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ORIGINAL RESEARCH PAPER

Management

THE IMPACT OF INNOVATION AS A MODERATING VARIABLE IN CONNECTION BETWEEN ORGANIZATIONAL LEARNING AND PERFORMANCE

KEY WORDS: Organizational learning, Organizational Performance, Organizational Innovation, India.

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ABSTRACT

This study investigates the relevance of innovation as a bridge between Organizational Learning and Performance. Effective organizational learning isn't easy. Thousands of learning programs are held annually, but most fail. This study explores the moderating influence with age, gender, and industry turmoil as controls. The data were exclusively collected from 344 respondents at the Rourkela Steel Plant in Odisha, India. Variance-Based Structural Equation Modelling was used to test hypotheses. Organizational learning (OL) positively impacts Organizational Performance (OP), according to the findings. Statically, Organizational Learning also affects Organizational Innovation (OI). It has been found that Organizational Innovation have a favorable impact on OP and to serve as a mediator between the two. Increasing organizational learning and concentrating on its capabilities can boost organizational innovation and performance. Innovation enhances organizational learning, as found in numerous earlier studies. Organization age, organization size and industry turbulence do not modify these relationships but it can vary to different industries across the globe.

INTRODUCTION

Today, we can say that constructing a learning environment and growing human resources' competency and aptitude are crucial for creating an organization where each member is on the lookout for knowledge regarding change (Alsabbagh & Khalil, 2017). To establish a dynamic and global economy, organizational innovation is a key output and source of generating additional value for businesses (Ganter & Hecker, 2014). Innovation is a key competitive advantage for companies. As long as people have sought better ways to complete daily activities, innovation has been a part of life. Since the pandemic began last year, people have had to adjust to a new normal. Never has "nothing lasts but change" been truer. Businesses have had to come up with imaginative methods to stay viable amid recent turmoil and turbulence.

Managers should focus on establishing core capabilities and learning (Tamayo-Torres, Gutiérrez-Gutiérrez, Llorens-Montes, & Martnez-López, 2016).

It's been considered that organizational learning and innovation (OL) are crucial to competitive advantage and success (Hung & Chou, 2013). All dynamic firms consider organizational learning and innovation as crucial. Complex interplays between OL, innovation, and business adaptability have been missed.

Because of this, there aren't enough studies on how learning as well as innovation influence managerial unbiased governing in dynamic situations. It's unclear how these mechanisms lead to competitive advantages. When it comes to defining the resources and expertise that companies require to ensure fundamental competencies and procedures that allow compatibility, OL and innovation are essential variables. To learn and evolve, firms must be able to handle OI. Organizations must use OL breakthroughs to gain a competitive advantage by using hard-to-replicate strategies (Soomro, Mangi, & Shah, 2020).

Theoretical Background And Hypotheses

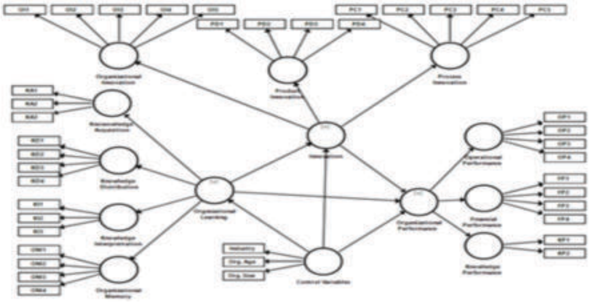
Literature shows that businesses in the West and other nations can gain from entrepreneurship, openness, innovation, and intrinsic motivation (Chaubey & Sahoo, 2019; Garca-Morales, Llorens-Montes, & Verd-Jover, 2006). Few studies were identified in developing nations, especially India. As per our best of knowledge, this type of mediation was not examined in steel industries in Indian context. OI, OL, and performance of organizations are rarely examined in this context (Waheed, Miao, et al 2019). In order for a company to be successful, it must have a creative atmosphere (Ashraf and Khan, 2013). The choice of OI and OL implies dynamic capacities to respond changing surroundings (Eisenhardt & Martin, 2000).

This research explored innovation's role in mediating organizational learning and performance. Organizational learning is a predictor of performance and creativity. To our knowledge, no such study has been conducted in India's steel industry. The majority of publications in the review reflect research in industrialized countries, with few tackling emerging or developing economies. In Asia, especially India, there is a shortage of empirical study on employee creativity and organizational learning. This study is a modest attempt to fill in certain research gaps.

H1: OL positively influences the organizational performance
H2: OL has positive effect on Organizational Innovation
H3: Innovation has positive effect on organizational performance
H4: Innovation mediates relationship between Organizational learning and performance.

Theoretical Framework

On the basis of these hypotheses, we built a theoretical framework showing a link between organizational learning and performance, wherein innovation mediates this relationship.



Data And Methodology

The study is restricted to the steel industry i.e.; Rourkela Steel Plant (RSP), Steel Authority of India Limited. In this paper top executives, middle management and supervisors are studied. The sample includes Asst. Managers, Managers, Dy. Managers, and Senior Managers. This study included supervisors from each department since they share equal operational responsibility. Their authority and responsi bilities add to the study's uniformity. 344 executives, managers, and supervisors were sampled.

The Smart-PLS 3.2.9 software (Ringle, Wende and Becker, 2015) was used to evaluate our theoretical model (Fig.1), which used variance-based SEM with partial least squares (Henseler, Ringle, and Sarstedt, 2015; Rigdon, Sarstedt, and Ringle, 2017). Recently, structural equation modelling using partial least squares (PLS-SEM) has made inroads into a wide range of disciplines, including marketing, accounting, and human resource management, to name a few. For numerous reasons, authors have chosen PSL-SEM. The PLS-SEM approach is particularly well suited to cases with a complicated underlying model. It is the purpose of confirmatory research to gather empirical data on the operational mechanism in order to better understand the causal link between theoretical constructs of interest and their theoretical counterparts. By testing measurement models and focusing on the explanation of a specific construct in a structural model, confirmatory and explanatory research is frequently coupled. PLS-SEM is an effective method for assessing mediation effects (Cepeda-Carri'on et al., 2017), especially when more complex models are being built (Nitzl et al., 2016). In significance testing, the bootstrapping method using 5,000 samples, the percentile technique, and a one-tailed test are used. The evaluation of the outcomes begins with the measuring models and then moves on to the structural model (Hair et al., 2019).

Control Variables

Previous studies suggested that organization-specific variables (organization size, organizations age, Industry type) and the demographic variables of the respondents affect organization performance. Therefore, these variables were used as control variables. However, multicollinearity issue (>5) was noticed between the variables of each group and control variable also failed to achieve acceptable values of Cronbach's Alpha, Composite Reliability, and AVE even after removing multicollinearity. Hence, the control variable was excluded from the established model.

Empirical Results

Data analysis was conducted using a two-phase partial least squares structural equation Modeling (PLS-SEM) approach. In the first phase, construct validity and reliability were examined for the measuring model, while the structural model and the study hypotheses were tested by implication in the second phase.

Reliability Estimation

Table III displays descriptive statistics and reliability coefficients for the 38 valid items of the 11 constructs. All Cronbach's Alpha values exceeded the required threshold (0.7), indicating that the eleven constructs in the scale had adequate reliability for the study of steel plants in India.

Table 2: Descriptive statistics and Cronbach's Alpha

5.1. Validity Estimation

To evaluate convergent and discriminant validity, a loadings and cross-loadings matrix was constructed. The discriminant validity of a measure is determined by comparing the loading of an item with its associated factor (i.e., construct) to its cross-loadings.

All remaining items in the analysis demonstrated greater loadings with their associated factors than with their cross-loadings (Table 2). All rho A values are greater than 0.70;

Table 1 Matrix Of Loadings And Cross-loadings

	FP	KA	KD	KI	KP	OI	OM	OP	PI
FP2	0.747	0.328	0.501	0.341	0.274	0.322	0.349	0.324	0.405
FP3	0.884	0.314	0.841	0.235	0.277	0.373	0.317	0.293	0.428
FP4	0.864	0.262	0.857	0.171	0.263	0.3	0.288	0.311	0.378
KA1	0.257	0.908	0.32	0.217	0.261	0.243	0.3	0.391	0.239
KA2	0.366	0.925	0.426	0.312	0.288	0.336	0.288	0.465	0.36
KA3	0.373	0.947	0.452	0.276	0.28	0.316	0.305	0.495	0.362
KD1	0.426	0.494	0.692	0.244	0.301	0.2	0.338	0.442	0.35
KD2	0.744	0.262	0.857	0.171	0.263	0.3	0.288	0.311	0.378
KD3	0.672	0.309	0.814	0.244	0.317	0.388	0.32	0.302	0.436
KD4	0.724	0.314	0.841	0.235	0.277	0.373	0.317	0.293	0.428
KI1	0.234	0.293	0.24	0.899	0.373	0.258	0.346	0.442	0.332
KI2	0.284	0.207	0.257	0.889	0.426	0.318	0.335	0.372	0.375
KI3	0.279	0.277	0.255	0.891	0.354	0.318	0.342	0.359	0.327
KP1	0.329	0.265	0.368	0.386	0.95	0.54	0.606	0.593	0.573
KP2	0.285	0.301	0.316	0.428	0.941	0.521	0.568	0.525	0.541
OI1	0.34	0.24	0.346	0.322	0.58	0.926	0.469	0.541	0.668
OI2	0.408	0.333	0.395	0.345	0.485	0.939	0.432	0.537	0.632
OI3	0.364	0.332	0.357	0.262	0.5	0.925	0.46	0.508	0.584
OM1	0.32	0.334	0.34	0.338	0.61	0.467	0.912	0.564	0.545
OM2	0.356	0.298	0.371	0.387	0.555	0.391	0.904	0.528	0.452
OM3	0.365	0.281	0.374	0.311	0.523	0.451	0.899	0.564	0.5
OM4	0.338	0.248	0.346	0.345	0.559	0.456	0.903	0.534	0.505
OP1	0.334	0.481	0.374	0.426	0.485	0.496	0.47	0.906	0.488
OP2	0.347	0.496	0.404	0.349	0.481	0.46	0.452	0.908	0.486
OP3	0.332	0.382	0.357	0.39	0.554	0.51	0.595	0.888	0.54
OP4	0.224	0.263	0.283	0.308	0.486	0.459	0.541	0.645	0.541
PD1	0.471	0.362	0.475	0.277	0.329	0.381	0.348	0.371	0.727
PD2	0.509	0.315	0.486	0.253	0.316	0.355	0.329	0.373	0.708
PD3	0.297	0.222	0.323	0.336	0.591	0.621	0.521	0.548	0.822
PD4	0.272	0.209	0.295	0.311	0.53	0.666	0.475	0.534	0.811

composite reliability (CR) are greater than 0.80; and average variance extracted (AVE) values are greater than 0.50, indicating that the research constructs converge. The results of estimating the CR and AVE values show that the items and constructs have an efficient internal consistency. In addition, the formative factors for multicollinearity were assessed using the variance inflation factors (VIFs) calculation for the formative construct's items. Since the VIFs of the indicators were less than 5, the formative indicators have sufficient construct validity.

Item	Mean	SD	Number of items	Cronbach's Alpha
KA1	3.817	1.468	3	0.917
KA2	3.837	1.363		
KA3	3.782	1.419		
KD1	3.637	1.416	4	0.814
KD2	3.578	1.414		
KD3	3.779	1.24		
KD4	3.727	1.306		
KI1	3.872	1.172	3	0.873
KI2	3.852	1.212		
KI3	3.927	1.165		
OM1	3.741	1.234	4	0.926
OM2	3.776	1.273		
OM3	3.797	1.203		
OM4	3.831	1.246		
OI1	3.799	1.293	5	0.922
OI2	3.823	1.308		
OI3	3.782	1.415		
OI4	3.852	1.382		
OI5	3.759	1.479		
PD1	3.945	1.283	4	0.881
PD2	3.86	1.43		
PD3	3.797	1.278		
PD4	3.826	1.355		
OP1	3.875	1.28	4	0.858
OP2	3.878	1.356		
OP3	3.919	1.196		
OP4	3.913	1.214		
FP2	3.77	1.358	3	0.777
FP3	3.727	1.306		
FP4	3.578	1.414		
KP1	4.003	1.254	2	0.882
KP2	3.936	1.247		

Table3 AVE and Convergent Validity Assessment

	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Product Innovation	0.788	0.851	0.59
Organizational Performance_	0.869	0.889	0.477a
Organizational Memory_	0.926	0.948	0.819
Organizational Learning	0.887	0.903	0.401b
Organizational Innovation	0.922	0.95	0.865
Operational Performance	0.876	0.907	0.712
Knowledge Performance	0.885	0.944	0.894
Knowledge Interpretation	0.874	0.922	0.797
Knowledge Distribution	0.813	0.879	0.646
Knowledge Acquisition	0.922	0.948	0.858
Innovation	0.892	0.909	0.593
Financial Performance	0.78	0.872	0.695

a, b: AVE values for OP and OL <0.5, but they are acceptable because the composite reliability is higher than 0.6 (Fornell & Larcker, 1981).

To determine construct validity in this study, Fornell and Larcker (1981) method was used. According to Fornell and Larcker, discriminant validity is established "if the square root of AVE for each construct is higher than its correlation coefficient with all other constructs" (Henseler, Ringle, and Sarstedt, 2015). Table 4 shows the correlations between the latent constructs in the study as off-diagonal values.

The diagonal values of AVEs are also represented by their square values. Discriminant validity exists between the research constructs, as Fornell and Larcker (1981) shown.

Table 4Fornell–Larcker Criterion

	FP	INNOVA	KA	KD	KI	KP	OP	OI	OL	OM	OP	PI
FP												
INNOVA	0.602											
KA	0.426	0.416										
KD	0.57	0.391	0.5									
KI	0.364	0.35	0.32	0.33								
KP	0.393	0.307	0.33	0.23	0.49							
OP	0.453	0.344	0.44	0.25	0.41	0.69						
OI	0.471	0.36	0.35	0.25	0.37	0.62	0.645					
OL	0.523	0.339	0.47	0.28	0.34	0.59	0.592	0.604				
OM	0.45	0.329	0.35	0.25	0.42	0.59	0.589	0.528	0.85			
OP	0.566	0.358	0.46	0.24	0.37	0.48	0.597	0.527	0.76	0.763		
PI	0.55	0.378	0.42	0.25	0.47	0.57	0.574	0.578	0.77	0.643	0.87	

6.Evaluating the Structural Model

For evaluating the structural model, values of R-squared, beta coefficients, as well as their direction were used to estimate the relationship between the dependent and independent constructs (Ringle, Sarstedt, Mitchell, 2018). The structural model was evaluated with SmartPLS 3 software. With the default parameters of the software, a path weighting scheme was run with a maximum of 500 iterations and a stop criterion of (1 × 10-7) with a maximum of 500 iterations.

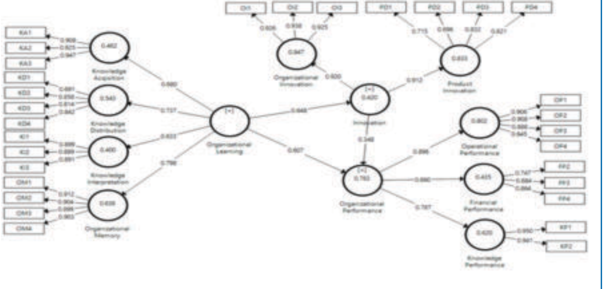


Fig.1:Theoretical model and results

The bootstrapping process was performed on 5000 subsamples with no sign changes. Other options for running the technique included one-tailed significance levels, as well as bias-corrected and expedited bootstrap.

In addition to the p-value, bias-corrected confidence intervals are becoming common in research for confirming significance and accepting or rejecting any hypothesis (Hair, Hult, and Ringle, 2016). The details of all the hypotheses are shown in Table-5, and the results were verified using both bias-corrected confidence intervals and t values

Table5 Results of Hypotheses

	Beta	SE	T Statistics (|O/STDEV|)	Bias Corrected Confidence Interval		Decision
				2.50%	97.50%	
H1: Organizational Learning -> Organizational Performance_	0.61	0.043	14.098	0.519	0.69	Supported

H2: Organizational Learning -> Innovation	0.65	0.041	15.904	0.555	0.717	Supported
H3:Innovation -> Organizational Performance_	0.35	0.045	7.803	0.264	0.441	Supported
	Beta	SE	T stistics (|O/STDEV|)	Bias Corrected Confidence Interval		
				2.50%	97.50%	
H4: Organizational Learning -> Innovation -> Organizational Performance	0.23	0.03	7.443	0.166	0.283	Supported

Table 5 depicts hypotheses testing results. H1: OL positively influences the organizational performance is supported because t-stats>1.96 and the corresponding bias corrected confidence interval does not contain zero. The beta coefficient is (= 0.61) and carries a positive sign. H2: OL has positive effect on Organizational Innovation is also supported because t-stats>1.96 and the corresponding bias corrected confidence interval does not include zero. The beta coeffic ient of the path: Organizational Learning -> Innovation also carries a positive sign and stands at (= 0.65). Similarly, Innovation is also noticed to have a significant and a positive effect on organizational performance because its coefficient carries a positive sign (=0.35) and corresponding t-stats>1.96 and the bias corrected confidence interval does not contain zero.

The mediation effect of innovation between organizational learning and organizational performance is also supported by t-statistics greater than 1.96 and the absence of zero in the bias-corrected confidence range. H4: Innovation mediates the relationship between organizational learning and performance is not rejected.

6. Research limitation/implications:

Only data from the Rourkela Steel Plant, India, were analyzed in this study. Therefore, the findings of the study can be generalized by conducting a cross - sectional study, longitudinal, and empirical intervention-based investigation. For improved performance, we can check the mediating effect of other constructs on organizational learning. It'd reveal new insights and study themes. This research will help find learning enablers by enhancing their work and applying what they've learnt. Innovation gives companies a competitive advantage. Emphasizing on the boundless potential of human resource, the study will be of great use to the Indian steel sector.

7. CONCLUSIONS

This study was conducted with the aim to explore a mediating part of innovation linking organizational learning with performance. It examines at how learning in the workplace affects outcomes like productivity and creativity. Results confirm that innovation mediates between organization leaning and organization performance indicating that by enhancing organizational learning and focusing on its capabilities, it is possible to strengthen organizational innovation and thus improve organizational performance. Innovation stimulates Organizational Learning; where this finding corroborates with the one produced in many previous research works. Indian steel industries should encourage their staff to seek out new information by requiring them to attend conferences and exhibitions often, enhancing their R&D, and fostering internal innovation and experimentation. Firms should maintain the knowledge they develop by updating databases and making it easy for others to access them through multiple networks.

Appendix:

Dimension/Item
Literature Source
Knowledge acquisition
Huber (1991),
Lopezet al. (2005),
Jiménez-Jiménez and Sanz-Valle (2011)

KA1: Employees are encouraged to join official or informal networks including people from outside the organization.
Ka2: Continuous experimentation with new ideas and approaches to work performance is a constant occurr ence.
KA3: Supporting organizational systems and procedures Innovation

Knowledge distribution

KD1: The organization has institutional procedures to share best practices across departments.
KD2: There are personnel responsible for internal collection, compilation, and distribution of employee suggestions.
KD3: People in the organization participate in many teams or divisions and act as linkages.
Kd4: Periodic meetings update staff on firm innovations.

Knowledge interpretation

KI1: Everyone in the organization is devoted to the same goal.
KI2: The organization establishes internal rotation programs to assist the transfer of staff from one department or function to another.
KI3: The Company gives various learning opportunities (visits to other departments, internal training programs, etc.) to make employees aware of other people's or departments' duties.

Organizational memory

OM1: The company stores its expertise and experience in databases for eventual use.
OM2: The company maintains up-to-date client databases.
OM3: The organization's database and papers are accessible through some network (Lotus Notes, intranet, etc.).
OM4: The databases are continually updated.

Description/Item
Literature Source
Organizational Innovation
Weerawardena, J. (2003)

OI1: Proposals for new ideas are always accepted at the company.
OI2. Management is always on the lookout for new ideas.
OI3. Innovation is perceived as too risky and is resisted
OI4. Program/Project managers promote and support innovative ideas, experimentation and creative process

Product Innovation
Schumpeter(1934);
Knowles (2007); Rogers (1998);
Wang and Ahmed(2004)
PD1. We constantly emphasize development of particular and patent products.
PD2. Our organization has introduced more new products and services in the last five years than our competitors.

PD3. We are able to respond swiftly to changing market conditions and produce new items.
PD4. Customers typically find our new products and services to be highly innovative.

Process Innovation
Schumpeter (1934);
Wang and Ahmed (2004)

PC1. Our company's efforts to find new markets for its goods and services are never-ending.
PC2. Customer comments and complaints are handled promptly and with the utmost attention by our staff.
PC3. As far as new market entry, pricing, and distribution techniques are concerned, our company outperforms the competition.
Pc4. As a company, we are always looking for ways to improve our management practices (e.g., new employee reward/training programs and new departments or project teams).