Zakariya Journal of Social Sciences (ZJSS)

Volume 3, Number 1, 2024, Pages 1 – 10

Journal Home Page

https://journals.airsd.org/index.php/zjss

Innovation in Organizational and Institutional Structural Equation Modeling, with Moderating Variables

Muhammad Zohaib[1], Muhammad Asad Afzal[2] & Muhammad Ijaz[3]

[1]*MS Business Administration, Institute of Southern Punjab, Multan, Pakistan* ***Email:*** *Muhammadzohaib7481@gmail.com , muhammadzohaib4647@gmail.com*
[2]*Bachelor of Business Administration, NFC Institute of Engineering & Technology, Multan*
Email: asadafzalm@yahoo.com
[3]*BBA, Department of Business Administration, Bahauddin Zakariya University, Multan, Pakistan*
E-mail: ijazhance71@gmail.com

ARTICLE INFO

Article History:

Received:	January	1, 2024
Revised:	January	20,2024
Accepted:	February	5,2024
Available Online:	March	10,2024

Keywords:

Determination, Structural equation modeling, innovation, firm, innovation, moderating variable,

ABSTRACT

Modern organizational theory perspective encourages to do adopt the innovational process in the industry and organization, according to keep in mind the firm/organization's age and size. But still its an intriguing among the policy makers and decision maker authorities. With the help of multiple theories like stakeholder theory, institutional theory, along with conceptualized modeling framework will explain the concept to this innovation in org. and inst. Structural equation modeling. Primary and secondary both data used for this research article, primary data gathering technique was 1-7-point Likert scale questionnaire, there were 350 questionnaires distributed, and received 288 (82%) response rate from the respondents. Additionally, use data analysis and structural equation modeling to verify the theoretical model. Findings: Current research article reveals that org. stakeholder forces and institutional stakeholder forces are having momentous initiations regarding the firm's innovation. Cronbach's alpha (α) is between 0.767 and 0.904 in different variables. Drawbacks: relationship between firm and institutional stakeholders does not based on the monitoring, while it becomes weaker. Conclusions: crux or nutshell of this research article is that the firm should focus on the competitive market to learn more ideas. Also accelerate the technological instruments, increase the PR public relation and social networking with stakeholders. Collect the maximum resources in shape of tangible and intangible, to strengthen the firm and skillful staff help-out to create more inventions. But the state government also contributes positively, wins the confidence of investors, and defends their initiatives and interests. To improve the level of firms and the inventive mindsets of entrepreneurs, the state should be required to improve the regulation of its regulatory framework, the application of laws, and various administrative and economic apparatuses.

Corresponding Author's Email: Muhammadzohaib7481@gmail.com

INTRODUCTION:

Most of the organizations are trying to adopt the innovative and modern system, that can reduce the supervisory role of the staff also reduce the wage burden on the firm expenses. Since industry pollution accounts for 80% of environmental contamination, it can be held primarily responsible for the unfavorable side effects of the firm's economic miracle. It is crucial for organizational enterprises to actively balance their ecological footprint and economic performance in light of the current state of the economy, industrial modernization, and sustainable development. Inventiveness, or the development or use of new institutional arrangements, services, processes, organizational structures, and social structures with less of an adverse effect on the environment, is one potential remedy (OECD, 2009).

Modern invention has drawn more and more scholarly attention from the business community and the majority of organisations, with the most active field being motivation research. Many empirical studies have been conducted in an attempt to explain the incentives behind environmental innovation. These studies range from the early emphasis on environmental regulations (such as taxation, emissions charges and standards, emission trade permits) to the market and technology push (such as retailor requirements, satisfaction with clients, export introductions, and exterior comparable pressure) as well as (Cleff and Rennings, 1999, Popp, 2002/2003, Rehfeld and Rennings, 2007, Frondel et al. 2007, Frondel et al. 2008). More recently, organizational factors—such as corporation strategy, organization structure, resources , and capability—have been studied (Hofmann et al. 2012, Berrone et al. 2013, Cai and Zhou, 2014) and personal factors (consciousness, ethics, and supervisory support) (Chang, 2011, Gadenne et al. 2009, Ramus and Steger, 2000).

Theoretical frameworks that connect innovation, management, and environmental economics include the following: theory of planned behaviour, resource-based perspective (RBV), the theory of institutions, stakeholder theory, and upper echelons theory. There are still certain restrictions even if the research now available offers multi-angle studies into the incentives that underlie invention. First of all, the majority of the literature now in publication examines the direct connection between theoretical proxies and invention. Despite a handful of the research done by Berrone et al. (2013) and Cai and Zhou (2014), very few studies examine the connection effect, balancing effect, and mediation impact among determinants, leaving the underlying mechanism of innovation stimuli unexplained. In addition, the majority of current research makes use of both organizational and institutional theories; yet, little is known about how an individual might enhance proactive environmental responsiveness. Thus, the goal of our research is to investigate the very influential elements in creation within the framework of the largest rising economy—firms. This paper suggests a framework built by integrating theories of institutions, RBV, with upper echelons theory using structural equation modeling. Our study tests our hypothesis using survey data from 288 firms. This exploratory study aims to clarify the many levels and perspectives of invention incentives and support the efforts of regulators and policymakers in promoting creativity.

THEORETICAL FOUNDATION

Institutional and stakeholder influencers:

The most recognizable and alluring ideology in the context of institutions is innovation. In despite of their competence and financial consideration, firms are persuaded to contrive socially valuable environmental performances by institutional philosophy, which clarifies about the organizations and firms that are vulnerable to social influence and seek endorsement and legitimacy (Berrone et al. 2013). This hypothesis explains why businesses, under intense regulatory and normative pressure, participate in environmentally unjustifiable actions at a financial loss. Environmental innovations have been found to be significantly influenced by regulations, both in principle and in practice. According to Porter (1991), well-crafted, strict enforcement and regulation foster innovation, which gives the company a competitive edge and ultimately offsets the cost of compliance. According to Cleff and Rennings (1999), regulation has a major role in determining process innovation related to the environment, and it is possible to identify the effects of so-called "soft" regulation (such as labels and eco-audits) upon product-integrated environmental innovation. According to the stakeholder theory, which emphasizes how organizations engage with the outside world, to maintain the profitability of the business, corporations will respond to stakeholder expectations and interests by their authority, legitimacy, and emergency of appeal. Stakeholders give the company unique key resources and distinct legitimate claims, and they are integrated into the network of neither explicit nor implicit contracts within the company (Lin et al. 2014). This is the reasoning for this. The institutional theory is complemented by the stakeholder theory, which takes competitiveness, consumer happiness, and regulatory compliance into account.

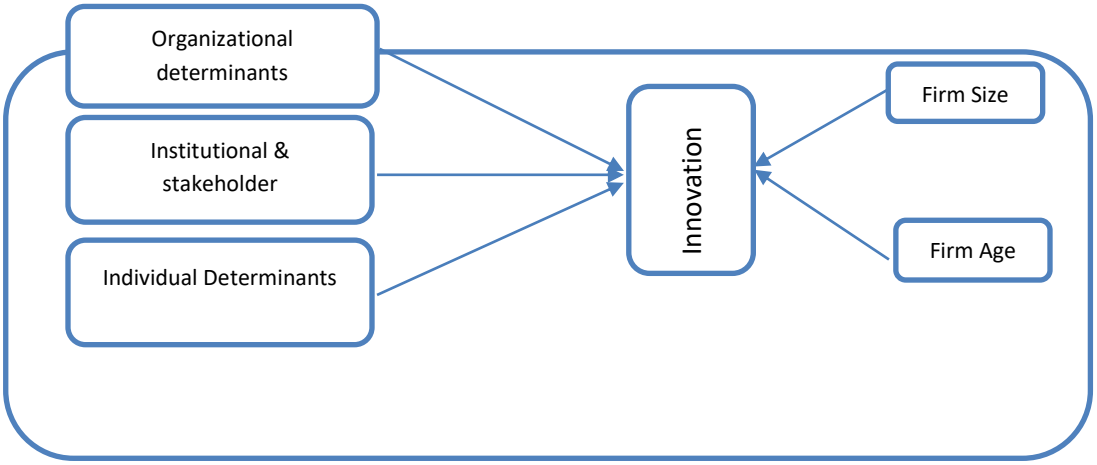
Organizational influencers:

From a business perspective, innovation is crucial in introducing novel ideas that rival those of competitors in the market. The stand of innovation-stimulating books may be divided into three areas based on corporate perspective: resource capability, organizational makeup, and strategic motivation. Dependence on paths has been found as a key indicator of strategic purpose, albeit with contradictory empirical evidence. Environmental improvement and technological capability are intertwined because new technology frequently leads to increased productivity, improved quality, lower costs, technological innovation, and improved environmental conditions; on the other hand, advanced technology is required for clean production (Hofmann et al., 2012). In particular, researchers have discovered a strong correlation between technological capability proxy, or R&D activity, and innovation in eco-products or eco-processes (Horbach 2008/2012). In terms of organizational structure, network strength—which benefits from performance improvements—value chain optimization, cost containment, risk mitigation, growth, and innovation efficiency—as well as the exchange of knowledge and expertise, the elimination of uncertainty, and the identification of opportunities—all help businesses innovate (Hofmann et al. 2012). Additionally, studies have shown that firms' environmental innovation is significantly impacted by their external R&D networks with retailers, universities, and research institutes (De Marchi, 2012).

The RBV approach highlights the means silhouette, which argues that a firm has a greater competitive advantage over its peers if it possesses a valuable, scarce resource that cannot be replicated at any point. According to Lin et al. (2014), resources are thought to be the primary factor determining invention. Since organizational slack and asset specificity are necessary for firm environmental innovation, we follow Berrone et al. (2013) and utilize them as proxies for firm resource profiles. Despite the absence of flexibility and switching capacity, asset specificity

guarantees that a corporation may carry out certain important activities, like invention, with long-lasting, specialized resources. Another aspect of the resource profile is organizational slack, which gives the company a resource cushion to allow for more flexibility in strategic decision-making and a quicker and more efficient response to external shocks. This also holds for invention: companies with enough of resources would acquire the raw materials and intellectual property needed to introduce environmentally friendly processes and products, while companies with few resources would simply take care of their most urgent demands (Berrone et al.2013).

We have developed the following logical framework for this study based on our thorough literature review (Figure 1).



Detail of the further Independent Variables that what's are include in these variables are as given below in-depth feature.

Individual Determinants:

1. Attitude
2. Commitment
3. Awareness.

Institutional & stakeholder determinants:

1. Competitor
2. Supplier
3. Regulation
4. Consumers

Organizational Determinants:

organizational slack

1. Network
2. Technology
3. Assets Specialty

We can postulate the hypothetical assumptions, which are as follows, that can represent the

HYPOTHESES DEVELOPMENT

H1: The performance of inventions is positively impacted by institutional and stakeholder pressure.

H2: Performance in the invention is positively impacted by organizational characteristics.

H3: Institutional and stakeholder drivers' effects on invention are mediated by organizational drivers.

H4: The association among institutional/stakeholder impacts and inventiveness is positively modulated by supervisory assistance.

H5: The relationship between organizational drivers and inventiveness is positively modulated by supervisory support.

DATA AND METHODOLOGY

The information is based on a Pakistani questionnaire study. Project managers in high-tech industries including gadgets information technology, biotechnology, advanced production, and new material/power are the target demographic since these companies are more likely to embrace environmental practices because of their strategic needs and the nature of their industry. The questionnaire survey was administered by email or in person. An aggregate of 350 survey forms were sent out, and 298 of them—or 85%—were returned. 288 (82%) of the questionnaires that were still valid after incomplete questionnaires were subtracted. The four variables that make up the hidden component of institutional and stakeholder determinants—regulation, supplier, consumers, and competition—were paraphrased from Lin's (2014) research. The development of the four organizational drivers and four inventive performance items was done under Berrone (2013) and Cai and Zhou (2014). A seven-point Likert scale was used, with 1 denoting "strongly disagree" and 7 denoting "strongly agree." We created three elements that provided the presenter leadership team by conducting in-depth interviews with the chosen firm's project managers. A 7-point Likert scale, with 1 denoting the least and 7 the most, was used. Additionally, as control variables, firm age and size of the company (the log of firm total assets) were added.

Test of reliability and validity

Cronbach's alpha (α) was used to examine the reliability and determine whether or not the items could consistently and accurately represent latent variables. Factor loading was used to assess the constructs' convergent validity. Table 3-1 demonstrates that Cronbach's α is more than Nunnally's (1978) proposed value of 0.7, falling between 0.767 and 0.904. For one-order CFA, all factor loadings were more than 0.5, indicating acceptable convergent validity (Hair 2006).

Table. 1 *Test of reliability and validity*

Construct	Measurement variables	Factor loading	Cronbach A
Institutional/ stakeholder drivers(ISD)	National regulation formulated in the industry	0.776	0.844
	Supplier could offer eco-friendly materials and products	0.814	
	Customer has environmental demand	0.798	
	The competition is intense within the industry	0.704	
Organizational drivers (OD)	Past R&D experience/certain technology advantage	0.647	0.767
	Formal or informal network	0.644	
	Possessing of specialized equipment or other fixed assets	0.773	
	Sufficient working capital	0.788	
Individual drivers (ID)	Executive environmental awareness	0.816	0.879
	Executive resource deploy commitment	0.875	
	Executive attitude toward eco-innovation	0.760	
Eco-innovation Performance (EP)	Environmental patent applications position among peers	0.853	0.904
	After-tax returns among peers	0.845	
	Reductions of energy compared with peer firms	0.793	
	Waste reduction ratio compares with peer firms	0.775	

Results

Descriptive statistics

The many elements, such as 1-variable means, 2-standard deviations, and 3-correlations, are shown in table 1. Bivariate correlations show that there is a weaker relationship between our expected moderators—individual driving in institutional/shareholder drivers and organizational drivers—and that there is a strong correlation among institutional/shareholder drivers and organizational drivers, as well as between organizational drivers and eco-performance. This validates the suitability of our conceptual model set.

Table. 2 *Descriptive Statistics*

Variable	Mean	SD	ISD	OD	ID	EP
ISD	5.127	0.841	1			
OD	5.091	0.938	.498**	1		
ID	5.212	1.060	.462**	.413**	1	
EP	4.978	0.984	.430**	.481**	.571**	1

*significant at 10% level; **significant at 5% level; ***significant at 1% level

Test for main effect and mediation effect

First, we assess H1 and H2 using OLS regressions; the results are shown in Table 2's second and third columns.

Table. 3 *OLS Regression Results*

Variable	Eco-performance			OD
	Model 1	Model 2	Model 3	Model 4
Size	0.256*	0.238*	0.290*	0.312*
Age	-0.147*	-0.053*	-0.049*	-0.135*
ISD	0.503***		0.299***	0.546***
OD		0.505***	0.373***	
R2	0.185	0.231	0.281	0.240
Adjusted R2	0.182	0.229	0.276	0.234
F	64.826***	86.077***	55.701***	90.183***

*significant at 10% level; **significant at 5% level; ***significant at 1% level

With a significance level of 1%, the noteworthy coefficients of 0.503 and 0.505 demonstrate that institutional/stakeholder and organizational proxies are both distinct drivers of the invention. To determine whether organizational influences operate as a mediator, we must run two more regressions under the logic of Baron and Kenny (1986). We regress eco-performance on institutional/stakeholder and organizational proxies in model 3, alongside the institutional/stakeholder factor in model 4, which has a significant association (coefficient of 0.546 at 1% significance level) in the case of the organizational driver. The presence of an organizational motive in the third model has caused the institutional/stakeholder coefficient of 0.503 on invention performance to decline to 0.299, confirming the idea that organizational drive acts as a mediator. Additionally, we use AMOS 17.0 to evaluate the fit between the partial mediator model and the absolute mediation model to determine whether it constitutes an ultimate mediation or a partial mediation (Table 3). Combining the further meaningful ISD indicator in Model 3 in Table 4 with the model's fitting indices, which show that the partially and absolute mediation models outmatch the direct effect model, leads us to the conclusion that the organizational driver functions as a partial mediator in Model 3.

Table.3 *Model Fittings of Partial, Absolute Mediation Model and Direct Effect Model*

Model	X2/DF	GFI	AGFI	RMSEA
Partial mediation	2.049	0.949	0.917	0.060
Direct effect	4.996	0.895	0.838	0.118
Absolute effect	2.226	0.945	0.913	0.065

Furthermore, we investigate the modulating influence of individual drivers using hierarchical regressions. All interaction items were mean-centered to remove multi-collinearity. A moderator

individual effect representation and an institutional/stakeholder proxy are included in Model 5 of Table 4, and an additional interaction between an individual impact proxy and an institutional/stakeholder proxy is introduced in Model 6. We may infer that the juxtaposition of Models 5 and 6 that there is no moderating effect and that the addition of a term of interaction among ISD and ID could not increase the model's explanatory power (the coefficient is 0.009, which can be disregarded). This demonstrates that the connection involving institutional/stakeholder force and creativity cannot be strengthened by supervisory support, which is why H4 has been rejected. We examine the interaction impact between supervisory support and organisational driver by following the same procedures as in Models 5 and 6. H5 has been discarded because, in contrast to what we anticipated, the term for interaction has a marginally significant negative impact on innovation performance.

Table. 4 *Hierarchical Regression Results*

Variable	Eco-performance			
	Model5	Model 6	Model 7	Model8
size	0.145*	0.223*	0.178*	0.256*
age	-0.064	-0.070*	-0.067*	-0.093*
ISD	0.247***	0.248***		
OD			0.414***	0.279***
ID	0.439***	0.439***	0.310***	0.308***
ID*ISD		0.009		
ID*OD				-0.136*
R2	0.361	0.361	0.398	0.412
Adjusted R2	0.356	0.354	0.394	0.409
F	80.378***	53.417**	94.257**	97.832**

*significant at 10% level; **significant at 5% level; ***significant at 1% level

CONCLUSION

An innovation is always an ideological thought that members of governing and deciding authorities consider. To investigate the factors that drive invention performance, this study integrates the reasoning of upper echelons theory, stakeholder theory, and institutional theory into a conceptualized model. We test the theoretical model using Structural Equation Modelling analysis on questionnaire data from 288 enterprises, and we come to several conclusions: institutional/stakeholder force and organizational force are important triggers in enterprise invention, with the former having an indirect effect and the latter having a direct effect. The link among institutional/stakeholder force and company invention is not strengthened by supervisory

assistance; rather, it is weakened by the relationship between organizational driver and invention. The findings indicate several recommendations that are relevant to those engaged in enterprise creativity. In addition to being heavily influenced by outside factors like stakeholder pressure and regulations, organizational capacity and resources play a critical role in the acceptance of invention in business. Businesses should get ready to accept the shift to an eco-economy by considering its technological prowess, scientific or social media connections, resource base, and asset uniqueness. It is important to fully utilize the enabling role that supervisory support plays in enterprise creation. Our empirical conclusion shows that the relationship between organizational driver and inventiveness is either negatively modulated or has no influence at all from the supervisory support proxy.

This unexpected outcome is not unusual in organizational enterprise, since many business owners do not receive fair punishment for environmental sabotage or are not assessed by so-called "green audits." Their unwillingness to engage in environmental practices stems from a lack of incentive for creativity. Instead, they would use organizational leeway to optimize the value of the company. Three areas require the utmost attention from policymakers and regulators: (1) optimize regulatory settings relevant to micro-level sustainability, such as marketization of pollution permit design; (2) enforce regulations more strictly, which is likely to result in higher environmental default costs; and (3) combine the regulatory penalty and economic stimulation currently in place with possible informal regulation (e.g., environmental NGOs, voluntary environmental disclosure, management acknowledgment or prize). This suggests combining different strategies to encourage enterprise invention.

REFERENCES:

Alexander, N., and Doherty, A. M. (2010). “International retail research: focus, methodology and conceptual development”, International Journal of Retail and Distribution Management , 38 (11/12), pp.228-242.

Bansal, P. From Issues to Actions: The Importance of Individual Concerns and Organizational Values in Responding to Natural Environmental Issues, Organization Sciences, 2003, 14(5):510527

Baron, R. M., Kenny, D. A. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations, Journal of personality and social psychology, 1986, 51(6): 1173-1986

Berrone P., Fosfuri A, Gelabert L, Gomez-Mejia L R. Necessity as the mother of ‘green’ inventions: institutional pressures and environmental innovations, Strategic Management Journal, 2013: 34:891-909

Cai Wugan and Zhou Xiaoliang. On the drivers of invention: empirical evidence from Firms, Journal of Cleaner Production, 2014, 1-10

Chandon, P., Morwitz, V. G., and Reinartz, W. J. (2003). The Self-Generated Validity of Measured Purchase Intentions. Journal of Marketing , 1-40.

Chang CH. The influence of corporate environmental ethics on competitive advantage: the mediation role of green innovation, Journal of Business Ethics, 2011, 104(3): 361-370

Cleff T, Rennings K. Determinants of environmental product and process innovation, European Environment, 1999, 9:191-201

David, Gadenne; Jessica, Kennedy and Catherine, McKeiver. An Empirical Study of Environmental Awareness and Practices in Smes, Journal of Business Ethics, 2009, 84(1), 45-63

De Marchi V. Environmental innovation and R&D cooperation: Empirical evidence from Spanish manufacturing firms, Research Policy, 2012, 41(3): 614-623

Frondel, M., Horbach, J., and Rennings, K.. End-of-pipe or cleaner production? An empirical comparison of environmental innovation decisions across OECD countries, Business Strategy and the Environment, 2007, 16: 571-584

Frondel,M. Horbach, J. Rennings, K. What triggers environmental management and innovation? Empirical evidence for Germany, Economics, 2008, 66(1): 153-160

Hair J. F., Black B., Babin B., Anderson R. E., Tatham, R.L. Multivariate data analysis sixth ed. Pearson Prentice Hall, Upper Saddle River, New Jersey, 2006

Hofmann K. H., Theyel G., and Wood C. H., Identifying firm capabilities as drivers of environmental management and sustainability practices-evidence from small and medium-sized manufactures, Business strategy and environment, 2012, 21: 530-545

Horbach J. Determinants of environmental innovation: New evidence from German panel data sources, Research Policy, 2008, 37:163-173

Horbach, J., Rammer C., Rennings K. Determinants of inventions by type of environmental impact — The role of regulatory push/pull, technology push and market pull, Ecological Economics, 2012, 78: 112-122

Lin H. et al. Can political capital drive corporate green innovation? Lesson from Firms, Journal of cleaner production, 2014, 64: 63-72

Nunnally, J. C. Psychometric Theory. New York, NY: McGraw-Hill, 1978

Organization for Economic Co-operation and Development (OECD). Sustainable manufacturing and invention: framework, practices, and measurement. Synthesis Report. OECD, Paris, 2009

Popp D. C. Induced innovation and energy prices, American Economic Review, 2002, 92:160180

Popp D C. Pollution control innovations and the clean air act of 1990. Journal of Policy Analysis and Management, 2003, 22(4):641-660

Porter, M.E. American's green strategy, Scientific American, 1991, 264(4): 168-176

Rehfeld M M, Rennings K, Ziegler A. Integrated product policy and environmental product innovations: An empirical analysis. Ecological Economics, 2007, 61:91-100

Ramus, C. A., Steger, U. The roles of supervisory support behaviors and environmental policy in employee "eco-initiatives" at leading-edge European companies. Academy of Management Journal, 2000, 43(4), 605-626