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Organizational Ergonomics and Work Effectiveness in Nepal's Industrial Sector: A PLS-SEM Study

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Abstract

Background: Organizational ergonomics is a very new idea in the industrial sector of developing economies. The industries in the Kathmandu Valley of Nepal are increasingly experiencing issues related to the feasibility of productivity versus the workplace health standards but not much research has been done to understand how well the principles of ergonomics can be systematically forwarded to enhance the productivity in the industry and the health of the employee in this context.

Purpose: This paper has studied the organizational ergonomics across the Nepali industrial sector in Kathmandu Valley and highlighted the barriers of implementing ergonomics in an organizational setting and then offered the evidence-based recommendations.

Methods: Descriptive and explanatory research design is used in this study. Self-administered structured questionnaires were used to collect data. A total of 160 responses were obtained via KOBO toolbox from Balaju, Patan, and Bhaktapur. Descriptive and inferential statistics were used to evaluate the data quantitatively, and Smart PLS 4 was used to determine the relationships between dependent and independent variables using SEM.

Findings: In Nepal, implementation of organizational ergonomics is not developed well. The major obstacles were the lack of health-related emphasis over production strains to the detriment of health conditions due to inadequate managerial training on ergonomic fundamentals and conflicts at work. The statistical analysis proved that a significant relationship exists between communication, motivation, managerial factors, work design, and performance management.

Conclusion The study confirms that performance management is a central mechanism linking organizational ergonomic factors communication, motivation, managerial practices, and work

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design to work effectiveness. However, practical implementation, particularly in contexts like Nepal, remains challenged by a production-centric culture, insufficient managerial training, and workplace conflicts.

Keywords: organizational ergonomics, work effectiveness, productivity, PLS SEM, organization, ergonomics, communication

1. Introduction

Ergonomic ideas were developed in the early 20th century to increase workers efficiency while industry production remained heavily dependent on human force and mobility (Berlin & Adams, 2017; Marková et al., 2025; Trstenjak et al., 2025). Organizational ergonomics is a study of how organizational structures, policies, and processes affect employees' productivity and well-being (Koirala & Maharjan, 2022). Communication, crew resource management, work design, design, design of working hours, teamwork, participatory design, community ergonomics, cooperative work, new work paradigms, virtual organizations, telework and quality management are the key issues of organizational ergonomics (Bentley et al., 2016). In 1959, the International Ergonomics Association (IEA) was established to coordinate the various ergonomics-related societies and associations that had been created in various nations and regions throughout the globe. In China, industrial design has replaced conventional product design. As qualities of their goods, "people-oriented" and "ergonomic design" are being emphasized by more and more manufacturers. The green design idea is one of the current trends in ergonomics development (Ong, 1991).

Ergonomics is the most frequently misused, misunderstood, and underutilized concept in today's corporate dictionary. It is not the first thing people think of when trying to increase profitability because it is difficult to measure (Lindblom & Österman, 2022; Nestorović, 2023). Despite some management claims to the contrary, no single establishment in Nepal meets the minimum workplace requirements. Any workplace, regardless of the setting, is dangerous (Prajapati et al., 2023). Each has some level of risk associated with the raw materials, manufacturing process, shipping, and so on. While most businesses acknowledge that they were unable to improve the workplace as needed, most employees believe that their workplace is subpar on average. Many businesses, particularly those in the construction and transportation industries, are open spaces where employees must work outside in all weather conditions, including sun, rain, wind, and noise (Karthick et al., 2021). Because of the nature of the establishments, the selected workplaces do not have the same type of risk (Koirala & Nepal, 2022).

According to Zeynullagil (2022), work effectiveness refers to the ability of a worker or a group of workers to achieve their goals and objectives while meeting or exceeding the expectations of their employer or stakeholders (Jossy & Kumar, 2018). Effective work can lead to positive outcomes, such as increased productivity, higher quality work, improved customer satisfaction, better morale and motivation, and greater job satisfaction and engagement. Organizational ergonomics has a significant impact on work effectiveness (Sohrabi & Babamiri, 2022). When an organization takes a holistic approach to designing work systems and processes, it can create a work environment that maximizes worker performance, minimizes the risk of injury and illness, and promotes job satisfaction and engagement (Koul et al., 2025).

In the context of Nepal, few papers on ergonomics are appeared such as Koirala and Nepal (2022), Koirala and Maharjan (2022), Maharjan et al. (2023), Nepal and Koirala (2024) but organizational ergonomics is a new concept and most of the organizations are unaware about the concept of it and no research is seen in these aspects. Management is unable to incline ergonomics practices in organizational culture (Kogi, 2006). But with globalization, numbers

of organizations can be found which try to adopt proper organizational structures, policies, and processes. The significant role that it plays in the industrial sector should be recognized so that unnecessary mental pressure and misapplication of industry employee plans and policies can be avoided. This will increase work efficiency while requiring less input (George, 2024). The demands of the individual to work or live in harmony with their surroundings are met by ergonomic design. This improves the quality of life at home and at work, making both settings more comfortable throughout the day (Vischer & Wifi, 2016). Ergonomics principles are significant when you consider how important comfort, and a pleasant atmosphere are to our general health and wellbeing (Adiga, 2023). Every company wants to boost overall productivity, keep workers on task, lower work-related injuries, and raise customer happiness. Adjusting occupations so that workers are more comfortably accommodated serves all the objectives, hence using ergonomic principles makes commercial sense. With the aim of enhancing these relationships, ergonomics studies how people interact with machines (Baldassarre et al., 2022). This may involve redesigning the tools used, altering how people operate the tools, or moving the workspace. Making the relationship more "user-friendly" is a common way to describe what engineering psychologists do (Votintseva et al., 2024).

This study aims to address the existing research gap by examining the impacts of organizational ergonomics on employee performance and work effectiveness. By investigating the application of ergonomics practices in the industrial workplace, it seeks to understand how ergonomics factors affect employee performance. Additionally, the study aims to identify the problems that employees face as a result of poor organizational ergonomics and to assess managerial solutions for implementing effective ergonomics practices to enhance employee performance. Through these analyses, this study intends to contribute valuable insights into the relationship between organizational ergonomics and employee performance, filling a void in the current body of research.

2. Conceptual Framework and Hypothesis Formulation

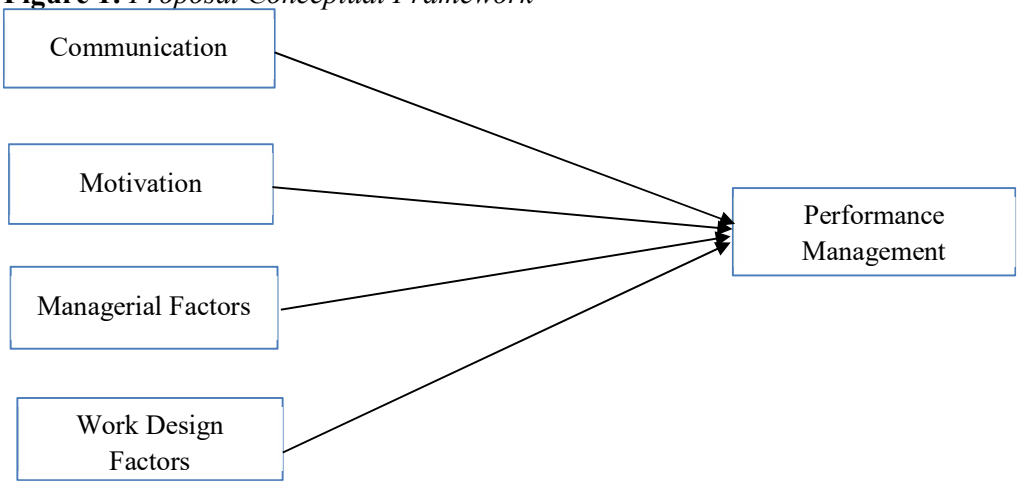
Several theories, including the Socio-Technical Theory, Social Exchange Theory, Activity Theory, Balance Theory, and Theory of Ergonomics relate to the ergonomics elements (Varpio, 2020). Social Exchange Theory deals with the idea of justice. Before continuing a social partnership, one individual evaluates each relationship's worth and costs (Cropanzano & Mitchell, 2005). Activity theory provides a rich holistic understanding of how people collaborate, i.e., carry out purposeful collective activities, with the assistance of sophisticated tools (information systems) in the complex dynamic environments of modern organizations (Engestrom, 1999). Balance theory explains when patterns of liking and disliking are balanced, structures are stable; it also explains how people create and retain consistency in patterns of their liking and dislike of nonhuman objects, attitudes, or ideas (Sternberg, 1998). Socio-technical theory is that both "social" and "technical" aspects must be brought together and viewed as interdependent components of a complex system to fully comprehend and improve the design and performance of any organizational structure (Appelbaum, 1997). Theory of ergonomics deals with the underlying concepts, and design methodologies present aid to maximize human well-being and overall system performance (IEA, 2021). Theory of ergonomics is that human performance can be measurably improved, and stress can be reduced by appropriate design and implementation of interactions among humans and other elements of a system. ISO 6385 defines "ergonomics" and the "study of human factors" similarly, as the "scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles and methods to design to optimize overall human performance.

Reviewing all those five theories of theoretical framework from different literature, Theory of ergonomics is correctly explained and addressed by linking with the related topic.

Theory of ergonomics relates to organizational ergonomics, and it plays an important role in the effectiveness of work (Duffy, 1999). In an organization there are several problems that can be estimated problems faced by employees due to bad workplace, improper management practice, unstructured plans and policies. By addressing these factors, the theory of ergonomics helps to deal with these issues. The theory of ergonomics emphasizes the importance of designing work systems that are tailored to the needs of individual workers, considering their abilities, preferences, and limitations. By doing so, organizations can create work environments that promote health, safety, and well-being while also enhancing work effectiveness (Trstenjak et al., 2025). By utilizing the principles of the theory of ergonomics to organizational ergonomics, organizations can create work environments that promote employee well-being and performance.

As per the theory of ergonomics, there are several models such as PDCA Model, Organizational System Model, Job Design & Ergonomics Model, Toxic work environment affects the employee engagement, Health & well-being in the workplace. These explain the acceptance and implementation of theories in business and industries. From the review, the Organizational system model has been used in this study.

Figure 1: *Proposal Conceptual Framework*



Source: *Adapted and modify from Duffy, 1999*

Figure 1 explained the impact of organizational ergonomics on work effectiveness in industrial sector in Kathmandu valley. In this model, communication, motivation, managerial factors, and work design factors are explained as independent variable and performance measures can be explained as dependent variables. Relationship between dependent variables and independent variables can be explained as:

2.1 Communication and Performance Management

Effective communication is critical in ensuring that employees have the necessary information and resources to perform their jobs well (Sultan, 2024). In the context of organizational ergonomics, communication can be used to convey important information about ergonomic practices and policies, as well as to solicit feedback and suggestions from employees regarding the design of their work environment in terms of industrial sector in Kathmandu valley (Rachmad, 2024). Additionally, communication can be used to provide feedback to employees on their job performance, including how well they are adhering to ergonomic guidelines and practices (Majchrzak, 1992).

H1: There is significant relationship between communication (C) and performance management (PM).

2.2 Motivation and Performance Measure

Motivation and performance management are also closely linked in terms of the impact of organizational ergonomics on work effectiveness. Organizational ergonomics can influence employee motivation by providing a work environment that is conducive to employee satisfaction and well-being (Fokam et al., 2025). For example, a workplace that offers comfortable and ergonomic flexible work schedule, adequate training, and making mental health priority can contribute to employee effectiveness, which can in turn lead to increased motivation and productivity (Gruman & Saks, 2011). Performance management can also have a significant impact on employee motivation. When employees receive regular feedback on their performance and have clear goals and objectives to work towards, they are more likely to be motivated to perform at their best (Dangol, 2021). This can lead to increased productivity and overall work effectiveness. Having high levels of motivation is useful in and of itself for workers, and a drop in motivation could have a detrimental impact. Three distinct indicators of employee performance are used at Armco Health Center to gauge the quality of staff performance (Azkar et al., 2024). Organizations can use the principles of organizational ergonomics to improve employee motivation and performance management (Lokman & Habidin, 2024)

H2: There is a significant relationship between Motivation (M) and performance management (PM).

2.3 Managerial Factors and Performance Management

Managerial factors and performance management are closely linked to the impact of organizational ergonomics on work effectiveness. Proper management methods will help boost the performance of employees and increase the overall productivity of an organization (Oladimeji et al., 2007). On the one hand, inadequate management practices are likely to result in low morale, low performance and reduced productivity. To make effective performance management, the managers should be able to communicate their expectations and targets without leaving any doubts, expect feedback and recognition, and allow development and growth opportunities (Shalley, 2024). By so doing, managers can motivate the employees to deliver to their best ability and to be able to ensure that employees are aligned to organizational goals and objectives being achieved. Performance management and effectiveness at work can also be affected by the managerial influences including leadership style, communications, and decision making. Autocratic style of leading that lacks employee reaction and suggestions can result in poor and less motivation and performance (Fiaz et al., 2017).

H3: There is a significant relationship between managerial factors (MF) and performance management (PM).

2.4 Work Design and Performance Measure

Work design factors refer to the way in which work is organized, structured, and performed in an organization. These factors can have a significant impact on employee well-being and performance. When work is designed to fit the capabilities and limitations of the workers, it can result in increased productivity, job satisfaction, and overall well-being. Performance management refers to the processes and activities that are used to measure and evaluate employee performance in the workplace. It includes setting goals, providing feedback, and offering opportunities for training and development. The link between work design factors and performance management lies in the fact that work design can impact the way in which performance is managed (Parker & Turner, 2002). For example, if work is designed to be repetitive and monotonous, it may be more difficult for managers to motivate employees to perform at their best. Conversely, if work is designed to be challenging and engaging, it may

be easier for managers to motivate employees and to provide feedback that is meaningful and relevant.
H4: There is a significant relationship between work design (WD) and performance management (PM).

2.5 Variables and its Definition

Table 1: Observed Variable and Description

Construct	**Observed Variables**	**Indicator**	**Explanation**
Communication	Levels	C_1	I believe that my communication is reachable to different team groups in an organization (Marketing, Production, HR, Finance, etc.)
	Quality	C_2	My organization has appropriate methods of displaying information.
	Value	C_3	The potential confusions between characters are avoided/ reduced while communicating between employees or other staff.
	Timeliness	C_4	I believe that there are detailed procedures or menus which have been used for staff with little knowledge and experience while interacting with computers.
	Attitude	C_5	My organization provides direct and clear information about effectiveness (quality & quantity) about work activities.
Managerial Factors	Formality	MF_1	My organization follows both formal and informal ways of communication between staff, managers and vice-versa.
	Relationship	MF_2	I believe that poor quality relationships between supervisors and co-workers in critical situations results in psychological strain like job burnout and job dissatisfaction.
	Risk Factors	MF_3	I believe that reduction in resources without considering workers opinions influence physical and psychological risk factors.
	Influence	MF_4	Better supervisors and co-workers' opinions influence physical and psychological risk factors.
	Environment	MF_5	The climate at the workplace is comfortable in terms of temperature and humidity.
	Resources	MF_6	Seating arrangements on the job are adequate.

Work design factors	Task Identity	WD_1	I believe that my organization allows workers regularly to perform different tasks and allows them to switch jobs during working hours.
	Flexibility	WD_2	My organization allows workers flexibility in scheduling their work, freedom to make decisions and select the methods to accomplish their task.
	Time	WD_3	My organization provides flexible time to complete key tasks, when there is an urgency.
	Task Significance	WD_4	My organization/ industry provides a clear understanding of duties, objectives, and process at work.
	Goal Oriented	WD_5	I believe that the results of my organization are likely to affect the lives of other people.
Performance Management	Distraction	PM_1	My performance of work tasks in the presence of distraction will lead to errors.
	Work Repetition	PM_2	I believe repetitive tasks cause less focus on the work process.
	Pressure	PM_3	I believe that work pressure leads to unpredictable errors.
	Quality	PM_4	I believe that learning from mistakes that lead to poor quality of work is part of performance improvement.
	Distraction	PM_5	I believe that performance of work tasks in the presence of distractions will lead to errors.
Motivation	Interest	M_1	I have the right to decide on a subject related to my work.
	Performance Reward	M_2*	I am not awarded due to high performance.
	Appreciation	M_3*	My manager appreciates me for what I did for my work.
	Opportunity	M_4*	I do not have an opportunity to be promoted in my work.
	Job Reputation	M_5	I believe that the work which I've done is respectable.

Note: *The items marked with * were discarded.*

3. Research Methodology

This research was developed using an explanatory design, sometimes referred to as an analytical research design as it focuses on elucidating the connection between cause and effect as well as offering explanations for the "why" and "how,".

3.1 Study Area and Population

This study was conducted in Kathmandu Valley, Bagmati Province. Bhaktapur, Kathmandu, and Patan were the districts within the valley, which covered an area of 899 square kilometers, whereas the Kathmandu valley only covered 665 kilometers. The Kathmandu valley is located between latitudes 27° 49' 10" north and 85° 11' 31" and 85° 31' 38" longitudes to the east and is 1300 meters above sea level. Conducting research on the effects of organizational ergonomics on employee work effectiveness in the Kathmandu valley's industrial estate can yield more accurate results because this area has the highest concentration of businesses and is diverse in terms of industries, workforce, and organizational structures.
The primary target audience for this study was the group of people employed in the industrial estates in Kathmandu valley. The Kathmandu Valley comprises three industrial estates, namely Balaju industrial estate and Patan industrial estate and Bhaktapur industrial estate. In the Patan industry there are 56 companies, in the Balaju industry there are 82 companies operating and in the Bhaktapur industry there are 22 companies under operation. So, the total sample size 160 is the study's population.

3.2 Sampling Technique

Probability sampling strategy is employed in this study to determine this study sample because the overall population for this study was an appropriate and manageable size in terms of addressing the research question, collecting data, and analyzing data (Taherdoost, 2016). To carefully select a respondent's characteristics, the researcher has used the purposive sampling technique. Purposive sampling is used to focus on respondents who have certain qualities and who will be better equipped to contribute to the relevant research.

3.3 Sample Size Determination

The sample size should be larger to allow for generalization from a random sample while avoiding biases or errors in sampling. While it is true that the likelihood of results being skewed decreases with sample size, if the sample size reaches a certain point, diminishing returns can soon set in, which must be weighed against the researcher's resources (Adcock, 1997). Simply, bigger sample numbers decrease sampling error, albeit more slowly. There are numerous statistical formulas that can be used to determine the sample size (Dell et al., 2002). The sample size was determined using the formula below.

$N = N*X / (X + N – 1)$

Where,

$X = Z\alpha/2^{2*p*}(1-p) / MOE^2$

And $Z\alpha/2$ is the critical value of the traditional distribution $\alpha/2$ (e.g., for a confidence level of 95%, α is 0.05 and also the critical value is 1.96), MOE is the margin error, p is the sample of portion and N is the population size. A finite population correction has been applied to the sample size formula.

$X = (1.96)^{2*}0.5(1-0.5) / (0.05)^2$

$= 384.16 \approx 385$

Now,

Sample size (n) = $250*385 / (385 + 250 – 1)$

$= 150.62 \approx 151$

We also add non-respondent error 5%
i.e., 151*0.05 = 7.55 ≈ 8
Thus, the sample size taken for the study is n= 151 + 8 = 159.

3.4 Research Instrument and Data Collection

The structured questionnaire with an interview is the primary research instrument used for this study's data collection process. For data collection, a structured questionnaire has been developed and designed to conduct surveys as well as collect primary data for the study of the effects of organizational ergonomics on employee work effectiveness in industrial sectors in Kathmandu valley. To address the research question, the questionnaire comprises both open-ended and closed-ended questions. After the questionnaire's development, the structured questionnaires are administered using the KOBO toolbox form to collect the data.

The study acquired primary data through the Key Informant Interview (KII) and questionnaire survey. The prepared structured questions are administered using the KOBO toolset for data collection. To achieve the multiple aims of the study, the researchers linked the questionnaires together. After entering the questionnaire into the KOBO toolbox, a pilot survey of a few questions was conducted to ensure instrument consistency and accuracy. The primary objective of the pilot study was to examine the extent to which the instrument provides relevant and sufficient data and evaluate whether it satisfies the main objective of the research or not (Backman, 2008). A total of 160 employees were selected for data collection to estimate the sample size. The data collection period was from February 2023 to March 2023, taking one month to complete. The data were obtained through face-to-face encounters with some respondents and closed-ended questions were prepared for data collection purposes. The organization's permission was obtained to conduct data collection.

3.5 Data Analysis Technique

The study is based on descriptive analysis, which includes mean, median and style analysis as well as inferential analysis which includes structural equation modeling based on a variety of latent components. To make sense of the research and arrive at precise conclusions and discoveries, every piece of data collected from the field is examined. It is done with descriptive analysis as well as inferential analysis, which includes structural equation modeling based on multiple latent constructs (Keith, 2014). To make sense of the research and come to specific conclusions and discoveries, every piece of data collected in the field is evaluated. KOBO Toolbox were used for data analysis, with Microsoft Excel being used for data entry and research tallying. Structural Equation Model (SEM) is used to analyze data inferentially. Data analysis was performed using descriptive analysis and inferential analysis.

4. Results

Data presentation and analysis are classified into two categories: descriptive and inferential. Descriptive analysis utilizes tables, charts, and figures while inferential analysis utilizes various statistical tests and their outcomes from Structural Equation Modeling.

4.1 Socio Demographic Characteristics

Table 2: *Social Demographic Result*

Variables	Category	Number	Percentage (%)
Gender	Male Female	127 33	79.38 20.62

Age	18-20 Years 21-30 Years 31-40 Years 41-50 Years 51 Years and above	2 23 98 31 6	1.25 14.38 61.25 19.38 3.75
Education Level	Secondary Higher Secondary Bachelors Masters Master's and above	1 6 70 71 12	0.62 3.75 43.75 44.38 7.5
Marital Status	Married Unmarried Separated Widowed	116 36 5 3	72.5 22.5 3.12 1.88
Organization Nature	Micro Small Medium Large Enterprise	2 18 83 39 18	1.25 11.25 51.88 24.38 11.25
Nature of your job	Part Time Full Time Contract Basis	4 151 5	2.5 94.38 3.12
Monthly Income (in average)	25,000-50,000 50,000-75,000 75,000-100,000 100,000-150,000 150,000-200,000 200,000 and above	17 69 39 26 5 4	10.62 43.12 24.38 16.25 3.12 2.5

Source: *Field Study, 2023*

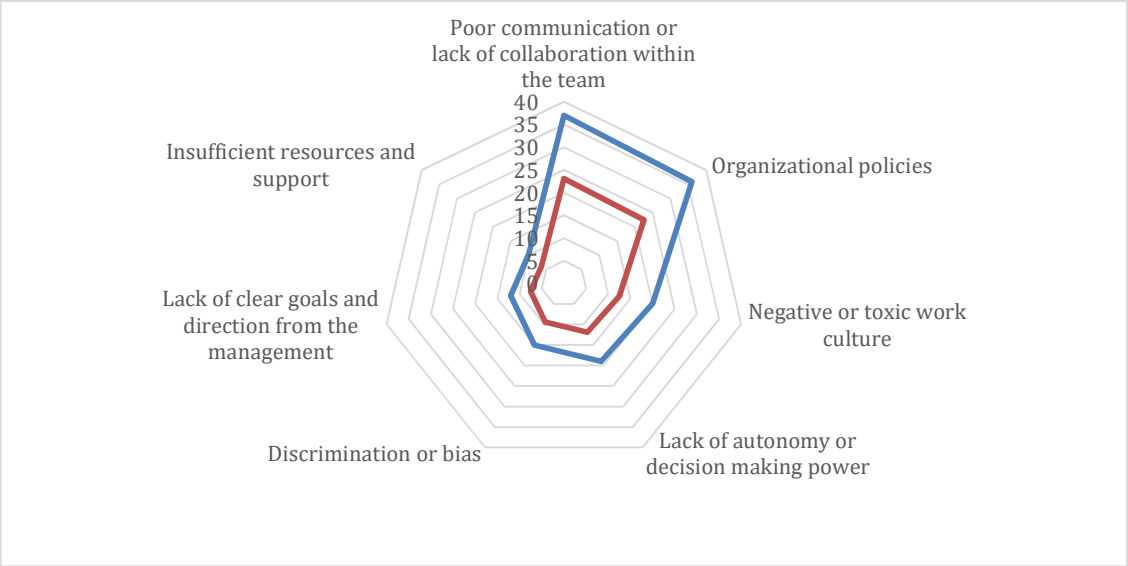
In above frequencies and percentages, the most respondents were male (n = 127, 79.38%). Most respondents in the age category were 31-40 years (n = 98, 61.25%), and most respondents are married (72.5%). The most frequently observed category of academic qualification was master's degree (n = 71, 44.38%) followed by bachelor's degree (70, 43.75%). A significant percentage of employees with a master's degree highlights the importance of education in this industry and the potential impact it may have on organizational processes and systems. Organizational types such as micro, small, medium, large, and enterprise, were categorized depending on their investment. The results indicated that the majority of organizations fell under the medium scale category (83, 51.88%). These findings suggest that the manufacturing industry exerts more organizational ergonomics pressure, resulting in decreased employee work effectiveness. This is consistent with prior research conducted on various organizational types. Furthermore, the study revealed that most employees were employed full-time (151, 94.38%) with a monthly income range of 50,000-75,000 (43.12%).

4.2 General Understanding on Organizational Ergonomics on Employee Work effectiveness

This section provides an overview of how the industry perceives organizational ergonomics practices. It is possible that there are variations in the understanding and awareness of ergonomics among different respondents. Most employees seem to be familiar with the term and its application in the workplace. Thus, this section serves as a demonstration of the general level of knowledge regarding organizational ergonomics practices in the Kathmandu Valley industries. The results of the study on organizational ergonomics and employee work effectiveness provide valuable insights into the factors that impact productivity and job satisfaction of employees. The high percentage of respondents who indicated a good understanding of organizational ergonomics (93.12%) suggests that employees are aware of the importance of a conducive work environment and may be willing to engage in efforts to improve it. The fact that poor communication and collaboration have been cited as the leading contributor to work effectiveness (23.12%) implies that there is a possibility of achieving positive results through the enhancement of the communication channel and the promotion of collaboration within this organization. Also, the notion of negative work culture (12.5%) being the significant factor can be interpreted to be relevant to develop a positive working experience that facilitates the well-being and engagement of the employees.

The results of the questionnaire at the workplace indicate that majority of the communication in the workplace is formal (53.75%), yet there is an existence of the informal communication style (23.12%). That the proportion of respondents who believe they can talk freely to their supervisors amounts to a high percentage of 68.75 percent is a good indication of positive organizational culture that embraces transparency and feedback. Nonetheless, the fact that so few respondents have claimed that they do not communicate freely (10.62%) indicates that channels of communication might need to be developed further in order to make all staff members feel that they are heard. Positive reactions to performance evaluations (75%) and professional development opportunities (75%) are indicative of the fact that the organization offers sufficient support to the employees with respect to evaluations and professional development. Nevertheless, the negligible proportion of respondents who did not agree with such statements (11.88% and 11.25%, accordingly) indicates that more should be done to make sure that every employee is supported and valued. The relatively large numbers of respondents who think the management adapts changes as a result of employee voice (83.75%) show that the management of this organization takes into consideration employee voice and is ready to change to make their workplace better. Nevertheless, the insignificant z in the background of disagreement (6.25%) reveals the need to address the process of eliciting and integrating employee opinions so that maximum voices can be represented and listened to.

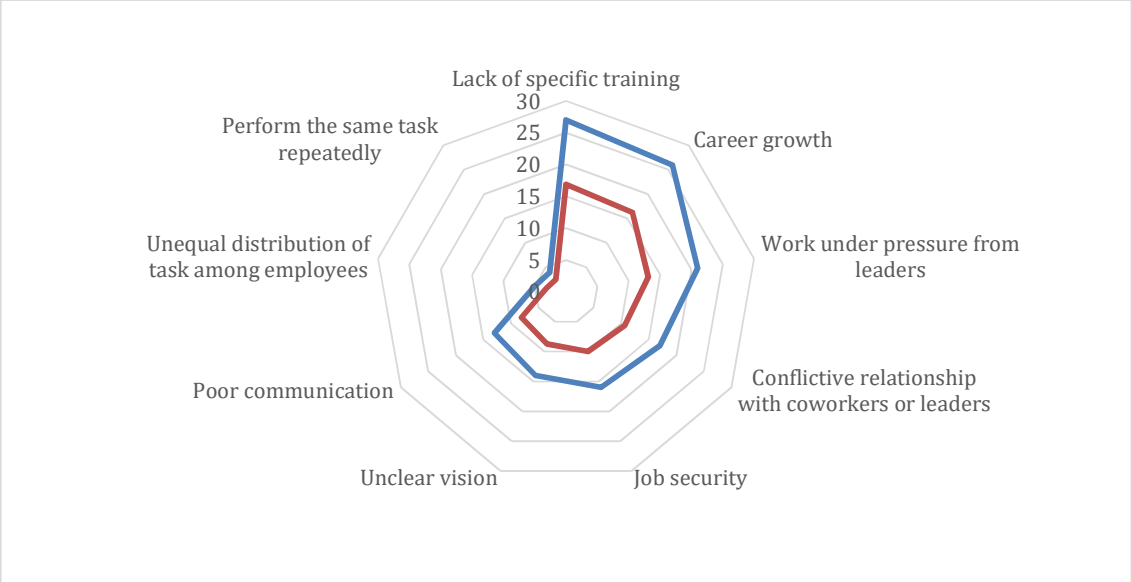
Figure 1: *General Understanding on Organizational Ergonomics on Employee Work effectiveness*



4.3 Challenges and Managerial solutions

This study provides critical insights into the challenges of organizational ergonomics faced by employees within the industrial estates of Nepal's Kathmandu Valley. An overwhelming majority of employees (89.38%) reported facing significant obstacles that hinder their work effectiveness. The primary challenges identified include insufficient training (27%), limited opportunities for career growth (26%), and high-pressure work environments (21%), pointing to systemic issues in management and organizational policy.

Figure 2: *Challenges of Organizational Ergonomics on work effectiveness in Industrial Sector*



The research confirms that these challenges are not insurmountable, with 73.12% of respondents believing they can be managed through targeted strategies. Respondents identified several critical areas for improvement, with poor communication and collaboration emerging as the primary concern (23.12%). To address this, they recommended implementing regular meetings, training programs, and formal feedback mechanisms. Organizational policies were the second most cited issue (22.5%), with suggestions for policy revisions that incorporate

employee feedback. Additionally, 12.5% of respondents highlighted negative work culture as a significant barrier, proposing team-building exercises, reward programs, and recognition schemes as solutions. Other challenges included lack of autonomy (11.8%), discrimination/bias (9.38%), and inadequate resources/support (7.5%), which respondents suggested addressing through enhanced training, mentoring, and coaching initiatives.

4.4 Inferential Analysis

4.4.1 Common Method Bias

Prior to conducting data analysis, this study assesses the presence of Common Method Bias using full collinearity tests as recommended by Kock and Lynn (2012). The findings show that all VIF values were less than 5, suggesting that the impact of multicollinearity problem is not likely to affect (Kalnins, 2018).

4.4.2 Measurement model

This study aimed to test a developed model using a 2-step approach, including a measurement model test for reliability and validity based on guidelines, followed by a structural model to test hypotheses (Amatya et al., 2023).

To assess the internal consistency and reliability of the data, two tests are used: Cronbach's Alpha (CA) and Composite Reliability (CR). To demonstrate internal consistency reliability, the data must meet the condition of CA>0.7 (Lawaju et al., 2024). Similarly, there are certain criteria for composite reliability. Typically, higher values of CR indicate higher levels of dependability. CR levels between 0.60 and 0.70 are considered "acceptable," while levels between 0.70 and 0.90 are classified as "satisfactory to good." However, values of 0.95 or higher pose an issue since they suggest that the items are redundant (Lawaju et al, 2024). The CA and CR of all constructs under consideration lies within the required threshold, which confirms the reliability of all constructs. The convergent validity of all constructs was examined based on the values of AVE. The AVE values were higher than 0.50, which confirms the convergent validity of the constructs.

Table 3: *Measurement Model*

Variables	Items	Loadings	AVE	CR	Cornbach's Alpha	Deleted Indicator
Communication	C1 C2 C3 C4 C5	0.693 0.861 0.834 0.787 0.781	0.629	0.894	0.849	
Motivation	M1 M5	0.874 0.769	0.677	0.807	0.531	M2 M3 M4
Managerial Factors	MF1 MF2 MF3 MF4 MF5 MF6	0.693 0.823 0.815 0.832 0.811 0.800	0.635	0.912	0.882	

Performance Measure	PM1 PM2 PM3 PM4 PM5	0.774 0.692 0.855 0.853 0.894	0.667	0.909	0.877	
Work Design Factors	WD1 WD2 WD3 WD4 WD5	0.836 0.820 0.839 0.848 0.859	0.706	0.923	0.896	

Source: *Field Survey, 2023*

To test the discriminant validity, HTMT, Fornell and Larcker's criteria and cross loading were used. The HTMT values should be less than or equal to 0.85 for the stricter criterion and less than or equal to 0.90 for the more lenient criterion (Henseler et al., 2015); Sarstedt et al., 2019). The results showed that all the values were lower than the stricter criterion of 0.85 except performance measure and work design is 0.912 (Table 4). Fornell and Larcker (1981) suggest that, for good discriminant validity, square root of AVE of a construct must be higher than the construct correlations with other constructs (Khadayat et al., 2024). As the square root of the AVE for each construct in the table is greater than its correlation with other constructs, all the constructs satisfy the FNL requirements for discriminant validity. Table 6 shows that the items' cross-loading values with other constructs are all below 0.1. So, there is no cross-loading problems (Hair et al., 2020).

Therefore, based on the results of both the reliability and validity tests, it can be concluded that the measurement items used in the study are both valid and reliable. This is important because it indicates that the measures used in the study accurately and consistently represent the constructs being studied.

Table 4: *Discriminant Validity: Heterotrait-monotrait (HTMT) Criterion*

	C	M	MF	PM	WD
Communication					
Motivation	0.590				
Managerial Factor	0.880	0.607			
Performance Measure	0.640	0.790	0.821		
Work Design	0.727	0.680	0.829	0.912	

Source: *Field Survey, 2023*

Table 5: *Discriminant Validity: Fornell and Larcker Criterion*

	C	M	MF	PM
C	0.793			
M	0.501	0.823		
MF	0.770	0.566	0.797	
PM	0.564	0.777	0.726	0.817
WD	0.641	0.673	0.736	0.810

Table 6: *Cross Loadings*

	C	**M**	**MF**	**PM**	**WD**
C1	**0.693**	0.370	0.390	0.384	0.430
C2	**0.861**	0.392	0.617	0.487	0.592

C3	**0.834**	0.367	0.554	0.402	0.456
C4	**0.787**	0.347	0.687	0.435	0.472
C5	**0.780**	0.448	0.755	0.505	0.563
M1	0.464	**0.825**	0.511	0.716	0.671
M5	0.351	**0.739**	0.413	0.545	0.409
MF1	0.645	0.401	**0.693**	0.476	0.544
MF2	0.623	0.432	**0.823**	0.591	0.563
MF3	0.647	0.428	**0.815**	0.545	0.634
MF4	0.596	0.443	**0.832**	0.617	0.588
MF5	0.586	0.434	**0.811**	0.592	0.575
MF6	0.603	0.456	**0.800**	0.634	0.617
PM1	0.478	0.553	0.592	**0.776**	0.696
PM2	0.295	0.430	0.534	**0.696**	0.532
PM3	0.398	0.647	0.542	**0.854**	0.659
PM4	0.546	0.678	0.581	**0.852**	0.662
PM5	0.549	0.709	0.706	**0.892**	0.740
WD1	0.573	0.565	0.639	0.670	**0.836**
WD2	0.590	0.525	0.654	0.677	**0.820**
WD3	0.489	0.585	0.567	0.722	**0.839**
WD4	0.517	0.501	0.595	0.653	**0.848**
WD5	0.527	0.538	0.640	0.678	**0.859**

Source: *Field Survey, 2023*
Note: *C= Communication, M= Motivation, MF= Managerial Factor, PM= Performance Measure, WD= Work Design*

4.4.3 Goodness of Fit

To achieve a good fit between the model and the data, the SRMR value should be less than 0.1 (Basnet et al., 2023), and the NFI value should fall between 0 and 1. Result shows that the SRMR value is 0.076 and the NFI value is 0.733, which exceeds the necessary threshold values, indicating a satisfactory goodness of fit (GOF) between the model and the data.

4.4.4 Structural Equation Model

Structural model was tested with four hypotheses. Structural Model shows the coefficient and R^2 value where R2 value depicts the predictive power of the model as the amount of variance explained in construct in the model.

Figure 4: *Structural Model Result*

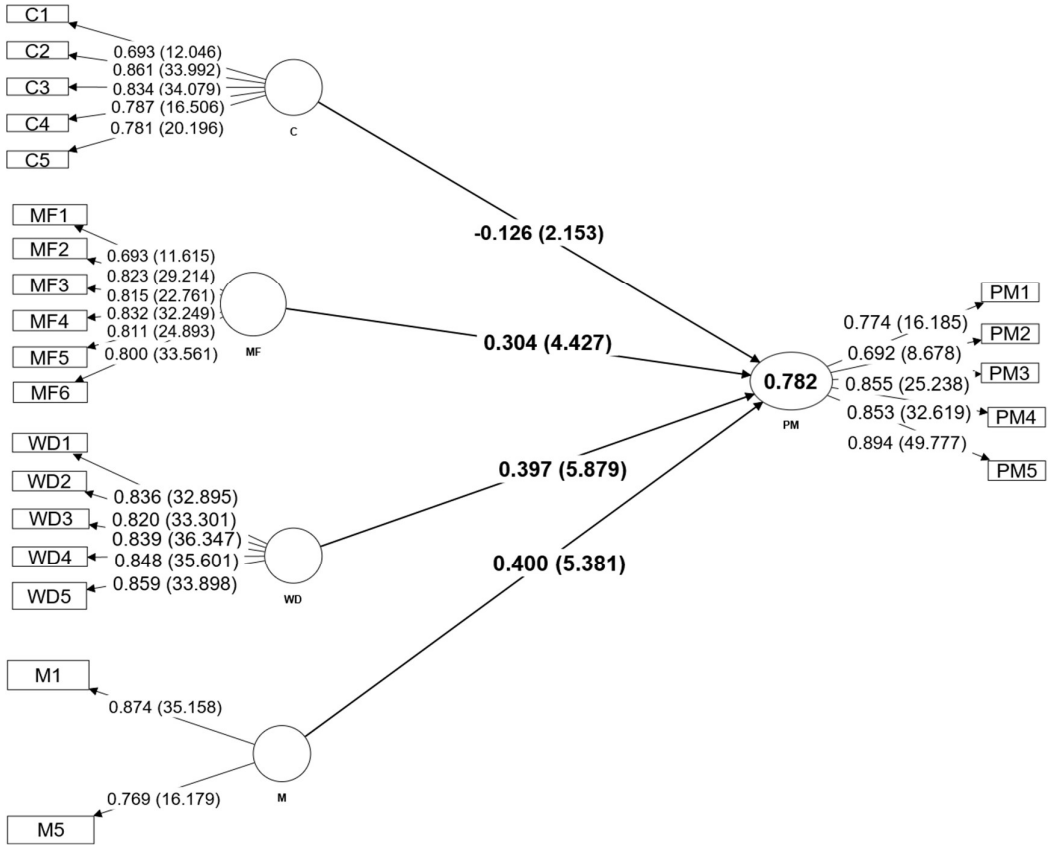


Table 7: *Hypothesis Result*

Hypothesis	Path	Beta	SD	t values	p values	LL 2.5%	UL 97.5%	Result
H1	**C -> PM**	-0.126	0.058	2.153	0.031	-0.232	-0.002	Supported
H2	**M -> PM**	0.4	0.074	5.381	0	0.242	0.534	Supported
H3	**MF -> PM**	0.304	0.069	4.427	0	0.162	0.434	Supported
H4	**WD -> PM**	0.397	0.068	5.879	0	0.274	0.539	Supported

Source: *Field Survey, 2023*

Note: C= *Communication, M= Motivation, MF= Managerial Factor, PM= Performance Measure, WD= Work Design*

The structural model shows the relationships (paths) between the constructs on the proposed model. H1 examines whether C is related to PM. The results showed that C has significant effect (total effect) on PM (β = -0.126, 2.153, $p < 0.05$). Hence, H1 was supported. H2 examines whether M is related to PM. The results showed that M has significant effect (total effect) on PM (β = 0.4, t = 5.381, $p < 0.05$). Hence, H2 was also supported. H3 examines whether MF is related to PM. The results showed that MF has a significant effect (total effect) on PM (β = 0.304, t = 4.427, $p < 0.05$). Hence, H3 was supported. H4 examines whether WD is related to PM. The results showed that it has a significant effect (total effect) on PM (β = 0.397, t = 5.879, $p > 0.05$). Hence, H4 was supported.

5. Discussion

This study examines the impact of organizational ergonomics in work effectiveness of industry in Kathmandu valley. Five different constructs, including interaction with nature (C),

Communication (M), Motivation (MF), Motivation Factor (PM), Performance Measure (WD) and Work design, were used to work effectiveness. This research was conducted to identify the general understanding of organizational ergonomics, including the challenges they faced and potential solutions to those challenges. The p-values obtained for the analyzed data were as follows: 0.028 and 0.000. The study conducted hypothesis testing, was found that out of the five hypotheses, hypothesis (especially H1, H2, H3 and H4) showed significant results. These significant findings provide evidence to support the research question being investigated.

Hypothesis 1 (H1) proposed that communication is positively related to the performance measure. The p-value of 0.031 supports this hypothesis, it indicates a statistically significant relationship between communication and performance measures. Similarly, the study conducted by Alsayed et al. (2000) has shown similar results where communication has significant relationship between performance measures. Hypothesis 2 (H2) proposed that motivation is positively related to performance measures. The p-value of 0.000 supports this hypothesis, it indicates a statistically significant relationship between motivation and performance measure. Similarly, the study conducted by Wu (2024) has shown a similar result where communication has significant relationship between performance measures.

Furthermore, as per hypothesis, H3 managerial factor positively influences performance measures. It indicates that managerial factors directly affect the performance measure. A similar study was found by Taghipour et al. (2022) reveals that managerial factors affect performance of employees. This study also supports the H4 hypothesis, which argues that work design has an impact on performance measures. A study by Nguyen et al. (2021) revealed a similar outcome.

To summarize, organization ergonomics practices in Nepalese organizations are not as advanced as in developed countries due to a lack of understanding among top-level management, limited successful people management patterns, and a centralized organizational structure. These practices are still in a primitive stage and have not been fully implemented to improve employee work effectiveness. A study was conducted to determine the effects of organizational ergonomics on employee performance in Nepalese industrial organizations. The study found that the level of organizational ergonomics awareness in the country is low and that employers are not aware of the benefits of implementing organizational ergonomics in employees' daily activities. The study also identified factors hindering the implementation of organizational ergonomic practices and best practices and methods adopted by various organizations across industries.

6. Conclusion

Organizational ergonomics plays crucial role in employee work effectiveness of industrial employees in Kathmandu Valley. So, organizations should prioritize workload management, clear communication, and decision-making skills to enhance productivity. Moreover, the study recommends that organizations should address the challenges related to organizational ergonomics and provide training and resources to employees to improve their work effectiveness.

To examine the ergonomics practice in the workplace of industry: Work effectiveness of employees is influenced by the amount of workload they are assigned and their level of motivation. This can lead to several negative outcomes, such as poor communication, increased employee turnover, negative work environment, and poor work performance. When employees are faced with challenging tasks, their performance is more likely to decline as their workload increases.

To investigate the impact of ergonomics factors on employee performance: In the context of Kathmandu Valley industrial estates, the study revealed various organizational ergonomics-related challenges that hinder employee work effectiveness. These challenges include the lack of specific training and career growth opportunities, leaders putting employees under pressure, conflicts with coworkers or leaders, job insecurity, unclear vision, poor communication, unequal task distribution, and repetitive job duties.

To identify problems faced by employees due to bad organizational ergonomics: Effective plans and policies are a crucial solution for addressing organizational challenges and adapting to the current situation in the country. Providing adequate training and development programs and prioritizing mental health are also important steps to overcome these challenges. In contrast, offering flexible working benefits was found to be of least importance to the respondents.

To recommend managerial solutions for ergonomics practice to enhance employee performance: The study recommends that plans and policies should be clearly stated and implemented effectively, open communication should be encouraged, proper planning should be prioritized, and a flexible working environment should be provided to enhance organizational effectiveness. Employee work satisfaction and motivation are among the primary reasons for turnover and early retirement in other countries. In Nepal, the lack of job opportunities is the focus for employees.

Employee work effectiveness of employee work is reflected in organizational performance, not only in learning and development of organization but also in interpersonal dynamics and ergonomic factors such as teamwork, communication, appropriate plans and policies, and organizational structure. Policymakers have introduced various policies to address employee satisfaction and work productivity issues, such as good service practices, work-life balance strategies, employee assistance programs, and training and organizational policy formulation. Employers should recognize their employees' problems by understanding their work efficiency and fulfilling their common interest in this increasingly competitive market.

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