

THE AGILITY, ADAPTABILITY, AND ALIGNMENT AS THE DETERMINANTS OF THE SUSTAINABLE HUMANITARIAN SUPPLY CHAIN DESIGN

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Abstract

Purpose: The main objective behind the study is to investigate the relationship between agility, adaptability and alignment as determinant of the Sustainable Humanitarian Supply Chain Design.

Methodology: The fashion industry is one of the dynamic industries, which undergoes rapid transformation in both the demand and flexibility. A review of the earlier relevant research in the area has been included in the research paper along with an analysis of HSC in comparison to other commercial supply chains. This research paper goes over the definition of SHSC, development, and hurdles in its design, identification of research limitations and development of a model and hypothesis. Statistical analysis for example surveys, sample design, data assembling, variables/measure of identification, bias/pre-testing has been included to support the claims made in the paper.

Results: The firms operating in the manufacturing of Indonesia are chosen as the sample of the study. Employing the survey-based methodology, the SEM-PLS technique is used to test the hypothesized relationships. So, the current study has used SEM-PLS as a statistical tool to answer the research questions raised in this study and research objectives envisaged in the current study. The findings of the study have provided support to the theoretical foundation and proposed hypothesis of the current study. Current study will be helpful for policymakers and practitioners in understanding the issues related to supply chain risk, supply chain integration and supply chain performance. In the author's knowledge this is among very few pioneering studies on this issue.

Keywords Flexibility, Agility, Supply Chain, Indonesia

INTRODUCTION

The frequency of manmade and natural disasters around the globe, including India, China, United States of America, Pakistan and the Philippines, has boosted the interest of the specialists in HSC (Goral and Akgoz, 2017; Friday *et al.*, 2018; Georgantopoulos *et al.*, 2018). These disasters have forced academic circles worldwide to look for solutions, especially over the span of the past decade. According to a survey by (UNISDR, 2013), one of such disasters called a tropical storm has caused considerable damage. The tropical storms in 2012 claimed the lives of over 2000 people along with \$1.7 billion worth of damages. Similarly, another estimate by (Guha-Sapir *et al.*, 2012) revealed that a total of 9655 human lives and more than 124.5 million dollars have been lost to all forms of natural disasters.

In order to minimize and overcome the consequences of these disasters, collective global research is being dedicated to the field of disaster management. The main purpose for the existence of the supply chain is to ensure the safety, security, and rehabilitation of those affected in a disaster. In the last couple of years, a remarkable increase in philanthropic donations for the affected has been witnessed. As described by (Tofghi *et al.*, 2016) disaster relief is after all majorly dependent on the systematization and logistics and the increased contributions towards the supply chain have proven to be of great assistance. Several publications including International Journal of Physical Distribution and Logistics Management, Transportation Research Part E, International Journal of Services Technology and Management, International Journal of Production Economics, International Journal of Risk Assessment and Management, Management Research News and Production and Operations Management have made their contributions by publishing issues regarding the cause at hand.

The criticality of the issue and the extent of its importance at a global and humanitarian level have led to the establishment of the Journal of Humanitarian Logistics and Supply Chain Management. It is a journal exclusive to the engineering, coordination, and planning of the supply chain developed for the relief operations in an occurrence of a disaster.

HSC is driven by humanitarian intentions and solely for the purpose of assistance to the affected. These traits distinguish HSC from commercial and profit-driven supply chains. Besides, the obvious reason there are some other factors that draw this distinction as explained by (Gyebi *et al.*, 2013; Bhattacharya *et al.*, 2014; Ha and Tran, 2018).

- Natural/manmade disasters mostly occur unexpectedly and therefore the best way to stay ahead for HSC is to stay prepared, have a response and a plan for collaboration ready in advance. Even though the contributions and donations come naturally as a reaction in such an instance HSC still needs to be in accordance with the aforementioned factors of planning.

- As part of preparatory measures, it is imperative to keep resources in store in case of an emergency for example tools of communication and transportation including vehicles capable of carrying a large number of supplies when required. Disaster management organizations take this measure to ensure a rapid action without causing any delays that can be overcome just by being prepared in advance (Bealt *et al.*, 2016).

It is a result of these practices that notions like flexibility, resilience, adaptability, and rapid action plans are an imperative part of HSC guidelines, (Bhattacharya *et al.*, 2014) Despite an admirable and extraordinary advancement in the contributions and efforts towards building a better HSC, there are still many challenges to be overcome. A large part of this is because of the fact that disasters have started to occur at a higher frequency over the last few decades (Halldórsson and Kovács, 2010). Due to the nature of its HSC is an important part of every society's process of development, however, the extent of its importance reaches a whole another level when it comes to developing communities even more so in the areas where natural disasters are common (Bhushan and Tirupati, 2013).

Academics argue that temporary measures are imperative for relief programs but in order to ensure a safer future, HSC must also take steps to come up with lasting solutions considering all the relevant factors Similarly (Dubey and Gunasekaran, 2016) has emphasized the crucial need for lasting capacity building solutions. In the current scenario, it seems to be the only way for HSC to maintain itself and keep working. A most important step towards sustainability and long-lasting capacity building demands action at all levels to take preventative measures before a state of emergency falls upon the human race. These preventative measures majorly consist of avoiding activities that are leading to manmade disasters.

The need for sustainability has always been a point of concern not only in the past even more so today considering the extent of what is at stake (Kaivo-oja *et al.*, 2014). Keeping this in mind this paper has been dedicated to research towards building a sustainable humanitarian supply chain. The motives of this supply chain will be to ensure that HSC can be directed in a way that leads towards sustainability all the while also discovering the areas of improvement. The methodology used intends to form an outlook projecting positivism and interpretivism

This research study has been divided into sections dealing with some of the aspects mentioned below. A review of the earlier relevant research in the area has been included in the research paper along with an analysis of HSC in comparison to other commercial supply chains. This research paper goes over the definition of SHSC, development, and hurdles in its design, identification of research limitations and development of a model and hypothesis. Statistical analysis for example surveys, sample design, data assembling, variables/measure of identification, bias/pre-testing has been included to support the claims made in the paper. Furthermore, psychometric evaluation of the data collected, and the hypothesis formulated will be explained as well. Finally, this research study provides a conclusion, contributions, limitations, further possibilities and areas of development.

LITERATURE REVIEW

Literature review has been conducted in a systematic way in this section. The purpose is to get an understanding of the state of the art. After a literature review, a suitable instrument for data collection will be developed.

Experts have been contacted in the relevant fields for exploring the potential journals publishing articles related to the topics of sustainability, supply chain, humanitarian logistics, supply chain agility, performance measures of supply chain, design, SHSC, disaster and climate change and HSC design. The identified journals have been categorized based on the climate change and disaster; and HSC

Over the past few years, research has gained wide attention to the disasters and HSC because of the change in climate. There is rarely any article, which has suggested the need for supply chain networks and logistics because of the natural disasters due to climate change. However, exceptions are there (Shackleton and Shackleton, 2012).

Commercial Supply Chain and HSC

Some researchers have claimed for a different community over the last few years. This has resulted in supply chain management concepts and humanitarian logistics (Habib *et al.*, 2016). The HSC community is making great contributions in defining humanitarian logistics and management of supply chain from the aspect of commercial supply chain. Without risking the level of service, maximum surplus in supply chain is tried to be generated by the commercial supply chain (Holguín-Veras *et al.*, 2013). HSC is related to the objectives, which are non-profit in nature. The purpose of HSC is to assist the victims by providing them shelter, food, aid and other necessities for survival. In this way, maximum relief is given to the victims of disasters.

This research has differentiated HSC from commercial supply chain in the following way:

- Commercial supply chain is related to a profitable objective. However, the purpose of HSC has non-profit objectives (Bhattacharya *et al.*, 2014).
- In relief chains, the logistics of humanitarian are reactive and followed by a purpose only. There is need for advance planning for successful operations (Scholten *et al.*, 2014). Advance planning may have three main elements including preparedness, collaboration and response (Tomasini and Van Wassenhove, 2009).

In commercial supply chain, the logistics differ in being reactive and proactive. Four factors including time, cost, quality and risks guide the logistics. Ecological balance and sustainable development will instruct both chains in the future. According to (K. Roehrich *et al.*, 2014), damages have been created by humans to the balance of ecology over recent years. Concerns have been raised by environmentalists regarding rise of sea level, ozone depletion and ice melt. The threat of disaster has been spread across the world, particularly in the coastal areas, where the risk of tsunami, earthquakes and floods is high. Millions of lives have suffered already. The changing complications among the human activities and ecosystem vulnerability have been explored by (Gunasekaran *et al.*, 2017). There is a strong association between supply chain sustainability and HSCs (Hafeez *et al.*, 2018). There will be great influence created by humanitarian logistics, NGOs and supply chains for disaster management. SHSCs need to be strengthened. SHSC has been defined in the next part of the research study.

Definitions of SHSCs

According to (Post, 2014), rapid industrialization and over usage of the naturally available resources on the planet, humanity has caused immense damage to life on earth. Pollution is widespread across water resources, land, and clean air is no longer available. All these factors have led to multiple problems across the globe affecting not only the natural environment and ecosystems but also human life at all levels, especially health. Moreover, at a bigger level, a lot of damage has been done to the economy, infrastructure and security of nations worldwide. It has led to insufficiency of basic needs, especially in developing countries where life expectancy and quality is equally affected.

A significant increase in the frequency of natural disasters has been witnessed owing to the aforementioned factors caused by decisions and choices made by man. According to the scholars, the water systems have a natural ability to ensure that the rainstorms are buffered. However, due to human activities, the percentage of water holding this ability has decreased by 15% as it is being used as land now. In addition, due to an increase in population, the natural hydrological conditions of water bodies for example rivers have been changed. As a result, the risk of floods in the sub-delta plain has significantly increased. It is a concerning matter as these areas are highly populated by humans. This paper intends to find a solution for these issues by introducing humanitarian relief chains that are not only sustainable but are incorporated with the adaptation of changes in climate and mitigation (Xiao *et al.*, 2011).

As a part of the research for this paper, the literature review covers sources that shed a light on either solely on the human supply chain or only its sustainable version. Despite the fact that considering the current situation sustainable human supply chains provide a better solution, there is not enough attention or contribution available in this regard. Following are some of SHSC's features:

- Due to the unexpected and catastrophic nature of disasters, there is only one way to be prepared in advance and that is to have the ability or a warning before its arrival. Dynamic sensing is the tool that can allow HSCs to do so and be as prepared as possible before time (Cox and Atkinson, 2018). An example would be the cyclone in India 6 years ago. The advance warning issued by the Meteorological Department has caused the disaster prevention team managed to save as many lives as possible through evacuation of the area.
- However, dynamic sensing cannot possibly resolve the whole problem. It is important that SHSCs develop a better and higher reactive capacity. According to (Kamalhamadi and Parast, 2016), reactive capacity, structural flexibility can help HSCs to have an increased reactive capacity, improved responsible communication, and coordination in the time of need.
- Natural disasters have destructive consequences. It needs to be ensured that help can reach the victims in time, therefore, HSCs should possess dynamic speed
- Based on the analysis by (Azadegan and Dooley, 2010), it can be deduced that another crucial tool for SHSCs is structural innovativeness along with the usage of crowd sourcing and pervasive technologies. It can be said that the objectives of SHSCs revolve around the concepts of agility, adaptability, and Alignment. This concept was named as "Triple-A Supply" whereas (Dwayne Whitten *et al.*, 2012) provided empirical evidence to prove it. Despite the efforts of Whitten, Green, and Zelbst the concept of Triple-A supply chain has not been fully developed and a lot of progress remains to be made yet. Therefore, it is important that SHSC invest into resources to carry out research in this area.

Supply chain design

For the supply chain to achieve its objectives, it is crucial for it to be supported by supply design. An array of published resources was discovered because of an extensive literature review. These articles were published between 1997 until 2014. These articles have been of great help in finding out the important factors required for supply chain design as the articles explain the process that helped transform commercial supply chains into humanitarian supply chains.

These factors have been mentioned as following:

- The identification and outlining of influencing, as well as macro factors and the building blocks, is extremely imperative.

- The design decisions play another important role in designing the triple-A concept must be incorporated while designing for supply chains concerning relief.

Theoretical framework and hypothesis development

This section of the research paper intends to deal with the development of a conceptual framework. There are mainly two phases involving the principles introduced by (Melnyk *et al.*, 2014) for the development of an SHSC design.

Principle 1: Influencers

According to the first principle by (Melnyk *et al.*, 2014) influencers include factors that hold a lot of importance as suggested by the name, “Influencers”. There are environmental factors (business and political), the working business along with the objectives and aims set by a business. Lastly, the life cycle of a supply chain is equally imperative.

Logistics play a crucial role in success and failure when it comes to a relief operation. (Kovács and Spens, 2009) brought attention to the role that could be played by the private sector for supporting the supply chains and ensuring that the logistics are always taken care of so that the relief work never faces any hindrances or delays. (Özdamar and Ertem, 2015) have explained that financing is the most crucial and difficult factor in the management of a relief supply chain. Preparedness, response and collaboration are the factors that require the most attention when it comes to the implementation of the principles of the supply chain (Holguín-Veras *et al.*, 2013).

A study was carried out by (Kabra and Ramesh, 2015) in which they examined the consequences of disasters, limitations of relief and the importance of being prepared in advance with reference to the following natural disasters:

- Asian tsunami in 2004
- The earthquake in Pakistan in the year 2005
- Tsunami and earthquake in Japan in 2011
- Landslides in Brazil in 2011

The studies uncovered that in such an instance it is not only necessary to be well prepared and have funding at the time of a disaster in order to carry out relief operations at a rapid pace but it is even more crucial to ensure that logistics are sustained until the operation is completed. Dealing with a natural disaster, its consequences and the damage it leaves behind means a well-managed and fully planned HRSC will be required to overcome the challenges and get relief wherever needed. It is only then a relief operation will be successful, effective and efficient. Moreover, advance planning will also help an HRSC to save money and time as well. This is the reason why more and more focus is being directed towards the principles and notions of leanness and agility in literary resources related to HSC (Cozzolino *et al.*, 2012) have analyzed the principles of leanness and agility with reference to World Food Program’s HRSC. As a comparison in humanitarian and business contexts, it is quite possible to use the model of an agile, adaptable and aligned supply chain. On the other hand, a bigger challenge is faced by HRSCs where logistics are involved. In case, if as a result of a natural disaster the means of transport to the affected area get damaged for example railroads or roads not only transportation but communication to become challenging. Other issues such as an abundance of untrained and relief material cause hindrance in the way of relief work. However, it is possible to overcome these challenges with guidance and assistance from the supply chains that have been successful in the past in dealing with such matters. The participants that come together on a humanitarian level to be a part of a relief operation are always expected to be diverse. The diversity could be on several grounds including culture, purpose, interest, mandates, capacity and logistics expertise (Xiao *et al.*, 2011). Therefore, HRSCs tend to focus on stakeholders’ relationship management, an evaluation of the resources, supplier management along with observing and the outcome of the provided assistance.

Principle 2: Design Decisions

The second principle is based on design decisions. The design decisions revolve around the components that outline a supply chain. These components may be social, behavioural, physical or structural in essence. In the case of this paper following features have been evaluated:

- HSC agility
- HSC adaptability
- HSC alignment

Following is an explanation, extracted from the literature review, of the aforementioned features:

HSC Agility

According to (M. Gligor and Holcomb, 2014), Supply agility provides a competitive advantage. HSC agility is required in situations that contain a risk of inconsistent supply. It emphasizes on demand, noticeable enthusiasm and involvement in such cases. According to (Azadegan and Dooley, 2010), supply chain agility holds the potential to have a progressive influence on the performance of a relief operation. Moreover, it provides assistance to a supply chain network so that it is ready to pull through the damage caused by external forces rapidly and begins to efforts to accomplish required delivery

and service levels (Basheer *et al.*, 2019). It has been concluded by researchers that a supply chain needs supply agility to carry out successful operations.

Majority of the humanitarian logistics and supply chain scholars have agreed that HSC agility is dependent on dynamic sensing, dynamic speed and dynamic flexibility to become capable of coping with the challenges faced in a non-deterministic area. Therefore, it is susceptible to disasters.

HSC Adaptability

In the view of scholars that HSC adaptability plays a crucial role in cost cutting and saving. Moreover, response time can be improved with Structural flexibility. One way of doing so could potentially be outsourcing (Ahi and Searcy, 2013). The overall performance of a supply chain can be upgraded through HSV adaptability as well. Despite several claims of HSC supply chain success and HSC adaptability, it seems impossible to deny the possibility of an unforeseen effect of supply chain adaptability under the intervening effect of supply chain agility. Adaptable capabilities such as collaboration with 3PL also influence the agile capabilities of supply chain networks along with other supply chain associates in an effort to achieve a lower lead-time. Moreover, these partners also focus on the development of the delivery process for products/services. However, as a part of our contribution to research, this possibility will be investigated further with the use of ISM. Based on our research so far it has been established that acknowledgment of HSC adaptability remains unexplored in HSC literature. However, supply chain adaptability plays a crucial role in HRSCs, especially in a humanitarian context.

HSC Alignment

Supply chain alignment allows a supply chain network to regulate its configuration openly in order to align the objectives of all the involved members. This includes transparency and cooperation among supply chain members as well as profit and risk sharing (Gunasekaran *et al.*, 2017). It has been observed that supply chain agility, supply chain adaptability, and supply chain alignment have not been fully explored from the HSC design perspective. According to (Cozzolino *et al.*, 2012) it is utterly important that there is alignment between actors/members of the supply chain network.

There is no concluding literature available on the relation between Supply Chain Agility, Alignment and Adaptability. Therefore, ISM methodology has been adopted to analyze their relationship in influencing the HSC performance. This approach is widely used in research for the development of research model (Gorane and Kant, 2013). ISM has been suggested by (K. Roehrich *et al.*, 2014) as a crucial approach for structuring complicated issues. ISM was also proposed by (Xiao *et al.*, 2011) as an alternative approach, in a seminal article for grounded theory. In this research, ISM model has been developed as depicted in Figure 2. MICMAC has been conducted in the research study. Cross-Impact Matrix Multiplication Applied to the Classification analysis has been represented in Figure 3. A final model has been resulted after the analysis through MICMAC and ISM model. The final model shows the SHSC structure.

For categorizing the enablers in four different parts, MICMAC analysis has been performance. The classification is based on dependence power and drive of the enabling factors. Through classification, the enablers, which are drivers, have been identified. Moreover, the figure shows that there is a strong driving power of alignment. However, its dependence power is poor. The dependence and driving power of agility and adaptability is moderate. The four variables have been categorized as below based on their driving and dependence power.

- (1) The Autonomous enablers – these have poor dependence as well as driving power. No variable lies in this part
- (2) The Dependence enablers – these have strong dependence power but poor driving power. HSC performance lies in this quadrant.
- (3) The Linkage enablers – these have moderate level of dependence and driving power. Supply chain agility and adaptability lies in this quadrant
- (4) The Driving enablers – these have poor level of dependence power and strong driving power. Alignment is the variable that lies in this quadrant.

The following research hypotheses have been formulated in this research study based on the theoretical framework represented by Figure 1.

Hypothesis 1: There is a positive association between HSC alignment (HSCAL) and HSC agility (HSCAG).

Hypothesis 2: There is a positive association between HSC adaptability (HSCAD) and HSC alignment (HSCAL).

Hypothesis 3: There is a positive association between HSC adaptability (HSCAD) and HSC agility (HSCAG).

Hypothesis 4: There is a positive association between HSC agility (HSCAG). And HSC performance (HSCP).

Hypothesis 5: There is a positive association between HSC adaptability (HSCAD) and HSC performance (HSCP).

Hypothesis 6: There is a positive association between HSC alignment (HSCAL) and HSC performance (HSCP).

METHODOLOGY

The second-generation structural equation modeling is also known to be Partial Least Squares Approach (Wold, 1982). The approach can work suitably with the structural equation model having casual relationships among the variables. Partial Least Square Approach is fit for the development of statistical model and making prediction PLS has been selected for this

research study because of several reasons. The first thing is its convenience in path modeling to deal with complex models. It fits good in the real-world applications. The relation between the dependent and independent variables has been examined in this research study. Moreover, the mediating effect on the relations has been assessed. Secondly, the PLS path modeling can be applied to the data (normal as well as non-normal) Most of the researchers in social sciences have data with less normality. This issue can be addressed through the use of PLS. The third reason to use PLS path modeling is its ability to estimation the association among the constructs as well as the corresponding latent constructs in a simultaneous way (Kovács and Spens, 2009). For this, it is considered an important statistical approach. In this research, PLS has been used for testing the hypothesized relation among the variables, their reliability and validity.

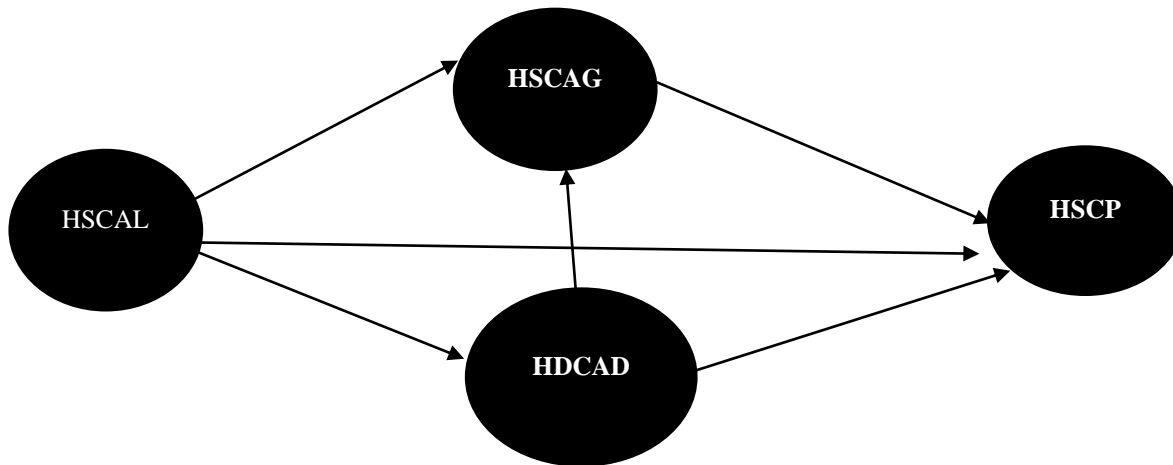


Figure 1: Conceptual framework

RESULTS

For assessing the reliability of internal consistency, the most suitable way is composite reliability in the PLS path model. The value can be defined as done for Cronbach's α . According to (Holguín-Veras *et al.*, 2013) the value of composite reliability needs to be greater than 0.7. The composite reliability of every variable has been represented in the table. The composite reliability value of every variable resides between the value 0.844 and 0.985. This range of value is greater than the standard value of 0.70. Ramayah *et al.*, (2011) has explained the convergent validity as the extent of measuring similar variables. This research study has checked convergent validity based on the recommendation of (Gunasekaran *et al.*, 2017). The value is determined by Average Variance Extracted (AVE). For every variable, the value of AVE value needs to be 0.5 at least. This value is considered sufficient. In order to improve the value of AVE, the items loadings with lowest loadings are eliminated from the data. The extent to which variables are distinct from each other is measured through discriminant validity. According to (Kabra and Ramesh, 2015), it is considered as the degree to which variables differ from the other variables involved in the research study. (Holguín-Veras *et al.*, 2013) have recommended two measures for assessing the discriminant validity. These measures are cross loadings and the Fornell-Larcker's criterion. The AVE value of every variable must be greater than the value of correlation among the other variables in the Fornell-Larcker's measure. The results of the study were consistent with this measure. The square root value of AVE for every variable was greater than the correlation among other values. Attitude variable was exempted from this and omitted from the data. Only 68 items were kept in the data whose value resided between 0.581 and 0.881. The square root value of AVE was greater than the correlation among other variables after eliminating these items. This reflects that there is suitable discriminant validity. The square roots of AVE have been presented in the table in boldface. However, the lightface values represent the correlations of latent variables.

Table 1. Reliability

	CR	AVE	Cronbach Alpha
HSCAL	0.975	0.872	0.885
HSCAG	0.702	0.737	0.924
HSCAD	0.960	0.871	0.893
HSCP	0.802	0.832	0.916

To check the construct validity of the outer model, the discriminant validity is established. The hypothesis testing is one through path analysis and for this, it is compulsory to test the discriminant validity. The extent to which the constructs differ from each other is measured through this. It has been shown through the discriminant validity that about 111 items have used different constructs, which do not relate to each other. Moreover, the variance among each construct is shared through the discriminant validity. The variance should be greater than the variance shared by the constructs. The method of (Holguín-Veras *et al.*, 2013) was used for determining the discriminant validity of measures. The diagonal elements of the correlation matrix replaced the square root of AVE for the constructs, as shown in the table.

Table 2. Discriminant Validity

	1	2	3	4
HSCAL	0.709			
HSCAG	0.680	0.727		
HSCAD	0.657	0.676	0.712	

The second step after the assessment of measurement model is to determine the inner model in PLS analysis. This research study has determined the significance of path coefficients as per the suggestion of (Azadegan and Dooley, 2010). The research has determined the value of R², predictive relevance, effect size and the moderating effect of variables. By using the bootstrapping process, the path coefficient significance was evaluated. As suggested by (F. Hair Jr et al., 2014), the study included 266 cases and 5000 bootstrap samples. For assessing the structural model, the variance of endogenous variables is determined in the PLS-SEM approach (Gorane and Kant, 2013).

Table 3. Direct Effect

	(β)	SD	T-value	P-Values
H1	0.211	0.135	3.211	0.000
H2	0.357	0.152	3.678	0.000
H3	0.321	0.178	3.321	0.000
H4	0.342	0.165	3.234	0.000
H5	0.453	0.187	3.768	0.000
H6	0.211	0.135	3.211	0.000

The total variation in the dependent variable caused by the explanatory variables are demonstrated by the value of R-square (F. Hair Jr et al., 2014). The value of R² to be 0.75 is considered substantial, 0.50 to be moderate and 0.25 as weak. The predictive relevance of the model is indicated by applying measures using PLS-SEM approach for determining the quality of model (F. Hair Jr et al., 2014; Habib and Mucha Sr, 2018; Hakim and Kasenda, 2018; Handa, 2018). The research is based on the test of Stone-Geisser for predictive relevance through employing the blindfolding procedures. In PLS-SEM modeling, for determining the goodness of fit, this test is used for predictive relevance. The variance explained by independent variables is 62 percent.

Table 4. Expected Variance

	R ²
FP	62.0%

CONCLUSION

This research study has been divided into sections dealing with some of the aspects mentioned below. A review of the earlier relevant research in the area has been included in the research paper along with an analysis of HSC in comparison to other commercial supply chains. Furthermore, psychometric evaluation of the data collected, and the hypothesis formulated will be explained as well. Finally, this research study provides a conclusion, contributions, limitations, further possibilities and areas of development. The main objective behind the study is to investigate the relationship between agility, adaptability and alignment as determinant of the Sustainable Humanitarian Supply Chain Design. The fashion industry is one of the dynamic industries, which undergoes rapid transformation in both the demand and flexibility. A review of the earlier relevant research in the area has been included in the research paper along with an analysis of HSC in comparison to other commercial supply chains. This research paper goes over the definition of SHSC, development, and hurdles in its design, identification of research limitations and development of a model and hypothesis. Statistical analysis for example surveys, sample design, data assembling, variables/measure of identification, bias/pre-testing has been included to support the claims made in the paper. The firms operating in the manufacturing of Indonesia are chosen as the sample of the study. Employing the survey-based methodology, the SEM-PLS technique is used to test the hypothesized relationships. So, the current study has used SEM-PLS as a statistical tool to answer the research questions raised in this study and research objectives envisaged in the current study. The findings of the study have provided support to the theoretical foundation and proposed hypothesis of the current study. Current study will be helpful for policymakers and practitioners in understanding the issues related to supply chain risk, supply chain integration and supply chain performance. In the author's knowledge this is among very few pioneering studies on this issue. Majority of the humanitarian logistics and supply chain scholars have agreed that HSC agility is dependent on dynamic sensing, dynamic speed and dynamic flexibility to become capable of coping with the challenges faced in a non-deterministic area. Therefore, it is susceptible to disasters.

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