6. THE IMPACT OF TERRORISM ON ECONOMICS AND LOGISTICS PERFORMANCE: AN EMPIRICAL STUDY FROM THE PERSPECTIVE OF SAARC MEMBER STATES

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Abstract

In this study, we investigate how terrorism and risk create impacts on logistics performance in the SAARC (South Asian Association for Regional Cooperation) member countries. This study adopted FE (Fixed Effects) methods and RE (Random Effects) as robustness. The results indicate that bombing attacks have strongly negative impacts on all logistics indices including LPIQTTI (logistics performance index: Quality of trade and transport-related infrastructure), LPIQLS (logistics performance index: Competence and quality of logistics services), and LPICCP (logistics performance index: Efficiency of customs clearance process). Due to a higher level of terrorism in the SAARC countries particularly in Pakistan, Afghanistan, and India, quality of logistics services and transport-related infrastructure is poor and/or destroyed, which directly creates disruption and a long delay in a global logistics operation. Besides, terrorism results in shrinkage to the trade and investment opportunities; and poor logistical infrastructure causes the slowdown of the economic growth of SAARC countries. As this is first research for examining the impact of terrorism on logistics operations using macro-level indicators, it will assist the policymaker to understand the consequences of terrorism on the logistics industry and make protection plan for logistics operations such as after 9/11 attacks; US built C-TRAT (Customs-Trade Partnership against Terrorism) and CSI (Container Security Initiative).

Keywords: macroeconomics; transport-related infrastructure; bombing attacks; and logistics performance
JEL Classification: D04, F40, L62, L90

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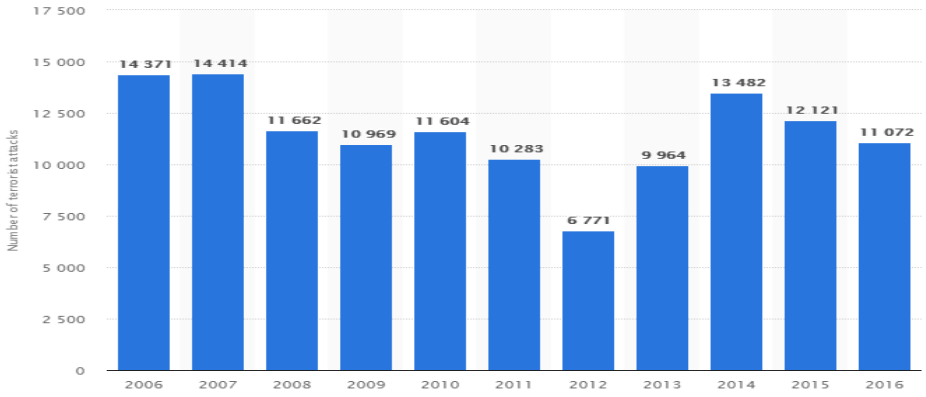
1. Introduction

Due to increasing terrorism in the Asian region, specifically in the SAARC (South Asian Association of Regional Cooperation) member states, disruption in logistical and trade operations create a negative effect on economic growth. The SAARC countries are mostly affected by different terrorism activities, mainly including, suicide bombing attacks, innocent people killing, kidnapping, armed assault and assassination (Imran, 2020). Global logistics acts as a backbone in countries' economy called (Leheny, 2019; Goodchild *et al*., 2009), while terrorism and criminal activities increase the risks of disruption in global logistics operation (Chaudhry *et al*., 2018), which not only becomes a hindrance to economic growth and generates panic in foreign investors, and building a negative image for the country in the world (Aldakhil *et al*., 2018; Henson *et al*., 2009).

A global supply chain is disrupted and suffering a lot due to terrorist attack, *e.g*., after the 9/11 attacks, Toyota and Ford were vulnerable to transportation disruptions because they were using a "Just-in-Time" inventory system, keeping raw materials and components on hand for only a few hours of operation. Akçay and Çelenay (2012) terrorism originate from the French word "terror" that means extreme anxiety and fear that has unique effects on non-traditional individuals and also usually causes the interplay of unconscious reaction. Michael (2007) described terrorism as people with different political and religious views that they want to impose on society through violence. Terrorist acts are taking place in many parts of the region, the bombing of public and private enterprises, government building and infrastructure; killing diplomatic and governmental officials; kidnapping of diplomats, passenger ships and aeroplanes, and in other different ways, such as the assassination of these people and the confrontation of the international community (Aksoy, 2014). Figure 1 illustrates the number of terrorist attacks worldwide from 2006 to 2016.

Figure 1

Global Terrorist Attacks from 2006 to 2016

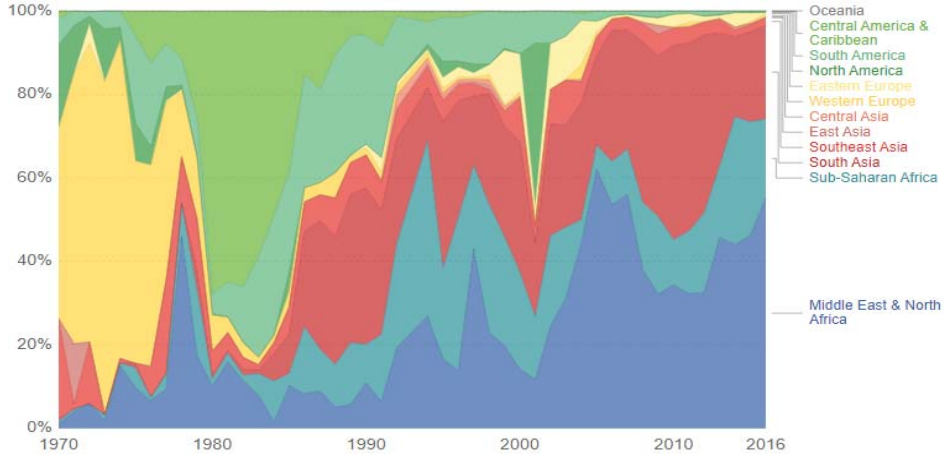


Undeniably, since the last couple of decades, the Asian region has been mainly affected by different terrorists' attacks, including suicide bombing, targeted killing, and kidnapping of government officials and diplomats. Surprisingly, Figure 2 shows that terrorism is continuously increasing in the Asian region, while terrorist attacks in other regions are on a declining phase, mainly in the European and American regions due to their improvement of

security. Chaudhry *et al.* (2018) conducted empirical research on terrorism in Asian countries and found that Afghanistan, Pakistan, and India are most affected by terrorist attacks. The results indicate that only in the last couple of years, Afghanistan, Pakistan and India suffered from 7,600, 6,664, and 4,407 terrorist attacks, respectively.

Figure 2

Number of Terrorism Fatalities by Region (Global Terrorism Database, 2017)



Sustainable Social Development Organization (2020) report that criminal cases have been increased dramatically during COVID-19 pandemic. The report highlights that only in Pakistan kidnapping and violence cases increase by 200%, which is not only a severe threat and challenging situation for the law enforcement bodies, but also creates several questions on their performance (Rossolatos, 2020; Imran, 2020). The COVID-19 patient in SAARC countries crossed to the five hundred thousand and death rate reach to the ten thousand (WHO, 2020). Due to severe lockdown in SAARC countries, economy is close to collapse and poverty is breaking previous records, which is one of the significant factors behind the kidnapping, violence and different street crimes (Khan *et al*., 2018; UNODC, 2020).

Goodchild *et al.* (2009) argued that due to future trade expected to grow, without investments in cross border trade and logistics infrastructure, trading nations, and border regions, will suffer social and economic costs. Khan and Dong, (2017a) researched the context of the United Kingdom to investigate the linkage between logistical operations and economic growth. The findings revealed that logistics enhances the country per capita income. Also, modern and developed logistics infrastructure attracts foreign investors. However, terrorist activities like suicide bombing are not only damaging economic growth and logistical infrastructure but also portray a negative image of a country on a global forum, resulting in trade barriers (Mohmand *et al*., 2017).

In today's world, management of supply chain disruption is a challenging task for countries due to the fact that logistics operations are interlinked with that of other countries through global trade (Hassini *et al*., 2012; Hwang, 2018). After the 9/11 terrorist attack, United States closed the country's borders, which directly and negatively impacted on several supply chains, such as that Ford Motor Co. had to idle several assembly lines intermittently when

trucks loading with components was not the time designed coming into the US from Mexico and Canada. Besides, Ford Motor output of fourth quarter of 2001 was down by 13% compared with its production plan. (Ford, 2001).

The second worst disruption in global supply chain occurred in 2020. Due to COVID-19 pandemic, China closed its borders, which created shortages of pharmaceutical and agricultural related products including masks, ventilator and live-saving drugs (Khan and Zhang, 2020a). In the Asian region, the SAARC countries are the most populated, and their people live in extreme poverty, while during COVID-19 pandemic, continuous lockdown, businesses and economic activities are closed or limited, which fuels the unemployment, violence and criminal activities (Economic Times, 2020).

Many studies found that acts of terror intimidation would cause direct loss and indirect loss to a country's financial capital and its image (Eruygur and Omay, 2014; Khan and Zhang 2020b). According to Karagöz (2016), terror can lead to a substantial loss for the economic growth and development of a country. The loss is because of uncertainties due to the confidence loss and infrastructure damage due to terrorism, and worse, this country's considerable resources will be transferred to military expenditure. Karaduman and Batu (2011) highlighted that the purpose of terrorist creating terrorism and panic in society is to achieve economic and political demands.

1.1 Research Objectives

In the last couple of decades, many researches have been conducted on advance-notice emergency evacuation events, such as precipitated by tsunamis and hurricanes. Nevertheless, comparatively very few studies were conducted on analyzing responses to no-notice emergency evacuations from events such as earthquakes and terrorist attacks and others stated that an advanced warning is not possible. Also, researchers need to explore the relationships and post consequences of the earthquake and terrorist activities on transport and logistics-related infrastructure (Auld, 2012; Khan *et al*., 2018). This study's principal purpose is to explore the impact of terrorism on the logistical performance in SAARC member states and to build the association between the type of terrorist attacks and country' logistics performance during the period from 2001 to 2017. In the last couple of decades, SAARC member countries, particularly Afghanistan, Pakistan, and India, were most affected by all types of terrorist attacks, including suicide bombing, armed assault, hostage-taking, and assassination. As per our knowledge and in-depth literature review, this study is a first to figure out the impact of terrorism on a country's logistics performance in a panel of SAARC member states.

This research has five sections. Section one is based on the overview of terrorist attacks and the importance of logistics operations for economic growth in the SAARC region. The second section is a literature review that attempts to find out the terrorism connection with logistics operations. Section three discusses the data source and research methodology, and we discuss the findings in the fourth section. Section five provides concluding remarks, future research and policy implications.

2. Literature Review

The objective of terrorists is to damage the economic development of countries and create panic in public. Gaibulloev and Sandler (2009) show that transnational terrorist attacks severely restrict economic growth. Logistical industry acts as a backbone in a country's economic growth and even the overall living standard. In practice, the logistics industry is

responsible for the delivery of food, lifesaving pharmaceutical goods, and other accessories to the urban and rural areas (Frey *et al*., 2007). Aslam *et al*. (2018) and Khan *et al*. (2020) demonstrate that logistics performance and economic performance of countries have a causal relationship, while terrorist attacks directly affect them. Barth *et al*. (2006) affirm that terrorism can generate inefficient resource allocation and create political instability, which diverts governmental priorities from development to combat terrorism through increasing military budgets. Ismail and Amjad (2014) postulate that terrorism is the underlying reason for poverty and low economic growth. Cinar (2017) revealed that emerging and low-income countries were more affected by terrorism as compared to developed countries. Zakaria *et al*. (2019) emphasize that governmental bodies cannot combat terrorism without solving unemployment, poverty and injustice issues, which are the fueling causes of terrorism in low-income countries.

Mubashra and Shafi (2018) highlighted that terrorist activities would not only disrupt the economic stability in the region, but also succeed in creating violence in society, which directly affects the logistics and tourism industry. Başıbüyük *et al*., (2012) reveal that terrorists attacks, directly and indirectly, hit economic growth and reputation of the country, and disrupt production and logistics operations, which is translated into a shortage of basic commodity products in cities, such as sugar, wheat, and rice. The public perceives the successive terrorist attacks as the failure of governance and security agencies (Uysal *et al*., 2009). Also, terrorist elements encourage the public to stand against the government such as protesting against the government, public and labor strikes, which may be converted into anarchy and reduction in foreign reserves and investments (Yalçınkaya, 2008; Kinyanjui, 2014; Khan and Yusof, 2017).

The literature has identified various channel variables through which terrorism is expected to affect economic growth (Hyder *et al*., 2015; Khan *et al*., 2016; Mehmood, 2014; Mirza & Verdier, 2008; Sandler & Enders, 2008). For instance, terrorism impedes economic growth by damaging infrastructure, FDI inflows, tourism, domestic savings, the currency exchange rate, and by increasing inflation, debt burden, brain drain, and capital flight. Previous studies measure the direct effect of terrorism on economic growth factors including trade and FDI, while no study was found to investigate the effect of terrorism on logistical operations, which facilitates trade and production output. To fill this gap, we have collected the data of different terrorist events from the panel of SAARC countries, which are profoundly affected countries in the Asian continent and investigate the long-run effect of terrorism on the logistical operations.

The SAARC countries' economies are continuously declining because terrorism is shrinking investors' confidence, and destroys logistical infrastructure with bombing attacks. Governmental bodies of Western and American countries issued travelling bans to their entrepreneurs (Khan *et al*., 2016). Thus, terrorism has significantly harmfully affected the logistical operations, which has thwarted economic growth. Abadie and Gardeazabal (2003) examined the relationship between terrorism and economic growth in the Basque Country. The results revealed that there is a strong and negative relationship between terrorism and economic growth, foreign direct investments and manufacturing value-added activities. Ak *et al*., (2015) concluded that terrorism activities create uncertainty in macroeconomic indicators, including FDI (foreign direct investment) inflows, GDP per capita income, and political stability. Gupta *et al*. (2004) explored that if there is an armed conflict, higher inflation and lower GDP per capita income is also present, which then negatively impacts on investment (domestic and foreign) and tax revenues. Tavares (2004) highlighted that 50% of the Palestinian territories' economy suffered from 1994 to 2002, while 4% GDP declined

in the Israel economy. Tavares, (2004) food supply and medical teams were unable to reach victim zone in Palestine territories due to poor infrastructure of logistics.

In 2014, a terrorist attacked an army public school in Peshawar city of Pakistan, killing 141 innocent people, 132 of them children (BBC, 2014). Asian region as a whole is under the target of terrorist, but mainly SAARC member countries are on the hit list. In India, during 1993, 13 bombs exploded in Mumbai in quick succession bringing the city's most iconic buildings to their knees, beginning with the symbol of its financial supremacy, the Bombay Stock Exchange (BBC, 1993). Unfortunately, till yet, SAARC countries lack behind in counter-terrorism policies and strategies, which not only increase the risk for SAARC member countries but also indirectly provoke terrorism in the Asian region (Azadeh *et al*. 2018). Logistics and transportation infrastructure are at risk due to several regional and local disruptions, mainly including hurricanes, blizzards, transit strikes, earthquake, and terrorist attacks (Mokhtarian, 2009). After the 9/11 attack, President George W. Bush released Homeland Security Presidential Directive- 7 (HSPD-7), to establish "a national policy for Federal departments and agencies to identify and prioritize United States critical infrastructure and key resources and to protect them from terrorist attacks" (Henson *et al*., 2009).

There is no doubt that improved logistical infrastructure facilitates corporate sectors, NGOs (Non-governmental organizations), and governmental bodies to supply foods and shelters in victim zones. Khan *et al.* (2018) described the importance of efficient and quality logistics services with improved logistics infrastructure in countries' economic development. In a similar line, Zhang *et al*. (2019) highlight that the indirect and direct effects of logistics and transportation infrastructure have a positive impact on the countries' economic growth, and also create employment opportunities through domestic and cross border trade. Yıldırım and Öcal (2013) show that the primary objective of terrorists is to victimize people in different cities with the short supply of foods, water, and medicine through damaging logistical infrastructure, which will not only force governmental bodies to accept their illegal demands but also slow down economic growth (Zakaria *et al*., 2019).

Yasir *et al*. (2016) conducted an empirical study to examine the impact of transportation-related infrastructure on economic growth in the context of Pakistan. The results indicate that in the short run, there is no causality between transportation investment and economic development at the national level. Besides, the results show that only investment in transportation infrastructure is not appropriate to boost economic growth in the long run, but also the technological and social development is required. Transportation planning and development is at a cross-road in many rapidly developing countries (Meierrieks and Gries, 2012). Logistics and transportation infrastructure increase the standard of living and economic growth of the country (Ram *et al*., 2009). Gaibulloev and Sandler (2009) transnational terrorist attacks had an inverse effect on economic development, while the findings revealed that an additional terrorist attack per million persons decreased per capita growth by 1.5%. This percentage was quite different between undeveloped, developing and developed countries. Especially for emerging countries in Asia, transnational terrorism curbs income per capita growth primarily by stimulating government security with resources taken from more productive public and private investments.

Bezić *et al*. (2016) conducted an empirical work to explore the impact of terrorism on FDI inflows in the European Union countries. They used GMM (Generalized Method of Moments) on panel data of 29 countries from 2000 to 2013, and the results showed that terrorism activities decrease foreign direct investment and per capita income. Khan (2020) reveals that a higher level of terrorist attacks encourages business professionals, experts, and

scientists to migrate to other countries, which indirectly damages the country's economic growth and development. Musayev (2016) examined the potential sources of positive externalities for the association between economic development and military expenditure using recent advances in panel data estimation techniques. The findings reveale that the impact of military expenditure on economic development is generally inverse as in the literature, but it is not significantly detrimental for countries to handle high internal threats (Nasir & Shahbaz, 2015).

Several empirical studies conducted in Asian, European and Western continents, showed that improved logistics operations and infrastructure enhance the economic growth, foreign direct investment and manufacturing value-added activities (Zaman, K. 2018; Shahzad *et al*., 2016; Khan *et al*., 2019; Aldakhil *et al*., 2018; Khan and Dong, 2017a; Khan *et al*., 2017a; Zaman & Shamsuddin, 2017; Hyder *et al*., 2015; Khan & Yusof, 2017; Mehmood, 2014; Ülgen & Forslund, 2015; Ram *et al*., 2009). However, in literature, no research is found to examine the effects of terrorism on logistics operations. In order to fill this gap, the current study investigates the impact of terrorism on logistics performance in most affected Asian emerging economies, including Afghanistan, Pakistan, and India.

3. Research Methodology

This research investigates the impact of terrorism on logistics performance in a panel of SAARC countries. Undeniably, logistics operations play a vital role in countries' financial growth, but on the other hand, the logistics industry is mainly targeted by terrorists for forcing the regulatory authorities, which results in a shortage of foods, water, and medical supplies. The following equation is drawn to calculate the impact of terrorist attacks on logistical performance in emerging economies of South Asia.

$$Log_{it} = \alpha_0 + \beta_1 Terrorism_{it} + \beta_2 Earthquai \quad (1)$$

where: Log represents logistics performance that is measured by LPICPS (arranging competitively priced shipments), LPIQTTI (quality of trade and transport-related infrastructure), LPIQLS (competence and quality of logistics services), and LPICCP (efficiency of customs clearance process). Terrorism represents the bombing, killing, armed assault, assassination, and hostage-taking, while in this model earthquake is used as a control variable. Also, *t* indicates the period, and *i* shows the number of SAARC association countries in the equation. Further, α and ε represent the alpha and error in the model.

In this research article, logistics indicators (LPICPS, LPIQTTI, LPICCP, and LPIQLS) data of sample countries were downloaded from World Bank website (https://data.worldbank.org/products/wdi), while terrorism and earthquake data were taken from Global Terrorism Database (www.start.umd.edu/gtd) and National Central for Environmental Information (https://www.ngdc.noaa.gov/hazard/earthqk.shtml) respectively.

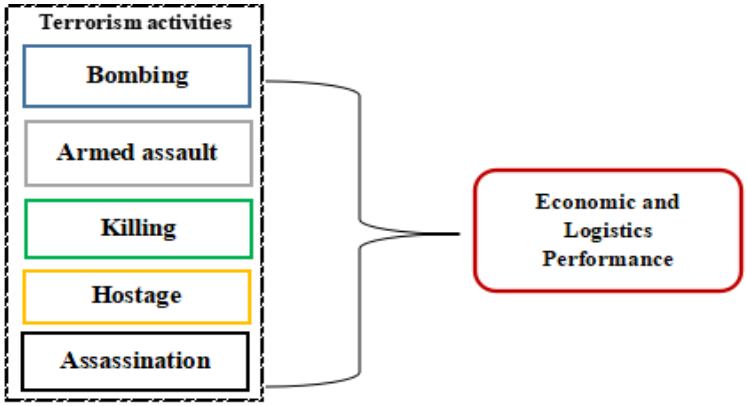
$$Log_{it} = \alpha_0 + \beta_{1t} Assassination_{it} + \beta_{2t} Bombing_{it} + \beta_{3t} Hostage_{it} + \beta_{4t} Killing_{it} + \beta_{5t} Armed_{it} + \beta_{6t} Earthquake_{it} + v_t + \varepsilon_{it} \quad (2)$$

After the initial evaluation and testing of a stationary test, it is suitable to employ FE (fixed effects) method and RE (random effects) as robustness check to investigate the impacts of different terrorist attacks on logistical performance in a panel of selected countries. The primary differences between random and fixed effects models are that: the fixed effects model controls for time-invariant unobservable variables while the random effects model

does not. Also, random parameters can estimate the effects of parameters that do not vary over time, while the fixed effects model can only estimate the effects of parameters that vary over time (Porter and Wood, 2013). The advantage of the random effect model is that it is economical in degrees of freedom. In this case, we only estimate the mean value of the intercept and its variance (Khan *et al*., 2019). Equation 2 is for examining the logistics performance in the most South Asian region that is most affected by terrorism. During 2001 to 2017, the SAARC countries were severely affected by terrorist activities, which motivate researchers to conduct a panel study and investigate the underlying phenomena between terrorism and logistics performance. Further, the theoretical model is shown in Figure 3.

Figure 3

Theoretical Model



4. Results and Discussion

Table 1 shows the descriptive statistics, all predictors and explanatory variables have positive means and standard deviation, which represents the high logistics performance of LPICCP, LPIQTTI, LPICPS, and LPIQLS.

Table 1

Descriptive Statistics

Variables	Mean	Std. Dev.
LPIQLS	2.371258	0.411412
LPICPS	2.289789	0.435755
LPIQTTI	2.571231	0.412415
LPICCP	2.494713	0.482431
Assassination	19.51479	7.83814
Bombing	21.49234	115858
Hostage	13.11547	2.09113
Killing	2.018922	2.75799
Armed assault	61.01469	37.0572
Earthquake	9.821401	5.07012

On the other hand, terrorist activities, including assassination, bombing, armed assault, killing, hostage-taking, and earthquake, are significantly influenced by positive means and standard deviation values. There is no doubt that terrorism disrupts logistics operations and damage the logistics infrastructure. In addition, global logistics operations may be disrupted and delayed due to terrorist attacks and earthquake, which create shortages of food and medical supplies in the affected region.

Table 2 shows a correlational matrix between endogenous and exogenous variables, and one may notice that there is a significantly negative effect on the performance of logistics from different terrorist attacks.

Table 2

Correlational Matrix

Variables	LPICCP	LPICPS	LPIQLS	LPIQTTI	ASSA	BOMB	HOST	KILLING	ARMED	EQ
LPICCP	1									
LPICPS	0.8402	1								
LPIQLS	0.9001	0.9107	1							
LPIQTTI	0.7012	0.8215	0.7061	1						
ASSA	-0.7604*	0.9652	0.5167	-0.8655	1					
BOMB	-0.4525**	-0.4121*	-0.3510**	-0.3691**	0.3122	1				
HOST	0.3211	0.4437	-0.2175*	0.6357	-0.7170	0.1916	1			
KILLING	0.4110	0.7539	-0.5645*	0.7128	0.4912	0.7213	0.4717	1		
ARMED	-0.8541*	0.6989	0.4051	-0.7568*	0.7607	0.6979	0.7150	0.9371	1	
EQ	-0.3581*	0.1622	-0.2011*	-0.0271**	0.1329	0.6133	0.4240	0.5120	0.510	1

Note: ASSA indicates assassination; BOMB denotes bombing attacks; HOST shows Hostage-taking, and EQ represents earthquake.

*** indicates significant on 1%; * shows significant on 5%/Logistics operations spur to the economic growth, attract foreign investors and are called the backbone of the country, while terrorist attacks damage to the logistical infrastructure, which ultimately impacts on trade (Khan et al., 2018). Younas, (2015) conducted panel research on 120 developing countries around the globe and collected the data from 1976 to 2009. The objective of this research was to investigate whether international openness limits the harmful effects of terrorism on countries' economic development. The results indicated that the positive interaction effect of terrorism. Akıncı et al. (2014) used data from 152 countries, including 45 developed nations, 30 underdeveloped and 77 emerging economies. The findings showed that terrorist attacks significantly disrupt the economic development of countries and increase inflation, while the terrorism effects were stronger in underdeveloped and developing countries of the Asian region.*

The correlational table indicates that bombing attacks are most negatively correlateed with all endogenous variables, including, LPICCP, LPICPS, LPIQLS, LPIQTTI, while an earthquake has adverse effects on LPICCP, LPIQLS, and LPIQTTI in the SAARC member states. In simple words, bombing attacks and earthquake disconnect/destroy the logistics and transport-related infrastructure and create disruption in supply chain and logistics operations through breaking the information system and the relevant infrastructure, which not only creates shortages of foods and medical supplies in different regions but also generates billions of dollars' loss in the economy and expected foreign investments (Choi, 2015). Further, high-level of terrorist activities in countries pay a high cost in terms of international banking black/grey list, limited opportunities of trade, and negative image of the country with the international fora, *e.g*., since the last couple of decades, SAARC countries, particularly, Afghanistan and Pakistan were suffering from high-risk of terrorism and were blacklisted by Financial Action Task Force (Mubashra and Shafi, 2018; Zakaria *et al*., 2019).

Table 3 shows the estimation of FE (fixed effects) and RE (random effects). Five terrorism and fear factors are used in this study, *i.e*., killing, armed assault, bombing, hostage-taking, and earthquake under the influence of logistics performance index. The results show that bombing is significantly and negatively correlated with LPIQTTI, LPIQLS, LPICPS, and LPICCP on different confidence levels. One per cent increase in bombing attacks reduces the quality of trade and transport-related infrastructure by 0.319 per cent, while 0.29 per cent reduction is noted in quality of logistics services due to bombing attacks in a selected panel of SAARC countries. In simple words, logistics performance suffered from terrorism and logistics industry is unable to utilize its full potential to lift the economic growth of a country, while terrorist attacks damage the logistics and transport-related infrastructure, which not only creates public panic and shortage of foods and medical supplies, but also decreases the logistics operations efficiency to a great extent indirectly. The results are also supported by previous studies (Bandyopadhyay *et al*., 2014); Filer & Stanisic, 2016; Shahzad *et al*., 2016).

Table 3

The estimations of Fixed Effects and Random Effects

Variables	FE-dv1	RE-dv1	FE-dv2	RE-dv2	FE-dv3	RE-dv3	FE-dv4	RE-dv4
	b/t	b/t	b/t	b/t	b/t	b/t	b/t	b/t
ASSA	0.09	0.022	-0.079	0.0011	0.068	0.026	0.094*	0.010
	(0.27)	(0.61)	(-0.95)	(0.01)	(0.60)	(0.37)	(2.31)	(0.16)
BOMB	-0.29***	-0.127**	-0.252*	-0.113*	-0.319***	-0.149***	-0.273**	-0.157*
	(-6.39)	(-3.79)	(-2.19)	(-2.18)	(-5.61)	(-5.89)	(-4.91)	(-1.99)
HOST	-0.234	-0.081	-0.634*	-0.157	-0.701	-0.137	-0.655*	-0.144
	(-0.57)	(-0.41)	(-1.96)	(-0.71)	(-1.81)	(-0.35)	(-2.43)	(-0.61)
KILLING	0.019	0.016	-0.113	-0.091	0.161	0.122	0.814	0.085
	(0.11)	(0.66)	(-0.79)	(-0.93)	(1.08)	(1.06)	(0.95)	(0.61)
ARMED	-0.019*	0.012	0.006	0.004	-0.046**	-0.019*	-0.013***	0.043**
	(2.01)	(0.88)	(0.19)	(0.31)	(-3.49)	(-2.19)	(-7.11)	(-5.98)
EQ	0.029**	0.019*	0.007	0.004	-0.579***	-0.314**	-0.053**	0.031*
	(2.14)	(2.18)	(0.17)	(0.39)	(-7.16)	(-4.13)	(-5.98)	(-3.02)

Note: dv1 shows LPIQLS; dv2 specify LPICPS dv3 show LPIQTTI; dv4 represents LPICCP
RE indicates a random effect model; FE show fixed effect model
**** shows significance at 1%; ** show significance at 5%; * shows significance at 10%*

Eckstein & Tsiddon, (2004) show that terrorism decreases FDI inflows more than domestic investment, which means that foreign investment is more sensitive to terrorism than domestic investment. Similarly, Altay *et al*. (2013) researched to explore the linkage between economic growth and terrorism. Their results revealed that terrorism is strongly and negatively correlated with economic growth. At the same time, transportation industry plays a crucial role in the economic growth of the country, but due to terrorist activities, the transportation industry is unable to utilize full potential to lift country economic growth (Khan *et al*., 2017c; Zakaria *et al*., 2019). Further, terrorism increased the military spending, which translates into downsizing of development funds because the enforcement agencies have to take appropriate security measures (Nasir & Shahbaz, 2015).

Liberalized economies attract more FDI and encourage its more efficient utilization than closed economies. Foreign investment increases with the depreciation of the domestic currency because it will increase the return/profit of foreign investors (Zakaria and Ahmed,

2013). Thus, the depreciation of the local currency appears to be conducive to attract foreign investment. Khan and Dong (2017a) conducted time-series research to evaluate the significance of logistics operations in economic growth. The study confirmed that logistics operations and higher performance of the logistics industry boost the per capita income, and increase manufacturing value-added and FDI inflows. Meierrieks and Gries (2012) explored the connection between countries' economic performance and terrorist attacks in 18 developed and developing countries. The results indicated that terrorism is significantly and negatively correlated with economic growth, while developed countries' economic growth is less affected by terrorism as compared to developing countries.

Gaibulloev and Sandler (2009) investigated the consequence of terrorism in Asian developing countries. The findings revealed that terrorist attacks per million persons mitigate the growth of gross domestic product per capita around 1.5 per cent and also create fear in investors. Çinar, (2017) highlighted that in the last couple of years, the most affected countries by terrorism were Asian developing countries, especially Pakistan, India and Afghanistan, and their regulatory bodies needed to develop proper security mechanism on the border to reduce and control terrorist activities with the help of technology same as United States, France, and other European countries.

The findings also revealed that one per cent increase in bombing attacks and armed assault would reduce LPICCP by 0.273 per cent and 0.013 per cent, respectively. The results are supported by previous studies (Gaibulloev & Sandler, 2008; Abadie & Gardeazabal, 2008; Blomberg *et al*., 2004; Bandyopadhyay *et al*., 2014). Due to bombing attacks and armed assault, customs authorities are not clear with shipments as per the federal government orders, which negatively affects the customs clearance process efficiency. In addition, governmental bodies immediately close the country's border for security reasons, which need to pay the price in terms of billions of dollar's financial loss and delays in cross-border logistics and freight operations (*e.g*., in 2007, a terrorist killed ex-prime minister of Pakistan Benazir Bhutto Shaheed in a bombing attack (Pendyala *et al*., 2009), and the country stock market immediately declined. Businesses were closed for a week, which created shortages of foods and medical supplies and translated into billions of dollars economic loss).

Similarly, in 2008, terrorist attack on Taj Mahal Palace hotel in India that killed more than two hundred peoples including Indian government officials and foreign countries citizens, has severely damaged the Indian financial market and government shifted development funds towards military budget to take sufficient measure to combat terrorism (Bandyopadhyay *et al*., 2014). In 2001, after the 9/11 attacks, the US closed its border for security reasons, which created negative impacts on its economy (Henson *et al*., 2009). In addition, Toyota, Ford and other several supply chains were disrupted because they were using "Just-in-Time" inventory systems.

Khan *et al*. (2017a) highlighted that the manufacturing industry is based on the logistics industry. In contrast, due to disruptions in the logistics industry, countries' manufacturing industry suffers a lot in terms of shortage of raw materials and components, which directly affects the GDP per capita income and creates unbalance in products supply and demand. Uysal *et al*. (2009) used time-series data to investigate the relationship between terrorism and GDP per capita income. The findings revealed that terrorist attacks slow down to economic development, while they suggested that governmental bodies may encounter terrorism through spending more money on military and education.

Khan *et al.* (2017b) conducted empirical research in developed countries to explore the linkage between GDP per capita incomes, FDI inflow and logistics performance indexes that

include the efficiency of the customs clearance process. The results show that higher efficiency of customs clearance process encourages trade openness and FDI inflows, while the findings also showed that higher efficiency of customs acts as a cornerstone in economic development. Meierrieks and Gries (2012) highlighted that the economic development of a country is integrated with the logistics industry and improved logistics and trade-related infrastructure lift to the country's economy. After the 9/11 attacks, the US established strict border security, and they built CSI (container security initiative) and C-TPAT (Customs-Trade Partnership Against Terrorism) between the government (Henson *et al*., 2009), and foreign ports and industry were designed to encourage security processes throughout the supply chain (Gaibulloev and Sendler 2009; Khan *et al*., 2017d; Aslam *et al*., 2018).

In our study, the results indicate that the earthquake harms LPIQLS, LPIQTTI, and LPICCP. Due to an earthquake, logistical infrastructure is damaged or even destroyed, which creates a disturbance in the supply of goods and services, including food, electricity, and water. Eckstein and Tsiddon (2004) natural disaster including earthquake and floods create a massive burden on countries' economy in terms of rebuilding of infrastructure, flexible logistics hubs and cross-docking nodes included. In a similar line, Xu *et al*. (2016) showed that during 2008 a devastating earthquake of magnitude eight on the Richter scale occurred in the Sichuan Province of China and after the earthquake the disaster areas urgently needed many emergency supplies. Because of the massive damage from sudden and unexpected earthquake disasters, external relief materials are often unable to be transported to the severely afflicted areas due to the collapse of all transport and logistics-related infrastructure.

Terrorism impedes economic growth by damaging infrastructure, foreign trade, investment, the currency exchange rate, tourism, and domestic capital formation, and by increasing inflation, brain drain, and military expenditure. Aldakhil (2018) found that improved logistical infrastructure and quality of logistics services increase economic development and attract foreign investors, which significantly reduces unemployment and crime rate. Bezić *et al*. (2016) investigated the impact of terrorist attacks on economic growth and FDI inflows in the member of European Union countries from 2000 to 2013. They found that terrorism reduces the confidence of foreign investors to bring investments into the victim country. Besides, corporate sectors shift their manufacturing operations and businesses in other countries due to fear of terrorist attacks on their property, which create an adverse effect on economic growth and also becomes a cause of unemployment (Mubashra, & Shafi, 2018; Yıldırım and Öcal 2013; Khan *et al*., 2019; Zakaria *et al*., 2019).

5. Conclusion

In the last couple of decades, the Asian developing countries, particularly SAARC member states including Afghanistan and Pakistan, are mainly affected by terrorism. This research paper investigates the impact of different terrorism, including bombing, assassination, hostage-taking, killing, earthquake and armed assault on logistics operations and performance, such as LPIQLS, LPIQTTI, and LPICCP. This research adopted FE (fixed effects) and RE (random effects) models on the sample of SAARC countries.

The results show that bombing attacks are strongly and negatively correlated with all indices of logistics performance, including quality of logistics services, the efficiency of the customs clearance process, and transport-related infrastructure, which creates a significant imbalance in supply and demand of products. The primary objective of terrorists is to force the hands of governmental bodies through victimization, damaging economic growth and

trade, creating political instability, shortages of food supplies, and anarchy situation in the country. Also, due to terrorism in Pakistan, several manufacturing plants are shifted into China and other neighboring countries, which works as "Doubled-sided sword," *e.g*., billions of dollars takeout from an economy and raised unemployment rate in the territory. The transport-related infrastructure and trade lift economic growth of countries, but due to the higher level of terrorism, transport and logistics industry are unable to utilize its full potential.

SAARC countries need to enhance their border security and strengthen their collaboration against terrorism, such as that after the 9/11 attacks, the US strengthened their border security and built CSI (container security initiative) and C-TPAT (Customs-Trade Partnership Against Terrorism) between the foreign ports. Government and industry were designed to promote security processes throughout the logistics operations (Henson *et al*., 2009). For another side, the results indicate that earthquake has significant adverse effects on logistics performance in SAARC countries, including Afghanistan, India, Pakistan, and Nepal, which are the primary victims of earthquakes. The earthquake victim countries lose their logistics and transport-related infrastructure, and their people suffer from the shortages of basic food and medical supplies. At the same time, restoration of economic growth requires developed infrastructure of logistics and transport, surety of peace to foreign investors, and cooperation with neighboring countries to arrest terrorists. Following are presented the policy drives from the study.

The following policy implications are proposed that are in line with the study's objectives, *i.e.,*

i. Governmental bodies of SAARC countries should allocate some budgetary funds for socio-economic development in war-affected areas to remove the root causes of terrorism, including illiteracy, unemployment, poverty, injustice and income inequality.

ii. Law enforcement agencies of SAARC countries should sign a mutual agreement to combat terrorism through an exchange of information and resources.

iii. The government should strengthen their foreign policy to end the external conflict with their neighboring countries such as India, Pakistan and Afghanistan.

iii. SAARC countries need to strengthen their border security with the help of advanced technology, which can only be possible through computerizing the citizen database.

iv. Government of SAARC countries should take appropriate steps at international levels to remove foreign-funded terrorism with the involvement of the United Nations.

vi. Regulatory bodies and national media should portray a soft image of the country, which will help to receive higher FDI inflows by building the confidence of investors.

vii. Regulatory bodies of SAARC countries should provide diversification opportunities to foreign investors with a lower terrorism risk, and a high return and compensation may be provided for high-risk projects.

viii. These countries required to improve their levels of law and order situation through strengthening their justice system, which will create a positive effect on their economic growth.

5.1 Study Limitation and Future Research

This research has its limitations such as that we only used the sample of SAARC countries to investigate the impact of terrorism on logistics performance, so future researchers may increase the sample size and also examine the impact of terrorist activities on the tourism industry. The self-selection biases of the country may affect the results, leading towards over

representing the study results (Yadav & Pathak, 2016). Additionally, future researchers may link terrorism with the one-belt-one-road project in the context of China, as China is called "world factory" and several manufacturing plants are working in China, which fulfil the hundreds of countries' consumer needs, including Asian, European, African and American regions. In the last three years, 29 terrorist attacks were on the private and governmental property, including airports and train stations (Global Terrorism Data, 2018). Further comparative research may also be conducted between ASEAN, SAARC, BRICS and OPEC countries.

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