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THE ASSOCIATION AMONG DIMENSIONS OF FINANCIAL DEVELOPMENT AND LOGISTICS PERFORMANCE

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Abstract

Although value of financial development for logistics industry is stressed by literature, the studies examining the impact of the dimensions of financial development -depth, access, and efficiency- on logistics performance are limited. Hence, the purpose of this paper is to contribute to the literature by empirically examining the association among logistics performance, financial depth, access and efficiency, by adding global competitiveness and good governance variables into the model. PLS-SEM is used to test the causal relationship between the variables simultaneously. Test results show that good governance has the largest impact on all. Importantly, financial depth, access, and efficiency have a significant and positive impact on logistics performance. One-unit change in financial depth, access, and efficiency leads 0,272, 0,195 and 0,164 unit change in logistics performance, respectively. Interestingly, we are not able to find statistically significant support for the linkage between financial depth and global competitiveness, but we find that financial access has the largest impact on global competitiveness compared to financial efficiency.

Keywords: *Logistics performance, Financial depth, Financial access, Financial efficiency, Good governance, Global competitiveness.*

FİNANSAL GELİŞMİŞLİĞİN BOYUTLARI İLE LOJİSTİK PERFORMANS ARASINDAKİ İLİŞKİNİN ARAŞTIRILMASI

Öz

Akademik çalışmalarda gelişmiş finansal sistemin lojistik sektörü için değeri vurgulanmaktadır. Ancak finansal gelişmişliğin boyutları olan finansal derinlik, erişim ve verimliliğin lojistik performans üzerindeki etkisini inceleyen çalışma sayısı sınırlıdır. Bu nedenle, lojistik performans ile finansal derinlik, erişim ve verimlilik arasındaki ilişkiyi ampirik olarak inceleyerek literatüre katkıda bulunulması hedeflenmiştir. Sayılan bu değişkenlere ilave olarak iyi yönetişim ve küresel rekabet gücü değişkenleri de kurulan modele eklenmiştir. Değişkenler arasındaki nedensellik ilişkisini eş zamanlı olarak test etmek için PLS-SEM kullanılmıştır. Test sonuçları, iyi yönetişimin bütün değişkenler üzerinde önemli etkiye sahip olduğunu göstermektedir. Finansal derinlik, erişim ve verimlilik, lojistik performans üzerinde önemli ve olumlu bir etkiye sahiptir. Finansal derinlik, erişim ve verimlilikteki bir birimlik değişiklik, lojistik performansta sırasıyla 0,272, 0,195 ve 0,164 birimlik değişikliğe yol açmaktadır. Finansal derinlik ile küresel rekabet gücü arasındaki bağlantı için istatistiksel olarak anlamlı bir sonuç bulunamamıştır, ancak finansal erişimin finansal verimliliğe oranla küresel rekabet üzerinde daha büyük etkiye sahip olduğu görülmüştür.

Anahtar kelimeler: *Lojistik performans, Finansal derinlik, Finansal erişim, Finansal verimlilik, İyi yönetişim, Küresel rekabet gücü.*

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1. INTRODUCTION

Logistics is a part of supply chain management and it is the backbone of trade both domestically and internationally. Logistics fundamentally "plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customers' requirements" (CSCMP, n.d.). Logistics operations require detailed plans and implementation of complex operations such as inventory management, payment systems, warehousing, freight transportation, border clearance and many more functions (Arvis et al., 2012: iii).

Logistics industry is subject to a variety of operational and financial risks, uncertainties and threats (Heckmann et al., 2015: 119-120; Zhen et al., 2016: 51). Over the past decades, logistics industry has become more complicated as a result of a series of changes in social, financial, technological, environmental, and other matters. With globalization and the increase in international trade, all of these shifts have deteriorated the size and scale of the risks, uncertainties and threats the logistics industry faces (Kwak et al., 2018: 372-373). However, financial intermediaries have offered numerous remedies and assistance to the logistics industry to cope with these risks, uncertainties, and threats.

In recent years, the number of academic studies emphasizing sophisticated financial systems leads to better logistics performance (Ellram, 1991: 14-16; Bowersox and Closs, 1996; Mentzer et al., 2004:607-609; Fugate et al., 2010: 44-43; Gupta and Dutta 2011: 48; Hofmann and Johnson, 2016: 3; Ozdemir, 2017: 1-7; Song et al., 2018: 70) have increased significantly.

Silvestro and Lustrato (2014: 299-301) stress that financial products or services such as invoice financing, letters of credit, open account, purchase order financing, pre- and post-shipment financing, payables discounting, receivables financing, global asset-based lending facilitate the flows of goods, services and information. Likewise, financial intermediaries like insurance companies assist to the logistics industry (Choi et al., 2016: 2-3; Zhen et al., 2016: 51-53) to deal with risks and threats such as loss, damage, strike, terrorism, civil unrest, fire, flood, collision. Financial derivatives market provides instruments like options, futures or forward freight agreements to hedge against the risks like high volatility in freight rates as well as in operating and capital risks (Kleindorfer and Visvikis, 2007: 6-8). In sophisticated financial system, the logisticians can reach the more cost-efficient and diverse financial products and services to support their capital needs and to manage their inventory needs and working capital (Buzacott and Zhang, 2004: 1274-1277; Hofmann, 2009: 716-718, More and Basu, 2013: 624-628).

Financial development arises if financial intermediaries ease the effects of information, enforcement, and transactions costs (World Bank, 2022). Typically, financial development is characterized as a combination of depth, access and efficiency (Sahay et al., 2015: 5). Countries with sophisticated financial systems could efficiently produce information about probable investments and allocate capital in line with these assessments. Furthermore, financial intermediaries monitor the entrepreneurs and exert corporate control following the allocation of the capital while providing liquidity, assisting in risk management and facilitating the exchange of goods and services. Thus, a sophisticated financial system significantly contributes to the logistics industry, which is a capital-intensive and subjected to numerous risks, uncertainties and threats.

Although studies examining the linkage between development of finance and logistics performance have recently emerged, the study investigating the linkage between dimensions of financial development -depth, access and efficiency- and logistics performance does not exist as far as we know. However, the argument of whether dimensions of financial development have an impact on logistics performance deserves to work; as the level of improvement of the dimensions of financial development may vary (Cihak et al., 2012: 1-3, Sahay et al., 2015: 5). That is, the deep financial system of a country may not indicate that the country has an easily accessible and effective financial system or vice versa. Thereby, investigation of whether the dimensions of financial development have different effects on logistics performance will contribute to the literature. Hence, to fill the gap, we examine the impact of financial depth, financial access and financial efficiency on logistics performance by adding good governance and global competitiveness factors into the model.

Contribution of this paper to the relevant literature is four-fold. Firstly, we examine the association and its strength between good governance and dimensions of financial development; depth, access and efficiency. Secondly, we test the linkage between good governance and logistics performance and global competitiveness factors. Thirdly, we investigate whether there is a linkage among financial depth, access and efficiency with logistics performance and global competitiveness factors. Lastly, we investigate the relationship between logistics performance and global competitiveness factors. To investigate all relationships among the variables concurrently we use Partial Least Squares Structural Equation Modeling (PLS-SEM). We conclude the study with offering some recommendations for policymakers, and business environment.

The test results indicate that good governance has a great impact on dimensions of financial development, logistics performance and global competitiveness. Notably, test results indicate a statistically significant and positive linkage between financial depth, access and efficiency with logistics performance. Importantly, financial depth has the biggest impact on logistics performance, followed by financial access and efficiency, respectively. On the other side, financial access has the biggest impact on the countries' global competitiveness factors, but we couldn't find a statistically significant association between financial depth and global competitiveness.

This paper is organized as follows: section two presents the theoretical background with the hypotheses. Section three focuses on the research methodology and details of the dataset. Section four provides the analysis results. Section five concludes the study and proposes recommendations for relevant parties.

2. THEORETICAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

Financial intermediaries perform significant functions for business and society. They channel funds from the savers to the investors. However, there are numerous frictions in the market such as information asymmetry, agency problem, transaction cost etc. Thus, according to Levine (2021: 12), the financial intermediaries carry out the following functions in the economy to ameliorate the market frictions: (a) collecting funds from the savers and pooling them to allocate the investments, (b) information production about the possible investments and choosing the capital allocation; (c) monitoring the investment after allocation of capital with applying corporate governance rules and procedures; (d) render risk management tools to handle, trade or diversify them, (e) facilitating the trade including payment process (IMF, 2005: 20-21). Financial development refers to improvements in these key functions. On the other side, financial development is cited as a combination of three dimensions;

-Depth (the size and liquidity of financial institutions and markets),

-Access (ability of individuals to access financial services at reasonable price to meet their needs) and

-Efficiency (ability of institutions to provide financial services at low cost and with sustainable revenues, and the level of activity of capital markets) (Sahay et al., 2015: 5).

Financial depth, access and efficiency characterize diverse dimensions of development of finance. Sahay et.al., (2015: 10-11) argue that it is not possible to expect a country with financial depth to also have high financial access and financial efficiency. Likewise, high financial access does not indicate that the financial system is deep or efficient in this country. Özdemir (2017: 65-66) compares the financial depth, access and efficiency of countries by graphs. As shown Figure 1, the study points out that the Netherlands and Jordan have almost same level financial access in terms of bank branches per 100.000 adults, however, they have highly differentiating financial depth -privat credit to GDP- as Netherlands has almost three times larger private credit to GDP compared to Jordan. Namely, Korea and Jordan have almost the same financial depth in terms of stock market capitalization to GDP, however, they have a very different stock market efficiency. Last but not least, Argentina and Jordan have relatively close financial access (bank branches per 100.000 adults), however, Jordan has a more efficient financial system (less bank overhead cost to total assets).

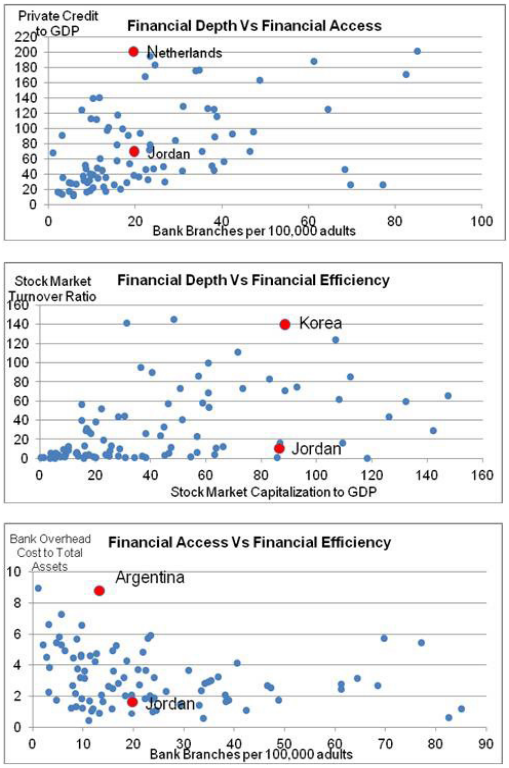

Figure 1: Comparison of financial depth, access, and efficiency

Source: Özdemir, 2017: 66

It is therefore important to consider which dimension of financial development -depth, access and efficiency- has superior impact on logistics performance and their association with other variables good governance and competitiveness factors. Thereby, we offer relevant hypotheses to examine the relationship and size of it among financial depth, financial access, financial efficiency, logistics performance, good governance and competitiveness factors.

Good governance refers to the separation of powers of the legislators, the executive and judicial system of government, and the effectiveness of democracy. Effective separation of powers provides an effective system of checks and balances within the countries that prevent a party from applying power unilaterally or arbitrarily. Thus, an unbiased, efficient, and sustainable public administration under good governance leads to a responsible, transparent and consensus-based political and social environment in which government and people follow the rule of law and have the commitment to fight against corruption.

Thereby, good governance is indispensable for development of finance, logistics performance, economic growth and better living conditions of citizens. Cihak and Demirguc-Kunt, (2013: 2-7) mention that a well-functioning financial system which is deep, accessible and efficient, relies on a wide range of high-quality social, political, environmental factors and regulatory system. Likewise, Beck et al. (2006: 948-949) stress that firms in the countries within higher overall institutional development report less financial obstacle and financial development.

Levine (1997: 690) emphasizes that countries' legal system and policy institutions stimulate not only financial development but also economic growth. Haber (1991: 559-562; 1996: 1-10) point out that the structure and size of the financial intermediaries significantly relies on to a large extent on the quality of regulatory policies. Outreville (1999: 12) indicates a reverse association between political instability and development of finance. Thereby, good governance is closely linked to the development of finance and thereby its dimensions -depth, access and efficiency-. Hence, we propose the following hypotheses:

Hypothesis 1 (H1): Good governance is positively associated with financial depth.

Hypothesis 2 (H2): Good governance is positively associated with financial access.

Hypothesis 3 (H3): Good governance is positively associated with financial efficiency.

Good governance has not only had significant impact on financial development but also logistics performance and competitiveness factors of the countries. Effectiveness of government bureaucracy, powerful tools to fight against corruption, bribery, red tape which are essential for higher logistics performance. Good governance facilities the operations of the logistics industry and spurs global competitiveness. Uyar et.al, (2021: 37) find that public governance quality is closely linked to the performance of logistics sector performance. Banda (2022: 1) also states that good governance is significantly linked to logistics performance in Sub-Saharan Africa. Thereby, we propose the following hypothesis:

Hypothesis 4 (H4): Good governance is positively associated with logistics performance.

Global competitiveness refers to the critical factors, institutions, and policies which lead to better outcomes for productivity (World Economic Forum, 2015: 35). World Economic Forum cites the competitiveness factors as; national institutions, macroeconomic environment, health system, education, goods and labor market efficiency, technological readiness, market size, business sophistication and innovation. Not surprisingly these factors rely on many social, economic and political factors. Thus, Acemoglu and Robinson (2012) mention that political power, democratic principles and economic incentive have a comprehensive effect on the living standards of citizens and competitiveness factors of the countries. Brunet (2012: 62-63) reveals that a well-functioning government economic environment and superior democratic practices lead higher global competitiveness factors. Thereby, we propose the following hypothesis:

Hypothesis 5 (H5): Good governance is positively associated with global competitiveness.

Sophisticated financial system is essential for logistics industry for efficient handling, storage and flow of goods, services and associated information between the parties such as seller and buyer or sender and receiver etc. (Ellram, 1991: 14; Bowersox and Closs, 1996; Mentzer et al., 2004: 607; Fugate et al., 2010: 43-44 and Gupta and Dutta 2011: 48, Ozdemir, 2017: 143-146; Song et al., 2018: 70). Logistics industry rely on various products and services provided by financial intermediaries such as insurance coverage for various kinds of risks (Fan and Stevenson, 2018: 205-206; Cavinato, 2004: 383; Choi et al., 2016: 2; Zhen et al., 2016: 51-53, Schramm, 2012) or hedging instruments for financial risks (Kavussanos and Visvikis, 2006; Kleindorfer and Visvikis, 2007: 6; Manuj and Mentzer, 2008: 192-196; Hertwig and Rau, 2010; Alizadeh et al., 2015: 57; Govindan and Chaudhuri, 2015: 178-180;) credit for working capital or fixed assets and infrastructure (Drobetz et al., 2013: 49-52).

Hence, we propose the following hypotheses;

Hypothesis 6 (H6): Financial depth is positively associated with logistics performance.

Hypothesis 7 (H7): Financial access is positively associated with logistics performance.

Hypothesis 8 (H8): Financial efficiency is positively associated with logistics performance.

Sophisticated financial system has a significant impact on the countries' competitiveness factors. Relevant literature indicates that the causality runs from financial development to global competitiveness factors (Ozdemir, 2017: 143-148). For example, Goldsmith (1969: 114-117), King and Levine (1993: 717), Levine (1997: 690; 2005: 869), and Beck et al. (2000) emphasize a sound linkage between development of finance and economic growth. Rajan and Zingales (1998: 560) illustrate the causal relationship between development of finance and economic growth. Outreville (1999: 12) states a strong association between the level of financial development and higher education. Acemoglu (2001: 665) and Gatti and Vaubourg (2009: 5) note that financial development drives creation of job. Claessens and Feijen (2007: 61) show that financial development has a positive linkage with gender equality, education and health. Fanelli and Medhora (2002), Levine (2005: 869), and Hsu et al. (2014: 116) stress the positive relationship between development of finance and technological innovation. Thereby, we propose the following hypotheses;

Hypothesis 9 (H9): Financial depth is positively associated with global competitiveness.

Hypothesis 10 (H10): Financial access is positively associated with global competitiveness.

Hypothesis 11 (H11): Financial efficiency is positively associated with global competitiveness.

Logistics is the backbone of trade, it can spur the overall competitiveness of day-to-day business operations (Martí et al., 2014: 2982-2983). Fawcett et al. (2011: 115-117) argue that global economic and trade improvement can only be achieved with a sophisticated logistics system. Coto-Milan et al. (2013: 301-302) investigate the associations between economic growth and logistics performance for years of 2007-2012; they discover that logistics operations have a larger impact on economic growth. The superior logistics performance boosts not only the competitiveness of the corporates but also the countries. Göçer et al. (2022: 22) postulate a sound association between logistics performance, economic growth and the development of national competitiveness. We propose the following hypothesis;

Hypothesis 12 (H12): Logistics performance is positively associated with global competitiveness.

Figure 2 provides 12 testable hypotheses in the model. The direction of the arrows points out the causality.

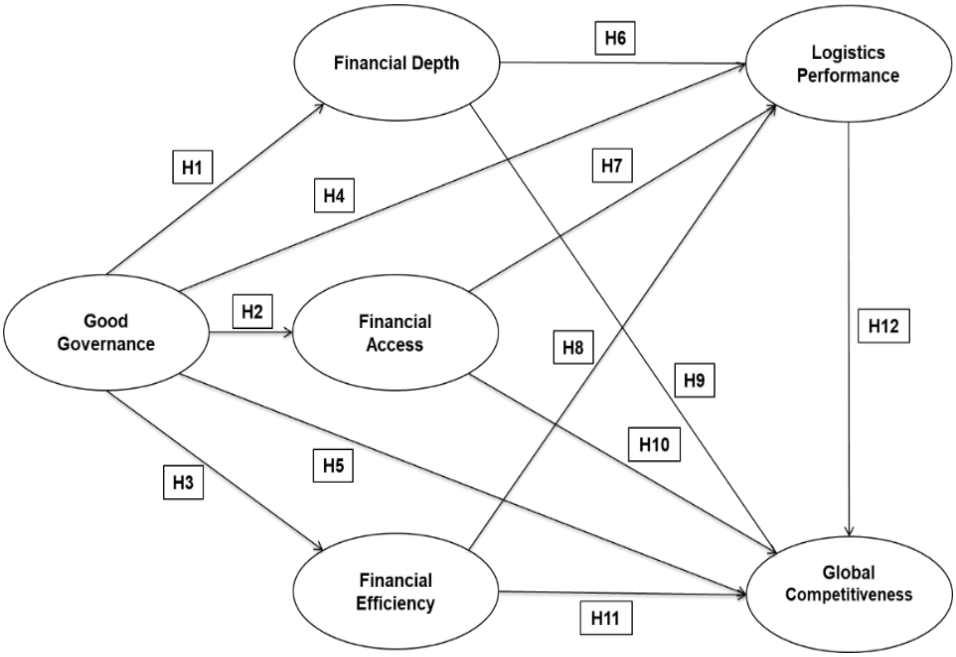

Figure 2: Proposed hypotheses

3. METHODOLOGY AND DATA

In this paper, we use Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the association among the variables; good governance, financial depth, financial access, financial efficiency, logistics performance, and competitiveness factors. PLS-SEM is an appropriate econometric analysis method for this study as it allows to the inclusion of more than one dependent variable into the model (Astrachan et al., 2014: 116) to concurrently test the association among the variables. Moreover, when the sample size is small, PLS-SEM doesn't have any requirement in terms of distribution assumption. PLS-SEM also provides robust results if the amount of missing data is smaller than % 5 (Hair et.al, 2022: 19).

In this study, the analysis is made using the relevant data from 99 countries for year-2012. Due to the greater availability of data, the year 2012 is selected because the number of data is significantly reduced if data are selected for other years. By selecting the year 2012, we are able to have a dataset which has missing data of less than % 5.

In this study, the financial depth variable is represented with seven indicators. All indicators but venture capital availability are received from the World Bank Financial Development databank and venture capital availability are received from the World Economic Forum databank. The indicators represent various financial intermediaries such as banks, the stock market, venture capital and insurance data. Financial access variable is represented with six indicators. The data relating to the number of bank branches and ATMs per 100.000 adults received from the databank of the World Bank and the others received from the World Economic Forum databank. Lastly, the financial efficiency variable is represented with five indicators and all received from the World Bank database. Figure 3 provides the indicators for the financial depth, access, and efficiency variables.

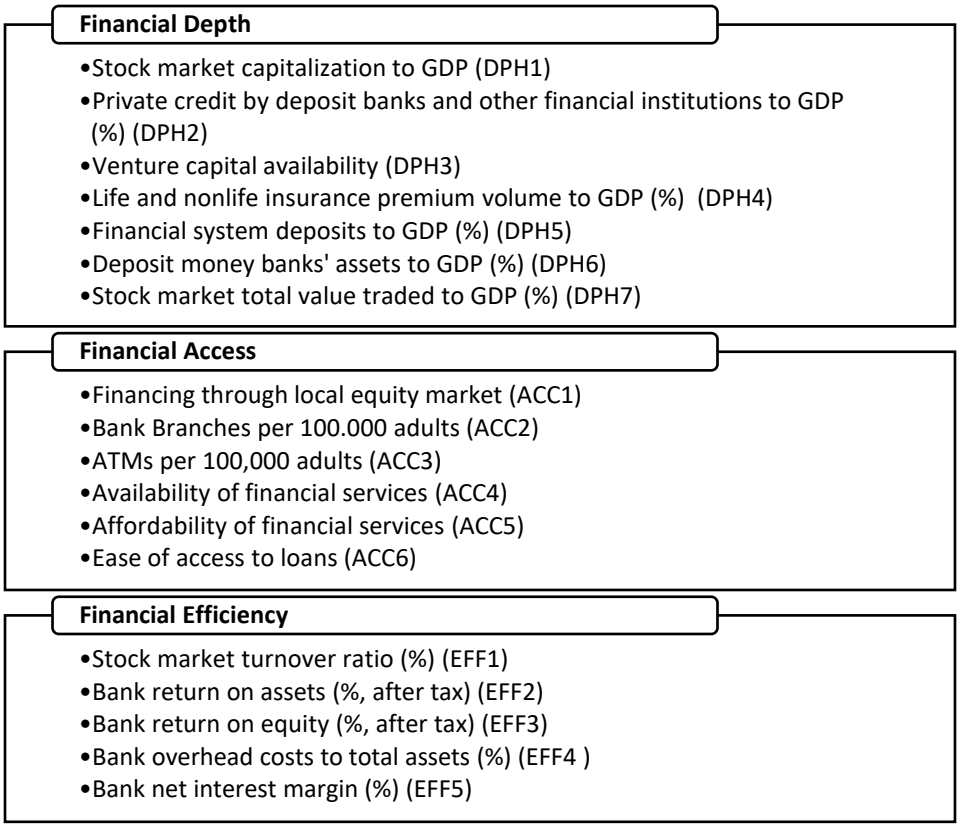

Figure 3: Indicators of financial depth, financial access and financial efficiency

Good governance data and logistics performance data are obtained from the World Bank's databank. However, global competitiveness data is received from the World Economic Forum's databank. The World Economic Forum determines 12 pillars to measure the global competitiveness of the states. These pillars are divided into three subgroups; basic requirements, efficiency enhancers, and business sophistication/innovation factors. In this study, we eliminate two indicators: the infrastructure and financial market development as the indicator of infrastructure are already included in logistics performance variable and financial market development is also a contrast in our model. We aggregated these three variables by average as offered by the World Economic Forum (2012: 385-397). Figure 4 shows the indicators for good governance, logistics performance, and global competitiveness.

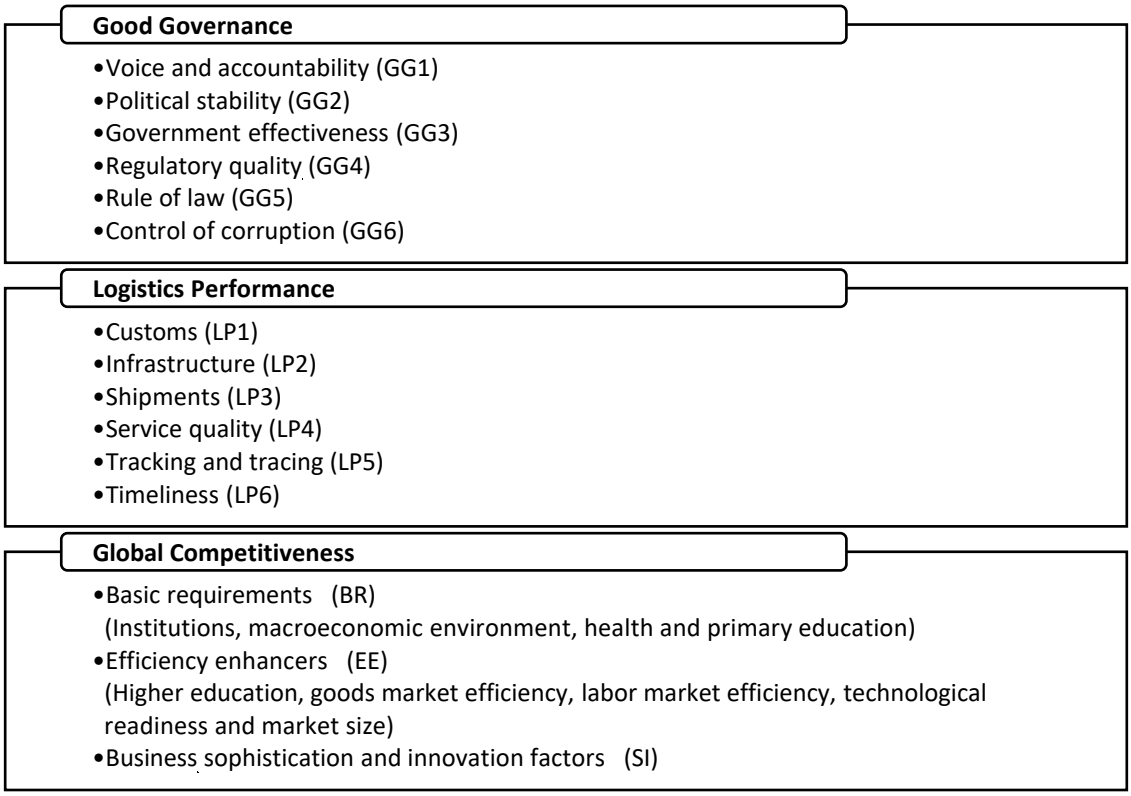

Figure 4: Indicators of good governance, logistics performance and global competitiveness

4. ANALYSIS AND RESULTS

In this paper, we set up six reflective measurement models as offered by Hair et.al., (2021: 77). They argue that if the indicators in the constructs are expected to be closely associated with each other, they should be designed as reflective measures. Analysis of the reflective measurement models begins with a sequence of evaluations of convergent validity, internal consistency, and discriminant validity.

As a first step, we begin with convergent validity test to examine the constructs' reliability. With convergent validity, we test whether the indicators in the construct are positively correlated with each other. If they are correlated, it shows that the construct is reliable as the indicators share a high proportion of the variance. We use outer loadings and average variance extracted (AVE) to test convergent validity. As a rule of thumb, an indicator with outer loading higher than 0,70 is closely correlated with other indicators in the same construct and it should be kept in the construct; an indicator with outer loading lower than 0,40 is not correlated with other indicators and it shall be removed from the construct; lastly, an indicator with outer loadings between 0,40 and 0,70 should be considered for elimination if removing the indicator increases the internal consistency reliability and discriminant validity (Hair et al., 2016).

Thereby indicator of ACC2 (bank branches per 100.000 adults) is removed from the construct as its outer loading is 0,233. On the other side, DPH3 (Venture capital availability) and ACC3 (ATMs per 100.000 adults) have outer loadings of 0,436 and 0,617, respectively. They are not only below the threshold of 0,70, but also, they alleviate discriminant validity within their constructs. Cross-Loadings and Fornell-Larcker Criterion measures show that when DPH3 and ACC3 are in the model, the financial depth and financial access construct do not meet the discriminant validity. Thus, DPH3 and ACC3 indicators are eliminated from the constructs. On the other side, even though EFF1 and EFF3 have outer loadings of 0,668 and 0,673, respectively, we keep them in the financial efficiency construct as when they are in the model, the construct's reliability and validity values are already above the thresholds. As a result, after removing DPH3, ACC2, and ACC3 indicators from the constructs, all constructs meet convergent validity and internal consistency reliability as seen in Table 1.

Table 1: Convergent validity and internal consistency reliability results

Latent Variable	Indicators	Convergent Validity		Internal Consistency Reliability	
		Outer Loadings > 0,70	AVE > 0,50	Cronbach's Alpha > 0,70	Composite Reliability > 0,70
Good Governance	GG1	0,844	0,867	0,969	0,975
	GG2	0,854			
	GG3	0,973			
	GG4	0,958			
	GG5	0,980			
	GG6	0,966			
Financial Depth	DPH1	0,760	0,698	0,913	0,933
	DPH2	0,919			
	DPH4	0,851			
	DPH5	0,803			
	DPH6	0,875			
	DPH7	0,795			
Financial Access	ACC1	0,865	0,830	0,932	0,951
	ACC4	0,940			
	ACC5	0,958			
	ACC6	0,878			
Financial Efficiency	EFF1	0,668	0,565	0,809	0,865
	EFF2	0,701			
	EFF3	0,673			
	EFF4	0,766			
	EFF5	0,921			
Logistics Performance	LP1	0,958	0,929	0,985	0,987
	LP2	0,978			
	LP3	0,981			
	LP4	0,941			
	LP5	0,949			
	LP6	0,973			
Global Competitiveness	BS	0,905	0,888	0,936	0,960
	EE	0,967			
	SI	0,954			

Lastly, discriminant validity tests, cross-loadings and Fornell-Larcker Criterion, are applied to examine whether the constructs are distinct from each other (Hair et al., 2009: 18). Cross-loadings approach refers that if the indicators in a construct have the highest cross-loading in its own construct compared to other constructs, discriminant validity is established for the construct (Hair et al., 2016: 32-41). Table 2 reflects that all indicators have the highest cross-loadings in their own construct. An alternative test, Fornell-Larcker Criterion, proposes that if a latent variable explains the highest variance in its own indicators compared to other constructs in the same model, the discriminant validity is established. Thus, to examine this requirement, in Fornell-Larcker Criterion, the average variance extracted (AVE) of each construct is compared with its squared correlations with other constructs. As a result, Table 2 indicates that the square root of AVE's for each construct shown on the diagonal has the largest correlations compared to other constructs. These test results indicate that each reflective construct has a unique concept.

Table 2: Discriminant validity test results

Construct		Discriminant Validity											
		Cross-Loadings						Fornell-Larcker Criterion					
		Good Governance	Financial Depth	Financial Access	Financial Efficiency	Logistics Performance	Global Competitiveness	Good Governance	Financial Depth	Financial Access	Financial Efficiency	Logistics Performance	Global Competitiveness
Good Governance	GG1	**0,844**	0,531	0,319	0,479	0,591	0,556	**0,931**					
	GG2	**0,854**	0,464	0,366	0,471	0,587	0,639						
	GG3	**0,973**	0,741	0,663	0,66	0,851	0,894						
	GG4	**0,958**	0,683	0,638	0,632	0,769	0,821						
	GG5	**0,980**	0,712	0,629	0,687	0,805	0,865						
	GG6	**0,966**	0,690	0,637	0,605	0,813	0,861						
Financial Depth	DPH1	0,468	**0,760**	0,689	0,469	0,575	0,600	0,696	**0,836**				
	DPH2	0,645	**0,919**	0,491	0,679	0,687	0,640						
	DPH4	0,693	**0,851**	0,489	0,597	0,753	0,646						
	DPH5	0,549	**0,803**	0,489	0,598	0,537	0,514						
	DPH6	0,627	**0,875**	0,436	0,712	0,652	0,614						
	DPH7	0,479	**0,795**	0,549	0,587	0,700	0,671						
Financial Access	ACC1	0,393	0,506	**0,865**	0,341	0,539	0,585	0,602	0,621	**0,911**			
	ACC4	0,700	0,702	**0,940**	0,563	0,737	0,777						
	ACC5	0,589	0,594	**0,958**	0,456	0,649	0,743						
	ACC6	0,451	0,410	**0,878**	0,264	0,49	0,611						
Financial Efficiency	EFF1	0,388	0,630	0,382	**0,668**	0,657	0,594	0,642	0,729	0,462	**0,752**		
	EFF2	0,35	0,362	0,056	**0,701**	0,35	0,27						
	EFF3	0,397	0,405	0,002	**0,673**	0,32	0,314						
	EFF4	0,475	0,488	0,474	**0,766**	0,463	0,538						
	EFF5	0,698	0,719	0,555	**0,921**	0,695	0,732						
Logistics Performance	LP1	0,845	0,763	0,667	0,669	**0,958**	0,882	0,803	0,785	0,675	0,704	**0,964**	
	LP2	0,800	0,794	0,670	0,713	**0,978**	0,88						
	LP3	0,781	0,748	0,643	0,66	**0,981**	0,868						
	LP4	0,732	0,742	0,650	0,694	**0,941**	0,824						
	LP5	0,702	0,714	0,618	0,621	**0,949**	0,804						
	LP6	0,775	0,774	0,653	0,709	**0,973**	0,87						
Global Competitiveness	BR	0,752	0,552	0,718	0,57	0,717	**0,905**	0,846	0,738	0,755	0,705	0,888	**0,942**
	EE	0,821	0,768	0,691	0,729	0,903	**0,967**						
	SI	0,814	0,752	0,729	0,685	0,879	**0,954**						

Before proceeding to the predictive capabilities of the model and the causality linkages, we check whether collinearity is a problem. The inner variance inflation factor (VIF) values are lower than the threshold of 5; thus, we comment that collinearity isn't an issue for the model and we can proceed to the examination of the structural model results.

Table 3 shows hypotheses, PLS-SEM path coefficients, t-statistics and acceptance or reject of the hypotheses. PLS-SEM path coefficients are standardized beta coefficients in an OLS regression and they vary between -1 to +1. Path coefficients close to -1 denote reverse associations between the variables, and +1 represent positive relationships between the variables. Thus, path coefficients close to 0 indicate weaker linkages between the variables.

Figure 5 provides general view of the structural model results. The numbers on the arrows between the latent variables represent weight of path coefficients and p-values (in parentheses), the numbers in ovals show R^2 values, the numbers on the arrows between the latent variable and its indicators reflect outer loading and p-values (in parentheses). On the other side Table 3 provides details whether the hypotheses are accepted or not. Therefore, Figure 5 and Table 3 points out extensive support for all hypotheses at 1% significance level excluding H8 and H9 in the model. H8, which states that countries' financial efficiency is positively associated with their logistics performance, is significant at 5% significance level. However, according to test results, there is no significant evidence for H9 which postulates that the countries' financial depth is positively associated with their global competitiveness. Thereby, statistically significant and larger coefficients support all hypotheses but H9.

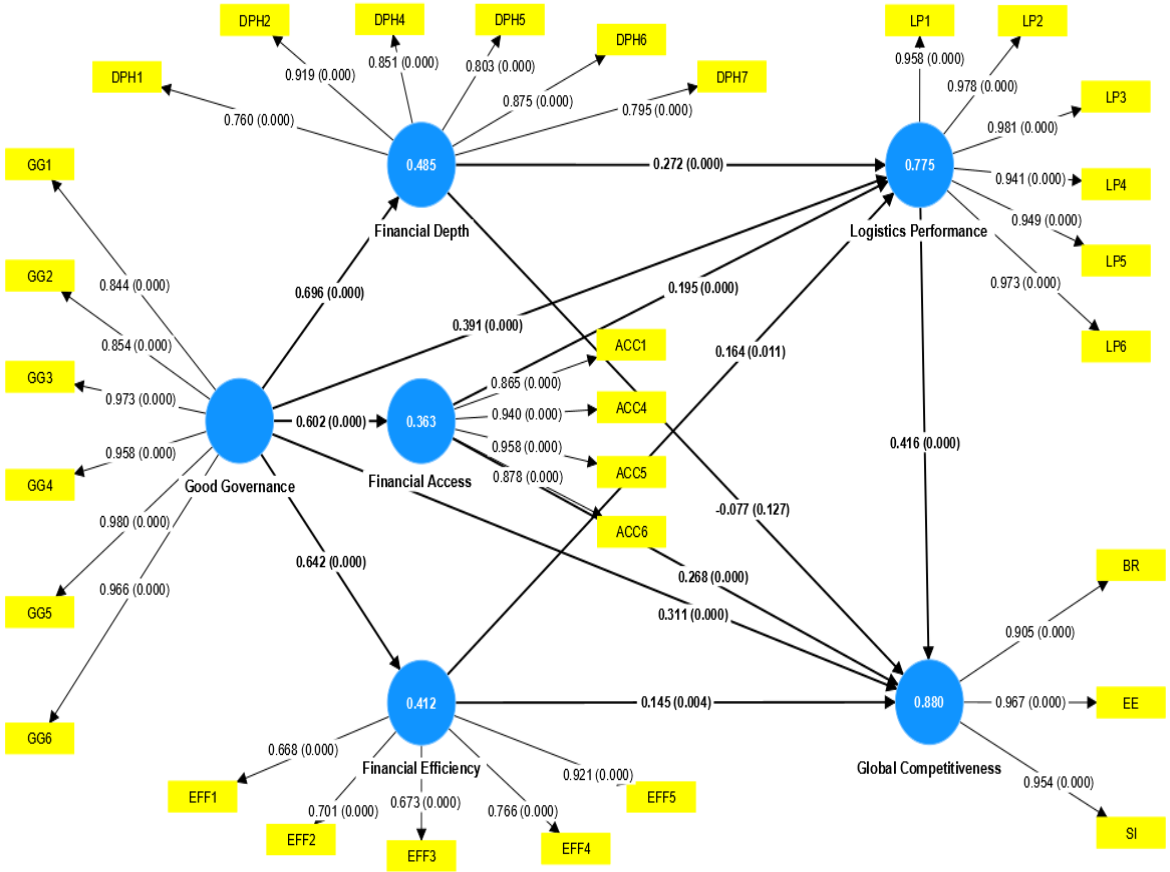

Figure 5: PLS-SEM structural model.

More specifically, test results show that one-unit increase in good governance leads to 0,696, 0,602, and 0,642 unit increase in financial depth, financial access, and financial efficiency, respectively, when everything else remains constant. On the other hand, one-unit increase in good governance spurs 0,391 and 0,311 unit increase in logistics performance and global competitiveness factors. These path coefficients refer that good governance has a significant and almost the same level strong impact on dimensions of financial development. Also, we can comment that good governance has a larger direct impact on dimensions of financial development compared to logistics performance and global competitiveness.

Table 3: PLS-SEM estimation for the model

Hypotheses	Hypotheses paths	Path coefficients	t-values	Accept / Reject significance
H1	Good Governance → Financial Depth	0,696	15,490	Accept ***
H2	Good Governance → Financial Access	0,602	10,084	Accept ***
H3	Good Governance → Financial Efficiency	0,642	13,796	Accept ***
H4	Good Governance → Logistics Performance	0,391	5,920	Accept ***
H5	Good Governance → Global Competitiveness	0,311	4,267	Accept ***
H6	Financial Depth → Logistics Performance	0,272	3,446	Accept ***
H7	Financial Access → Logistics Performance	0,195	3,373	Accept ***
H8	Financial Efficiency → Logistics Performance	0,164	2,270	Accept **
H9	Financial Depth → Global Competitiveness	-0,077	1,136	Reject
H10	Financial Access → Global Competitiveness	0,268	5,095	Accept ***
H11	Financial Efficiency → Global Competitiveness	0,145	2,600	Accept ***
H12	Logistics Performance → Global Competitiveness	0,416	5,797	Accept ***

* p < 0,10; ** p < 0,05; *** p < 0,01

Importantly, each dimension of financial development has a positive and statistically significant relationship with logistics performance. Financial depth (0,272) has the largest positive relationship with logistics performance compared to financial access (0,195) and financial efficiency (0,145).

Likewise, each of the exogenous variables but financial depth has a statistically significant and positive relationship with global competitiveness. One-unit change in financial access, financial efficiency, and logistics performance lead to 0,268, 0,145, and 0,416, unit change, respectively, in global competitiveness factors. Logistics performance has the largest impact on global competitiveness compared to financial access and financial efficiency. Notably, Financial access has the largest impact on global competitiveness compared to financial efficiency. This finding is not surprising as in easily accessible financial markets, the logistics industry can reach and benefit from various financial products and services to cope with operational and financial risks and uncertainties.

The coefficient of determination, R^2, which gives predictive power of the model is presented in Table 4. R^2 shows the endogenous latent variable's explained variance by all linked exogenous variables. R^2 results indicate that good governance quality explains % 48,5, % 36,3, and % 41,2 of the variance in financial depth, financial access and financial efficiency, respectively. Likewise, good governance, financial depth, financial access and financial efficiency explain % 77,5 of the variance in logistics performance. Lastly, all constructs explain % 88 of the variance in global competitiveness.

To determine the contribution of the exogenous latent variables to R^2 of an endogenous latent variable, we use Cohen's f^2 (Cohen, 1988). In Cohen's f^2 test, we investigate how R^2 of an endogenous construct is affected by the removal of a selected exogenous construct from the model (Hair et. al., 2019: 119) As a rule of thumb, Cohen's f^2 values larger than 0,02, 0,15 and 0,35 refer the size of the explanatory power of the exogenous construct on the endogenous construct as a small, medium and large effect, respectively (Hair et al., 2016). Table 4 presents that good governance has a medium effect on the explained variance of logistics performance (0,292) and global competitiveness (0,267) constructs. Financial depth, financial access, and financial efficiency have a small effect size on logistics performance's explained variance. While financial access and financial efficiency have a small effect size on global competitiveness, financial depth does not have a statistically significant effect size on it.

Table 4: PSL-SEM structural model metrics

Constructs	R^2	f^2		Q^2	q^2	
		Logistics Performance	Global Competitiveness		Logistics Performance	Global Competitiveness
Good Governance		0,292	0,267		0,16	0,095
Financial Depth	0,485	0,111	0,015	0,307	0,062	-0,011
Financial Access	0,363	0,094	0,304	0,266	0,053	0,109
Financial Efficiency	0,412	0,052	0,072	0,209	0,027	0,021
Logistics Performance	0,775		0,324	0,662		0,124
Global Competitiveness	0,880			0,726		

In this step, we apply Stone-Geisser's Q^2 (Stone 1974; Geisser, 1974) as offered by Hair et al. (2011: 25) to examine the path's predictive relevance. Q^2 values greater than zero show that the exogenous construct has predictive relevance for the linked endogenous construct. Table 4 indicates that all endogenous constructs have Q^2 values larger than zero. To examine which exogenous construct has predictive relevance on an endogenous construct, we use q^2 test. q^2 values greater than 0,02, 0,15, and 0,35 indicates that the exogenous construct has a small, medium, and large predictive relevance for the linked endogenous construct, respectively (Hair et al., 2016: 26-44). Thereby, Table 4 indicates that good governance has medium predictive relevance for logistics performance; on the other side, financial depth, financial access, and financial efficiency have small predictive relevance for logistics performance. Lastly, all the exogenous variables but financial depth have small predictive relevance for global competitiveness. These findings are in tandem with our previous findings.

5. CONCLUDING REMARKS

In this paper, the linkages among good governance, dimensions of development of finance -depth, access and efficiency-, logistics performance, and global competitiveness are examined. We find strong evidence that good governance is positively associated with all constructs in our model. Thus, good governance of the states is almost a prerequisite for development of finance, logistics industry and global competitiveness. Notably, test results specify that good governance has a significant impact on dimensions of financial development constructs. One-unit increase in good governance leads 0,696, 0,602 and 0,642 unit increase in financial depth, access and efficiency, respectively. Likewise, one-unit increase in good governance leads 0,391 and 0,311 unit increase in logistics performance and global competitiveness. As a result, industries and firms in a country severely depend on the good governance, namely; government efficiency, political stability, voice and accountability, control of corruption, regulatory quality and rule of law. Thus, it is advisable for policymakers to develop good governance indicators to boost financial depth, financial efficiency, financial access, logistics performance and global competitiveness, respectively.

Importantly, financial depth, financial access and financial efficiency are positively linked with logistics performance. One-unit change in financial depth, financial access, and financial efficiency leads 0,272, 0,195 and 0,164 unit change in logistics performance, respectively, when everything else remains constant. Financial depth has the greatest impact on logistics performance compared to financial access and financial efficiency. Notably, test results empirically demonstrate that each dimension of financial development is crucial for logistics performance as the financial intermediaries provide vital products and services for the logistics industry to mitigate its operational and financial risks, uncertainties, and shortcomings. As hypothesized by the literature and reinforced by the results of this paper, a well-functioning, depth, accessible and efficient financial system has a crucial influence on the logistics performance of the countries. Therefore, policymakers and practitioners should have a decent comprehension of the linkage between financial depth, financial access, financial efficiency, and logistics performance in order to enhance the logistics performance of the country and global competitiveness factors.

On the other side, financial access has the largest impact on global competitiveness, and then financial efficiency follows it, however empirical results could not able to find statistically significant evidence supporting the argument that financial depth is positively associated with global competitiveness. Therefore, this study gives evidence for the World Bank (2008: 113-121), Ardıc et al. (2011: 1-5), Samans et al.'s (2015: 12) argument which stress that better access to financial products and services reduces poverty, facilitates daily life of citizens and leads to the likelihood of obtaining higher education and better health and public services.

Finally, logistics performance is significantly and positively linked with global competitiveness. One-unit change in logistics performance leads 0,416 unit change in global competitiveness. By this means, the policymakers who desire to expand their country's global competitiveness shall concentrate on logistics.

This study examines the relationship between the variables without grouping the countries according to their economic development levels. In future studies, the associations can be examined by dividing countries according to their level of economic development as the strength of the path coefficient might differ for developed and developing countries.

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