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Analysis of Work Motivation Factors Among Experts Affecting Construction Project Productivity (Case Study: USU Sport Science Facility Construction Project)

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ABSTRACT

The construction industry in Indonesia is growing rapidly, making project success highly dependent on human resource management, particularly expert personnel. However, problems such as suboptimal coordination, time pressure, material permit delays, and operational disruptions can reduce expert work motivation, ultimately affecting project productivity. This study aims to identify work motivation factors among construction experts and analyze experts assessments of motivation factors associated with construction project productivity. A descriptive quantitative approach was used, with data collected through interviews and questionnaires administered to 10 experts involved in the Sport Science Building Project at Universitas Sumatera Utara (USU), selected through purposive sampling. Data were analyzed using mean values and the Relative Importance Index (RII). The results show that good teamwork (X21) is the most dominant motivational factor, with an RII of 0.90 (very high category). At the group level, extrinsic factors (RII = 0.825) were more dominant than intrinsic factors (RII = 0.797) and social/self-development factors (RII = 0.775). The highest-ranked productivity indicators are the ability to use time and resources efficiently (Y7) and the ability to coordinate with the team (Y14), both with an RII of 0.85. The findings suggest that teamwork and workplace support are perceived as important in supporting effective coordination and efficient use of time and resources among experts in the studied project.

Keywords: *work motivation, construction experts, project productivity, Relative Importance Index (RII), construction project*

1. Introduction

The construction industry in Indonesia is developing rapidly in line with the growing need for infrastructure and building development. The success of a construction project is largely determined by effective resource management, particularly human resources as the main executors in the field, namely construction experts. Construction experts are personnel who possess specialized skills and competencies evidenced by a Work Competency Certificate (SKK) and are responsible for technical and managerial functions such as planning, supervision, quality control, coordination, and project monitoring. These responsibilities distinguish certified experts from general construction workers because their work requires professional judgment and coordination across project disciplines.

Without the support of professional and motivated workers, the implementation of construction projects has the potential to experience delays as well as a decline in the quality of work results (Nurhayati, 2023). Because experts are responsible for technical and managerial activities, their work is closely connected with project time targets, work quality, and coordination among different disciplines. Motivation-related conditions such as teamwork, adequate work facilities, and professional development may therefore be relevant to how

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experts perceive their ability to perform these responsibilities. High motivation encourages workers to work more disciplined, responsible, and target-oriented, whereas low work motivation can lower work morale and the quality of work as well as increase the risk of project delays. In addition, intrinsic and extrinsic motivation, such as compensation, recognition, and career opportunities, have been shown to significantly affect the performance of construction workers.

On the Sport Science Building Construction Project at Universitas Sumatera Utara (USU), field observations show problems in the form of suboptimal coordination as well as pressure on work-time targets. In addition, there is a critical issue in the procurement aspect, namely delays in the permitting of excavation and fill materials that hinder the main work and cause idle time, as well as operational disruptions due to sudden technical testing and sampling activities. These conditions make the USU Sport Science Facility project a relevant case for examining expert perceptions of work motivation and productivity. The project requires coordination among experts from different technical and managerial roles, while field conditions include time pressure, material-permitting delays, and operational disruptions. This setting provides a practical context for identifying which motivation factors are considered important by the project team.

Based on the above description, this study aims to: (1) identify the factors influencing the work motivation of experts on construction projects, and (2) analyze experts' assessments of the work motivation factors affecting construction project productivity. The contribution of this study is to provide a project-level description of motivation factors considered important by certified experts and to identify productivity indicators receiving the highest assessments within the same project context. Unlike studies focusing broadly on construction workers, this study concentrates on expert personnel involved in a multidisciplinary building project.

2. Method

This study uses a descriptive quantitative approach to describe the condition of work motivation and productivity of experts as they are, without using regression analysis or the assistance of statistical software. Primary data were obtained through direct interviews and questionnaires, while secondary data were obtained from general project data and the organizational structure.

The research was conducted on the Sport Science USU Construction Project, located on Jl. Tri Dharma No. 9, Padang Bulan, Medan City, with PT Nindya Karya as the service provider, a total budget of Rp155,547,000,000, a building area of 12,710 m², and an implementation period of 450 working days. The population of the study was all experts involved in the project, totaling 10 people. The population consisted of 10 experts involved in the project. All identified experts meeting the study criteria were included as respondents, namely experts holding an SKK and directly involved in the technical or managerial aspects of the project.

The questionnaire was developed from indicators reported in previous studies on work motivation and construction productivity (Apriani et al., 2024; Setiawan & Soekiman, 2023; Widyaningsih, 2022; Ajijah et al., 2021; Febrian et al., 2021; Nurhayati, 2023; Faustine & Waty, 2022; Tuanany et al., 2023). The indicators were reviewed across these studies and synthesized based on the motivation and productivity factors identified in their findings. The resulting indicators were then organized into the work motivation variable (X) and productivity variable (Y) for application to the context of experts involved in the USU Sport Science Facility project. So, that repeated statistical testing of validity and reliability was not carried out. The work motivation variable (X) consisted of 22 items divided into three groups, namely extrinsic factors (X1-X10), intrinsic factors (X11-X18), and social and self-development factors (X19-X22). The productivity variable (Y) consisted of 15 items covering the dimensions of time, quality, efficiency, individual, and team (Y1-Y15).

Data were analyzed using two descriptive statistical techniques, namely the mean value and the Relative Importance Index (RII). The mean value was calculated using the formula $Me = \Sigma Xi / n$, to determine the tendency of respondents' assessments of each factor. The RII value was calculated using the formula $RII = \Sigma W / (A \times N)$, where ΣW is the total score of respondents' answers, A is the highest value on the scale (4), and N is the number of respondents (10). The RII value was categorized as follows: 0.00-0.25 (Very Low), 0.26-0.50 (Low), 0.51-0.75 (High), and 0.76-1.00 (Very High). The RII analysis was used to rank the relative importance of the motivation factors and productivity indicators based on respondents' assessments. When

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two or more items have the same RII value, they are assigned the same rank (tie/shared rank). For example, the motivation factors with an RII of 0.85 are all ranked 3, while factors with an RII of 0.825 are assigned rank 4. The ranking is therefore based on the unrounded RII values used in the analysis.

3. Results and Discussion

3.1 Respondent Characteristics

The respondents in this study numbered 10 experts representing 10 different positions in the project (Site Engineer Manager, Structural Expert, Architecture Expert, MEP Expert, Construction K3 Expert, Quantity Engineer, Quality Control, Inspector, Project Control, and Cost Control), each with a proportion of 10.0%. In terms of education level, 80.0% of respondents held a Bachelor's degree (S1) and 20.0% held a professional qualification (Engineer/Architect). In terms of work experience, respondents were fairly evenly distributed across the ranges of 5-10 years (30.0%), 15-20 years (30.0%), and more than 20 years (30.0%), as well as 10-15 years (10.0%). This composition indicates that the respondents possess a competency background and experience adequate to provide a representative assessment of work motivation factors and productivity.

3.2 Work Motivation Factor Analysis

The RII analysis of the 22 work motivation factor items shows that all factors fall into the High to Very High category. The 22 factors with the highest RII values are presented in Table 1.

Table 1 Work Motivation Factors Based on RII

Rank	Code	Motivation Factor	Group	RII	Category
1	X21	Good teamwork	Social and Self-Development	0,90	Very High
2	X8	Availability of adequate work facilities	Extrinsic	0,875	Very High
3	X3	Comfortable and healthy work environment	Extrinsic	0,85	Very High
3	X4	Team cohesion	Extrinsic	0,85	Very High
3	X5	Provision of bonuses and allowances	Extrinsic	0,85	Very High
4	X1	Suitability of salary received	Extrinsic	0,825	Very High
4	X2	Flexibility of working time	Extrinsic	0,825	Very High
4	X9	Provision of leave and accommodation facilities	Extrinsic	0,825	Very High
4	X11	Opportunity to gain new knowledge/experience	Intrinsic	0,825	Very High
4	X12	Opportunity for career/position development	Intrinsic	0,825	Very High
4	X16	Sense of responsibility toward work	Intrinsic	0.825	Very High
5	X7	Occupational health and safety guarantee	Extrinsic	0.800	Very High
5	X10	Good communication among staff	Extrinsic	0.800	Very High
5	X13	Suitability of work with area of expertise	Intrinsic	0.800	Very High
5	X14	Suitability of work with interests and abilities	Intrinsic	0.800	Very High
5	X15	Previous work experience	Intrinsic	0.800	Very High
6	X17	Satisfaction after completing work	Intrinsic	0.775	Very High
6	X19	Opportunity to build relationships with other parties	Social and Self-Development	0.775	Very High
6	X20	Team discussion and exchange of ideas	Social and Self-Development	0.775	Very High
7	X6	Regularity of working hours	Extrinsic	0.750	High
8	X18	Opportunity to obtain professional certification	Intrinsic	0.725	High

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9	X22	Recognition of performance from superiors	Social and Self-Development	0.650	High

Source: Author's analysis (2026)

The results show that all 22 motivation factors are categorized as High or Very High. Good teamwork (X21) has the highest RII (0.900), followed by adequate work facilities (X8) with an RII of 0.875. At the group level, extrinsic factors have the highest average RII (0.825), followed by intrinsic factors (0.797) and social and self-development factors (0.775). Recognition from superiors (X22) has the lowest RII (0.650), although it remains in the High category.

3.3 Productivity Indicators Analysis

The assessment of construction productivity was further analyzed using the Relative Importance Index (RII). The results for the 15 productivity indicators assessed by the experts are presented in Table 2.

Table 2 Productivity Indicators Based on RII

Rank	Code	Productivity Indicators	Group	RII	Category
1	Y7	Ability to use time and resources efficiently	0.850	Very High	1
1	Y14	Ability to coordinate with the team	0.850	Very High	1
2	Y3	Ability to manage working time	0.825	Very High	2
2	Y6	Ability to maintain work quality consistently	0.825	Very High	2
2	Y13	Ability to work together in a team	0.825	Very High	2
3	Y1	Ability to complete work on time	0.800	Very High	3
3	Y4	Ability to produce work according to standards	0.800	Very High	3
3	Y5	Ability to minimize work errors	0.800	Very High	3
3	Y8	Ability to avoid material/cost waste	0.800	Very High	3
3	Y9	Ability to optimize use of work equipment	0.800	Very High	3
4	Y10	Ability to achieve work targets	0.775	Very High	4
4	Y15	Active contribution to the team	0.775	Very High	4
5	Y2	Ability to work effectively under time pressure	0.750	High	5
6	Y11	Ability to work consistently	0.725	High	6
7	Y12	Ability to work independently	0.675	High	7

Source: Author's analysis (2026)

The productivity indicators range from High to Very High categories. The highest-ranked indicators are the ability to use time and resources efficiently (Y7) and the ability to coordinate with the team (Y14), both with an RII of 0.850. The lowest-ranked indicator is the ability to work independently (Y12), with an RII of 0.675, which remains in the High category.

3.4 Comparison of Motivation Factors and Productivity Indicators

A comparison of the RII results shows a correspondence between highly ranked motivation factors and productivity indicators. Good teamwork (X21) has the highest motivation RII (0.900), corresponding with team coordination (Y14), which has an RII of 0.850. Similarly, adequate work facilities (X8) has a high RII (0.875), corresponding with efficient use of time and resources (Y7), which also has an RII of 0.850. These patterns indicate that teamwork and workplace support are perceived as important aspects of expert productivity in the studied project. However, the findings are descriptive and do not establish a direct causal relationship between motivation factors and productivity.

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3.5 Discussion

The finding that good teamwork (X21) is the highest-ranked motivation factor is consistent with previous studies highlighting the importance of working relationships and team collaboration in construction worker performance. Teamwork reflects social and affiliation needs that encourage individuals to collaborate and contribute to project objectives. The high ranking of extrinsic factors, including salary, work facilities, work environment, and bonuses, is also consistent with Apriani et al. (2024), who identify compensation and working conditions as important factors related to construction worker motivation and productivity. Similarly, Nurhayati (2023) emphasizes the importance of safety guarantees in construction work.

The findings can also be interpreted through the motivation theories used in this study. From Maslow's perspective, the high RII values for salary (X1), occupational health and safety guarantees (X7), and work facilities (X8) reflect physiological and safety needs, while teamwork (X21) and career development (X12) represent higher-level social and self-development needs. From Alderfer's ERG perspective, the findings reflect the simultaneous presence of existence needs (salary, facilities, and safety), relatedness needs (teamwork and communication), and growth needs (career development and professional certification). This interpretation is consistent with the ERG view that these needs may operate simultaneously rather than sequentially. From McClelland's perspective, responsibility (X16) and career development (X12) reflect achievement needs, while teamwork (X21) and communication among staff (X10) reflect affiliation needs. The relatively low RII for recognition from superiors (X22) suggests that hierarchical recognition was less highly prioritized by the experts in the studied project.

Overall, the theoretical perspectives help explain the pattern of RII results by showing that experts motivation involves basic working conditions, social relationships, and opportunities for development. These interpretations should be understood as explanatory perspectives on the descriptive findings rather than evidence of causal effects between motivation factors and productivity.

3.6 Practical Implications

The findings provide several practical considerations for project managers. First, routine team coordination and communication should be strengthened, as good teamwork (X21) received the highest RII (0.900). Second, adequate work facilities (X8) and a comfortable and healthy work environment (X3) should be maintained to support experts in performing their responsibilities. Third, opportunities to gain professional knowledge and experience (X11) and career development (X12) can be incorporated into expert workforce management. These measures provide practical considerations based on the perceptions of experts in the studied project.

3.7 Study Limitations

This study is limited to one construction project, namely the USU Sport Science Facility project, and involves 10 experts. Therefore, the findings represent the perceptions of these experts within the studied project and should not be directly generalized to other construction projects or construction experts. In addition, the study uses descriptive analysis based on mean values and the Relative Importance Index (RII); therefore, the findings do not establish causal relationships between work motivation and productivity.

4. Conclusion

Based on the descriptive analysis, the work motivation factors examined in this study are grouped into extrinsic factors (X1–X10), intrinsic factors (X11–X18), and social and self-development factors (X19–X22). At the individual-factor level, good teamwork (X21) has the highest RII (0.900), while recognition of performance from superiors (X22) has the lowest RII (0.650) among the motivation factors examined. For productivity, the highest-ranked indicators are the ability to use time and resources efficiently (Y7) and the ability to coordinate with the team (Y14), both with an RII of 0.850.

The correspondence between the highly ranked motivation and productivity indicators suggests that teamwork and workplace support are perceived as important aspects of expert productivity in the studied project. However, because the analysis is descriptive and the study involves only one project and 10 experts,

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the findings represent project-level perceptions and should not be interpreted as evidence of direct causal effects or generalized to all construction experts and projects.

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6. Conflict of Interest

The authors of this work, whose names are stated below, attest to the absence of conflicts of interest.

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