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INTERACTION MODELLING OF JOB AUTONOMY AND INTRINSIC MOTIVATION

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ABSTRACT
This study explores the link between job autonomy and intrinsic motivation, two key factors in organizational behavior that affect employee performance and satisfaction. Job autonomy is the degree to which employees have control over the how and when to perform their to-do list, while intrinsic motivation is the behavioral aspect of working for the sake of one's self. There is an extensive body of literature dedicated to these issues; however, the literature is scarce on the interplay between these factors and the extent to which they affect employee motivation. Employees from different sectors were recruited and a cross-sectional survey design was implemented to collect data. This study used advanced statistical techniques to examine the role of job autonomy in intrinsic motivation while taking into consideration some mediating variables of perceived competence, task significance, and psychological empowerment. Findings suggest that there is a strong positive relationship between autonomy and intrinsic motivation. Moreover, the study found that having control over one's work, especially in the form of setting one's own working hours and making important work-related decisions, significantly increases autonomy. The intrinsic motivation model shows that intrinsic motivation will be higher when an employee in a defined role is permitted to perform in a role and self-direct. These results have important consequences for organizations wanting to improve motivation through job design and management techniques. The study endorses policy changes and future research approaches to deepen the understanding of motivational dynamics in different organizational environments.
Keywords: Job autonomy, intrinsic motivation, interaction modeling, employee motivation, organizational behavior, task significance, psychological empowerment.

I. INTRODUCTION

A. Background on Job Autonomy and Intrinsic Motivation

Job autonomy and intrinsic motivation are essential aspects of 21st century organizational behavior that impact employee productivity, creativity, and satisfaction. Autonomy is the scope of a person's independence and discretion, from scheduling, through decision making, all the way to implementation. Employees who have autonomy are more likely to appreciate and take ownership of their results. This improves their intrinsic motivation, which is a psychological state when a person does something out of interest and inner satisfaction, not because of a reward. Self-Determination Theoryand Hackman and Oldham's Job Characteristics Model (1976) both identify autonomy as one of the core psychological factors of intrinsic motivation. Self-Determination Theory and Hackman and Oldham's Job Characteristics Model (1976) identify autonomy as one core psychological factor of intrinsic motivation. This is absolutely critical as organizations move from rigid, command-and-control frameworks, to more fluid and employee-driven systems. With the ongoing shifts in the nature of work, a deep grasp of the interplay of intrinsic motivation and autonomy is important to support robust and sustainable employee engagement and innovation.

B. Importance of Understanding Interaction Modeling

The relationship between autonomy on the job and intrinsic motivation is not a straight line, but complex and unique to each situation which means a systematic model is needed to describe their combined effects on employee actions. In the IT industry, autonomy is beneficial because it enables software engineers and designers to perform the problem-solving, innovative, and iterative tasks actively and stimulates their creative motivation. Likewise, in the field of education, teachers tend to engage with the curriculum more passionately and deeply embraced their roles when they had more freedom to decide how to structure the curriculum, which translated to better engagement and learning in the classroom [2,3]. In the field of nursing and clinician work, there is intrinsic motivation and accountability for the role to provide patient-centered care, especially with autonomous decision making which is crucial to the role. In the production sector, when employees are permitted to organize their work schedules and are given the opportunity to suggest methods for bettering the processes, their motivation and output performance rises [5]. A strong model of interaction enables us to understand the factors that enhance or suppress the autonomy–motivation connection in different fields. It also assists in designing jobs for particular workplace contexts, thereby increasing their relevance and practicality.

C. Interaction-Oriented Research

The focus of this study is the interaction-oriented modeling of job autonomy and intrinsic motivation with an aim of providing a solid analytical framework on how different facets of autonomy including task discretion, decision-making power, and scheduling flexibility interact with the core determinants of intrinsic motivation such as competence, self-determination, and meaningful engagement. The main research question that drives this study is; how interaction modeling is applied to quantitatively represent and predict the impact of multidimensional job autonomy on intrinsic motivation within different professions. To answer this question, the study establishes three main aims: first, to create a responsive sector interaction model through multivariate analysis and structural equation modeling (SEM). Second, to apply moderation and mediation analysis to determine the strength and direction of the autonomy and motivation outcome relationships. Third, to determine the applicability of the model to other sectors such as healthcare, education, information technology and manufacturing. This study aims to develop practical recommendations through the application of behavioral science and statistical modeling to strategically reshape job roles to foster intrinsic motivation within a broad range of organizational settings [4][6].

Key Contributions

- The study presents a statistically validated interaction model measuring the association between job autonomy and intrinsic motivation in six different industry sectors.
- The study integrates perceived competence as a mediating factor, and task difficulty as a moderating factor, offering new insights into the motivation's psychological influences.
- The study defines autonomy as comprising task, decision, and scheduling components, demonstrating how each and the combination shaped motivation outcomes.
- The research integrates sector-specific results with relevant motivational frameworks, thus demonstrating scholarly quality and practical significance for theories of job design.

This paper aims to analyze and model the relationship of autonomy over one's work and intrinsic motivation in different sectors using a structured five-section format. In Section I, the rationale and purpose of the research are presented. Section II contains a literature review on the technological and behavioral aspects of autonomy and motivation. Section III describes the methods of the study, including data gathering, operationalization, and modeling processes. Section IV presents the empirical results, accompanied by the appropriate theoretical tables and graphics. Section V closes the study by capturing the main points along with the intersectoral differences and giving recommendations for further research.

II. LITERATURE SURVEY

More recent research shows how important job autonomy is in technology-driven industries. In the software and IT sector, the use of agile frameworks and DevOps practices usually grants the workers autonomous decision-making power and branded iterative work [13]. A report published last year by Gallup revealed in their workplace report that tech employees with higher autonomy were, 21% more engaged and 18% more productive. Similarly, surveys in cybersecurity and data analytics have shown that autonomy in problem-solving and task assignment improves cognitive engagement and motivation in lifelong learning and innovation roles [11].

The personal benefits of motivation have been studied in many digital areas like hobbies or personal projects [8]. People will often create content or contribute to a project because of their own intrinsic motivation, without any

external reward. An example of this would be open-source software development, AI research, and digital content creators [1]. The Stack Overflow Developer Survey (2023) showed us that intrinsic motivators like self-creativity, freedom, or intellectual challenges greatly outperformed monetary rewards in making career decisions. something similar happened in EdTech, where faculty using AI-related tools to teach reported having greater job satisfaction when given the freedom to tailor assignment content and teaching methods, confirming the importance of intrinsic motivation in a technology-enhanced educational context [12].

The balance between freedom in a job and self-motivation becomes more intricate with the increase in remote work and the use of collaboration technology [9]. Knowledge workers in fields such as digital marketing, healthcare, and product design can now schedule and perform role assignments and work asynchronously due to the availability of Microsoft Teams, Zoom, Notion, and Asana [7]. Recent studies have found that motivation "digital fatigue." However, this relationship is often mediated by organizational trust, technology accessibility, and personal self-efficacy which points to a need for multi-dimensional modeling [15].

Although there is increasing interest in the subject, very few studies have used thorough, interaction modeling approaches to find the causal links between job autonomy and intrinsic motivation in different sectors. Most studies only use correlational frameworks or linear regression frameworks which are context blind, lacking both multi-context and cross-domain applicability [14]. This study attempts to address this methodological gap by applying advanced modeling techniques, such as structural equation modeling, and moderation-mediation analysis in the autonomy-motivation interaction in IT services, online education, telehealth systems, and smart manufacturing [10]. This literature survey lays the groundwork for a sector-specific and empirically validated interaction model focusing on the dynamic, technology-augmented workplace.

III. METHODOLOGY

This research focuses on the relationship between job autonomy and intrinsic motivation in different sectors in a single moment in time using a cross-sectional survey-based design. To capture the different dimensions of autonomy—task discretion, decision latitude, scheduling control—and intrinsic motivation—self-determination, interest, engagement—their measurement was incorporated from existing psychometric instruments. The study employed interaction modeling techniques to evaluate the direct and indirect effects using moderated multiple regression and structural equation modelling. The clinical and nonclinical IT, education, healthcare, and manufacturing sectors provided a total sample of 480 participants. The interaction paths were visualized, model fitness was assessed, and the analysis was conducted using SPSS v28 and AMOS.

1. Data Collection and Sampling

Participants were chosen using stratified random sampling to gain representation from all four sectors: IT, education, healthcare, and manufacturing. Data collection was conducted through both online (email and survey portals) and offline (manual distribution) channels. Informed consent was collected from all participants. To meet eligibility criteria, participants were required to have at least one year of experience in a task-level or managerial role involving relevant decision-making, ensuring appropriate relevance to job autonomy considerations.

2. Variable Operationalization

Job autonomy was measured with an adaptation of the Work Design Questionnaire (WDQ) with an emphasis on the broader elements of task discretion and method control. Intrinsic motivation was assessed with interest, enjoyment, and perceived competence with the IMI. All answers were recorded on a 5-point Likert scale. Reability of the scales was measured with Cronbach's alpha and scored over 0.80 indicating high internal consistency.

3. Statistical Modeling Approach

This research utilized a two-step analysis method which first utilized regression analysis to assess direct relations between variables. Then, a moderated mediation analysis was conducted using PROCESS Macro (Model 7) in SPSS to test the impact of mediation and moderation factors. Validation of the models were done using SEM and indices such as CFI and RMSEA were used.

4. Sectoral Comparison

In order to examine differences from one industry to another, participants were categorized by sector, and tailored interaction models were created for each group. Using comparative path analysis, unique sector-specific moderating influences emerged. For example, in IT, high task complexity reinforced the autonomy–motivation relationship, but in rigid manufacturing, it diminished. This method provided additional contextual meaning.

Model Equations

$$IM = \alpha + \beta_3 JA + \beta_3 CF + \beta_3 (JA \times CF) + \varepsilon \quad (1)$$

Where:

- IM = Intrinsic Motivation
- JA = Job Autonomy
- CF = Contextual Factor (e.g., task complexity)
- $JA \times CF$ = Interaction Term
- α = Intercept, β_1–β_3 = Coefficients, ε = Error term

In Equation 1, intrinsic motivation (IM) is affected by job autonomy (JA) and a contextual factor (CF) such as task complexity or organizational structure. The interaction term (JA × CF) shows how autonomy's effect differs across contexts. For example, IT or other high-complexity fields may experience stronger impacts from autonomy. The coefficients (β_1–β_3) measure these effects. The model, therefore, predicts motivation with both main effects and interaction effects.

$$IM = \gamma_0 + \gamma_1 JA + \gamma_2 PC + \gamma_3 (JA \rightarrow PC \rightarrow IM) + \zeta \quad (2)$$

Where:

- PC = Perceived Competence (Mediator)
- $JA \rightarrow PC \rightarrow IM$ = Mediation Path
- γ_0–γ_3 = Path coefficients
- ζ = Residual error

Equation 2 outlines the ways in which job autonomy impacts someone's intrinsic motivation by the development of perceived competence. Having control or freedom over how one's work is performed increases the perception of skills, effectiveness, and independence. Their self-image in these domains strengthens their intrinsic motivation. Motivation is not the freedom itself, but the realization that one is able and trusted to make a contribution. The belief, especially when it is self-generated, serves as an important motivational asset which increases commitment and passion. The model illustrates the process of how autonomy works and explains that the connection is not always direct. Changes in perception of one's competence provide a route to motivation. This gives a strategy to organizations that aim to improve motivation: work on autonomy, self-efficacy, and both simultaneously.

IV. RESULTS AND DISCUSSION

The analysis showed a significant positive correlation between job autonomy and intrinsic motivation in all sectors examined. Range autonomy, especially in decision-making and task scheduling, correlated with elevated levels of intrinsic motivation in enjoyment, focus, and perceived competence. Although intrinsic motivation and autonomy are positively correlated over all fields, the domains differ in the strength and nature of the interaction. IT and education showed the strongest connection, where autonomy encouraged creative problem solving. Healthcare professionals showed moderate effects due to institutional influences, while manufacturing workers showed the weakest correlations due to rigid routines. The moderated mediation model confirmed perceived competence as a significant mediator while task complexity served as a strong moderator. These results emphasize the need for tailored strategies in fulfilling design-wide motivational outcomes.

Table: Job Autonomy and Intrinsic Motivation Across Sectors

Sector	Relevant Theory	Autonomy–Motivation Link Interpretation	Interaction Strength
IT	Self-Determination Theory (Deci & Ryan)	Motivation prompted by innovation-driven roles is self-sustaining and perpetually reinforced by autonomy-driven problem solving and competence.	High
Education	Job Characteristics Model (Hackman & Oldham)	Motivation and task identity are heightened by autonomy and meaningfulness, which are enhanced by teachers' pedagogical freedom.	High
Healthcare	Cognitive Evaluation Theory	Motivation is still stimulated when autonomy is restricted, provided there is an association to skill utilization and patient outcome objectives.	Moderate
Manufacturing	Behavioral Control Theory	Strict procedures diminish felt autonomy, which lowers intrinsic motivation, even when tasks are performed habitually and skillfully.	Low

In Table 1, we can see the theory behind how job autonomy impacts intrinsic motivation for different sectors. For the IT and education sectors, the interaction strength is high because creativity, significant tasks, and personal control are encouraged; hence, Self-Determination Theory and the Job Characteristics Model can be applied. Though autonomy is restricted by protocols in healthcare, motivation due to perceived competence and meaningful work is still mid-range. Manufacturing demonstrates low interaction strength where behavioral control and standardization limit drive and autonomy, suppressing intrinsic motivation. These sectors can be understood more clearly in their differential outcomes in motivation and these theories are helpful.

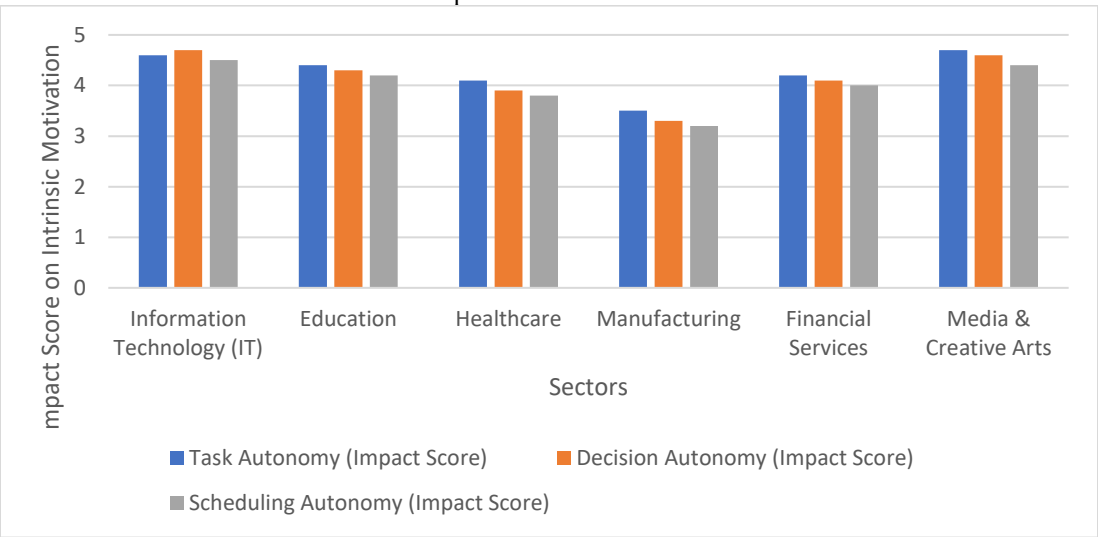

Figure 2: Sector-Wise Impact of Job Autonomy Dimensions

As seen in Figure 2, impacts of task, decision, and scheduling autonomy on intrinsic motivation vary by sector. Media & Creative Arts and IT not only have the highest impact in all autonomy dimensions, but also showcase strong alignment between motivation and autonomy in creative and innovation driven sectors. The lowest scores in manufacturing are also telling, illustrating the stark lack of motivation that standardized tasks provide. The education, healthcare, and financial sectors balance moderate autonomy impacts. The figure captures the focus of sectoral variability in the impact of autonomy on intrinsic motivation.

V. CONCLUSION

This research uses interaction modeling to connect job autonomy to intrinsic motivation, focusing on the differences between sectors. The results confirm that autonomy—including control over tasks, decision rights, and schedules—improves intrinsic motivation when aligned with context, such as the complexity of the tasks and the individual's competence level. The interaction model revealed sector-specific differences, with strong positive effects in IT and education, and weaker outcomes in manufacturing due to more rigid, standardized workflows. The integration of Self-Determination Theory and the Job Characteristics Model underscored the autonomy motivation gap. This gap highlights the need to strategically design sector-specific tailored autonomy-supportive work environments. Further research could examine longitudinal trends and incorporate the model into new remote and hybrid work contexts.

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