Transformational Leadership, Information System, Supplier Integration and Supply Chain Performance: Examining the Mediating Role of Trust

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Abstract- **The main purpose of the current paper is to examine impact of information system, supplier integration and transformational leadership on supply chain performance. Moreover, mediating role of trust is examined as well. For the present research study, the data was gathered from the employees of mining industry of Indonesia. The response rate of the study was 42.3%. Partial Least Square Structural Equation Modeling (PLS-SEM) technique is used for data analysis, following linearity, autocorrelation, non-multicollinearity and homoscedasticity assumptions, to ascertain whether underlying technique meets all the required assumptions. Information system and supplier integration do not impact significantly to the trust. Whereas the mediation of supplier integration, trust and supplier performance is reported insignificant. All other hypothesis is found significant. The findings of the study are important for the practitioner and policy makers of human resource and supply chain department of the organization.**

Keywords; *Information System, Supplier Integration, Transformational Leadership, Trust, Supply chain performance*

1. Introduction

In present era, the supply chain of business is considered complex networks which should be managed through the collaboration and must be optimized at the global level. Moreover, the landscape of business is changing regularly and rapidly around the globe. The most important characteristics of today's business environment are to reduce the cost, meet the customers' demands, minimize the cycle of the work, and increase the competition. Therefore, it is worthy to measure, manage and track the performance of supply chain. Management of performance is related to the application of technologies, metrics, methods and processes so the relationship among supply chain controlling, implementation, planning and strategy can be developed [1].

There is variation of needs of customers at the global level and competition among competitors is intense as well. As the needs of the customers are getting intense due to which the competition is getting intense as well. The term partnership means there exist relationship among the partners of the business. For improved performance of business, partnership in the performance of supply chain has become very crucial. Firms are also exposed to the competition at the global level due to which it has become important for the organizations to focus on their supply chains especially towards SCM. The collaboration of SCM is very important to attain the goals of organization [2].

Within overall system of supply chain, electronic commerce is deployed because of advancement of IT in last few years. Interchange of electronic data is mostly being used in the business process for the transaction purpose since last 5 decades. It has covered a number of activities of the business including transfer of funds, processing of the order, sales and purchase. in recent past, the computer network within the organization has advanced a lot due to which application of supply chain and its new concepts have been enabled. These concepts of SCM includes systems like schemes of inventory replacement. The internet is being used world wide web is being used to make the ecommerce feasible. Moreover, its utilization within the SCM have increased the volume and sophistication [3].

Advancement is being brought in different manufacturing sectors due to IT. These advancements in these sectors include optimum utilization of the capacity, expanded networks, entering in the market in time, better tracking and tracing, minimize the recycle time , quick response, detecting the problem in time, making the social bond strong, making the services better, efficiency of the organization, maximize the productivity, improvement in the utilization of resources, significant reduction in the things which are not required, increasing the visibility, minimize the cost, managing the inventory efficiently and

reduction in inventory. Whereas, there are few obstacles related to information sharing as well. As mentioned earlier that it is very important for the manufacturing sector organizations to utilize the information technology for information sharing in a better way. These information sharing is required to be better in the supply chain so the organizations can develop and sustain competitive advantage. The competitive advantage is important so the organizations can sustain in the global economy. Therefore, it is key for the manufacturing organizations to integrate information system among models of supply chain so the accurate, quality, accessible and relevant information can be shared among the stakeholders of organization [4].

Integration of supply chain also known as supply chain integration is defined as the amount of integration among members of supply chain, customers, suppliers and within the organizations. integration of supplier and customers integration is generally known as external integration. It is considered to be the degree to which partners of manufacturers with external partners are linked to the synchronized processes, processes, collaboration, practices and strategies of inter-organization. Core competencies are involved in supplier integration which are important to coordinate with the suppliers [5]. Activities of the supplier includes the activities sharing information with suppliers, ensuring delivery, which is reliable, fast response to the order, management of inventory, planning of production and design stage. Researchers mentioned that data flow is related to supplier integration among more than one organization. Moreover, through it, the path to achieve process integration is achieved in which control regarding purchase and inventory is taken by supplier [6].

One of the most important management aspects is leadership. It is because leadership is the major cause which plays major role for the nations and organizational wellbeing. Transformer leader is the one who inspires and stimulate the employees or followers so the extra ordinary outcomes can be achieved [7]. The transformer leader gives importance and attention to the developmental needs and concerns of followers the awareness of the followers regarding the different issues is changed by the transformer leaders. These leaders help the employees in putting extra efforts so the goal of the organization can be achieved [8].

Having the roots form behavioral research, it is determined that having trust among the members of overall value chain. Trust between the supply chain members, help to improve collaboration among them. In the presence of trust, the parties of supply chain show mutual influence among each other and make appropriate decisions having benefits for both sides [9].

Indonesia is the important player of mining industry around the globe. It is the major contributor of gold, nickel and coal around the globe. A number of manpower of Indonesia is associated with this sector. The purpose of his study is to explore supply chain performance as a significant dependent variable. Also, trust is taken as a significant mediator between independent variables (information system, supplier integration, transformational leadership) and supply chain performance. Current study also adds up to the existing knowledge on supply chain performance literature. Next, the paper describes the relationships in detail along with extensive increase in present literature.

2. Literature Review

The organizational performance can be improved by focusing strong market base development like highlighting the needs and demands of customers. So, researchers worked out to search the impact of market base on supply chain performance and association among these variables [10].

2.1 Supply Chain Performance

Supply chain performance is the extended supply of the supply chain to meet the needs and demands of the customers which includes availability of the product, to deliver the product timely, management of the inventory and supply chain's capability for its performance delivery. Integration of supply chain is also necessary for management and controlling all the operations. Like flow control is linked with inventory management. To support the flow control system, a system must meet strategic and competitive objective of speed quality, flexibility, cost and dependability. As needs of customer is ever changing process, so the process of supply chain might change accordingly [11-15].

According to the concept of supply chain, member companies must know the performance of supply chain so they should fulfil the needs of customers. Moreover, to assess the members' company contribution in supply chain is also necessary. So, the system of performance management is required, that can operate at multiple levels but also can integrate the struggles to reach the goals of supply chain [1]. To fulfil this need, the performance management system must have tools and techniques to measure, control, monitor and manage process of the supply chain. SCM is getting much attention form industry as well as academics, but integration between SCM and performance management system is lacking. Many performance management frameworks and models can assess the performance of single organization and can cover particular type like financial or marketing. Some performance management systems particularly focus on management of supply chain. Organizations have to assess the strategic performance, tactical and operational performance in

relation with production, delivery and after sale services [12].

2.2 Trust

Trust is the level at which an organization have confidence on its partner in honesty and generosity. It shows that how comfortably and willingly, an organization can depend on its partner. Trust is an important and critical issue to work in partnership for exchanging the hazards and working on supply chain to minimize uncertainty of actions of the partner and other risks [13].

Supply chain trust is a critical and important relational capital to facilitate cooperative activities. If an organization is working in the environment of trust, manufacturer is meeting the needs and expectation of the customers as its having capability to monitor and control the actions. The environment of trust can be created by the members of supply chain minimize their requirements willingly to maximize the chance of success of the supply chain. According to past literature, it is important way to maintain cooperation and to avoid conflicts. Asset investment can also be increased by trust among partners of supply chain. Trust is an important component to establish long relations business relationship among partners of supply chain [14].

2.3 Information systems

The cornerstone of the supply chain is its information system. Information system is necessary for supply chain to keep operating. Information system keep the individuals from suppliers to consumers connected and integrated [16]. The role of information system has evolved from back office, leading to operational, extending towards operational leading to strategic and finally toward infrastructural. Companies are using information system in the whole process of value chain. It facilitates the coordination among suppliers, customers and stakeholders. It is divided into three parts at three different levels named as strategic information system, operational information system, and infrastructural information system [15].

2.4 Supplier integration

Supplier integration refers to the association among company and supplier in long run. It helps the members of the company to achieve their certain goals and benefits. There are different aspects of supplier integration like sharing of information, trust building, coordination, integration in processes, contracts, provision of assistance to suppliers to improve production processes, improving quality, investment in asset of supplier like developing new product, sharing of gains and losses and shared benefits from efforts [18]. So strong decision making, knowledge sharing, building learning routines, aligned capabilities and elevating performance of SC partners are the benefits of supplier integration. Trust increase the sharing level among two groups, lessen transactional cost, improving cooperation, elevate satisfaction level, lessen formal agreements and conflicts. It is also known as backward integration which means the association and interaction among a company and the supplier for effective and continuous flow of the product [17].

2.5 Transformational leadership

There are for parts of transformational leadership named as idealized influence, intellectual stimulation, individualized consideration and inspirational motivation. When a leader is in transformational style, he acts as the follower's role model to motivate motivating them to perform better and to get awareness about the vision and mission on which they are working together [20]. So transformational leadership in the framework of SCM means the capability of the buying company to attract and motivate the behaviors and actions of members of supply chain. A supply chain leader should have ability to create the environment of trust by increasing information sharing and communication. It is argued that organizational learning can be enhanced by showing transformational leadership, studies states that transformational leadership and operational performance are positively related with each other. A buying company exhibiting transformational leadership can increase its innovations that can lead towards its financial betterment. Furthermore, transformational leadership can also play a role for managing the organizational change, articulate the vision and helps to enhance their commitment for organizations [19].

2.6 Development of hypotheses

2.6.1 Relationship between Trust and Supply chain Performance

It's been revealed in past studies that assets and relational capitals such as dependence, commitment, power and trust play very important role so the organizations can get competitive advantage and gain SCI goals. The access of SC resources is gathered more effectively and efficiently through high level of trust. External resources and assets can be acquired by the supply chain members through this way. These external assets include technology, financial capacity, suppliers, information and access of channel [20-22]. These external resources can be gathered by the researchers more easily as in the absence of trust. Therefore, length of integrative relationship is increased through the trust among suppliers or customers. Partners of the supply chain are integrated with each other when they show intention to cooperate with the partners of supply chain [21].

SCI is revealed as important factor to improve the creating value and performance of the organization. trust is the most important and critical factor for collaborative

and committed relationship among the partners of supply chain. If they do not trust with each other the transaction cost of the SC will rise [22].

Hence, it hypothesizes that:

H1: Trust have significant impact on Supply chain Performance.

Information System; Association with Trust and Supply chain Performance

Among the relations of SC, there exists both interdependence and risk. Moreover, among the partners of the organizations, there must be clear agreement. in order to be successful, all partners of supply chain need to be open, honest and developed. In-fact, competence, openness, fairness, loyalty and honesty. Apparently, trust among the parties exist when both of the parties involved in supply chain thinks that it exists. It means that both of the parties have perception that have thought that they are important, they should make their promise, share the required information freely, and treat other supply chain partners equally. Throughout the organization, the integration of business information and processes is important for all the parties which are involved. Whereas, if there is lack of trust among the parties, it can work as the roadblock. It's been revealed by the researchers that there are number of different challenges faced by the parties regarding trust and information system. Whereas, under the supply chain practices, trust is mostly used for the decision-making process [23].

In terms of supply chain performance, Information system is very effective [24]. The reliance of SCM on a number of factors including exchanging information, developing management insight, performing communication and handling transaction. Appropriate system regarding information and access which is controlled is important for the supply chain so they can develop and sustain the competitive advantage on the long run basis [25]. On the basis of above argument, it's been hypothesized that

H2: Information System have significant impact on Trust.

H3: Trust mediates the relationship between Information System and Supply chain Performance.

Supplier Integration; Association with Trust and Supply chain Performance

The partnership is characterized on the basis of mutual trust and commitment among collaborators. The activities of supply chain are impacted by the absence of supply chain. It causes problems regarding free ridings, leakages and holdups due to which satisfaction of supply chain performance is impacted. Among the buyer supplier relationship there comes two types of trust namely goodwill trust and competence trust. The most important and fundamental function of trust is the interaction of trust [26].

It's been revealed empirically that business show better performance because of comprehensive integration [27]. Integration of supplier antecedents like status and skills and its impact on the performance of supply chain is overlooked largely. Cost of gathering information can be reduced because of information integration

H4: Supplier Integration have significant impact on Trust.

H5: Trust mediates the relationship between Supplier Integration and Supply chain Performance

Transformational Leadership; Association with Trust and Supply chain Performance

Leadership is described by a number of authors as important aspect and function of individual behavior and trait in terms of function of influencing, ordering relationship, unconsciousness needs and collective needs. There exists limited literature regarding leadership under supply chain, focus of most of the literature is regarding transformational and transactional leadership style [29].

Transformational leaders have the quality to motivate their followers and thus, they perform more than the expected performance, and this leads to earn respect and trust. Reliable behaviors like honesty, truthfulness and integrity are the features that the followers mostly need in leaders. It is the need of followers to get recognized with the name of their leaders, facilitates the development of commitment and trust in their association [28]. From organizational viewpoint, transformational leadership improves innovation, organizational learning, performance and creativity [30].

H6: Transformational Leadership have significant impact on Trust.

H7: Trust mediates the relationship between Transformational Leadership and Supply chain Performance

Research Framework

Following framework is developed for the current research

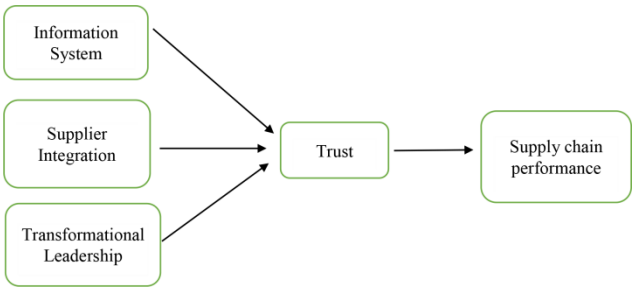


Figure 1: framework of SCM

3. Methodology

A cross-sectional designed quantitative method is applied in this research to quantify the relationship among the variables. The hypothesis for this research was developed after carefully reviewing the literature. The data was collected by conducting a cross-sectional survey, and the samples were selected using simple random sampling. Therefore, we chose a random sample procedure to confirm whether observed population is truly reflected by its sample. In case of current research, it was suitable to use survey method for data collection, with questionnaire as a research instrument. During a sample selection process, an arbitrary number is chosen from a table involving random numbers, given in the program software. The assigned number corresponds to any firm in the population that is added as a sample firm. Afterwards, around 550 random numbers were obtained through a random number generator to form a table.

The data was collected from the employees of mining companies of Indonesia. The response rate of the current study is 42.3 percent. The researcher then used the data analysis techniques, such as, statistical procedures and tools for assessing data, refining theories and testing the research hypotheses. As a data analysis technique, the Partial Least Square Structural Equation Modeling (PLS-SEM) is used, following linearity, autocorrelation, non-multicollinearity and homoscedasticity assumptions, to ascertain whether underlying technique meets all the required assumptions. The PLS-SEM can flexibly and efficiently perform statistical and numerical analysis and test the set of hypotheses. The CSA-SEM is a covariance structure analysis, also known as covariance-based SEM (CB-SEM), and a substitution for SEM approach. In addition, it is one of the earliest approaches based on the regression, to measure structural equation modeling parameters using minimized covariance matrices. On the other hand, PLS-SEM, a second-generation technique, which determines the model relationships by maximizing the variance through attractive PLS succession. Applying PLS-SEM technique is pertinent when model fails to meet the multi-variant assumption [27-30].

4. Analysis

After data collection, screening and checking, the next step is the measurement and inner models estimation [31], where outer model explains the nature of association among latent variable and the manifest or observed variables. Thus, for the purpose of estimating SEM sub-models i.e. inner (structural) and outer (measurement) models, PLS-SEM is applied. In other words, we used PLS-SEM approach to analyze the structural equation model in this research, by examining the model's direct as well as the moderating relationships among the constructs. For this purpose, Smart PLS 3.0, a PLS-SEM software package was used to determine causal relationships among the constructs [32].

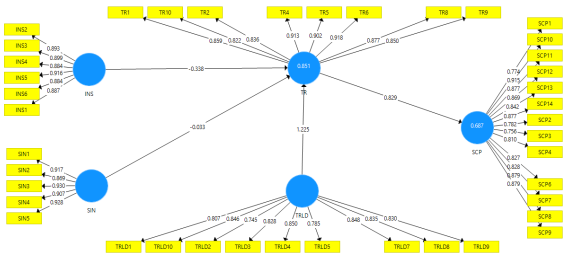


Figure 2. Measurement Model

The PLS model estimation is a two-phase process, where, measurement (outer) model is measured in the first phase, by ascertaining the validity and reliability of the instruments, followed by the structural (inner) model estimation in the second phase, which is carried out by examining the model's predictive ability and relevance, significance of coefficients, R-square and effect sizes. Meanwhile, multi-item constructs' in the model were measured by assessing their properties through determining the convergent and discriminant validity in the first phase. While, in the second phase of estimation process, bootstrapping procedure was performed in order to test the hypotheses set.

Thus, the study assessed the PLS-SEM's measurement model by establishing the model's content validity, convergent validity, construct validity and discriminant validity, as recommended by [33]. The construct and content validity refer to the extent to which the intended concept of the constructs is measured suitably by the proposed items [31]. Putting differently, the measuring items that are added into the model for estimating the construct should exhibit higher loadings for respective constructs. Hence, the items were observed through a comprehensive review of the literature. For underlying research model, all items were correctly loaded on their respective constructs, subject to the constructs' factor loadings. For the measurement model, the content validity is presented in Table 1, however, in case of factor loadings, the table also shows that valid items were obtained for each construct, which thus confirms the achievement of adequate content validity.

Table 1. Outer Loading

	INS	SCP	SIN	TR	TRLD
INS2	**0.893**				
INS3	**0.899**				
INS4	**0.884**				
INS5	**0.916**				
INS6	**0.884**				
SCP1		**0.774**			
SCP10		**0.915**			
SCP11		**0.877**			
SCP12		**0.869**			
SCP13		**0.842**			

SCP14		0.877			
SCP2		0.782			
SCP3		0.756			
SCP4		0.810			
SCP6		0.827			
SCP7		0.828			
SCP8		0.879			
SCP9		0.879			
SIN1			0.917		
SIN2			0.869		
SIN3			0.930		
SIN4			0.907		
SIN5			0.928		
TR1				0.859	
TR10				0.822	
TR2				0.836	
TR4				0.913	
TR5				0.902	
TR6				0.918	
TR8				0.877	
TR9				0.850	
TRLD1					0.807
TRLD10					0.846
TRLD2					0.745
TRLD3					0.828
TRLD4					0.850
TRLD5					0.785
TRLD7					0.848
TRLD8					0.835
TRLD9					0.830
INS1	0.887				

Convergent validity is defined as the extent to which variables are grouped together for measuring a particular concept. Generally, a model's convergent validity is established, by considering and ascertaining the adequate levels of average variance extracted (AVE), composite reliability (CR) and factor loadings. For each construct, all the items were found to be loaded above 0.70, which is in line with [34-38] recommended threshold level.

Table 2. Reliability

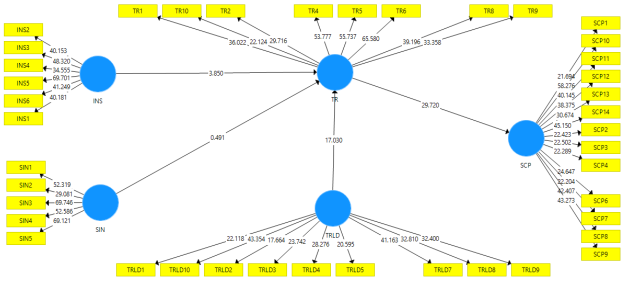
	Cronbach's Alpha	rho_A	CR	(AVE)
INS	0.950	0.952	0.960	0.799
SCP	0.965	0.969	0.969	0.707
SIN	0.948	0.952	0.960	0.829
TR	0.955	0.957	0.962	0.762
TRLD	0.939	0.945	0.949	0.672

Besides the above-mentioned measuring criteria, construct validity and discriminant validity are also important for measurement model estimation. The discriminant validity refers to the extent to which the difference among the constructs is characterized by their measurement items [35], thus, showing, that different model constructs have non-converging items. Furthermore, the measures' discriminant validity explains the shared variance among individual construct, which is expected to exhibit higher value than the shared variance among particular constructs.

Table 3. Discriminant Validity

	INS	SCP	SIN	TR	TRLD
INS	0.894				
SCP	0.709	0.841			
SIN	0.892	0.710	0.901		
TR	0.691	0.829	0.700	0.873	
TRLD	0.864	0.831	0.845	0.804	0.820

The measurement model's reliability and validity are also assessed before estimating the structural model. In the second phase i.e. structural model estimation, the predictive abilities of the model and relationship between the constructs were observed after checking the collinearity problem [36].



During the structural model estimation, the study used 5000 bootstrap samples for 320 cases to perform a bootstrapping procedure, thereby allowing to analyze the significance of path coefficients. This bootstrapping method was performed in Smart PLS 3.0 software and provided p and t-statistics for assessing path coefficients' statistical significance. The results of the direct relationships between the independent variable and dependent variable is shown in the table 4. Except the **SIN -> SCP, and SIN -> TR all the direct paths are significant at p-value less than 0.05.**

Table 4. Direct Results

	(O)	(M)	(STDEV)	(|O/STDEV|)	P Values
INS -> SCP	0.280	0.272	0.073	3.833	**0.000**
INS -> TR	0.338	0.328	0.088	3.850	**0.000**
SIN -> SCP	-0.028	-0.020	0.056	0.489	**0.312**
SIN -> TR	-0.033	-0.024	0.068	0.491	**0.312**
TR -> SCP	0.829	0.831	0.028	29.720	**0.000**
TRLD -> SCP	1.015	1.005	0.069	14.738	**0.000**
TRLD -> TR	1.225	1.209	0.072	17.030	**0.000**

The mediation of TR is shown in the table 5. Except the **SIN -> TR -> SCP, all the paths are significant at p-value less than 0.05.**

Table 5. Mediation

	(O)	(M)	(STDEV)	(|O/STDEV|)	P Values
INS -> TR -> SCP	0.280	0.272	0.073	3.833	**0.000**
SIN -> TR -> SCP	-0.028	-0.020	0.056	0.489	**0.312**
TRLD -> TR -> SCP	1.015	1.005	0.069	14.738	**0.000**

The value of R-square is shown in the table 6.

Table 6. R-square

	R Square
SCP	0.687
TR	0.851

5. Conclusion

Human resource is the important asset of the organization. It is critical for the organizations to focus on developing trust among the employees so the supply performance can be enhanced. In order to develop the trust and enhance the supplier performance, organizations should focus on the leadership of the organization. Moreover, Information system is also the integral part of organization which is vital for developing trust and improve supply chain performance. For the present study, the data was collected from the employees of mining firms operating in Indonesia and PLS-SEM was employed for analysis. The findings of the study revealed all proposed relationships had significant relationships other than supplier integration and IS impact on trust. The findings show the importance of Information system and HR for the organization to improve their supply chain performance by developing trust. The findings filled the gap of limited studies addressing the issue of supply chain performance in mining sector of Indonesia.

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