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Mapping Green Organizational Resources Across Employee Groups in Indonesia's Palm Oil Industry

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ABSTRACT

Objectives: This study aims to map the current profile and distribution of Green Human Capital (GHC), Green Capability (GC), and Green Knowledge Management (GKM) across employee groups in an Indonesian palm oil company.

Methodology: A quantitative descriptive survey was conducted among 145 managerial and supervisory employees of PT Sawit Sumbermas Sarana Tbk using a five-point Likert-scale questionnaire. GHC was assessed through knowledge, skills, competencies, attitudes, and values; GC through foresight, adaptive, and absorptive capability; and GKM through acquisition, sharing, storage, and application. Mean scores and standard deviations were used to evaluate the level and relative strengths of each construct and dimension.

Finding: The findings indicate very high levels of all three green organizational resources, with Green Human Capital scoring highest ($M = 4.459$), followed by Green Capability ($M = 4.323$) and Green Knowledge Management ($M = 4.303$). Among the dimensions, Green Foresight Capability recorded the highest mean ($M = 4.453$), while Green Absorptive Capability showed the lowest ($M = 4.147$), indicating a relatively lower dimension across employee groups. Green Knowledge Sharing also showed a comparatively lower mean ($M = 4.269$).

Conclusion: The findings indicate that strong individual green orientation should be accompanied by organizational mechanisms for external learning, knowledge sharing, technology adoption, and cross-level integration.

Keywords: Green Human Capital; Green Capability; Green Knowledge Management; Organizational Diagnostic; Palm Oil Industry.

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INTRODUCTION

Sustainability has moved from a peripheral responsibility toward a core organizational concern. Environmental regulation, stakeholder scrutiny, resource constraints, and climate-related risks increasingly require firms to build internal capacity for environmentally responsible decision-making. Recent research applying the Natural Resource-Based View (NRBV) shows that sustainability-oriented resources and capabilities can be integrated with

organizational strategy to support environmental and business outcomes (Alkaraan et al., 2024; Mishra & Yadav, 2021).

The issue is especially relevant to Indonesia's palm oil industry, where environmental stewardship is closely connected with operational efficiency, legitimacy, and long-term competitiveness. Palm oil firms must respond simultaneously to environmental expectations, resource-efficiency demands, stakeholder scrutiny, and evolving sustainability requirements. These conditions make internal organizational readiness important. PT Sawit Sumbermas Sarana Tbk (SSMS), an integrated palm oil company, offers a relevant setting for examining how employees and organizational systems perceive green resources within an operationally intensive industry.

Recent studies have demonstrated the relevance of green human resources, organizational capabilities, and knowledge management to environmental and sustainability outcomes (Doghan, 2024; Joshi et al., 2023; Yu et al., 2022). However, much of the existing literature emphasizes relationships and causal effects among variables, with relatively limited attention to the current level and dimensional profile of these organizational green resources. Green Human Capital (GHC) captures the environmental knowledge, skills, competencies, attitudes, and values embedded in employees. Recent evidence from Indonesia also reports associations between GHC, environmental awareness, sustainable innovation, and organizational sustainability (Pratiwi et al., 2025).

Green Capability (GC) represents the organizational capacity to anticipate environmental developments, adapt work processes, and absorb relevant external knowledge. Recent research identifies green capability as an organizational mechanism linked with green performance and sustainability-oriented practices (Doghan, 2024). Green Knowledge Management (GKM), meanwhile, concerns the processes through which environmental knowledge is acquired, shared, stored, and applied. The development and validation of a GKM scale confirms these dimensions as a structured way of assessing organizational green knowledge processes (Yu et al., 2022).

Therefore, this study adopts a descriptive perspective to map the current profile and distribution of Green Human Capital (GHC), Green Capability (GC), and Green Knowledge Management (GKM) across employee groups in an Indonesian palm oil company. Rather than examining causal relationships among these constructs, the study focuses on identifying their descriptive levels, dimensional profiles, and patterns across employee groups based on gender, work division, job level, and tenure. Accordingly, this study addresses the following research question: "What is the current profile and distribution of Green Human Capital, Green Capability, and Green Knowledge Management across employee groups in an Indonesian palm oil company?"

This study contributes by providing a descriptive mapping of green organizational resources across employee groups, offering insights into the current profiles of Green Human Capital, Green Capability, and Green Knowledge Management within an Indonesian palm oil company. The findings provide practical insights for strengthening human resources, organizational capabilities, and knowledge management to support sustainability-oriented transformation.

LITERATURE REVIEW

Natural Resource-Based View and green organizational resources

The Natural Resource-Based View (NRBV) places environmental challenges within the strategic management of organizational resources and capabilities. Recent empirical studies continue to use NRBV to explain how firms mobilize environmental resources, capabilities, and strategic practices to address sustainability challenges (Alkaraan et al., 2024; Mishra & Yadav, 2021). In the present study, NRBV is used as a theoretical lens for organizing the descriptive assessment of green organizational resources, rather than for testing causal relationships.

From an NRBV perspective, GHC, GC, and GKM are treated as complementary intangible organizational resources. GHC represents the employee-level foundation, GC represents organizational capacity to anticipate and adapt to environmental demands, and GKM represents the organizational process through which environmental knowledge is mobilized. The framework therefore focuses on the presence and distribution of these resources across employee groups, consistent with recent sustainability-oriented capability research (Alkaraan et al., 2024; Royer & Simon, 2024).

Green Human Capital

Green Human Capital (GHC) refers to the environmental knowledge, skills, competencies, attitudes, and values embedded in employees that support environmentally responsible activities within organizations. As a human-centered organizational resource, GHC reflects the extent to which employees possess and internalize attributes needed to translate environmental objectives into everyday work practices. Recent studies continue to position GHC as an important resource associated with sustainability-oriented organizational outcomes (Badwy et al., 2026; Pratiwi et al., 2025).

In the context of this study, GHC is operationalized through five dimensions: green knowledge, green skills, green competencies, green attitudes, and green values (Badwy et al., 2026). These dimensions capture different aspects of employees' environmental orientation, ranging from their understanding of sustainability objectives and ability to apply environmentally responsible practices to their willingness, commitment, and values toward environmental responsibility. Examining these dimensions separately can reveal where employee readiness is strongest rather than relying only on an aggregate score.

Green Capability

Green Capability (GC) refers to an organization's ability to anticipate environmental developments, adapt to changing environmental demands, and absorb environmental knowledge and practices from external sources. These capabilities reflect the organization's capacity to respond to environmental change through forward-looking planning, process adaptation, and integration of external environmental knowledge into organizational practices (Doghan, 2024).

In this context, Green Capability encompasses three dimensions: Green Foresight Capability, Green Adaptive Capability, and Green Absorptive Capability. Foresight capability refers to anticipating future environmental challenges; adaptive capability reflects adjustment of processes and practices in response to environmental change; and absorptive capability represents the ability to acquire, understand, adopt, and utilize relevant external environmental

knowledge and practices. This dimensional logic is consistent with recent capability-oriented sustainability research (Doghan, 2024; Khan et al., 2024).

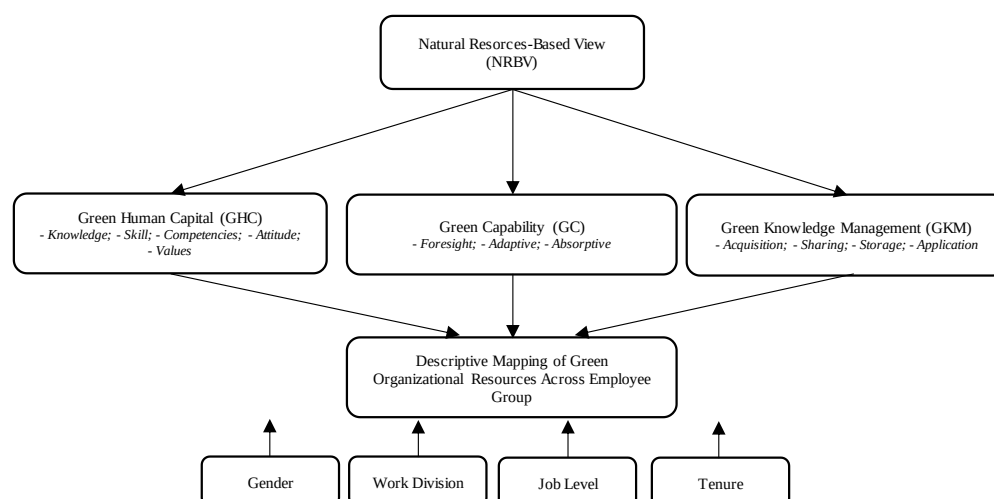
Green Knowledge Management

Green Knowledge Management (GKM) refers to the organizational processes through which environmental knowledge is acquired, shared, stored, and applied to support environmentally oriented activities and practices (Yu et al., 2022). As an organizational knowledge resource, GKM enables environmental knowledge to be structured and embedded beyond individual employees. Recent empirical evidence indicates that GKM is positively associated with green technology innovation and sustainable performance, highlighting the relevance of effective knowledge processes in supporting environmental transformation (Khan et al., 2024).

In this study, four GKM dimensions are examined to capture key knowledge-cycle processes: acquisition, sharing, storage, and application. Acquisition reflects the process of obtaining new environmental information and knowledge; sharing concerns the dissemination of green knowledge among employees and organizational units; storage refers to the documentation and preservation of environmental knowledge; and application captures the use of green knowledge in work processes and decision-making. Examining these dimensions provides a descriptive profile of how green knowledge is managed and distributed across employee groups within the organization.

Research Framework

Figure 1. Conceptual Framework



The research framework positions NRBV as the theoretical lens and treats GHC, GC, and GKM as complementary green organizational resources. The framework does not specify causal paths among the constructs. Instead, it guides the descriptive mapping of the three resources across four employee-group characteristics: gender, work division, job level, and tenure. This structure is consistent with recent NRBV applications that emphasize the strategic role of environmental resources and capabilities while allowing the present study to remain descriptive (Alkaraan et al., 2024; Royer & Simon, 2024).

METHOD

This study employed a quantitative descriptive research design to map the profile and distribution of Green Human Capital (GHC), Green Capability (GC), and Green Knowledge Management (GKM) across employee groups in an Indonesian palm oil company. The descriptive design was complemented by measurement-model assessment to establish the quality of the questionnaire indicators before interpreting the descriptive profiles.

Measurement Model Assessment

Table 1. Model Assessment Result

Construct	Indicator	Code	Outer Loading	CR	AVE
Green Human Capital (GHC)	Green Knowledge	X1.1	0.710	0.861	0.554
	Green Skills	X1.2	0.735		
	Green Competencies	X1.3	0.759		
	Green Attitudes	X1.4	0.760		
	Green Values	X1.5	0.755		
Green Capability (GC)	Green Foresight Capability 1	X2.1	0.702	0.923	0.573
	Green Foresight Capability 2	X2.2	0.815		
	Green Foresight Capability 3	X2.3	0.786		
	Green Adaptive Capability 1	X2.4	0.782		
	Green Adaptive Capability 2	X2.5	0.753		
	Green Adaptive Capability 3	X2.6	0.777		
	Green Absorptive Capability 1	X2.7	0.744		
	Green Absorptive Capability 2	X2.8	0.759		
	Green Absorptive Capability 3	X2.9	0.689		
Green Knowledge Management (GKM)	Green Knowledge Acquisition	X3.1	0.873	0.921	0.745
	Green Knowledge Sharing	X3.2	0.892		
	Green Knowledge Storage	X3.3	0.858		
	Green Knowledge Application	X3.4	0.828		

The outer loadings ranged from 0.689 to 0.892, while CR values ranged from 0.861 to 0.923 and AVE values from 0.554 to 0.745. All constructs exceeded the recommended thresholds of 0.70 for CR and 0.50 for AVE, indicating satisfactory reliability and convergent validity (Hair et al., 2022; Sarstedt et al., 2022). Although X2.9 had a loading of 0.689, it was retained because the Green Capability construct satisfied the required construct-level criteria.

Research context and sample

The study was conducted at PT Sawit Sumbermas Sarana Tbk (SSMS), an integrated palm oil company in Indonesia. The population comprised 227 permanent employees in managerial and supervisory positions, of whom 145 provided complete responses and were included in the analysis. Respondents represented operational and supporting functions and were classified by gender, work division, job level, and tenure.

Instrument and measurement. Data were collected using a structured questionnaire consisting of 18 measurement items based on the three green organizational resources and measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). GHC was measured through five dimensions: knowledge, skills, competencies,

attitudes, and values; GC through foresight, adaptive, and absorptive capabilities; and GKM through knowledge acquisition, sharing, storage, and application.

Data processing and analysis. Mean scores were calculated for each indicator and dimension and then cross-tabulated by gender, work division, job level, and tenure. Scores were interpreted as very high (4.21–5.00), high (3.41–4.20), moderate (2.61–3.40), low (1.81–2.60), and very low (1.00–1.80).

This processing strategy is consistent with the study's organizational-diagnostic purpose. The results should be understood as a descriptive map of current green-resource perceptions. Where one group has a higher mean than another, the appropriate interpretation is that the group is descriptively higher, not that membership in the group produces the observed difference.

RESULTS AND DISCUSSION

Results

Respondent Characteristics

Table 2. Respondent Characteristics Result

Characteristics	Category	n	%
Gender	Male	138	95.2
	Female	7	4.8
Work Division	Operational	94	64.8
	Supporting	51	35.2
Job Level	Staff/Assistant	74	51
	Assistant Manager	31	21.4
	Manager	29	20
	Senior Manager and above	11	7.6
Tenure	< 2 years	18	12.4
	2–5 years	57	39.3
	5–10 years	36	24.8
	> 10 years	34	23.4

Source: Primary survey data, processed by authors

Table presents the characteristics of the 145 respondents included in the analysis. Most respondents were male (95.2%) and worked in operational divisions (64.8%). In terms of job level, Staff/Assistant represented the largest group (51.0%), followed by Assistant Managers (21.4%) and Managers (20.0%). Regarding tenure, the largest proportion had worked for 2–5 years (39.3%), indicating that the sample comprised employees with diverse organizational experience.

Green Organizational Resources by Gender

Table 3. Green Organizational Resources by Gender Result

Group	Green Human Capital (GHC)						Green Capability (GC)				Green Knowledge Management (GKM)				
	Green Knowledge	Green Skills	Green Competencies	Green Attitudes	Green Values	Overall GHC	Green Foresight Capability	Green Adaptive Capability	Green Absorptive Capability	Overall GC	Green Knowledge Acquisition	Green Knowledge Sharing	Green Knowledge Storage	Green Knowledge Application	Overall GKM
Male	4.507	4.319	4.471	4.580	4.406	4.457	4.459	4.372	4.145	4.325	4.341	4.275	4.304	4.297	4.304
Female	4.429	4.571	4.571	4.429	4.571	4.514	4.333	4.333	4.190	4.286	4.286	4.143	4.286	4.429	4.286

Source: Primary survey data, processed by authors

Gender-based profiles were broadly similar. Female respondents reported a slightly higher overall GHC score (4.514) than male respondents (4.457), while male respondents reported slightly higher GC (4.325 versus 4.286) and GKM (4.304 versus 4.286). Within GHC, males were relatively higher in knowledge and attitudes, whereas females were relatively higher in skills, competencies, and values. For GKM, males were relatively higher in acquisition, sharing, and storage, while females were relatively higher in application. The overall gaps were small, indicating a relatively consistent green-resource profile across gender groups.

Green Organizational Resources by Work Division

Table 4. Green Organizational Resources by Work Division Result

Group	Green Human Capital (GHC)						Green Capability (GC)				Green Knowledge Management (GKM)				
	Green Knowledge	Green Skills	Green Competencies	Green Attitudes	Green Values	Overall GHC	Green Foresight Capability	Green Adaptive Capability	Green Absorptive Capability	Overall GC	Green Knowledge Acquisition	Green Knowledge Sharing	Green Knowledge Storage	Green Knowledge Application	Overall GKM
Supporting	4.510	4.255	4.471	4.549	4.333	4.424	4.405	4.431	4.065	4.301	4.373	4.137	4.235	4.314	4.265
Operational	4.500	4.372	4.479	4.585	4.457	4.479	4.479	4.337	4.191	4.336	4.319	4.340	4.340	4.298	4.324

Source: Primary survey data, processed by authors

Operational employees showed slightly higher overall GHC (4.479), GC (4.336), and GKM (4.324) than supporting employees (4.424, 4.301, and 4.265, respectively). The pattern, however, was not uniform across dimensions. Supporting employees were relatively higher in GKM acquisition and application, while operational employees were relatively higher in knowledge sharing and storage. Adaptive capability was also relatively higher in the supporting group, whereas foresight and absorptive capability were relatively higher in the operational group. These results suggest that work context may be associated with different descriptive strengths within the green-resource profile, but the present analysis does not establish statistical differences.

Green Organizational Resources by Job Level

Table 5. Green Organizational Resources by Job Level Result

Group	Green Human Capital (GHC)						Green Capability (GC)				Green Knowledge Management (GKM)				
	Green Knowledge	Green Skills	Green Competencies	Green Attitudes	Green Values	Overall GHC	Green Foresight Capability	Green Adaptive Capability	Green Absorptive Capability	Overall GC	Green Knowledge Acquisition	Green Knowledge Sharing	Green Knowledge Storage	Green Knowledge Application	Overall GKM
Staff/Assistant	4.473	4.365	4.541	4.527	4.419	4.465	4.473	4.432	4.203	4.369	4.392	4.270	4.338	4.392	4.348
Assistant Manager	4.419	4.161	4.290	4.613	4.355	4.368	4.419	4.323	4.140	4.294	4.258	4.226	4.161	4.194	4.210
Manager	4.655	4.345	4.448	4.586	4.448	4.497	4.460	4.310	4.092	4.287	4.414	4.414	4.448	4.241	4.379
Senior Manager and above	4.545	4.545	4.636	4.727	4.455	4.582	4.394	4.242	3.939	4.192	4.000	4.000	4.091	4.182	4.068

Source: Primary survey data, processed by authors

Job level produced the clearest descriptive variation. Senior Manager Up respondents had the highest GHC score (4.582), but the lowest GC (4.192) and GKM (4.068) among the four job-level groups. In contrast, Staff/Assistant respondents recorded the highest GC (4.369), while Managers recorded the highest GKM (4.379). Assistant Managers had the lowest overall scores for GHC, GC, and GKM. Within GC, absorptive capability decreased across the upper job levels, with Senior Manager Up recording 3.939, although this score remained within the high category. Within GKM, Senior Manager Up was also lower across acquisition, sharing, storage, and application. The pattern indicates a descriptive alignment issue between individual

green orientation and perceptions of organizational capability and knowledge-management mechanisms across job levels.

Green Organizational Resources by Tenure

Table 6. Green Organizational Resources by Tenure Result

Group	Green Human Capital (GHC)						Green Capability (GC)				Green Knowledge Management (GKM)				
	Green Knowledge	Green Skills	Green Competencies	Green Attitudes	Green Values	Overall GHC	Green Foresight Capability	Green Adaptive Capability	Green Absorptive Capability	Overall GC	Green Knowledge Acquisition	Green Knowledge Sharing	Green Knowledge Storage	Green Knowledge Application	Overall GKM
2 - 5 Years	4.439	4.368	4.439	4.509	4.439	4.439	4.421	4.427	4.135	4.327	4.368	4.228	4.298	4.404	4.325
≥ 10 Years	4.529	4.412	4.471	4.529	4.294	4.447	4.500	4.382	4.157	4.346	4.324	4.294	4.353	4.265	4.309
5 - 10 Years	4.556	4.250	4.528	4.694	4.472	4.500	4.528	4.389	4.167	4.361	4.389	4.306	4.306	4.278	4.319
≤ 2 Years	4.556	4.222	4.500	4.611	4.444	4.467	4.315	4.130	4.130	4.191	4.167	4.278	4.222	4.111	4.194

Source: Primary survey data, processed by authors

The GHC profile was remarkably stable across tenure groups, ranging only from 4.439 to 4.500. The greatest descriptive variation was observed in GC. Employees with 5–10 years of tenure recorded the highest GC score (4.361), whereas employees with two years or less recorded the lowest (4.191). GKM showed a similar pattern: the 2–5 year group had the highest score (4.325), while the ≤2 year group had the lowest (4.194). Across all tenure groups, absorptive capability was the lowest GC dimension, indicating that the capacity to absorb external environmental knowledge may require more attention than foresight or adaptation.

Discussion

Strong and Relatively Consistent Green Human Capital

GHC was the most stable resource across the organizational groups examined. Overall scores remained in the very-high category across gender, work division, job level, and tenure. This profile indicates a broadly established level of employee environmental readiness, covering knowledge, practical skills, competencies, attitudes, and values. The pattern is consistent with the view that green human capital as relevant to organizational sustainability, although the present study does not test such relationships causally (Pratiwi et al., 2025).

Green Absorptive Capability Aas the Main Development Area

Absorptive capability was the most consistently lower GC dimension across the employee groups. The finding is noteworthy because contemporary sustainability requires organizations to learn not only from internal experience but also from external regulation, technology, partners, benchmarking, and stakeholder expectations. Green capability research emphasizes the importance of organizational capacity to respond to environmental change, while knowledge-oriented studies highlight the role of acquiring and mobilizing external knowledge (Doghan, 2024; Khan et al., 2024). The descriptive pattern therefore identifies external learning and internalization as a practical area for further development.

A Descriptive Alignment Pattern Across Job Levels

The job-level analysis provides the clearest diagnostic pattern. Senior Manager Up respondents recorded the highest GHC but the lowest GC and GKM. This should not be interpreted as evidence that leadership level causes lower capability or knowledge management. Instead, it indicates that strong individual green orientation is not necessarily accompanied by equally high perceptions of organizational capability and knowledge infrastructure. From an

NRBV perspective, this distinction matters because strategic value depends on organizational routines that mobilize resources, not merely on the presence of individual resources.

Tenure and Organizational Integration

Tenure produced another useful descriptive pattern. Employees with two years or less of tenure reported strong GHC but comparatively lower GC and GKM, whereas employees with longer tenure generally reported stronger organizational capability and knowledge-management profiles. One possible managerial interpretation is that individual environmental readiness can be established before employees become fully familiar with organizational routines and knowledge networks. This remains an interpretation rather than a causal conclusion, but it provides a rationale for strengthening sustainability-oriented onboarding, mentoring, and cross-functional learning for newer employees.

Implications for Organizational Sustainability Readiness

Taken together, the results suggest that sustainability readiness is better understood as an organizational system comprising people, capability, and knowledge infrastructure. Strong GHC provides a favorable foundation, but that foundation needs organizational mechanisms for external learning, knowledge sharing, documentation, and application. Recent GKM research similarly emphasizes that knowledge processes can support green innovation and sustainable performance when environmental knowledge is effectively mobilized (Khan et al., 2024). The contribution of the present study is to show where such resources appear relatively stronger or weaker across employee groups within one organizational context.

CONCLUSION

This study mapped the distribution of Green Human Capital, Green Capability, and Green Knowledge Management across employee groups in an Indonesian palm oil company. The findings indicate that all three green organizational resources were generally high to very high, with GHC showing the most consistent profile, while GC and GKM displayed greater variation across job levels and tenure. Green Absorptive Capability emerged as the relatively lower dimension, highlighting an area for further organizational development.

The findings suggest the importance of strengthening external environmental learning, knowledge sharing, technology adoption, and cross-level integration while maintaining employee green competence. Future research can extend this descriptive profile by applying inferential tests, multigroup analysis, longitudinal designs, or intervention studies to determine whether the descriptive patterns identified here represent statistically meaningful and persistent differences.

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