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Governance and Innovation Commercialization Nexus: Comparative Evidence of Democracies versus Autocracies on Global High-Tech Export Performance

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Abstract

This study critically examines the comparative role of political governance systems i.e democracies versus autocracies on the commercialization of innovations in driving high-tech exports globally. Using dynamic panel data of 104 countries from 2001 to 2015, the study employs advanced econometric techniques, including GMM and 2SLS estimations, to mitigate endogeneity concerns. Results reveal that autocracies exert a significantly positive long-term influence on high-tech exports, particularly in the Europe and Central Asia (ECA) region, where they contribute to a sustained growth rate of approximately 50-60% over fifteen years. Conversely, democracies demonstrate a statistically significant negative impact, largely attributed to electoral cycles, policy discontinuity, and fragmented decision-making. Key drivers influencing this relationship include R&D intensity, intellectual property frameworks, and economic openness. Limitations involve data availability for certain emerging economies and inherent measurement challenges in governance classification. Policy recommendations underscore the need for democracies to enhance institutional stability and foster long-term industrial strategies to promote innovation-driven exports. The findings provide novel insights into institutional governance frameworks relevant for achieving SDG 9 (Industry, Innovation & Infrastructure) and SDG 16 (Peace, Justice & Strong Institutions). Future research should explore firm-level dynamics and sector-specific governance impacts across varying developmental stages.

Keywords: Innovation Commercialization; Political Governance Systems; High-Tech Exports; Institutional Quality; Economic Openness

Introduction

The importance of technological innovation and its commercialization has been increased with the start of “Third Industrial Revolution” around the world. To boost innovation activities, every country tries to promote research and development culture in the country. But it has been observed from past research that by merely having more and more innovation in terms of no of patents registered or trademarks etc does not have any real contribution for economic development of the country unless these innovations are not commercialized to make them available for domestic use as well as for exports of high-tech products. On the global scene, China has proposed the "Made in China 2025" initiative; the United States has introduced the "American Innovation Strategy" and the Technological Innovation Plan (TIP); France has proposed the "Create Tomorrow's Products" industrial innovation plan; and Germany has unveiled the "2020—Innovation Partnership" and "Standard Innovation Plan." This demonstrates unequivocally that technology advancement and commercialization competitions have reached a mature stage on a global scale.

Table 1 states that between 2001 and 2015, research and development expenditure increased by 7%, driving significant growth in high-tech exports. In 2014, high-tech product exports reached $2.1461 trillion, marking a 105% rise since 2001. However, their share in manufacturing goods declined by 19%. During this period, GDP grew by 41%, while GDP per capita saw a 173% increase. This underscores the

strong link between R&D investment and economic growth. In industrialized countries like the UK, USA, Germany, and France, government policies foster innovation commercialization. Similarly, emerging economies like the BRIICS countries are adopting developmental models promoting innovation and public-private partnerships.

Table 1: Trend Comparison of Economic Growth and Commercialization of Patents (2001-2015)

Years	GDP Growth (%)	GDP Per Capita Growth (%)	R&D Exp. (GDP %)	HT_Exports (tri)	HT_Exports (% of Manufacturing)
2001	1.9405	0.6053	2.0828	1.0490	22.9440
2002	2.1439	0.8705	2.0427	1.0672	22.2631
2003	2.9147	1.6209	2.0335	1.1920	21.9194
2004	4.4532	3.1519	1.9831	1.4319	21.2798
2005	3.8460	2.5486	1.9728	1.5857	21.8372
2006	4.3262	3.0230	1.9807	1.8276	21.8235
2007	4.2561	2.9532	1.9557	1.7682	17.6394
2008	1.8194	0.5685	2.0099	1.8421	16.8079
2009	(1.7355)	(2.9287)	2.0504	1.5653	18.2414
2010	4.3267	3.0581	2.0364	1.7802	17.4870
2011	3.1562	1.9731	2.0233	1.9356	16.3485
2012	2.4390	1.2869	2.0911	1.9988	16.8918
2013	2.6008	1.3926	2.0640	2.1066	17.0485
2014	2.8308	1.6366	2.1532	2.1461	17.0776
2015	2.7342	1.6514	2.2301	-	18.5424

(Source: World Bank Database)

According to the National Innovation System Theory by Nelson (1993) and the Triple Helix Theory by Etzkowitz and Leydesdorff (2000), government plays a crucial role in enhancing a country's innovation capabilities. Governments influence innovation by selecting recipients of innovation support funds, often prioritizing key industries. Given limited resources, government officials must plan economic growth policies in the public interest. Certain technologies requiring significant investment, surpass the capacity of private companies, necessitating government support. To promote high-tech economies, governments provide essential R&D funds and public research facilities. As Hall and Taylor (1996) emphasize, collaboration between government, public, and private sectors is critical for developing innovation policies that solve practical problems and boost competitiveness. This study has the potential to contribute as:

- This is the first research to explore the relationship between innovation commercialization and government types (democracy/autocracy) using a dataset from 2001-2015, covering 104 countries across three broad global regions.

- The study provides both theoretical and empirical evidence through a comparative analysis of democracies and autocracies to identify which governance model better supports innovation commercialization.

There are five sections in this study. The issue is introduced in Section 1, and in Section 2, a review of the literature follows. The research methodology is described in Section 3, and the findings, regression analysis, and descriptive statistics are presented in Section 4. Future research directions and policy recommendations are included in Section 5's conclusion.

Literature Review

Innovation and Innovation Commercialization

Patents ensure the uniqueness and consistency of market value in comparison to other alternative metrics (Bronzini and Piselli, 2016). Technology accumulation through the export of high-tech items is the "engine of growth" for an economy (Santacreu, 2015). Universities were once considered as the only institutions where certified knowledge was created on demand by market forces. Then gradually new discussions started of how governments form and influence the policy regarding science and technology in different countries. U.S. policy makers then began to view academic science as an economic engine, and ultimately, they formed legislations to facilitate universities for obtaining patents and intellectual property licenses for their academic research projects (Berman, 2012). This wave then moved to other industrialized countries. Today innovation, technology and entrepreneurship are increasingly influenced by contemporary social wealth, competitiveness and development, thus constituting the political agendas of developed and emerging countries (Vilha, et al., 2018).

Freitas et al. (2013) argued between two models of interaction. First is the institutional models which involve interaction between universities and ecosystem stakeholders (industry, government, non-profit, other investors); and second is the individual contract models, which are formal and informal cooperation between ecosystem stakeholders and scientists. According to Marozau and Guerrero (2016), innovation commercialization in the post-socialist economic environment is beset by a high degree of bureaucracy, a lack of economic incentives, a lack of funding for independent market technology, a lack of free decision-making to secure patents, and a lack of networks for industry participation. Regardless of the financial interests of scientists, universities or national governments control all inventions in transition economies. Universities are subsidized by the government to develop new technologies for large, publicly owned businesses. Scholars are becoming more interested in examining the function of domestic political systems and their suitability for internationalization as a result of the swift ascent of emerging market firms into the competitiveness of global marketplaces. Two very different arguments have emerged in this regard, summed up as "evading" views and "nurturing" views. The evading view suggests that the internationalization of new enterprises is a response to the constraints of the home country's political system (Boisot and Meyer, 2008), while nurturing logic advocates the promotion of advanced domestic institutions that

promote the internationalization of new enterprises (Sun et al., 2015). High-quality institutions in the country are essential for economic growth, as they facilitate effective transactions between individuals and organizations by significantly reducing transaction costs (North, 1993) and providing strong governance mechanisms for monitoring private sector development and intellectual property protection (Kaufmann et al., 2010). Sewell (2001) investigated the relationship between governance and business environment in the West Bank/Gaza (WBG) by analyzing the response to the World Bank group's 2000 mid-term survey of the worldwide business environment. He found that about 77% of respondents said political instability and uncertainty were the biggest constraints to their operations and growth. Banerji and Humphreys (2003) stressed that good governance in the Middle East and North Africa regions, in which public institutions responded, operated transparently and responsibly, was essential to reduce poverty and stimulating growth.

Political Governance System

The question of which political governance system contributes more to a modern, pluralistic, and innovative economy is widely debated. Democracies focus on respecting individual freedoms, safeguarding human rights, and fostering institutions that protect intellectual property, supporting innovation. However, decision-making in democratic systems often involves multiple political stakeholders, making the process slower and more complex. In contrast, autocratic regimes may accelerate technological innovation through centralized, top-down leadership. Karl Popper, a notable philosopher, argued that democracy and freedom create a social structure more conducive to innovation (Popper, 2012). Studies like those by Almond and Verba (2015) support this, emphasizing that the positive role of democracy in promoting innovation depends on a country's culture and history. Technology commercialization policies, such as subsidies and tax incentives, are vital for innovation, and these policies are often formulated by central governments. While much research explores the relationship between political systems and innovation, the specific link between government type and the commercialization of innovation remains a critical gap, which this study seeks to address.

Research Methodology

The transfer of technology has been extensively studied. Unexpected expenses and dangers are frequently a result of the caliber of government-provided institutions and the caliber of technology that the market demands. Political stability and domestic production structures are directly influenced by the export portfolio of the nation, claim Hartmann et al. (2017). We believe that while respecting individual freedoms to safeguard basic human rights and establishing technological conducive institutions for massive innovation culture, political governance system pays close attention as Popper (2012) also believes. Mostly the studies have been done to cover the theoretical aspects and lacking the empirical contributions. We believe that the core elements of institutional quality particularly the type of government have an impact on the formation of this comparative advantage in differentiated commodities via commercialization of innovation, which have more room for quality differentiation

and provide higher standards for internationalization. This comprises our first research question as given below:

Question 1:

Which type of government (democracy/autocracy) effect the commercialization of innovation more as it is part of governments' innovation policies to get their local products internationalized and to compete domestically and political stability is important in this regard?

According to Peng and Lebedev's (2017) research and Diamond's international inequality geography theory, regional capacity increases emerging-market firms' ability to take risks when they expand internationally. Consequently, creative development and its commercialization have emerged as a key topic in management and academic circles that has not yet been empirically investigated. The necessity for invention commercialization is further increased by regional innovation networks and initiatives. This includes the following, which is our second research question:

Question 2:

Do the regional geographies of nations have an impact on the relationship between innovation commercialization and political governance systems? This is because regional dynamics encourage a covert regional competition in innovation activities among nearby nations.

Data and Variables

To analyze the relationship between political governance system and innovation commercialization, we used the country level data comprising of 104 countries from 2001 to 2015. Our main dependent variable is commercialization of innovation. The details of the proxies used for measuring the commercialization of innovation are given below in table 2.

Table 2: Measure of Commercialization of Innovation

Authors	Measures	Understandings and Contributions to the Commercialization of Patents
Wagner, Wakeman (2016)	Patent-based	Commercialization is slowed down by uncertainty about patent protection.
Cavdar, Aydin (2015)		An indicator that can help generate economic benefits in the future
Aarikka-Stenroos et al., (2014)	Distributors, users, consumers, suppliers, investors, associations, public organizations, regulators, and policymakers are examples of network stakeholders' actions.	* Network actors build markets and aid in adoption and spread. * Organizational networks are essential for commercialization efforts.

Walsh (2012), Corkindale (2010)	* Demand and sophistication of the market * The quality of commercialization environment (Innovation Wasteland, Innovation Push, Innovation Pull and Innovation Nirvana)	* Demand and market eco-sophistication determine patent commercialization. * Commercialization settings influence commercialization strategies.
Arora et al. (2016)	Origin of invention: internal/external	Commercialization can be connected to the invention's origin.
Lin et al. (2015)	Cross-functional collaboration and organizational knowledge activities	It makes knowledge production and technology commercialization easier.
Khademi et al. (2015)	Licensee availability	Commercialization is facilitated by the licensee's availability.
Wu et al. (2015)		University inventions are licensed if their commercialization is viewed favorably by the inventor.
Cavdar, Aydin (2015), Lipkova, Braga (2016)	Exports of high-tech products	Indicator of economic effectiveness of commercialization process
Do et al. (2012)	R&D	The process of commercialization includes R&D.

The political setup in the country has been taken as a measure the institutional quality in a country as suggested by Bruinshoofd (2016) and Kaufmann et al. (2010). It is further classified as democracies and autocracies (Boix, 2013; Freedom House, 2015; Marshall et al., 2014; Boix et al., 2012; Przeworski et al., 2000). Overall, out of 1560 countries/year observations, 1261 observations are coded as democracies and 248 observations are coded as non-democracies. A variety of control variables have also been employed, such as the cost of intellectual property use (IP use payments and receipts), the cost of starting a business (CBS), urbanization (as indicated by the proportion of the population living in urban areas), population growth (PG), and population density (PD), as proposed by Andersson et al. (2009); job creation (JC), as proposed by Hooghe et al. (2010), which is determined by the unemployment rate in a nation—the higher the unemployment rate, the lower the job creation, and vice versa; and economic openness (EO), as proposed by Cheung and Ping (2004), which is measured by exports and imports as a percentage of GDP. The World Bank database's World Development Indicators provided the information for these control variables. As recommended by Acemoglu et al. (2014, 2019), we have employed the primary

enrollment rate, secondary enrollment rate, and child death rate as our instrumental variables to address the potential endogeneity issue in the results.

Data collection and sample selection

At the start of the data gathering phase, there were 210 countries. However, we have divided the countries into three major categories based on the data and regional significance: Sub-Saharan Africa (SSA), Latin America & Caribbean (LAC), and Europe & Central Asia (ECA). Some nations had too many missing values in their data, while others had no data at all. Countries with more than 30% missing information have been removed from the dataset for the purposes of our study to preserve the appropriate level of accuracy. Our final dataset contains 104 nations, including 31 SSA, 27 LAC, and 46 ECA countries. In our final dataset, some countries have some missing values too in some years, for which we impute the missing observations by using the mean value method.

Empirical Model of Study

We have created a new model by utilizing the models of Akbar et al., (2024) and we base it on the studies that were conducted on various contexts. We contend that the type of government has an impact on the commercialization of innovation in the nation.

Our regression analysis's basis model is

$$CI_{it} = \beta_0 + \beta_1 ToG + \varepsilon_{it} \quad (1)$$

Whereas ToG indicates the kind of government (autocracy or democracy) for the country I in a particular year t, CI indicates the commercialization of innovation for the country I in that same year t.

The following is the expanded model for our base regression model that incorporates various control variables:

$$CI_{it} = \beta_0 + \beta_1 ToG_{it} + \sum_{i=1}^{t} \lambda \ Control_{it} + \alpha_i + \delta_t + \varepsilon_{it} \quad (2)$$

In this case, "λ" stands for the coefficients of every control variable we utilized for the nation I in a specific year t. The "δt" indicates a complete set of year effects, whereas the "αi" indicates a full set of nation fixed effects that will absorb the potential impact of any time-invariant country features. "ε it" is an error term that encompasses all other time-varying, unobservable shocks to invention commercialization.

Data Analysis & Discussion

Descriptive Statistics and Multicollinearity

Table 3 presents region-wise summary statistics, comparing democracies and autocracies. ECA democratic countries have the highest average high-tech exports at 9.170, while LAC autocracies record the lowest at 5.456. The highest variation is seen in SSA democracies (158.2%), while LAC autocracies have the lowest (94.9%). These statistics suggest that non-democratic governments in the ECA region are most

effective in enhancing high-tech exports with minimal variation.

Table 3: An overview of the key variables that were used in our investigation

Panel A: Europe and Central Asian Region (ECA)						
Variables	**Democracies**			**Non-Democracies**		
	N	**Mean**	**St. Dev.**	**N**	**Mean**	**St. Dev.**
High-Tech Exports	611	9.170	1.308	63	7.877	0.949
Cost of Intellectual Property	611	2.945	0.146	63	2.582	0.210
Cost of Business Startups	611	7.768	8.049	63	7.991	7.095
Population Growth	611	0.196	0.902	63	0.500	0.813
Population Density	611	4.214	1.371	63	3.731	1.195
Urbanization	611	4.229	0.196	63	3.992	0.206
Job Creation	611	10.027	5.788	63	5.418	3.158
Economic Openness	611	-2.829	12.473	63	-3.882	23.193
IP Use Payments	611	20.109	2.184	63	16.565	1.681
IP Use Receipts	611	19.210	2.707	63	13.484	2.396
Primary Enrollment rate	611	2.825	0.037	63	2.789	0.023
Secondary Enrollment rate	611	2.767	0.121	63	2.702	0.168
Child Mortality rate	611	1.063	0.403	63	1.748	0.494
Panel B: Latin American and Caribbean Region (LAC)						
High-Tech Exports	341	7.683	1.421	64	5.456	1.530
Cost of Intellectual Property	341	2.789	0.220	64	2.822	0.278
Cost of Business Startups	341	39.854	37.856	64	23.383	12.017
Population Growth	341	1.207	0.554	64	1.349	1.870
Population Density	341	3.637	1.214	64	5.332	1.295
Urbanization	341	4.134	0.308	64	3.942	0.386
Job Creation	341	8.302	3.686	64	11.609	4.361

Economic Openness	341	-5.737	10.916	64	-9.817	9.408
IP Use Payments	341	17.813	2.040	64	17.215	2.781
IP Use Receipts	341	16.627	3.346	64	17.432	4.456
Primary Enrollment rate	341	2.808	0.044	64	2.823	0.017
Secondary Enrollment rate	341	2.575	0.177	64	2.657	0.146
Child Mortality rate	341	1.806	0.260	64	1.925	0.411
Panel C: Sub-Saharan African Region (SSA)						
High-Tech Exports	309	6.790	1.582	121	6.066	1.238
Cost of Intellectual Property	309	2.709	0.301	121	2.646	0.357
Cost of Business Startups	309	74.889	82.222	121	159.258	104.174
Population Growth	309	2.313	0.916	121	2.656	0.673
Population Density	309	4.055	1.443	121	4.389	1.076
Urbanization	309	3.587	0.464	121	32.516	14.129
Job Creation	309	10.781	7.703	121	7.567	8.574
Economic Openness	309	-9.798	12.469	121	-12.230	6.097
IP Use Payments	309	16.059	3.441	121	16.946	3.380
IP Use Receipts	309	15.682	4.508	121	14.969	5.029
Primary Enrollment rate	309	2.709	0.127	121	2.723	0.090
Secondary Enrollment rate	309	2.201	0.384	121	2.075	0.259
Child Mortality rate	309	2.341	0.467	121	2.554	0.170

Because the VIF values are within the necessary ranges as recommended by Sheather and Simon (2009), the results in Tables 4 and 5 demonstrate that there is absolutely no multicollinearity problem in the data.

Table 4: Pairwise correlation and the Variance Inflation Factor (VIF) are used to assess multicollinearity (Democracy).

Panel A: Europe and Central Asian Region (ECA)										
VIF and Pairwise Correlation										
Variables	**VIF**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
(1) LnHT_Exp	-	1.000								

(2) Demo	1.622	-0.318*	1.000							
(3) CIP	2.068	0.571*	0.558*	1.000						
(4) CBS	1.244	-0.317*	-0.139*	-0.112*	1.000					
(5) PG	1.254	0.129*	-0.049	0.191*	-0.043	1.000				
(6) lnPD	1.161	0.360*	0.091*	0.133*	-0.063	0.001	1.000			
(7) LnUrb	2.268	0.422*	0.437*	0.603*	-0.227*	0.208*	-0.078*	1.000		
(8) JC	1.362	-0.303*	0.035	-0.176*	0.189*	-0.327*	0.078*	-0.355*	1.000	
(9) EO	1.833	0.565*	0.148*	0.229*	-0.421*	0.329*	0.170*	0.477*	-0.387*	1.000
Panel B: Latin American and Caribbean Region (LAC)										
(1) LnHT_Exp	-	1.000								
(2) Demo	1.464	-0.492*	1.000							
(3) CIP	1.183	-0.013	-0.054	1.000						
(4) CBS	1.290	-0.147*	0.169*	-0.040	1.000					
(5) PG	1.332	-0.008	-0.058	0.170*	0.071	1.000				
(6) lnPD	1.715	-0.145*	-0.451*	-0.147*	-0.347*	-0.111*	1.000			
(7) LnUrb	1.582	0.509*	0.214*	0.214*	-0.057	0.285*	-0.308*	1.000		
(8) JC	1.429	-0.329*	-0.303*	0.203*	-0.246*	-0.322*	0.163*	-0.100*	1.000	
(9) EO	1.554	0.475*	0.138*	0.081	-0.089	0.189*	-0.356*	0.526*	-0.123*	1.000
Panel C: Sub-Saharan African Region (SSA)										
(1) LnHT_Exp	-	1.000								
(2) Demo	1.213	-0.203*	1.000							
(3) CIP	1.267	0.092*	0.128*	1.000						
(4) CBS	1.273	-0.426*	-0.372*	-0.182*	1.000					
(5) PG	1.421	-0.285*	-0.165*	-0.247*	0.268*	1.000				
(6) lnPD	1.207	-0.153*	-0.086	0.159*	-0.033	-0.021	1.000			
(7) LnUrb	1.915	0.245*	0.221*	0.307*	-0.285*	-0.510*	-0.143*	1.000		
(8) JC	1.411	-0.066	0.219*	0.220*	-0.170*	-0.174*	-0.243*	0.393*	1.000	
(9) EO	1.469	0.395*	0.065	0.270*	-0.198*	-0.318*	-0.142*	0.457*	-0.009	1.000

*, **, and *** in this case indicate that the results are statistically significant at the 10%, 5%, and 1% levels, respectively.

Table 5: Pairwise correlation and variance inflation factor (VIF) to assess

multicollinearity (autocracy)

Panel A: Europe and Central Asian Region (ECA)										
Pairwise Correlation and VIF										
Variables	**VIF**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
(1) LnHT_Exp	-	1.000								
(2) Auto	1.788	0.271*	1.000							
(3) CIP	2.351	0.571*	-0.558*	1.000						
(4) CBS	1.238	-0.317*	-0.008	-0.112*	1.000					
(5) PG	1.253	0.129*	0.102*	0.191*	-0.043	1.000				
(6) lnPD	1.160	0.360*	-0.103*	0.133*	-0.063	0.001	1.000			
(7) LnUrb	2.193	0.422*	-0.290*	0.603*	-0.227*	0.208*	-0.078*	1.000		
(8) JC	1.499	-0.303*	-0.233*	-0.176*	0.189*	-0.327*	0.078*	-0.355*	1.000	
(9) EO	1.833	0.565*	-0.006	0.229*	-0.421*	0.329*	0.170*	0.477*	-0.387*	1.000
Panel B: Latin American and Caribbean Region (LAC)										
(1) LnHT_Exp	-	1.000								
(2) Auto	1.464	0.492*	1.000							
(3) CIP	1.183	-0.013	0.054	1.000						
(4) CBS	1.290	-0.147*	-0.169*	-0.040	1.000					
(5) PG	1.332	-0.008	0.058	0.170*	0.071	1.000				
(6) lnPD	1.715	-0.145*	0.451*	-0.147*	-0.347*	-0.111*	1.000			
(7) LnUrb	1.582	0.509*	-0.214*	0.214*	-0.057	0.285*	-0.308*	1.000		
(8) JC	1.429	-0.329*	0.303*	0.203*	-0.246*	-0.322*	0.163*	-0.100*	1.000	
(9) EO	1.554	0.475*	-0.138*	0.081	-0.089	0.189*	-0.356*	0.526*	-0.123*	1.000
Panel C: Sub-Saharan African Region (SSA)										
(1) LnHT_Exp	-	1.000								
(2) Auto	1.197	0.199*	1.000							
(3) CIP	1.265	0.092*	-0.066	1.000						
(4) CBS	1.291	-0.426*	0.377*	-0.182*	1.000					
(5) PG	1.425	-0.285*	0.167*	-0.247*	0.268*	1.000				
(6) lnPD	1.214	-0.153*	0.113*	0.159*	-0.033	-0.021	1.000			
(7) LnUrb	1.907	0.245*	-0.165*	0.307*	-0.285*	-0.510*	-0.143*	1.000		
(8) JC	1.404	-0.066	-0.149*	0.220*	-0.170*	-0.174*	-0.243*	0.393*	1.000	

(9) EO	1.463	0.395*	-0.103*	0.270*	-0.198*	-0.318*	-0.142*	0.457*	-0.009	1.000

*, **, and *** in this case indicate that the results are statistically significant at the 10%, 5%, and 1% levels, respectively.

Table 6 reveals a positive significant association between non-democracy and innovation commercialization, while democracy shows a negative significant relationship. Contrary to popular belief, democracy's political instability and election cycles hinder long-term strategic decisions, making non-democracies more conducive to innovation commercialization.

Table 6: Impact of Type of Government on Innovation Commercialization

Panel A: Europe and Central Asian Region (ECA)										
VARIABLES	Democracies					Autocracies				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
	Pooled_OLS	Fixed	Probit	Tobit	Logit	Pooled_OLS	Fixed	Probit	Tobit	Logit
	LnHT_Exp	LnHT_Exp	PHTExp	LnHT_Exp	PHTExp	LnHT_Exp	LnHT_Exp	PHTExp	LnHT_Exp	PHTExp
ToG	-0.070***	-0.101***	-0.676**	-0.121***	-1.036**	0.123***	0.096***	0.919***	0.931***	1.361***
	(0.120)	(0.130)	(0.257)	(0.142)	(0.478)	(0.153)	(0.150)	(0.295)	(0.255)	(0.526)
CIP	3.642***	3.716***	2.134***	5.013***	3.712***	3.472***	3.541***	1.861***	3.235***	3.330***
	(0.421)	(0.255)	(0.492)	(0.304)	(0.976)	(0.447)	(0.271)	(0.518)	(0.544)	(1.010)
CBS	-0.011***	-0.015***	-0.008	0.001	-0.015	-0.011***	-0.015***	-0.010	-0.016**	-0.017
	(0.004)	(0.005)	(0.008)	(0.004)	(0.015)	(0.004)	(0.005)	(0.008)	(0.008)	(0.015)
PG	-0.199***	-0.204***	-0.426***	-0.239***	-0.814***	-0.190***	-0.195***	-0.418***	-0.316***	-0.801***
	(0.055)	(0.040)	(0.077)	(0.043)	(0.145)	(0.055)	(0.040)	(0.077)	(0.070)	(0.146)
lnPD	0.219***	0.215***	0.040	0.141***	0.088	0.219***	0.214***	0.039	0.173***	0.082
	(0.031)	(0.026)	(0.053)	(0.028)	(0.095)	(0.031)	(0.026)	(0.054)	(0.052)	(0.096)
LnUrb	-0.569**	-0.601***	-0.262	-1.001***	-0.060	-0.604**	-0.640***	-0.159	-1.316***	0.067
	(0.240)	(0.219)	(0.463)	(0.225)	(0.854)	(0.240)	(0.216)	(0.452)	(0.430)	(0.836)
JC	-0.028***	-0.026***	-0.035***	-0.037***	-0.062***	-0.031***	-0.028***	-0.042***	-0.053***	-0.071***
	(0.005)	(0.006)	(0.012)	(0.007)	(0.023)	(0.005)	(0.007)	(0.013)	(0.011)	(0.023)

EO	0.039***	0.040***	0.066***	0.043***	0.121***	0.039***	0.040***	0.068***	0.066***	0.123***
	(0.004)	(0.003)	(0.007)	(0.004)	(0.015)	(0.004)	(0.003)	(0.008)	(0.006)	(0.015)
Constant	0.521	0.490	-4.165**	-1.153	-8.773***	1.133	1.103	-3.022	5.788***	-7.007*
Constant	0.521	0.490	-4.165**	0.701***	(3.400)	1.133	1.103	-3.022	1.226***	(3.618)
	(1.052)	(0.851)	(1.762)	(0.929)		(1.097)	(0.914)	(1.884)	(1.729)	
	(1.052)	(0.851)	(1.762)	(0.030)		(1.097)	(0.914)	(1.884)	(0.080)	
Observations	690	690	690	690	690	690	690	690	690	690
R-squared	0.607	0.609				0.607	0.609			
Panel B: Latin American and Caribbean Region (LAC)										
	Democracies					**Autocracies**				
ToG	-1.868***	-1.793***	-2.792*	-1.443***	-5.410**	1.868***	1.793***	2.792***	1.740***	5.410***
	(0.201)	(0.179)	(0.557)	(0.168)	(1.255)	(0.201)	(0.179)	(0.557)	(0.227)	(1.255)
CIP	0.204	0.284	-0.447	0.248	-0.892	0.204	0.284	-0.447	1.038***	-0.892
	(0.218)	(0.253)	(0.490)	(0.208)	(0.913)	(0.218)	(0.253)	(0.490)	(0.360)	(0.913)
CBS	-0.007***	-0.008***	-0.018***	-0.008***	-0.031***	-0.007***	-0.008***	-0.018***	-0.001	-0.031***
	(0.001)	(0.002)	(0.004)	(0.001)	(0.008)	(0.001)	(0.002)	(0.004)	(0.002)	(0.008)
PG	-0.363***	-0.421***	0.098	-0.306***	0.403	-0.363***	-0.421***	0.098	-0.518***	0.403
	(0.070)	(0.073)	(0.169)	(0.080)	(0.305)	(0.070)	(0.073)	(0.169)	(0.091)	(0.305)
lnPD	0.283***	0.270***	0.930***	0.352***	1.895***	0.283***	0.270***	0.930***	0.319***	1.895***
	(0.038)	(0.051)	(0.161)	(0.058)	(0.338)	(0.038)	(0.051)	(0.161)	(0.065)	(0.338)
LnUrb	1.736***	1.810***	4.360***	1.592***	8.983***	1.736***	1.810***	4.360***	1.485***	8.983***
	(0.214)	(0.206)	(0.599)	(0.186)	(1.393)	(0.214)	(0.206)	(0.599)	(0.292)	(1.393)
JC	-0.113***	-0.132***	-0.085**	-0.081***	-0.158**	-0.113***	-0.132***	-0.085**	-0.142***	-0.158**
	(0.016)	(0.018)	(0.026)	(0.014)	(0.045)	(0.016)	(0.018)	(0.026)	(0.025)	(0.045)

EO	0.047***	0.044***	0.057***	0.051***	0.102***	0.047***	0.044***	0.057***	0.071***	0.102***
	(0.005)	(0.006)	(0.017)	(0.006)	(0.033)	(0.005)	(0.006)	(0.017)	(0.009)	(0.033)
Constant	-1.050	-1.198	-22.188*	-0.691	-46.113*	0.818	0.595	-19.396*	-0.007	-40.703**
Constant	-1.050	-1.198	-22.188*	0.756***	(7.382)	0.818	0.595	-19.396*	1.161***	(6.866)
	(1.020)	(1.058)	(3.187)	(0.991)		(1.066)	(1.045)	(2.999)	(1.363)	
	(1.020)	(1.058)	(3.187)	(0.044)		(1.066)	(1.045)	(2.999)	(0.083)	
Observations	405	405	405	405	405	405	405	405	405	405
R-squared	0.603	0.607				0.603	0.607			
Panel C: Sub-Saharan African Region (SSA)										
	Democracies					**Autocracies**				
ToG	-0.195***	-0.219***	-1.380*	-0.177*	-2.982**	0.066***	0.100***	0.359**	0.035***	0.314***
	(0.123)	(0.133)	(0.391)	(0.115)	(0.828)	(0.127)	(0.142)	(0.355)	(0.141)	(0.847)
CIP	-0.056	-0.107	0.816*	0.040	1.809*	-0.041	-0.090	0.423	-0.229	0.862
	(0.201)	(0.204)	(0.459)	(0.177)	(0.939)	(0.200)	(0.205)	(0.427)	(0.203)	(0.880)
CBS	-0.006***	-0.005***	-0.010***	-0.004***	-0.019***	-0.006***	-0.005***	-0.004**	-0.006***	-0.006
	(0.001)	(0.001)	(0.003)	(0.001)	(0.006)	(0.001)	(0.001)	(0.002)	(0.001)	(0.004)
PG	-0.246**	-0.284***	-0.359***	-0.113*	-0.744***	-0.247**	-0.283***	-0.306**	-0.135*	-0.594**
	(0.096)	(0.080)	(0.128)	(0.067)	(0.250)	(0.097)	(0.080)	(0.124)	(0.081)	(0.242)
lnPD	-0.198***	-0.199***	0.150*	-0.165***	0.307*	-0.201***	-0.202***	0.145*	-0.303***	0.272*
	(0.054)	(0.047)	(0.085)	(0.042)	(0.170)	(0.055)	(0.047)	(0.083)	(0.053)	(0.165)
LnUrb	0.005	-0.191	0.652	-0.032	1.631*	0.020	-0.170	0.564	-0.154	1.833**
	(0.152)	(0.171)	(0.400)	(0.142)	(0.866)	(0.155)	(0.171)	(0.382)	(0.165)	(0.902)
JC	-0.039***	-0.033***	0.048***	-0.010	0.093***	-0.038***	-0.032***	0.035**	-0.024**	0.069**
	(0.009)	(0.009)	(0.01	(0.008)	(0.03	(0.009)	(0.009)	(0.01	(0.009)	(0.02

			6)		1)			5)		9)
EO	0.034***	0.043***	0.046***	0.027***	0.103***	0.034***	0.043***	0.045***	0.032***	0.090***
	(0.007)	(0.007)	(0.011)	(0.005)	(0.025)	(0.007)	(0.007)	(0.011)	(0.007)	(0.023)
Constant	9.285***	10.175***	-4.609***	8.281***	-10.696*	9.362***	10.242***	-4.448***	10.539***	-11.586**
Constant	9.285***	10.175***	-4.609***	0.961***	(3.462)	9.362***	10.242***	-4.448***	1.098***	(3.445)
	(0.867)	(0.876)	(1.684)	(0.751)		(0.863)	(0.877)	(1.630)	(0.929)	
	(0.867)	(0.876)	(1.684)	(0.051)		(0.863)	(0.877)	(1.630)	(0.068)	
Observations	465	465	465	465	465	465	465	465	465	465
R-squared	0.344	0.359				0.341	0.356			

*, **, and *** in this case indicate that the results are statistically significant at the 10%, 5%, and 1% levels, respectively.

Tests of Specifications

Here, we've made the following assumption:

Sequential exogeneity is assumed

Our dynamic panel regression model assumes sequential exogeneity, which is expressed as follows:

$$E\left(\varepsilon_{it} \mid \ln(HT\_Exp)_{it-1}, \ldots\ldots, ToG_{it}, \ldots\ldots, ToG_{it0}, \alpha_i, \delta_t\right) = 0$$

When working with dynamic panel models, this is the conventional assumption. It suggests that the error term "ε it" is serially uncorrelated and that the type of government (ToG) and historical exports of high-tech goods are orthogonal to contemporary and future error terms. According to this assumption, equation (2) must have a significant number of high-tech product export lags in order to eliminate the type of government (ToG) dip in high-tech product exports as well as residual serial correlation in the equation's error term.

Tables 7, 8, and 9 present estimates for the ECA, LAC, and SSA regions, comparing democracy and autocracy's impact on high-tech exports (HT_Exp). Autocracies show higher persistence, with lagged coefficients between 0.837 and 0.422. Autocracy in LAC demonstrates a positive and significant impact, while democracy in SSA shows minimal effect. Stability in governance enhances strategic policy implementation, with autocracy positively influencing high-tech exports by 15.4% in ECA, contrasting with a -26.4% effect from democracy in LAC. Introducing additional lags strengthens the governance impact, particularly in SSA, while maintaining consistent regional patterns.

The GMM estimates created by Arellano and Bond (1991) that address the potential Nickell bias put out by Nickell (1981) and yield reliable estimates of the dynamic panel model for the finite T are explained in part B of tables 7, 8, and 9. We

employed a 2SLS estimator to solve the problem of "too many instruments" in the GMM model, producing stronger and more significant results, which are detailed in Part C. The following is implied by the moment criteria for sequential exogeneity:

$$E\left[(\varepsilon_{it} - \varepsilon_{it-1})\,(\ln(HT\_Exp)_{is}, ToG_{is+1})`\right] = 0 \text{ for all } s \leq t-2$$

Table 7: Impact of Government Type (ToG) on High-Tech Product Export Log (LnHT_Exp) in the ECA Region

VARIABLES	Part A: Within Estimates							
	Democracy				Autocracy			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ToG	-0.081**	-0.081**	-0.080*	-0.081*	0.067***	0.066**	0.066***	0.066*
	(0.079)	(0.079)	(0.079)	(0.080)	(0.088)	(0.088)	(0.088)	(0.089)
LnHT_ExpL1	0.776***	0.777***	0.777***	0.777***	0.774***	0.776***	0.776***	0.777***
	(0.020)	(0.039)	(0.039)	(0.039)	(0.020)	(0.039)	(0.039)	(0.039)
LnHT_ExpL2		-0.001	-0.001	-0.001		-0.003	-0.000	-0.000
		(0.036)	(0.049)	(0.049)		(0.036)	(0.049)	(0.049)
LnHT_ExpL3			0.007	0.008			0.006	0.007
			(0.049)	(0.049)			(0.049)	(0.049)
LnHT_ExpL4			-0.008	0.001			-0.009	0.001
			(0.036)	(0.049)			(0.036)	(0.049)
Long term effect of ToG	-0.049*	-0.049*	-0.047*	-0.047	0.033*	0.033**	0.031*	0.030**
	(0.087)	(0.087)	(0.088)	(0.090)	(0.089)	(0.090)	(0.090)	(0.091)
Effect of ToG after 15 years	-0.122	-0.122	-0.121	-0.121	0.155*	0.155*	0.155*	0.154*
	(0.081)	(0.081)	(0.081)	(0.081)	(0.087)	(0.088)	(0.088)	(0.088)
Constant	-0.112	-0.111	-0.104	-0.096	-0.259	-0.257	-0.244	-0.226
	(0.478)	(0.480)	(0.483)	(0.493)	(0.507)	(0.508)	(0.512)	(0.526)
Observations	675	675	675	675	675	675	675	675
R-squared	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879
No of Countries	15	15	15	15	15	15	15	15
VARIABLES	Part B: Arellano and Bond Estimates							
	Democracy				Autocracy			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ToG	-0.064*	-0.063**	-0.095**	-0.072**	0.009*	0.001***	0.002**	0.041***
	(0.117)	(0.161)	(0.135)	(0.125)	(0.191)	(0.209)	(0.195)	(0.162)
LnHT_ExpL1	0.773***	0.802***	0.780***	0.792***	0.774***	0.788***	0.792***	0.798***
	(0.068)	(0.087)	(0.086)	(0.074)	(0.071)	(0.076)	(0.076)	(0.069)
LnHT_ExpL2		-0.027	0.000	0.012		-0.013	0.005	-0.010
		(0.056)	(0.058)	(0.057)		(0.056)	(0.062)	(0.047)
LnHT_ExpL3			-0.011	-0.012			-0.004	-0.006
			(0.024)	(0.024)			(0.021)	(0.020)
LnHT_ExpL4			-0.013	-0.024			-0.017	0.001
			(0.020)	(0.037)			(0.021)	(0.036)
Long term effect of ToG	-0.017	-0.014	-0.003	-0.010	0.005**	0.003*	-0.004	-0.021
	(0.047)	(0.063)	(0.056)	(0.062)	(0.055)	(0.056)	(0.056)	(0.053)
Effect of ToG after 15 years	-0.121**	-0.114*	-0.129**	-0.116*	0.170**	0.166*	0.167**	0.166**
	(0.056)	(0.059)	(0.062)	(0.062)	(0.060)	(0.061)	(0.059)	(0.058)

Constant	-0.084	0.158	-0.037	0.029	-0.151	0.021	-0.059	-0.124
	(1.186)	(1.131)	(1.134)	(1.183)	(1.093)	(1.028)	(1.018)	(1.034)
Observations	675	675	675	675	675	675	675	675
No of Countries	45	45	45	45	45	45	45	45
VARIABLES	**Part C: 2SLS Estimates**							
	Democracy				**Autocracy**			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
ToG	-1.920**	-1.941**	-1.943***	-1.945***	1.508***	1.508***	1.511***	1.512***
	(0.388)	(0.388)	(0.388)	(0.388)	(0.343)	(0.343)	(0.343)	(0.343)
LnHT_ExpL1	0.777***	0.719***	0.719***	0.719***	0.762***	0.730***	0.730***	0.731***
	(0.027)	(0.052)	(0.052)	(0.052)	(0.024)	(0.046)	(0.046)	(0.046)
LnHT_ExpL2		0.065	0.058	0.057		0.036	0.042	0.041
		(0.050)	(0.066)	(0.066)		(0.043)	(0.058)	(0.058)
LnHT_ExpL3			-0.020	-0.019			-0.018	-0.018
			(0.065)	(0.065)			(0.057)	(0.057)
LnHT_ExpL4			0.030	0.039			0.013	0.032
			(0.048)	(0.065)			(0.042)	(0.057)
Long term effect of ToG	-0.807***	-0.824***	-0.829***	-0.844***	0.529***	0.534***	0.535***	0.535***
	(0.195)	(0.197)	(0.197)	(0.200)	(0.155)	(0.156)	(0.157)	(0.157)
Effect of ToG after 15 years	-0.227*	-0.233*	-0.232*	-0.233*	0.201**	0.201*	-0.202	0.203**
	(0.132)	(0.132)	(0.132)	(0.132)	(0.133)	(0.133)	(0.133)	(0.133)
Constant	4.505	4.478	4.440	4.344	3.924	3.879	3.881	3.893
	(1.148)	(1.133)	(1.126)	(1.121)	(1.133)	(1.123)	(1.122)	(1.134)
Observations	675	675	675	675	675	675	675	675
R-squared		0.770	0.770	0.770	0.824	0.824	0.824	0.824
No of Countries	15							

*, **, and *** in this case indicate that the results are statistically significant at the 10%, 5%, and 1% levels, respectively.

Table 8: Impact of Government Type (ToG) on High-Tech Product Export Log (LnHT_Exp) in the LAC Region

VARIABLES	**Part A: Within Estimates**							
	Democracy				**Autocracy**			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
ToG	-0.830***	-0.825**	-0.847**	-0.880**	0.830***	0.825***	0.847***	0.880***
	(0.153)	(0.152)	(0.152)	(0.157)	(0.153)	(0.152)	(0.152)	(0.157)
LnHT_ExpL1	0.635***	0.541***	0.524***	0.524***	0.635***	0.541***	0.524***	0.524***
	(0.033)	(0.050)	(0.051)	(0.051)	(0.033)	(0.050)	(0.051)	(0.051)
LnHT_ExpL2		0.114**	0.037	0.022		0.114**	0.037	0.022
		(0.046)	(0.058)	(0.058)		(0.046)	(0.058)	(0.058)
LnHT_ExpL3			0.104*	0.100*			0.104*	0.100*
			(0.058)	(0.058)			(0.058)	(0.058)
LnHT_ExpL4			0.001	-0.085			0.001	-0.085
			(0.049)	(0.060)			(0.049)	(0.060)
Long term effect of ToG	-0.264*	-0.301*	-0.356**	-0.409**	0.264*	0.301*	0.356**	0.409**

	(0.157)	(0.157)	(0.161)	(0.171)	(0.157)	(0.157)	(0.161)	(0.171)
Effect of ToG after 15 years	-0.330**	-0.331**	-0.354**	-0.376**	0.330**	0.331**	0.354**	0.376**
	(0.166)	(0.165)	(0.166)	(0.166)	(0.166)	(0.165)	(0.166)	(0.166)
Constant	-1.534	-1.592	-1.657	-1.747	-0.639	-0.737	-0.812	-0.900
	(0.863)	(0.858)	(0.855)	(0.859)	(0.796)	(0.792)	(0.790)	(0.795)
Observations	390	390	390	390	390	390	390	390
R-squared	0.803	0.807	0.809	0.812	0.803	0.807	0.809	0.812
No of Countries	15	15	15	15	15	15	15	15
VARIABLES	**Part B: Arellano and Bond Estimates**							
	Democracy				**Autocracy**			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
ToG	-0.379***	-0.936**	-1.071**	-0.677**	2.546*	1.389**	1.454**	0.658*
	(0.569)	(0.395)	(0.415)	(0.318)	(1.318)	(0.610)	(0.594)	(0.324)
LnHT_ExpL1	0.651***	0.930***	0.712***	0.528***	0.748***	0.309	0.416***	0.596***
	(0.087)	(0.223)	(0.170)	(0.065)	(0.080)	(0.218)	(0.081)	(0.076)
LnHT_ExpL2		-0.244	-0.307	0.035		0.132*	-0.006	-0.044
		(0.232)	(0.266)	(0.088)		(0.074)	(0.107)	(0.097)
LnHT_ExpL3			0.327**	0.127*			0.117*	0.204**
			(0.145)	(0.070)			(0.068)	(0.086)
LnHT_ExpL4			-0.007	-0.091			0.130	-0.075
			(0.055)	(0.061)			(0.086)	(0.058)
Long term effect of ToG	-0.509**	-0.116	-0.725*	0.000	-0.673	-0.018	1.996**	-1.230
	(0.238)	(0.145)	(0.391)	(0.000)	(0.763)	(0.315)	(0.957)	(1.282)
Effect of ToG after 15 years	-1.398*	0.274	-0.087*	0.058	1.259	-0.328	1.290**	0.700
	(0.953)	(0.188)	(0.223)	(0.199)	(1.126)	(0.268)	(0.520)	(0.815)
Constant	28.241	0.000	0.000	0.000	10.301	0.000	0.000	0.000
	(14.543)	(0.000)	(0.000)	(0.000)	(8.571)	(0.000)	(0.000)	(0.000)
Observations	390	390	390	390	390	390	390	390
No of Countries	26	26	26	26	26	26	26	26
VARIABLES	**Part C: 2SLS Estimates**							
	Democracy				**Autocracy**			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
ToG	-0.152*	-0.200*	-0.258	-0.203**	0.152**	0.200**	0.258*	0.203*
	(0.308)	(0.298)	(0.302)	(0.340)	(0.303)	(0.298)	(0.302)	(0.340)
LnHT_ExpL1	0.686***	0.589***	0.571***	0.577***	0.686***	0.589***	0.571***	0.577***
	(0.038)	(0.053)	(0.054)	(0.055)	(0.038)	(0.053)	(0.054)	(0.055)
LnHT_ExpL2		0.113**	0.036	0.026		0.113**	0.036	0.026
		(0.046)	(0.057)	(0.058)		(0.046)	(0.057)	(0.058)
LnHT_ExpL3			0.117**	0.120**			0.117**	0.120**
			(0.057)	(0.058)			(0.057)	(0.058)
LnHT_ExpL4			-0.016	-0.083			-0.016	-0.083
			(0.049)	(0.060)			(0.049)	(0.060)
Long term effect of ToG	-0.075*	-0.126*	-0.183	-0.161	0.075*	0.126*	0.183*	0.161
	(0.176)	(0.171)	(0.177)	(0.203)	(0.173)	(0.171)	(0.177)	(0.203)
Effect of ToG	0.202	-0.212*	0.238	0.244	-0.202	-0.212	0.238*	0.244*

after 15 years								
	(0.173)	(0.169)	(0.169)	(0.171)	(0.171)	(0.169)	(0.169)	(0.171)
Constant	-0.539	-0.678	-0.795	-0.744	-0.260	-0.392	-0.483	-0.458
	(0.931)	(0.905)	(0.901)	(0.932)	(0.798)	(0.791)	(0.785)	(0.798)
Observations	390	390	390	390	390	390	390	390
R-squared		0.792	0.797	0.798	0.787	0.792	0.797	0.798
No of Countries	15							

*, **, and *** in this case indicate that the results are statistically significant at the 10%, 5%, and 1% levels, respectively.

Table 9: Impact of Government Type (ToG) on High-Tech Product Export Log (LnHT_Exp) in the SSA Region

VARIABLES	Part A: Within Estimates							
	Democracy				Autocracy			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ToG	-0.066***	-0.071**	-0.071***	-0.067**	0.014***	0.022***	0.022***	0.021***
	(0.083)	(0.083)	(0.083)	(0.084)	(0.090)	(0.090)	(0.090)	(0.090)
LnHT_ExpL1	0.752***	0.661***	0.661***	0.663***	0.744***	0.656***	0.656***	0.658***
	(0.029)	(0.048)	(0.048)	(0.048)	(0.029)	(0.048)	(0.048)	(0.048)
LnHT_ExpL2		0.111**	0.109*	0.107*		0.108**	0.108*	0.105*
		(0.046)	(0.058)	(0.058)		(0.047)	(0.058)	(0.058)
LnHT_ExpL3			-0.007	-0.008			-0.010	-0.011
			(0.058)	(0.058)			(0.058)	(0.058)
LnHT_ExpL4			0.010	0.004			0.011	0.004
			(0.047)	(0.058)			(0.047)	(0.058)
Long term effect of ToG	-0.152*	-0.171**	-0.172**	-0.169*	0.128**	0.159*	0.161**	0.160*
	(0.086)	(0.086)	(0.086)	(0.087)	(0.101)	(0.101)	(0.102)	(0.103)
Effect of ToG after 15 years	-0.145*	-0.128*	-0.128	-0.125*	0.217**	0.186*	0.186*	0.183*
	(0.087)	(0.087)	(0.087)	(0.087)	(0.105)	(0.105)	(0.105)	(0.106)
Constant	3.463	3.296	3.292	3.278	3.334	3.168	3.165	3.154
	(0.646)	(0.647)	(0.649)	(0.652)	(0.639)	(0.640)	(0.643)	(0.645)
Observations	450	450	450	450	450	450	450	450
R-squared	0.775	0.778	0.778	0.779	0.776	0.778	0.778	0.779
No of Countries	15	15	15	15	15	15	15	15
VARIABLES	Part B: Arellano and Bond Estimates							
	Democracy				Autocracy			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ToG	-0.172***	-0.265**	-0.388**	0.003	0.011**	0.028**	0.107**	0.100*
	(0.110)	(0.125)	(0.148)	(0.085)	(0.130)	(0.000)	(0.384)	(0.138)
LnHT_ExpL1	0.422**	0.181	-0.097	1.039***	0.837***	0.599***	0.388	0.539*
	(0.207)	(0.165)	(0.244)	(0.236)	(0.280)	(0.101)	(0.422)	(0.303)
LnHT_ExpL2		-0.109	0.187***	-0.387		0.197	0.194	0.280
		(0.123)	(0.054)	(0.351)		(0.000)	(0.185)	(0.257)
LnHT_ExpL3			-0.089	0.242			-0.011	0.042
			(0.092)	(0.150)			(0.097)	(0.099)
LnHT_ExpL4			-0.206**	-0.208			-0.074	-0.107

			(0.068)	(0.149)			(0.103)	(0.128)
Long term effect of ToG	-0.284*	-0.499***	-0.722**	-0.064*	0.045**	0.091***	0.144*	-0.038
	(0.167)	(0.181)	(0.226)	(0.076)	(0.092)	(0.000)	(0.255)	(0.285)
Effect of ToG after 15 years	-0.460**	-0.741**	-0.964**	0.005	0.138*	0.153*	0.405*	0.154*
	(0.216)	(0.216)	(0.316)	(0.080)	(0.252)	(0.180)	(0.420)	(0.149)
Constant	18.041	33.493	32.456	0.000	-0.725	2.325	14.711	0.000
	(9.010)	(12.205)	(10.672)	(0.000)	(12.205)	(.)	(26.343)	(0.000)
Observations	450	450	450	450	450	450	450	450
No of Countries	30	30	30	30	30	30	30	30
VARIABLES	**Part C: 2SLS Estimates**							
	Democracy				**Autocracy**			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
ToG	-1.534***	-1.531**	-1.537**	-1.574**	0.140**	0.125**	0.125*	0.147**
	(0.549)	(0.539)	(0.544)	(0.560)	(0.300)	(0.298)	(0.297)	(0.295)
LnHT_ExpL1	0.711***	0.612***	0.608***	0.607***	0.735***	0.651***	0.651***	0.651***
	(0.040)	(0.062)	(0.063)	(0.064)	(0.030)	(0.047)	(0.048)	(0.048)
LnHT_ExpL2		0.124**	0.105	0.103		0.107**	0.110*	0.109*
		(0.059)	(0.073)	(0.074)		(0.046)	(0.056)	(0.056)
LnHT_ExpL3			0.037	0.032			0.006	0.004
			(0.073)	(0.075)			(0.056)	(0.057)
LnHT_ExpL4			-0.010	-0.039			-0.011	-0.028
			(0.059)	(0.073)			(0.046)	(0.056)
Long term effect of ToG	-0.491***	-0.509**	-0.514**	-0.530**	0.141*	0.163**	0.161**	0.171*
	(0.168)	(0.166)	(0.168)	(0.174)	(0.134)	(0.134)	(0.134)	(0.134)
Effect of ToG after 15 years	0.039	0.055	0.058	0.063	0.230**	0.205*	0.205*	0.198*
	(0.133)	(0.131)	(0.132)	(0.134)	(0.115)	(0.115)	(0.115)	(0.115)
Constant	3.231	3.000	2.976	2.945	3.070	2.856	2.865	2.846
	(0.822)	(0.813)	(0.817)	(0.826)	(0.634)	(0.634)	(0.636)	(0.637)
Observations	450	450	450	450	450	450	450	450
R-squared		0.599	0.598	0.590	0.758	0.761	0.761	0.762
No of Countries	15							

*, **, and *** in this case indicate that the results are statistically significant at the 10%, 5%, and 1% levels, respectively.

Conclusion & Recommendations

This study contributes significant empirical evidence to the ongoing debate about how political governance systems affect innovation commercialization, particularly regarding high-tech exports. Our findings, drawn from a comprehensive dataset of 104 countries spanning 2001 to 2015, robustly confirm that autocratic governance structures tend to be more effective in facilitating the export of high-technology goods than democratic systems. This positive effect is particularly pronounced in the Europe and Central Asia (ECA) region, where the long-term contribution of autocracies reaches up to 60%, in stark contrast to democracies that often suffer negative or

negligible effects. The econometric robustness of these results, employing GMM and 2SLS techniques, underscores how policy stability, long-term vision, and centralized decision-making features often associated with autocracies that translate into favorable commercialization environments. Conversely, democracies, though rich in participatory governance and intellectual freedoms, encounter institutional fragmentation, frequent policy shifts, and election-cycle-driven disruptions that compromise their innovation export potential. Policy implications are profound. Democracies must prioritize the depoliticization of innovation policy frameworks and establish independent innovation councils to ensure continuity beyond electoral cycles. Enhancing grassroots R&D ecosystems, strengthening intellectual property rights, and fostering industry-academia partnerships will be essential for bridging this commercialization gap. Despite these contributions, the study acknowledges limitations such as the exclusion of micro-level firm data and the challenges posed by potential regional heterogeneity. Future research should integrate sectoral and firm-level analyses, possibly leveraging micro-panel datasets to dissect sector-specific policy interventions. This study directly aligns with SDG 9 (Industry, Innovation, and Infrastructure) by advocating policies that promote sustainable industrialization through innovation commercialization, and SDG 16 (Peace, Justice, and Strong Institutions) by emphasizing the role of governance stability in economic transformation.

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