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Knowledge Sharing and Innovation Performance: A Case Study of Aluminum Bahrain.

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Abstract: This study investigates the relationship between knowledge sharing and innovation performance at the company Aluminum Bahrain B.S.C. ("Alba"). A cross-sectional quantitative survey was conducted. The sample consisted of 477 employees (15% of Alba's total workforce). A self-administered questionnaire based on existing measures was adopted. The response rate was 23.9%. Partial least squares structural equation modeling was used as a statistical technique to test the proposed hypotheses. The collected data were analyzed using the SPSS and Smart PLS software. The findings reveal that knowledge sharing has a significant effect on innovation performance. The study presents important implications for further advancing and strengthening the relationship between knowledge sharing and innovation performance.

Keywords: knowledge sharing, innovation performance.

1 Introduction

Today's globally competitive market requires businesses to employ a variety of methods to compete, succeed, and grow their market share and performance. One of these methods is product and service innovation, which results in long-term performance benefits (Visnjic et al., 2016) and increased market share. However, not necessarily greater return on total assets, which implies, investing in innovative activities takes time to yield positive results in terms of profitability, though it may aid in gaining customer loyalty (Canh et al., 2019). Although short-term financial advantages are created when service innovation is separated from product innovation, loss of long-term knowledge and market performance may also occur. As a result, manufacturers may need to focus on one of the two areas (i.e., either service or product innovation) in order to optimize short-term profitability. Deploying service and product innovation independently tends to result in increased performance the next year; however, deploying them jointly

appears to result in a decline in performance the following year, since combined deployment may result in an initial increase in coordination costs (Visnjic et al., 2016).

To achieve long-term success and a sustainable competitive advantage, organizations should emphasize proper knowledge management in their core culture (Singh, 2018). Product, service, and manufacturing development as well as knowledge management and knowledge sharing are all important components of success (Gao & Nee, n.d.). Knowledge management is substantially connected to innovative capabilities (Lam et al., 2021), and knowledge sharing is itself a critical aspect of knowledge management (Ologbo et al., 2015). Knowledge sharing is the process through which experience, skills, and information are transformed into activities, such as innovation (Castaneda & Cuellar, 2020). Knowledge sharing helps firms enhance their ability to innovate (Tassabehji et al., 2019). As such, it is a vital component of strengthening employees' abilities to innovate, which are in turn part of a company's overall innovation capabilities (Ologbo et al., 2015).

2 Literature Review

2.1 Knowledge Sharing

Knowledge sharing has been identified as a critical component of generating sustainable long-term performance—and, as a result, competitive advantage—and thus has attracted the attention of scholars and practitioners (Ahmed et al., 2016). Knowledge-sharing behavior can be measured by the epistemological aspect of knowledge sharing: explicit and tacit information sharing (Oliveira et al., 2015). Explicit knowledge refers to knowledge that can be written down and shared, whereas tacit knowledge is learned through experience and is passed down from person to person through oral tradition. Tacit and explicit knowledge sharing both promote a strong approach to the business knowledge process (Oyemomi et al., 2016). Another way to measure knowledge sharing involves an individual's involvement in knowledge-sharing behavior, which is measured through conduct and participation (Oliveira et al., 2015). Knowledge sharing between organizations comprises two processes: knowledge donation and knowledge collection (Akram et al., 2018; Nodari et al., 2016). Cavaliere et al. (2015) suggest three enablers of knowledge sharing: individual, organizational, and technological. Individual enablers which drive employees to share knowledge about their job-related expertise (Ologbo et al., 2015). Employees are more likely to donate their knowledge if they can simultaneously collect knowledge within their organization (Akram et al., 2018), which then leads to the development of knowledge-sharing intention (Serenko&Bontis, 2016). At Cavaliere et al. (2015) second type of knowledge-sharing enabler (i.e., organizational), Lam et al., 2021; Nham et al., 2020 noted that, as business unit boundaries are reduced and organization members' openness increases, knowledge-sharing activities among employees become more successful. Supportive leadership style can be considered an enabler of employees' empowerment (Nham et al., 2020). Teamwork, employee empowerment, and trust all have a positive effect on knowledge donation and collection (Ahmed et al., 2016). Therefore, managers should focus on encouraging employees to participate in knowledge donation and collection activities (Akram et al., 2018; Nham et al., 2020; Nodari et al., 2016); foster a positive knowledge-sharing culture in which all employees believe they are making a beneficial contribution to the common good, rather than expecting reciprocal rewards as a result of sharing their knowledge (Serenko&Bontis, 2016); consider as many employees' ideas as possible (Nham et al., 2020); and reward employees for sharing all information that they obtain from internal and external resources (Singh, 2018).

2.2 Innovation Performance

The literature shows that organizational innovation can be divided into product and service innovation, process innovation (Canh et al., 2019), and marketing innovation (Rajapathirana& Hui, 2018). Process innovation refers to changes made to the methods with which a business produces and provides its goods and services (Canh et al., 2019). The quality of these processes affects new product development. The innovation process is usually complex and is divided into different stages: innovation strategy (as a preparatory step), product definition, product concept, validation, production, and market launch and commercialization (Dziallas& Blind, 2019). The result is product and service innovation. (Chung & Tan, 2017) identify three distinct product innovation stages in the Chinese context. The first, called Yin, refers to the initial stages of product innovation development, which focus primarily on applying existing knowledge and technology at production. The second stage of product innovation development, called Tiao, focuses on adopting new knowledge and skills gained to improve innovation. The final stage, Chuang, refers to the stage of product innovation. The process by which an organization reconfigures its resources and capabilities to innovate is defined by its innovation capabilities (Aryanto et al., 2015). Employee innovation capability is the ability of employees to generate and implement new ideas that contribute to the improvement of the overall organization's innovation capabilities (Cavaliere et al., 2015). Ologbo et al. (2015) state that a firm's overall innovation capabilities are the total sum of its employees' individual innovation capabilities, such that higher levels of individual innovation will lead to higher levels of organizational innovation (Nham et al., 2020). Consequently, strategic human resources management practices have a positive impact on a firm's innovation capability, which in turn has a positive impact on innovation performance (Aryanto et al., 2015). Dziallas and Blind (2019) categorized innovation indicators into two dimensions: company-specific and contextual. The company-specific dimension includes the company structure, which defines, controls, and coordinates norms, hierarchies, and responsibilities, and the organization's open innovation culture, wherein supportive and participative leaders inspire mutual trust, cooperation, and learning, which in turn boost knowledge donation efficiency (Cavaliere et al., 2015) and lead to greater firm innovation potential (Lam et al., 2021). Another dimension is the company network, which includes the collaborations with external stakeholders that are important for a company's innovation capability (Cavaliere et al., 2015). The enhancement of a buyer–supplier relationship is associated with improvements in innovation orientation, which in turn promotes the sharing of tacit and explicit knowledge among trade partners and improves the performance of learning alliances (Yang et al., 2016).

2.3 Knowledge Sharing and Innovation Performance

Knowledge sharing has the potential to significantly influence corporate performance and is thus critical for innovation (Oyemomi et al., 2016). Innovation is contingent upon knowledge sharing, which results in the invention of new services, products, business models, processes, and organizational structures. Organizations that encourage knowledge exchange improve their ability to innovate (Castaneda & Cuellar, 2020).Akram et al. (2018) illustrate that donating and collecting knowledge both have positive and significant impacts on employees' innovative work behaviors. In particular, knowledge donation has been found to have a direct positive effect on product innovation (Nham et al., 2020). Moreover, it assists in the development of knowledge collection, which indirectly impacts overall organizational performance (Nodari et al., 2016). One feature of innovation is the establishment of beneficial processes, which may be

accomplished through knowledge sharing (Castaneda & Cuellar, 2020). When implementing new ideas or processes, a knowledge-sharing culture is necessary in order to disseminate knowledge throughout the organization. It is critical to connect all employees and foster synergy, as each employee's individual innovation capability plays a critical mediating role in enhancing the impact of knowledge sharing on product, process, and management innovation capability (Nham et al., 2020). Ologbo et al. (2015) addressed the way to enhance an organization's overall innovation capacity, in which knowledge sharing should be introduced into the workplace, as it can enhance employees' creativity. Participating in the knowledge-sharing process enables employees to generate new product and service development ideas.

The research framework, which was constructed based on this conceptual viewpoint, is presented in Figure

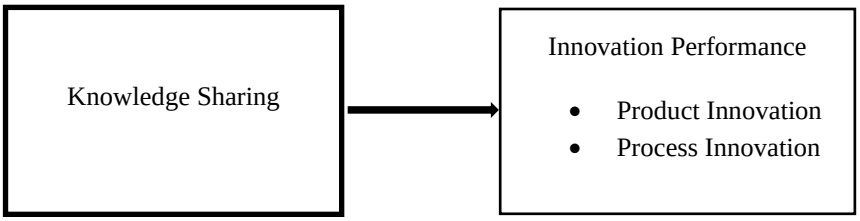

Figure 1. Research Framework

3 Research Hypotheses

Based on the above literature review, we hypothesize that knowledge sharing has a significant effect on three dimensions of innovation: performance, product, and process innovation. To examine this overarching hypothesis, the following three hypotheses are proposed:

H1: Knowledge sharing has a significant effect on innovation performance.

H2: Knowledge sharing has a significant effect on product innovation.

H3: Knowledge sharing has a significant effect on process innovation.

4 Research Methodology

We adopted a quantitative approach in this study, namely a cross-sectional survey. This design was well suited for observing the natural setting of the studied phenomenon and for testing our several research hypotheses. The hypotheses of the study were tested using the company Aluminium Bahrain B.S.C. ("Alba") as a case study. Alba is a smelting firm that produces high-grade materials used in the automotive, aviation, and other precision engineering sectors (Alba, 2019). There were 3,181 total members of our target population (i.e., workers at Alba). Probability sampling was used to examine the entire company as a case study. 477 workers (15% of Alba's total workforce) were included in the sample. Data were collected from the sample using a self-administered questionnaire adapted from existing measures.

The questionnaire was divided into three sections. The first section collected respondents' basic demographic information (gender, age, education level, and tenure at Alba). The second section, which measured knowledge sharing, was developed based on De Vries, Hooff and Ridder, (2006). Knowledge sharing was broken down into two components: knowledge donation, in which individuals contribute new

knowledge, and knowledge collection, in which individuals acquire new knowledge. The final section of the questionnaire measured innovation performance and was adapted from Prajogo and Ahmed, (2006); Prajogo and McDermott, (2011). This section was developed to track two measures of innovation performance: product and process innovation.

In total, 114 of the completed surveys were deemed usable, representing a response rate of 23.9%. Partial least squares structural equation modeling with Structural Equation Model (SEM) was utilized as a statistical analysis approach to test the hypotheses and evaluate the overarching hypothesis. The data collected were evaluated using the Microsoft Excel, SPSS, and SmartPLS software.

5 Findings and Discussions

5.1 Respondents' Demographic Profiles

We analyzed the surveys of 114 individuals. Male respondents accounted for 84.2% of the total, with female respondents accounting for the remaining 15.8%. With regard to respondents' ages, 47.4% of respondents were between the ages of 36 and 40 years, 15.5% were between the ages of 26 and 30, 12.3% were between the ages of 31 and 35, 12.3% were between the ages of 41 and 45, 10.5% were over the age of 45, and 1.8% were above 45. In terms of educational attainment, 75% of respondents held a bachelor's degree, 14% held a master's degree, and 10.5% held secondary and certificate degrees. In terms of employment duration at Alba, 28.1% of respondents had a tenure of less than six years, 28.1% between six and 10 years, 28.1% more than 15 years, and 15.8% between 11 and 15 years.

5.2 Outlier Analysis

Outlier analysis was conducted to identify very low or very high values within respondents' answers. Table 1 shows the maximum and minimum values for each item in the study. The standardized (Z) scores of all items fell within the acceptable range of ± 4.0 (Hair et al., 2010; Tabachnick&Fidell, 2007).

Table 1: Univariate Outliers Based on Standardized Values

Construct	Item	Standardized Value (Z-Score)	
		Lower Bound	Upper Bound
Knowledge Share	KS1	-2.54627	1.70165
	KS2	-3.24819	1.43907
	KS3	-2.70679	1.50104
	KS4	-2.17841	1.43817
	KS5	-.78934	1.25577
	KS6	-2.44498	1.32161
Innovation Performance	IP1	-3.16714	.90490
	IP2	-3.30151	.84965
	IP3	-3.07689	.84959
	IP4	-2.79118	1.02716
	IP5	-3.57621	.85518
	IP6	-2.80498	.85648

5.3 Assessment of Data Normality

Data normality was assessed for all items in the studyin terms of skewness and kurtosis. The results show that the skewness and kurtosis values all fell within the ranges of ± 2 and ± 7, respectively. These results are within the acceptable range, as shown in Table 2, which implies that data set containing all items follows the normal distribution.

Table 2: Model of Assessment of Normality

Construct		Skewness		Kurtosis	
	Items	Statistic	Std. Error	Statistic	Std. Error
Knowledge Share	KS1	.001	.226	-.415	.449
	KS2	-.894	.226	2.562	.449
	KS3	-.494	.226	.484	.449
	KS4	-.381	.226	-.286	.449
	KS5	.475	.226	-1.807	.449
	KS6	.149	.226	-.599	.449
Innovation Performance	IP1	-1.161	.226	1.621	.449
	IP2	-1.310	.226	2.169	.449
	IP3	-1.179	.226	1.285	.449
	IP4	-.802	.226	.338	.449
	IP5	-1.101	.226	1.415	.449
	IP6	-.997	.226	.341	.449

5.4 Validity and Reliability

To examine the questionnaire's convenient prediction, the goodness has been assessed by validity and reliability analysis. Because the measurement model is reflective, construct validity was assessed in terms of convergent validity using average variance extract (AVE), factor loadings was used to assess the reliability. As shown in Table 3, the values of the factor loadings for the two variables are greater than the cutoff value of 0.6 (Hair et al., 2010).

Table 3: Convergent Validity and Reliability for Knowledge Sharing

	Construct	Item	Factor Loading	Average Variance Extracted (AVE)a	Composite Reliability (CR)[b]	InternalReliability Cronbach Alpha[c]
Knowledge Sharing	Knowledge Donating	KS1	0.792	0.767	0.908	0.847
		KS2	0.924			
		KS3	0.906			
	Knowledge Collection	KS4	0.609	0.601	0.815	0.673
		KS5	0.767			
		KS6	0.916			
Innovation	Product	IP1	0.975	0.966	0.988	0.982
		IP2	0.992			

Performance	Innovation	IP3	0.981			
	Process	IP4	0.924	0.879	0.956	0.931
	Innovation	IP5	0.949			
		IP6	0.941			

a: AVE= ∑ λi 2/ n

b: CR = (∑ķ) 2 / [(∑ķ) 2 + (∑ l- ķ2)]

c: Denotes item discarded due to insufficient factor loading (< 0.6)

Discriminant validity was analyzed and verified using the Fornell–Larcker and cross-loading criteria. The discriminant validity results are shown in Table 4. For the Fornell–Larcker criterion, correlations between factors should be greater than 0.85. As shown in Table 4, the Fornell–Larcker criterion results ranged from 0.125 to 0.811, which is below the cutoff value. Similarly, regarding the cross-loading criterion, values are recommended to be greater than the other variables involved in the structural model (Hair et al., 2014). The results of the cross-loadings criterion ranged from 0.775 to 0.983. These findings reflect the questionnaire's high level of discriminant validity.

Table 4. Discriminant Validity of Constructs

Constructs	Knowledge	Knowledge	Process	Product
Knowledge Donation	**0.876**	0	0	0
Knowledge Collection	0.1851	**0.775**	0	0
Process Innovation	0.1373	0.161	**0.938**	0
Product Innovation	0.246	0.125	0.811	**0.983**

5.5 Hypotheses Testing

Based on the research framework, the direct effects between studied variables were analyzed using SEM and are presented in Table 5. Table 5 illustrates the values of path coefficients, standard errors, *t*-statistics, and *p*-values for knowledge sharing as a predictor of innovation performance and its two constructs. The *t*-statistic and *p*-value for knowledge sharing as a predictor of innovation performance were 29.18 and 0.000, respectively. This means that the probability of obtaining a *t*-statistic with an absolute value as large as 29.18 is 0.000. These results support the first hypothesis. Regarding the second and third hypotheses, the *t*-statistic was 29.01 for both, with *p*-values of 0.000. These findings support the second and third hypotheses, which link knowledge sharing with the two constructs (product innovation and process innovation) of innovation performance.

Table 5: Hypotheses Testing

Hypothesis	Path Shape	Path Coefficient	Standard Error	T-value	P-value	Hypothesis Result

H1	Sharing→Innovation Performance	0.2316	0.0079	29.18	0.000	Supported
H2	Sharing→Product Innovation	0.2232	0.0077	29.01	0.000	Supported
H3	Sharing→ Process Innovation	0.2248	0.0077	29.01	0.000	Supported

*p< 0.05, **p< 0.01, ***p< 0.001

6 Conclusion

The purpose of this study was to assess the impact of knowledge sharing on Alba's innovative performance. Data were gathered from the company's employees, ultimately obtaining 114 usable questionnaires. Excel, SPSS, and SmartPLS were used to evaluate and analyze the obtained data. Our research found that knowledge sharing has a substantial impact on Alba's innovation performance. This study's findings are in line with those of previous research (Akram et al., 2018; Nham et al., 2020; Nodari et al., 2016; Ologbo et al., 2015; Oyemomi et al., 2016).

This study has significant implications for strengthening and extending the link between the variables studied (i.e., knowledge sharing and innovation performance). These implications can be utilized to promote and regulate both major modes of knowledge sharing: knowledge donation and knowledge collection. This strategy may be bolstered by including rewards for workers and similar incentives into other administrative functions, such as performance reviews and employee promotions. Additionally, creating a corporate culture of learning may motivate employees to seek out additional opportunities for knowledge sharing in which they may acquire and contribute information

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