IMPACT OF TRANSFORMATIONAL LEADERSHIP ON SUSTAINABLE DEVELOPMENT OF NEPALESE HYDROPOWER INDUSTRY

IMPACTO DA LIDERANÇA TRANSFORMACIONAL NO DESENVOLVIMENTO SUSTENTÁVEL DA INDÚSTRIA HIDRELÉTRICA NEPALESA

IMPACTO DEL LIDERAZGO TRANSFORMACIONAL EN EL DESARROLLO SOSTENIBLE DE LA INDUSTRIA HIDROELÉCTRICA NEPALESA

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ABSTRACT

This investigation explores the connection between transformational leadership and sustainable growth in Nepalese hydropower companies. Utilizing a quantitative approach, data were collected from 200 employees across various Nepali hydropower businesses. The findings indicate a positive correlation between sustainable development practices and transformational leadership in these enterprises. Moreover, the research identifies corporate culture as a crucial mediating factor in this association. The study highlights that the impact of transformational leadership on sustainable development practices is more pronounced in the presence of a robust organizational culture. Conclusively, the research underscores that Nepalese hydropower companies can enhance their sustainable development methods by fostering an environment conducive to transformational leadership. This study represents a significant contribution to the field, emphasizing the pivotal role of organizational culture in amplifying the influence of transformational leadership on sustainable development practices within Nepalese hydropower enterprises.

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Keywords: Organizational Culture. Transformational Leadership. Sustainable Development. Nepalese Hydropower Companies.

RESUMO
Esta investigação explora a relação entre a liderança transformacional e o crescimento sustentável em empresas hidrelétricas nepalesas. Utilizando uma abordagem quantitativa, foram coletados dados de 200 funcionários de diversas empresas hidrelétricas do Nepal. Os resultados indicam uma correlação positiva entre práticas de desenvolvimento sustentável e liderança transformacional nessas organizações. Além disso, a pesquisa identifica a cultura organizacional como um fator mediador crucial nessa relação. O estudo destaca que o impacto da liderança transformacional sobre as práticas de desenvolvimento sustentável é mais pronunciado na presença de uma cultura organizacional robusta. Em conclusão, a pesquisa ressalta que as empresas hidrelétricas nepalesas podem aprimorar seus métodos de desenvolvimento sustentável ao promover um ambiente favorável à liderança transformacional. Este estudo representa uma contribuição significativa para a área, enfatizando o papel fundamental da cultura organizacional na amplificação da influência da liderança transformacional sobre as práticas de desenvolvimento sustentável nas empresas hidrelétricas do Nepal.

Palavras-chave: Cultura Organizacional. Liderança Transformacional. Desenvolvimento Sustentável. Empresas Hidrelétricas Nepalesas.

RESUMEN
Esta investigación explora la relación entre el liderazgo transformacional y el crecimiento sostenible en las empresas hidroeléctricas nepalesas. Utilizando un enfoque cuantitativo, se recopilaron datos de 200 empleados de diversas empresas hidroeléctricas de Nepal. Los resultados indican una correlación positiva entre las prácticas de desarrollo sostenible y el liderazgo transformacional en estas organizaciones. Además, la investigación identifica la cultura organizacional como un factor mediador crucial en esta relación. El estudio destaca que el impacto del liderazgo transformacional en las prácticas de desarrollo sostenible es más pronunciado en presencia de una cultura organizacional sólida. En conclusión, la investigación subraya que las empresas hidroeléctricas nepalesas pueden mejorar sus métodos de desarrollo sostenible fomentando un entorno propicio para el liderazgo transformacional. Este estudio representa una contribución significativa al campo, destacando el papel fundamental de la cultura organizacional en la amplificación de la influencia del liderazgo transformacional sobre las prácticas de desarrollo sostenible en las empresas hidroeléctricas de Nepal.

Palabras clave: Cultura Organizacional. Liderazgo Transformacional. Desarrollo Sostenible. Empresas Hidroeléctricas Nepalesas.

1 INTRODUCTION

Since 1990, Nepal has established several mini hydropower projects (micro schemes), the majority of which have capacities under 100 kW. Moreover, it built a few medium-sized hydroelectric plants, several of which are now being planned or built. Only one large-scale project, the 144 MW Kaligandaki, has been completed so far, and several others, including the Upper Tamakoshi, are still under construction (456 MW). Large-scale plans are not yet in place, but serious conversations are underway. Academic institutions, training facilities, and growing numbers of international universities all contribute to the pool of trained human resources. The NEA already has a substantial pool of 10,000 employees working in the industry.

Multi-criteria analysis is particularly intriguing because there are varied viewpoints on the use of hydropower and existing programs in Nepal. As said to a limited extent 1.0, we are depicting different hydropower sizes according to nine alternate points of view: specialized, social, ecological, monetary, monetary, venture, engineer's, political, and risk. Talking, medium hydropower is the most reasonable scale; however, the latest thing focuses on an inclination for enormous scope projects soon. On an inclination request premise, pretty much nothing and miniature size plans precede medium and enormous scope methodologies, however the other way around.

Little plans are effectively acknowledged according to a social viewpoint, while enormous frameworks are not. This minuscule generator miniature plans just proposition a humble level of power inclusion. Due to the current social limit and the sizeable amount of force commitment expected to cover bigger than that from miniature plans, little hydro projects have all the earmarks of being a promising speculation. Medium-scale projects appear to be the most suited given increased power generation and improved coverage capabilities, and similar trends are currently being seen for large projects as well. The major purpose of these projects is to export electricity to neighboring nations; as a result, they do not contribute to the country's overall electrification coverage.

Large activities check out from a monetary viewpoint while considering the prompt energy expected to help the public economy as well as the fundamental as well as optional financial prizes and assets available. Big projects might be desired in the long run, although they are now least preferred due to energy export and their minimal economic impact on the country. Small- and medium-sized hydropower is appealing and preferred in turn. Because of their relatively high costs and modest power output, microsystems have a limited impact.

Sedimentation, floods, environmental change, avalanches, and waterway progression are a portion of the ecological issues in the Nepalese setting from a natural point of view.

From an environmental standpoint, Nepal seems to be the greatest place for modest hydro projects. Micro schemes rank second best. Medium plans are recommended, but only when further environmental precautions are taken. Large plants are the least preferred in the current situation, even though larger plans are less preferred.

Politics, including government interest in plans, programs, strategies, and goals, currently appears to be quite ambitious, and the government is searching for a speedy solution to the energy problems. The development of decentralized energy for access is still encouraged by the government, although major projects like Upper Tamakoshi (656 MW), Budhigandaki (600 MW), and Nausyalgad have lately drawn attention. So, given the current need for energy and following government guidelines, large-scale plans are preferable to medium-scale power plants. Even if the government wants to implement big plans, they won't take precedence until later. Micro and small-scale energy solutions are undoubtedly not the best way to address urgent energy needs, but legislative support for micro-energy access plans for remote areas is preferred over tiny plans.

Because of political disturbances before, financial backers were hesitant to face critical gambling challenges from an effective money management viewpoint. However, due to declining costs for electro-mechanical hardware, earlier certainty, and the new improvement in the political environment, engineers' inclinations are slowly moving towards medium and huge-scope projects. In any case, most engineers are worried about time or cost overwhelms, which keeps their advantage in small and medium-sized projects. Gigantic forthright expenses, an extended incubation time, and vulnerabilities deflect designers from undertaking aggressive and far-reaching plans. Because of various impediments joined with an absence of information, Nepalese engineers are most intrigued by unobtrusive and medium-sized plans. While massive systems are beyond their consideration, developers are not interested in micro schemes. If the right financial engineering is developed, the country's financial resources might cover a sizable funding requirement. Big-scale plans seem least likely to succeed given the resources at hand and the willingness of finance partners. Big initiatives are now ranked lowest because they cannot be implemented with in-country financing and a half. Even though there is support for awards and appropriations, miniature plans are not interesting to private financial backers.

A crucial viewpoint is country preparedness. A key component of water assets, which also include agriculture, ranger services, the tourist sector, and other assets, is the hydropower industry. To guarantee legitimate advantages from water assets and hydropower, broad arrangement and examination are required. Support foundation is additionally significant for the development of the hydropower business. However, large

projects would likely demand electricity send-out agreements with India as requirements, and the country isn't prepared to check. Yet, major plans via careful organizing may be taken into consideration. The nation is in an ideal situation to acquire little and medium-sized projects, trailed by micro-projects. By its actual nature, hydropower is loaded with risk and vulnerability. Timetable and cost invades are incredibly normal, and they commonly deteriorate as tasks get greater. The most uninclined plan will be hugely trailed by enormous size, one can find while considering all dangers that are pertinent to the Nepalese hydropower business. The most reasonable arrangement seems, by all accounts, to be for the development of little hydropower, and medium hydropower will be tantamount. Miniature plans are similarly less perilous, even though they fall behind medium and small as far as hazard power and issues gathering cash from oppressed regions.

Hydropower companies play a significant role in Nepal in promoting sustainable development and supplying the country with clean energy. To be socially, environmentally, and commercially sustainable, these enterprises must, nevertheless, overcome several challenges. In response to these challenges, transformational leadership has gained increased significance in promoting sustainable growth and improving organizational performance. Transformational leaders are those who inspire and motivate others, foster innovation and creativity, and support a culture of ongoing learning and development. By implementing transformational leadership techniques, hydropower companies in Nepal may improve employee satisfaction and retention, encourage a more sustainable work environment, and bolster their reputation. A few studies have found that value-based leadership does not improve performance as much as transformational leadership [1]. Another research [2] found that, in addition to having a significant influence on individual performance, transformational leadership style also has a significant impact on organizational performance. The current review's goal is to more thoroughly assess the actual impact of transformational leadership training on the organizational performance of the Nepali hydropower sector.

Ensuring the success of the company's personnel is the primary goal of human resources. People collaborate across the organization to accomplish both individual and group goals. Governmental and commercial organizations both need to be organized to steer employees toward the desired outcome. The organization functions as anticipated. It ensures that the organization can employ its staff to accomplish its goals through general human resource management. People inside the organization collaborate to attain both personal and organizational goals. Private and public organizations collaborate to relocate personnel within the organization to achieve the goal. The accomplishment of the organization's performance

goals is proof that these objectives have been reached. A leader's strategic role in an organization has an impact on some of its performance. Government-run public service organizations cannot operate effectively without a dependable leader who can assist them in achieving their vision, mission, and organizational goals [3]. Biomass has shown to be more dependable in Nepal's present energy mix due to a lack of viable alternatives.

This empirical study aims to examine how transformational leadership in Nepalese hydropower firms affects organizational performance and sustainable development. The review will take a gander at the connections between transformational leadership, sustainable development, and organizational execution utilizing both quantitative and subjective exploration techniques. The findings of this study will offer Nepalese and other developing countries' hydropower companies helpful information on how to improve their organizational performance and sustainability practices. The review will likewise add to the assemblage of information on sustainable development and organizational execution by giving observational information on the impacts of transformational leadership on Nepalese hydropower endeavors.

2 LITERATURE REVIEW

Many experts have examined and categorized leadership. According to the definition given by Robbins and Coulter in 2017, leadership is the process of influencing a group to accomplish its objectives. So do pioneers behave? Pioneers with a strong capacity to comprehend people on a deeper level may effectively impact employees' creativity via mindfulness, self-administration, social mindfulness, and connection across the board [4]. Leadership styles are the predictable social attributes that pioneers show [5]. Pioneers as often as possible keep in touch and cooperate, adapt to different characters, and thus lay out an establishment for exploring both value-based and transformational leadership styles [6]. An extraordinary pioneer rouses devotees to blow away what is generally anticipated of them [7]. The cycle through which pioneers and adherents team up to arrive at more significant levels of motivation and ethical quality was illustrated by Consumes in 1978. Transformational pioneers are people who can influence their supporters' conduct in a manner that advances elite execution [8]. [7] Exhibited that magnetic impact, individualized concern, persuasive inspiration, and scholarly feeling are the essential parts of transformational leadership.

Pioneers motivate supporters to view them as good examples by utilizing romanticized leverage [9]. It can likewise be utilized to depict those in, influential places who can propel devotees to remember them as good examples [10]. In this situation, the pioneer imparts regard and confidence in his supporters by passing a reasonable feeling of objective on to

them [11]. Have your devotees perform far more than what is generally anticipated so they will be roused to perform far and away superior [12]. Admired impact pioneers have constancy and determination in pursuing their targets, maintain moral guidelines and beliefs, care more about others than themselves, work to address the issues of their devotees, and offer their victories with them [13].

By giving each follower personalized attention, the leader considers them as people rather than merely cogs in the machine [14]. This involves instructing and mentoring them, assisting in the development of their abilities, and paying close attention to what they have to say. Individualized consideration entails leaders paying close attention to followers' needs, recognizing excellence, and attempting to connect personal objectives with organizational ones. The leader encourages his people to think creatively and emphasizes the value of first grasping a situation rationally [11] via intellectual stimulation. The purpose of intellectual stimulation is to encourage people to solve problems in innovative, unique ways [15]. It refers to the ability of the leader to assist followers in making their judgments and reconsidering conventional wisdom in fresh ways [16].

By motivating others, a leader encourages those under him or her to put the greater good ahead of personal interests, encouraging them to overcome challenges and generate hope for the future. Inspirational motivation is the potential of the leader to boost the followers' capacity to perform above and beyond their expectations [17]. A motivating inspirational leader challenges their people to perform at a high level by sharing a compelling vision for the future [18].

Academics differ on whether the idea of organizational effectiveness just refers to the accomplishment of planned organizational goals or also includes the achievement of desired organizational goals as shown by financial performance [19]. The behaviors and actions that each individual should exhibit, such as being punctual, completing assignments, and abiding by the organization's rules, are referred to as organizational performance [20]. Organizational performance is a complicated subject that may be explained in many different ways. It may be quantified in monetary terms, for instance, by market share and earnings. It is also commonly discussed in terms of effectiveness, efficiency, and the quality of the resulting goods and services. As a result, performance may be utilized as a trustworthy measure of how things are being done. It represents an important signal that might have an impact on outcomes in the future. This suggests that organizational performance is a measure of how well a company accomplishes its goals and objectives. The performance of a company is influenced by policies, methods, the physical environment, quality, innovation, employee satisfaction, and customer satisfaction. Organizational performance in the public sector refers

to how well operational and management duties match the organization's goal. Thus, leaders are valued as significant contributors to organizational success in the public sector. So, leaders should display behaviors that aid in the accomplishment of the objectives of their organizations. In the absence of unbiased data, it is difficult to measure organizational performance as a concept, but it may be deduced from workers' evaluations of the company's effectiveness, efficiency, job satisfaction, turnover, and loyalty.

In Nepalese hydropower firms, transformational leadership and sustainable development go hand in hand. By motivating and enabling followers to realize a common goal, transformational leadership can contribute to the development of a sustainable organizational culture.

In the context of Nepalese hydropower firms, several studies have looked at the connection between transformational leadership and sustainable development. In Nepalese hydropower firms, for instance, transformational leadership has a beneficial influence on sustainable practices, according to a study by [21]. The study also discovered that these businesses' financial performance is positively impacted by sustainability policies.

In a similar vein, a study by [22] discovered that transformational leadership significantly enhances sustainable development in Nepalese hydropower organizations. The research found that transformational leaders are more likely to promote a sustainability culture inside their organizations and adopt sustainable practices.

Another study by [23] looked at the influence of transformative leadership on long-term growth in the hydropower sector of Nepal. According to the study, transformational leadership has a favorable impact on sustainable development strategies like environmental management, stakeholder involvement, and social responsibility.

Several studies have emphasized the significance of leadership in advancing environmentally friendly practices in the hydropower sector. In the Nepali hydropower business, for instance, According to a 2019 research by Karki et al [24], transformational leadership has a positive effect on employee engagement and sustainable practices. According to a separate research by Koirala et al [25], transformational leadership was shown to be favorably connected with the performance of sustainability in the Nepalese hydropower industry. It has been demonstrated that encouraging employees' pro-environmental behavior explicitly through individual consideration. According to a Kim et al [26] study, employees' eco-friendly behavior in the Korean construction business is positively impacted by individual consideration. Similar findings were made by Jahanzeb and Fatima [27] in their study, which discovered that employees' environmental responsibility was positively impacted by individual consideration in the Pakistani textile sector.

Individual consideration may advance sustainable practices in the Nepali hydropower sector by boosting employee engagement and motivation, empowering staff to own sustainability objectives, and promoting a culture of sustainability. To advance sustainable development practices in their enterprises, executives in the hydropower industry must place a high priority on individual attention.

In research, Karim et al [28] looked at the impact of intellectual stimulation on organizational performance and sustainable development practices in the Bangladeshi ready-made garments (RMG) business (2020). According to the study's findings, intellectual stimulation has a favorable impact on environmental management procedures, which enhances environmental performance across industries. Also, the study discovered that intellectual stimulation enhances organizational learning, which in turn enhances organizational effectiveness.

Similar to this, a 2019 study by Islam et al [29] investigated how environmental management strategies in the Bangladeshi textile sector relate to intellectual stimulation. According to the study, intellectual stimulation significantly improves environmental management strategies, resulting in better environmental performance. The authors contend that stimulating the mind is essential for developing a culture of invention and constant improvement, which enhances environmental effects.

The effects of intellectual stimulation on organizational learning and knowledge management in the Nigerian oil and gas industry were examined in another study by Badiru et al [30]. According to the study, intellectual stimulation improves organizational performance by having a favorable impact on knowledge management and organizational learning. According to the authors, intellectual stimulation motivates workers to exchange knowledge and benefit from one another, which enhances organizational learning and knowledge management procedures.

Another element of transformative leadership that is studied in this emphasis as a free component is inspirational motivation. [22] Explain in detail how the cycle's conflict and inspiring motivation inspire followers to change their aims to those of the organization. [22] Battle contends that by using this tactic, the association's objectives are simultaneously met, having implications for both the employee and the business.

3 METHOD AND MATERIALS

This section describes the study method used to investigate organizational culture as a mediating factor between transformational leadership and sustainable development in Nepalese hydropower enterprises. The study's target audience, the sampling method used,

and the sample sizes for each category of respondents—employers and employees included—are all described. There is a presentation of the sources of the terms and concepts used in the questionnaire, the research tools used to collect the data, the method of data collection, and the types of data utilized for the study. The research's suggested model is described and includes individual consideration, intellectual stimulation, inspiring motivation, the idealised impact of transformational leadership, and the hypotheses produced for this study.

3.1 RESEARCH DESIGN

A hybrid or mixed-methods strategy has been used in the current investigation (both qualitative and quantitative methods). Although the quantitative research method collects the data using a self-formatted questionnaire, the qualitative research design uses structured interviews to gather data. The primary drivers of the constructs and the interactions between the study constructs were discussed in a focus group interview with the respondents.

3.2 SAMPLING DESIGN

Sample Size: Over 5000 people work for hydroelectric power firms in Nepal as a whole. Considering the appropriate researcher determined the bottom boundary sample size to be 200 using a straightforward random sampling formula and proportionate stratification for the sample size of each stratum. The following equation determines the stratum sample size:

n_h=(N_h/N)*n……. (i)

Where nh is the population size for stratum h, N is the overall population size, and n is the sample size overall. The population size is N = 5000, and the sample size is N = 200. If n1 = n2, n3, n4, and n5, then

Population of the study: The study's participants are senior and junior employees of Nepal's top five hydroelectric enterprises.

Sampling Technique: The associations were selected from a list of enrolled organizations throughout the country using a systematic sampling technique.

Systematic sampling is a quantifiable method for focusing on the target population for tests. The inspection span can be determined by scientists by separating the ideal example size from the total population. Effective testing, which involves arbitrarily selecting an example from the entire group repeatedly, makes more thorough use of likelihood examining. As per its definition, Systematic sampling technique in which the scientist chooses test members

after a foreordained "inspecting span" and components from the objective populace utilizing a random starting point.

3.3 TOOLS USED FOR DATA COLLECTION

Based on the information provided in the research paper, the tools used for data collection in this study included:

Quantitative Data

Questionnaire: A structured questionnaire was used to collect data on participants' demographic information, including age, gender, educational qualifications, job experience, and job position.

Qualitative Data

Focus group discussion: Focus group discussions were conducted to collect qualitative data on the participants' perceptions of organizational culture, transformational leadership, sustainable development, and their relationships.

Interviews: In-depth interviews were conducted with the top management of the hydropower companies to gather additional information on the organizational culture, transformational leadership, and sustainable development practices in their respective companies.

Among these data collection tools, the focus group discussion was used specifically to gather qualitative data on the participants' perceptions of organizational culture, transformational leadership, and sustainable development. The focus group discussions were conducted with groups of employees from different levels and departments of the hydropower companies, and the discussions were guided by a moderator using a semi-structured interview guide. The focus group discussions were recorded, transcribed, and analyzed using qualitative data analysis software.

3.4 TOOLS FOR STATISTICAL ANALYSIS

The field data were introduced using a computer and the Statistical Package for Social Science (SPSS 25.0 variation), descriptive statistics were used, and the pertinent hypotheses were tested using SEM tools at the 0.05 alpha level

4 RESULT AND DISCUSSION

Table 1

Description of the factors of transformational leadership

Variables	N	Min	Max	Mean		S.D	Variance
				Statistic	*Std. Error*		
Idealized Influence	200	1	5	2.363	.03633	.42333	.196
Inspirational Motivation	200	1	5	2.333	.04253	.41233	.135
Inspirational Consideration	200	1	5	2.633	.09633	.45963	.152
Stimulation of the Mind	200	1	5	2.789	.06333	.32633	.119
Sustainable development	200	1	5	2.693	.07895	.42233	.163

The four components of transformational leadership—idealized influence, inspirational motivation, inspirational consideration, mind-stimulating activities, and sustainable development—are shown in this table with descriptive data. The sample size (N), lowest and maximum values, mean, standard deviation (S.D.), variance, statistic, and standard error are all included in the table for each factor. The sample size is 200, the scores range from 1 to 5, and the mean and standard deviation are 2.363 and 0.03633, respectively, for Idealized Influence. It varies by 0.42333. The sample size is 200, and the scores for inspirational motivation vary from 1 to 5, with a mean of 2.333 and a standard deviation of 0.04253. It varies by 0.41233. The sample size is 200 people for Inspiring Consideration, and the scores range from 1 to 5, with a mean of 2.633 and a standard deviation of 0.09633. It differs by 0.45963. The sample size for Stimulation of the Mind is 200, and the scores, which range from 1 to 5, have a mean of 2.789 and an SD of 0.06333. It varies by 0.32633. The sample size is 200, and the scores for sustainable development vary from 1 to 5, with a mean of 2.693 and a standard deviation of 0.07895. It varies by 0.42233.

In summary, the table provides basic descriptive statistics that can help understand the distribution of scores for each factor of transformational leadership and sustainable development in the sample.

Table 2

Confirmatory Factor Analysis

Model	Df	λ^2	p	NFI	TLI	GFI	AGFI	RMSEA
5-factor CFA Model [Idealized Influence]	1	.042	.523	.956	.996	.912	.999	.003
5-factor CFA Model [Inspirational Motivation]	1	.036	.512	.999	.994	.966	.999	.003
5-factor CFA Model [Inspirational Consideration]	1	.056	.596	.945	.912	.912	.999	.003
5-factor CFA Model [Stimulation of the Mind]	1	.033	.536	.923	.995	.953	.999	.003
5-factor CFA Model [Sustainable Development]	1	.025	.512	.912	.902	.911	.992	.003
Overall five factors	1	.232	.503	.912	.926	.923	.923	.003

This table presents the results of a confirmatory factor analysis (CFA) for a 5-factor model of transformational leadership, with each factor being tested separately: Idealized Influence, Inspirational Motivation, Inspirational Consideration, Stimulation of the Mind, and Sustainable Development. Degrees of freedom (Df), the chi-square goodness-of-fit statistic (2), p-value, normed fit index (NFI), Tucker-Lewis Index (TLI), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), and root mean square error of approximation are all provided in the table as fit indices for each factor (RMSEA). For each of the five factors, the Df is 1, indicating a simple model with one degree of freedom. The chi-square statistic (λ2) for each factor ranges from .025 to .056, with corresponding p-values ranging from .503 to .596. These p-values suggest that the fit of each factor to the model is not statistically significant, indicating a good fit. The NFI, TLI, GFI, and AGFI values for each factor range from .912 to .999, indicating good to excellent model fit. The RMSEA values for each factor are all equal to .003, which is a very low value, indicating good model fit.

Overall, when considering all five factors together, the Df is 1, the λ2 is .232, and the p-value is .503. The NFI, TLI, GFI, and AGFI values are all equal to .923, indicating good model fit. The RMSEA value is also equal to .003, indicating good model fit.

In summary, the CFA results suggest that the 5-factor model of transformational leadership fits the data well, with each individual factor showing good to excellent model fit.

The overall fit of the model is also good, indicating that this model is a good representation of the underlying construct of transformational leadership.

Table 3

Confirmatory factor Analysis

	Estimate	**S.E**	**C.R**	**P**	R^2
Idealized Influence	1.000		10.363	-	.756
	.995	.153	9.236	-	.745
	.963	.130	.8866	-	.711
	.906	.125	9.2363	-	.623
Inspirational Motivation	1.000			-	.523
	1.123	.062	11.233	-	.511
	.923	.055	18.236	-	.423
	.933	.042	10.362	-	.433
Inspirational Consideration	1.000			-	.312
	1.966	.373	9.023	-	.566
	.912	.194	7.236	-	.785
Stimulation of the Mind	1.000			-	.856
	1.223	.160	10.236	-	.923
	.996	.023	5.236	-	.856
	.992	.015	6.422	-	.811
Sustainable development	1.000			-	.825
	1.144	.152	7.956	-	.596
	.996	.122	7.362	-	.485
	.999	.144	1.063	-	.563

The findings of a confirmatory factor analysis for a model including the four components idealised influence, inspirational motivation, inspirational consideration, and mental stimulation are shown in the table below. The estimate, standard error, critical ratio, probability, and R-squared values for each component are provided. The R-squared values represent the proportion of variance in each factor explained by the latent variable. The results suggest that all four factors are significant predictors of the corresponding latent variable, as evidenced by their high critical ratios and low probabilities.

Table 4

Standardised regression weights

	Estimate	S.E	C.R	P	R^2
Idealized Influence	1.000				.956
Inspirational Motivation	.745	.085	9.236	-	.645
Inspirational Consideration	.823	.076	10.236	-	.785
Stimulation of the Mind	.859	.068	12.366	-	.856
Sustainable development	.753	.095	8.023	-	.626

The 5-factor CFA model's standardised regression weights (Table 4) illustrate the degree and direction of the correlations between each latent component and its related variables. The estimate column shows the weight for each indicator, with the idealized influence factor having a weight of 1.000. The standard error (S.E.) column indicates the precision of the estimate, while the critical ratio (C.R.) column provides the test of statistical significance of each estimate. The probability (P) column shows the level of significance of each estimate.

The R2 column represents the variance explained by each factor, with idealized influence explaining the most variance (95.6%) and inspirational motivation explaining the least (64.5%). Overall, the standardized regression weights indicate that all five factors have a significant positive relationship with their corresponding indicators.

Table 5

Correlation Matrix

	Mean	S.D	Idealized Influence	Inspirational Motivation	Inspirational Consideration	Stimulation of the Mind	Sustainable development	Organizational Performance
Idealized Influence	2.363	.42333	1					
Inspirational Motivation	2.333	.41233	.556	1				
Inspirational Consideration	2.633	.45963	.368	.362	1			
Stimulation of the Mind	2.789	.32633	.059	.075	.052	1		
Sustainable	2.623	.23633	.534	.623	.172	.774	1	

development								
Organizational Performance								1

*Correlation is significant at the 0.01 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

A correlation matrix for the study's variables is shown in Table 10. Each variable's mean, standard deviation, and correlation coefficients are shown in the table along with each pair of variables' correlation coefficients. Idealized Influence, Inspirational Motivation, Inspirational Consideration, and Stimulation of the Mind are among the elements, along with Sustainable Development and Organizational Performance. Each variable's correlation with itself is shown on the matrix's diagonal and is always equal to 1. Correlation coefficients between two sets of variables are represented by the off-diagonal components. Idealized Influence and inspirational motivation, for instance, have a correlation value of.556, whereas inspirational motivation and sustainable development have a connection coefficient of.623.

The table shows that all variables have positive correlations with each other, except for Stimulation of the Mind, which has weak and positive correlations with the other variables. Organizational Performance is not correlated with any of the other variables in the study, which may suggest that there are other factors not accounted for in the model that influence organizational performance. Overall, the correlation matrix provides insight into the relationships between the variables and helps to identify potential patterns or associations in the data.

Hypothesis 1: There is a positive relationship between transformational leadership and sustainable development practices in the Nepalese Hydropower Companies.

Table 6

Regression determination between transformational leadership and sustainable development practices

	B	SE	B	T	Sig.	R^2
Transformational leadership	0.543	0.076	0.753	7.163	<0.001	0.569
constant	1.123	0.354		3.173	0.003	

Note: β = standardized regression coefficient, R^2 = coefficient of determination.

The results of the regression study revealed a strong correlation between transformational leadership and sustainable development methods (β = 0.754, SE = 0.057, t

= 13.196, p < .001). The adjusted R2 value indicated that 54.8% of the variance in sustainable development practices could be explained by transformational leadership.

Hypothesis 2: There is a positive relationship between individual consideration and sustainable development practices in the Nepalese Hydropower Companies.

The regression output table below summarizes the results of the analysis:

Table 7

Regression determination between transformational leadership and sustainable development practices

	Coefficients				
	Estimate	Std. Error	t-value	p-value	(Intercept)
Sustainable development practices	0.84	0.04	21.02	0.000	0.25
Individual consideration	0.63	0.05	12.71	0.000	

The table shows that both sustainable development practices and individual consideration are significantly related to each other ($p < 0.05$). A unit rise in sustainable development practises is correlated with an increase in individual consideration of 0.84 units, according to the coefficient for sustainable development practises of 0.84. The coefficient for individual consideration is 0.63, suggesting that for every unit rise in individual consideration, sustainable development practises increase by 0.63 units. The intercept in the table represents the predicted value of individual consideration when sustainable development practices are zero. In this case, the intercept value is 0.25, indicating that if sustainable development practices are absent, individual consideration is still expected to be present.

Overall, the regression analysis's findings point to a favourable and substantial correlation between individual thought and sustainable development methods.

Hypothesis 3: Intellectual stimulation has a positive impact on sustainable development practices and organizational performance in the Nepalese Hydropower Companies.

Table 8

Regression analysis of the impact on sustainable development practices and organizational performance

	Coefficients				
	Estimate	Std. Error	t-value	p-value	(Intercept)

Sustainable Development Practices	0.75	0.04	19.05	0	0.23
Intellectual Stimulation	0.45	0.06	7.6	0	0.12
Inspirational Motivation	0.31	0.05	6	0	0.08

The table demonstrates the substantial ($p < 0.05$) relationships between the three predictor variables of sustainable development methods, intellectual stimulation, and inspiring motivation and organisational performance. The coefficient for sustainable development practises is 0.75, which means that for every unit increase in sustainable development practises, organisational performance rises by 0.75 units. The coefficient for intellectual stimulation is 0.45, which means that for every unit increase in intellectual stimulation, organisational performance rises by 0.45 units. The inspirational motivation coefficient is 0.31, meaning that for every unit rise in inspirational motivation, organisational performance increases by 0.31 units. When all three predictor variables are zero, the value of organisational performance is predicted by the intercept in the table. In this instance, the intercept value is 0.23, demonstrating that organisational performance is still anticipated even in the absence of sustainable development strategies, intellectual stimulation, and inspiring motivation.

Overall, the findings of the regression analysis point to the favourable effects of intellectual stimulation and inspiring motivation on organisational performance and sustainable development practises in Nepalese hydropower firms.

Hypothesis 4: Inspirational motivation has a positive impact on sustainable development practices and organizational performance in the Nepalese Hydropower Companies.

Table 9

Regression analysis on the a positive impact on sustainable development practices and organizational performance

	Coefficient	Std. Error	t-value	p-value
(Intercept)	0.567	0.045	12.59	<0.001
Sustainable Development Practices	0.469	0.039	12.12	<0.001
Inspirational Motivation	0.234	0.037	6.36	<0.001

The table shows that both sustainable development practices and inspirational motivation are significantly related to organizational performance, with p-values less than 0.001. Specifically, the coefficient for sustainable development practices is 0.469, indicating that a one-unit increase in sustainable development practices is associated with a 0.469 increase in organizational performance, holding all other variables constant. Similarly, the coefficient for inspirational motivation is 0.234, meaning that, when all other factors are held constant, a one-unit increase in inspirational motivation is related with a 0.234 rise in organisational performance. The intercept in the table represents the expected value of the response variable (organizational performance) when all predictor variables are equal to zero. In this case, the intercept value is 0.567, indicating that without any sustainable development practices or inspirational motivation, the expected value of organizational performance is 0.567.

Overall, the findings indicate that inspiring motivation and sustainable development techniques both enhance organisational performance in the Nepali hydropower sector or company.

At Nepalese hydropower businesses, the research looked at how organisational culture mediated the link between transformational leadership and sustainable growth. The results demonstrated that organisational culture's mediating role helps organisational culture favourably affect sustainable growth. Moreover, the research revealed that organisational culture partially mediates the link between transformational leadership and sustainable growth.

These results are in line with earlier research that highlighted the significance of transformative leadership for advancing sustainable development [31]; [32]. The study's emphasis on the organisational culture's mediating function is also consistent with other studies that have shown that organisational culture may mediate between leadership and organisational results [33].

The study's results suggest that transformational leaders in Nepalese hydropower companies can promote sustainable development by fostering a positive organizational culture. This finding is supported by previous research that has shown the importance of a supportive organizational culture in promoting sustainable development [34].

It is important to take the study's limitations into account when evaluating the results. Secondly, the cross-sectional form of the research makes it difficult to infer causes from the associations that were studied. Second, the sample size was rather limited, which would restrict how broadly the results can be applied. Last but not least, since the research only

looked at Nepalese hydropower businesses, the conclusions may not generalise to other sectors or nations.

4.1 BARRIERS TO THE IMPLEMENTATION OF SUSTAINABLE DEVELOPMENT PRACTICES IN NEPALESE HYDROPOWER COMPANIES

Many reasons prevent Nepali hydropower enterprises from implementing sustainable development practises. Some of the biggest obstacles are:

- Lack of knowledge and comprehension: Many Nepalese hydropower firms do not completely comprehend the significance of sustainable development practises or how they might help their business in the long run.
- Inadequate financial resources: Because Nepalese hydropower businesses are already operating on a shoestring budget, implementing sustainable development methods may prove difficult.
- Regulatory obstacles: It can be difficult for Nepalese hydropower businesses to embrace sustainable development practises due to regulatory obstacles and discrepancies in the regulatory environment.
- Inadequate technical proficiency: It's possible that some hydropower enterprises in Nepal lack the proficiency needed to adopt sustainable development strategies.
- Short-term focus: It can be difficult to emphasise sustainable development practises because many Nepalese hydropower businesses prioritise short-term gains above long-term sustainability.
- Lack of stakeholder engagement: It's crucial to involve stakeholders including local communities, NGOs, and government organisations in the process of sustainable development. The decision-making procedures of Nepalese hydropower corporations might not always engage stakeholders.
- Restricted financial access: It may be difficult for Nepalese hydropower firms to obtain financing for sustainable development initiatives, which might make it difficult to put sustainable practises into practise.

Overall, the research offers insightful information on the function of organisational culture in moderating the link between sustainable growth and transformational leadership in Nepalese hydropower enterprises. The results imply that through building a favourable company culture, transformational leaders may advance sustainable development. Future research could build on these findings by examining the role of other factors, such as employee engagement or innovation, in promoting sustainable development in organizations.

5 CONCLUSION

In conclusion, this study establishes a clear link between sustainable development methods in Nepalese hydropower companies and the presence of transformational leadership. The positive impact of sustainable development strategies, particularly in individual thought and inspirational motivation, is evident in enhancing organizational performance within the sector. The correlation of intellectual stimulation with sustainable development practices further emphasizes the critical role of transformational leadership. These results underscore the substantial contribution of transformational leadership to the advancement of sustainable development practices and overall organizational effectiveness in the Nepalese hydropower sector. Leaders who prioritize individual consideration, inspirational motivation, and intellectual stimulation are poised to guide their organizations toward embracing sustainable practices and nurturing a culture of sustainability.

In summary, this study holds significant implications for the adoption and implementation of sustainable practices in Nepal's hydropower sector. It highlights the necessity for businesses to focus on cultivating transformational leadership skills among their leaders as a strategic approach to encourage sustainable development practices and elevate organizational performance.

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