply chain.	
GS3	pursue the provision of value-added logistics services for our port supply chain.	
GS4	pursue cost reduction throughout our port supply chain.	
GS5	pursue reduced cycle times and enhanced inventory management for our port supply chain.	
Decision harmonization (DS1)	plan on emergent situations within our port supply chain.	
DS2	plan on altering schedules and amending orders and when customers demand them within our port supply chain.	
DS3	manage the flow of cargoes within port supply chains	
DS4	plan on transport planning and scheduling transport within our port supply chain.	
DS5	advise each other of any potential problems in meeting the shipper's needs within our port supply chain.	
Joint supply chain performance (JPM1)	develop systems to evaluate supply chain performance for our port supply chain.	
JPM2	deal with security and risks that may occur for our port supply chain.	
JPM3	develop systems to enable shippers to identify their cargoes' location for our port supply chain.	
JPM4	keep seamless transport flows even in a peak time for our port supply chain.	
JPM5	solve the problems together (i.e. delay and accidents in transport) for our port supply chain.	
Port performance (PP)		
PP1	our port is compliant with security regulations.	Seo et al. (2016)
PP2	the number of accidents is low.	
PP3	terminal productivity is high.	
PP4	port turn-around time is short (ship waiting time due to congestion).	
PP5	port operating hours (24/7/365).	
PP6	our total price is low.	
PP7	our cargo handling charge is low.	
PP8	our auxiliary service charge is low (pilotage, towage, customers).	
PP9	cost of inland transport services is low.	
PP10	our port handles cargo at quoted or anticipated times.	
PP11	our port handles cargo on time as customers require.	
PP12	our port's service lead time is short.	
PP13	our port provides shipment information accurately.	
PP14	our port has information technology capability.	
PP15	our port has easy and fast operational processes for port users.	
PP16	our port has convenient custom procedures.	

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