

# Intellectual Capital in Competitive Advantage through Green Human Resource Management

The Role of  
Intellectual  
Capital

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## ABSTRACT

The wood craft industry in Badung Regency, Bali, significantly contributes to export value, yet faces challenges in maintaining sustainability and competitiveness. This study aims to examine the role of green human resource management as a mediator in the relationship between green human capital, green structural capital, green relational capital, and competitive advantage in wood small and medium enterprises. Employing a quantitative approach with descriptive and associative methods, the study sampled 267 enterprises from a population of 804 using proportionate stratified random sampling. Data were collected through questionnaires and analyzed using Structural Equation Modeling–Partial Least Squares. Findings reveal that green human capital, green structural capital, and green relational capital positively influence green human resource management and competitive advantage. Green human resource management significantly mediates these relationships, enhancing employees' eco-friendly competencies, supporting efficient green systems, and fostering sustainable partnerships. These results underscore the critical integration of green human resource management and green intellectual capital to achieve sustainable competitive advantage in the wood small and medium enterprise sector. The study highlights the strategic importance of aligning human resource practices with environmental goals to enhance efficiency, innovation, and market reputation, ensuring long-term sustainability and competitiveness.

**Keywords:** Competitive Advantage, Green Human Resource Management, Green Intellectual Capital, Small and Medium Enterprises, Sustainability.

## ABSTRAK

Industri kerajinan kayu di Kabupaten Badung, Bali, memberikan kontribusi yang signifikan terhadap nilai ekspor, namun menghadapi tantangan dalam menjaga keberlanjutan dan daya saing. Penelitian ini bertujuan untuk mengkaji peran manajemen sumber daya manusia hijau sebagai mediator dalam hubungan antara modal manusia hijau, modal struktural hijau, modal relasional hijau, dan keunggulan kompetitif pada usaha kecil dan menengah kayu. Dengan menggunakan pendekatan kuantitatif dengan metode deskriptif dan asosiatif, penelitian ini mengambil sampel 267 perusahaan dari populasi 804 menggunakan sampel acak stratifikasi proporsional. Data dikumpulkan melalui kuesioner dan dianalisis menggunakan Structural Equation Modeling–Partial Least Squares. Temuan penelitian mengungkapkan bahwa modal manusia hijau, modal struktural hijau, dan modal relasional hijau secara positif memengaruhi manajemen sumber daya manusia hijau dan keunggulan kompetitif. Manajemen sumber daya manusia hijau secara signifikan memediasi hubungan ini, meningkatkan kompetensi ramah lingkungan karyawan, mendukung sistem hijau yang efisien, dan membina kemitraan yang berkelanjutan. Hasil ini menggarisbawahi integrasi penting manajemen sumber daya manusia

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*hijau dan modal intelektual hijau untuk mencapai keunggulan kompetitif yang berkelanjutan di sektor usaha kecil dan menengah kayu. Studi ini menyoroti pentingnya strategis dalam menyelaraskan praktik sumber daya manusia dengan tujuan lingkungan untuk meningkatkan efisiensi, inovasi, dan reputasi pasar, serta memastikan keberlanjutan dan daya saing jangka panjang.*

**Kata kunci:** *Keunggulan Kompetitif, Manajemen Sumber Daya Manusia Hijau, Modal Intelektual Hijau, Usaha Kecil dan Menengah, Keberlanjutan*

## INTRODUCTION

The wood craft industry occupies the top position as a contributor to the export value of Bali Province from the craft industry sector, with the largest number of small and medium wood industries in Badung Regency, namely 804 SMEs that can absorb 3,327 workers. The Badung Regency Government through the Industry and Manpower Office has implemented several policies to support wood SMEs (Suwandana et al., 2023; Rachma et al., 2024). The role of the business world, especially SMEs that focus on human resource management, must currently consider environmental issues and social ethics to ensure the sustainability of business and the environment (Astuti & Wahyuni, 2018). A company's business strategy evolves in response to environmental changes (Yasa et al., 2024). Environmental strategies drive companies to assess their ecological impacts and actively address environmental issues (Riaz et al., 2023; Puspitasari et al., 2025). Kartika et al. (2020) emphasized that the green management approach enhances the integration of environmental concerns across all company functions. Ekawati et al. (2023) and Gumilang et al. (2024) and Noor and Mulyana (2024) added that this trend aligns with the growing consumer preference for environmentally friendly products, reflecting ethical and socially responsible behavior. Renwick et al. (2013) and Falco et al. (2024) argued that Green HRM is crucial for aligning employee behavior with environmental goals to achieve competitive advantage.

Advantages can be in the form of lower operating costs or providing more value compared to competitors (Ong et al., 2022). According to Chuang et al. (2016) Competitive advantage is a condition of a company that is more efficient than its competitors. The level of efficiency is seen based on product quality and operating costs. Pratono et al. (2019) stated that competitive advantage refers to a company's ability to achieve greater performance than its consumers, provide innovation, differentiation, and offer higher value compared to its competitors.

In the new economic era, intangible assets play a crucial role in achieving competitive advantage, where intellectual capital often surpasses financial capital in value (Chen, 2008; Alkaf et al., 2023). Innovation in human resource management becomes essential to foster organizational competitiveness. Organizations that effectively develop their intangible assets gain more opportunities to strengthen their competitive position (Yusoff et al., 2019). Green intellectual capital, as a form of intangible asset, includes knowledge, skills, and organizational capacities that support environmental innovation and sustainability efforts at both the company and institutional levels (Zahra et al., 2022). This concept comprises green human capital, green structural capital, and green relational capital—collectively forming an environmentally oriented intellectual resource base (Omar et al., 2017). When applied strategically, green intellectual capital can lead to sustained competitive advantage and improved business performance, particularly in eco-conscious markets. However, despite its potential as a long-term investment, the practical application and recognition of green intellectual capital remain limited (Jermsittiparsert, 2021).

Human capital is understood as a collection of knowledge, skills, and experiences that cannot be owned separately from their owners, and is a key driver of organizational or company performance and value (Quintero et al., 2021). Green Human Capital is considered an important strategic resource for sustainable competitive advantage in

today's changing environment (Solihin et al., 2023). Relational Capital is an intangible resource that emphasizes the development, maintenance, and maintenance of good relationships with any company, group, or individual that can affect the company's market position (Alam et al., 2021; Mansoor et al., 2021). Green HRM is a manifesto that can help create a green workforce that is able to understand and appreciate green culture in the organization. This study aims to analyze and test the role of green human resource management as a mediating variable in the relationship between green human capital, green structural capital, and green relational capital on the competitive advantage of small and medium enterprises (SMEs) in the wood sector in Badung Regency.

## **LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT**

### **Human Capital, Structural and Realtion Capital on Human Resource Management**

With the trend of strict environmental conventions and increasing environmental awareness, there have been numerous changes and impacts on the rules and patterns of industrial competition. This research refers to the classification of intellectual capital into green human capital, green structural capital, and green relational capital (Bontis, 1999; Johnson, 1999). Green intellectual capital has a positive impact on a company's competitive advantage. This finding challenges the previous view, which assumed that environmental protection efforts hindered companies' economic growth (Sun, 2020; Suba & Ahamed, 2022). Several previous studies have developed the concept of human resource management practices, providing a view that green intellectual capital is related to human resource management as a driving force in this relationship (Luftman & Kempaiah, 2007; Kong & Thomson, 2009; Yong et al., 2019).

Human resources management is at the heart of achieving a competitive advantage. Human resource activities have become an integral part of employees, developed over a specific period, and help fulfill the company's goals and values (Alam et al., 2021). According to the Resource-Based View (RBV) theoretical framework, an organization's competitive advantage primarily depends on the intrinsic nature of its human resources management and internal capabilities. Employee knowledge, skills and abilities are critical to the successful implementation of sustainable practices and serve as a competitive advantage (Saud et al., 2023). Organizations must maintain their competitive advantage in this dynamic environment. Company management and the environment must be synchronized with green human resources management (green HRM) policies to achieve a lasting competitive advantage (Amin et al., 2022). Green HRM encompasses all activities involved in developing, implementing, and maintaining sustainable systems that aim to promote environmentally friendly practices among employees (Owino & Kwasira, 2016; Kara et al., 2023).

H1: Green human capital has a significant effect on green human resource management.

H2: Green structural capital has a significant effect on green human resource management.

H3: Green relational capital has a significant effect on green human resource management.

### **Human Capital, Structural and Realtion Capital on Competitive Advantage**

Green intellectual capital shows a positive influence on the competitive advantage of companies. This eliminates the previous assumption that environmental protection hinders the economic development of companies (Stewart, 1997). Conclusively, organizations are moving changes in the international economy and starting to implement environmentally friendly practices as part of their organizations. Competitive advantage is considered a major factor in determining organizational performance, and to achieve it, resources must be rare and difficult to beat by competitors. Green HRM is a major resource that will ultimately provide competitive advantage to organizations (Amin et al., 2022). According to A'yuni and Muafi (2020), the better the green human resource

management of an organization, the higher its ability to survive in competition, so that the organization can continue to exist and gain competitive advantage.

The first component, green human capital, refers to the aspect of green intellectual capital, which involves the knowledge, expertise, innovation, and environmental awareness of employees, which collectively contribute to the development of environmentally friendly solutions, reduce environmental impacts, and take advantage of sustainable business opportunities (Sihombing & Murwaningsari, 2022; Mulyadi et al., 2024). Green human resources refer to the ability and commitment of employees. This means that compliance with formal rules alone is not enough to achieve desire; however, it is necessary to encourage green HRM through voluntary green initiatives carried out by employees in the workplace (Elias & Scarbrough, 2004; Benevene & Buonomo, 2020). In addition, Broman and Robert (2017) and Kurucz et al. (2017) identified desire as an effort that goes beyond the organization's internal efforts in creating and training effective teams, and as a broader step towards alignment and shared goals of desire, thus significantly influencing the success and competitive advantage of an organization.

H4: Green human capital has a significant effect on competitive advantage.

H5: Green structural capital has a significant effect on competitive advantage.

H6: Green relational capital has a significant effect on competitive advantage.

H7: Green human resource management has a significant effect on Competitive Advantage.

#### **Green Human Resource Management as a Mediation**

Like green human capital, green structural capital is a combination of capital as defined in the concept of intellectual capital with environmental aspects. However, if human capital is associated with employees, then structural capital is associated with the organization, so that structural capital will not be lost even if employees leave (Chang & Chen, 2012). Green structural capital is defined as a collection of organizational capabilities, organizational commitment, knowledge management systems, managerial philosophies, organizational culture, corporate image, patents, copyrights, and trademarks that support environmental protection or green innovation in the company (Benevene et al., 2021). Furthermore, green relational capital is a combination of relational capital, as defined in the concept of intellectual capital, with environmental aspects, which represent the total number of relationships between the organization and key stakeholders, such as customers, suppliers, and partners (Chen et al., 2006). When stakeholder attention shifts to environmental aspects, companies must meet stakeholder expectations to maintain positive relationships with them (Chang & Chen, 2012).

Thus, green relational capital is defined as the interactive relationship capital of a company with customers, suppliers, network members, and partners regarding the company's environmental management and green innovation (Heryana et al., 2024). According to Bombiak (2021), companies seeking to increase their green intellectual capital while reducing costs can focus on developing green relational capital. This strategy is highly recommended, especially in organizations with limited expertise and experience in dealing with environmental issues, because it allows the entity to expand its environmental cooperation with other parties. In addition, it can increase competitive advantage through green human resource management by strengthening relationships with customers, suppliers, communities, and governments, which can foster ecological values and enhance an environmentally friendly reputation.

H8: Green human resource management plays a mediating role in the effect of green human capital on competitive advantage.

H9: Green human resource management plays a mediating role in green structural capital on competitive advantage.

H10: Green human resource management plays a mediating role in green relational capital on competitive advantage

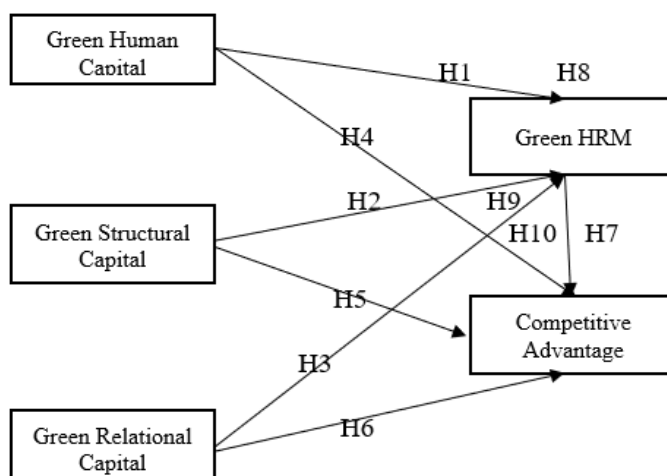


Figure 1. Research Framework

The novelty of this study lies in the use of green human capital, green structural capital, and green relational capital as dimensions of intellectual capital, which are tested for their influence on green human resource management as a mediator of competitive advantage. Figure 1 explains the research framework that tests the influence of green human capital, green structural capital, and green relational capital on green human resource management (GHRM) and the competitive advantage of SMEs. The three green capitals are also tested for their direct influence on competitive advantage, as well as their indirect influence through the mediating role of GHRM. There are ten hypotheses formulated to test the direct and mediating relationships. The novelty of this study lies in the separation of the dimensions of green intellectual capital and the testing of the mediating role of GHRM specifically, not as a whole, thus providing a new perspective on the development of sustainability-based competitive advantage.

## RESEARCH METHOD

This study employed a quantitative research method with a descriptive and associative analysis approach, aimed at systematically identifying and measuring the relationships between research variables. The research was conducted in the small and medium enterprise (SME) sector, specifically focusing on the timber craft industry in Badung Regency. The study examined three exogenous latent variables: green human capital (X1), green structural capital (X2), and green relational capital (X3). The mediating variable used in the model is green human resource management (Y1), while the primary endogenous variable is competitive advantage (Y2). The total population consisted of 804 timber SMEs in Badung Regency, including 757 small enterprises and 47 medium-sized enterprises. The sample size was determined using the Slovin formula with a 5% margin of error, resulting in 267 SMEs as respondents. The sampling technique used was proportionate stratified random sampling, as the population is heterogeneous and categorized by village areas and product types, ensuring proportional representation of each subgroup.

Data were collected through a structured questionnaire designed based on theoretical indicators of each variable. The responses were measured using a 5-point Likert scale, ranging from “strongly disagree” (1) to “strongly agree” (5). The instrument’s validity was tested using a correlation coefficient (r) greater than 0.3 at a 0.05 significance level, indicating that all items were valid. Reliability testing using Cronbach’s Alpha showed values greater than 0.60, confirming that the instruments were internally consistent and reliable. The collected data were analyzed using both descriptive statistics and inferential statistics. Inferential analysis was conducted using Structural Equation Modeling (SEM) with the Partial Least Squares (PLS) approach, commonly known as component-based

SEM. This method was chosen for its robustness in handling complex models with multiple latent variables and its ability to work with non-normally distributed data. Data analysis was performed using SmartPLS software, enabling the testing of direct and indirect effects, as well as the mediating role of green HRM within the theoretical framework developed in this study.

## RESULTS

The study provides insights into the characteristics of respondents and the evaluation of research variables related to green intellectual capital, green human resource management, and competitive advantage in wood small and medium enterprises (SMEs) in Badung Regency. Respondents were predominantly male (94.38%, n=252), with females comprising only 5.62% (n=15). The majority were aged 36–45 years (34.08%), followed by 46–55 years (22.47%), 56–65 years (17.23%), 26–35 years (14.98%), 15–25 years (6.74%), and over 65 years (4.49%). Education levels were primarily high school (59.55%), followed by junior high school (16.48%), elementary school (14.61%), and diploma/bachelor's degree (9.36%). Most respondents were married (81.65%, n=218), with 74.16% (n=198) being heads of households, 22.10% (n=59) children, and 3.74% (n=10) wives. These demographic characteristics provide context for understanding the respondents' perspectives on the variables assessed, reflecting a diverse yet predominantly male and moderately educated workforce in the wood SME sector.

Table 1. Respondents' Appreciation Regarding Research Variables

Variable	Model	Indicator						Average
		1	2	3	4	5	6	
Green human capital (X <sub>1</sub> )	Average score	4.45	4.29	4.16	3.78	4.20	3.31	4.03
	Appreciation (%)	88.91	85.70	83.22	75.64	84.06	66.27	80.63
Green structural capital (X <sub>2</sub> )	Average score	3.02	2.86	4.43	3.22	2.97	3.11	3.27
	Appreciation (%)	60.37	57.17	88.52	64.47	59.45	62.24	65.37
Green relational capital (X <sub>3</sub> )	Average score	4.26	4.14	3.85	3.12	4.34	3.36	3.85
	Appreciation (%)	85.16	82.79	77.02	62.38	86.86	67.23	76.91
Green HRM (Y <sub>1</sub> )	Average score	4.11	3.11	4.27	4.13	3.91	3.50	3.84
	Appreciation (%)	82.19	62.22	85.42	82.54	78.30	70.02	76.78
Competitive advantage (Y <sub>2</sub> )	Average score	4.20	4.21	4.53	4.00	4.33	3.68	4.16
	Appreciation (%)	84.08	84.28	90.51	80.07	86.55	73.61	83.18

The results of the respondents' appreciation regarding research variables test in Table 1 show that Green human capital with indicators of productivity, competence, product quality, service quality, work team, and support for wood SMEs obtained an average score of 4.03 and an appreciation of 80.63 percent, classified as receiving good/high appreciation. Green structural capital with indicators of management system, environmental committee, regulation, investment, management, and operational process obtained an average score of 3.27 and an appreciation of 65.37 percent, classified as receiving moderate/sufficient appreciation. Green relational capital with indicators of product or service, consumer satisfaction, cooperation with suppliers, cooperation with consumers, craft community, and cooperation with strategic partners obtained an average score of 3.85 and an appreciation of 76.91 percent, classified as receiving good/high appreciation. Green human resource capital with indicators of green job analysis and description, green recruitment, green performance assessment, green awards, green selection, and green training obtained an average score of 3.84 and an appreciation rating of 76.78 percent, classified as receiving good/high appreciation. Competitive advantage is achieved by indicators of low cost, green product quality, green innovation, environmental management, profitability, and business growth, resulting in an average score of 4.16 and an appreciation rating of 83.18 percent, classified as 'good' or 'high appreciation.

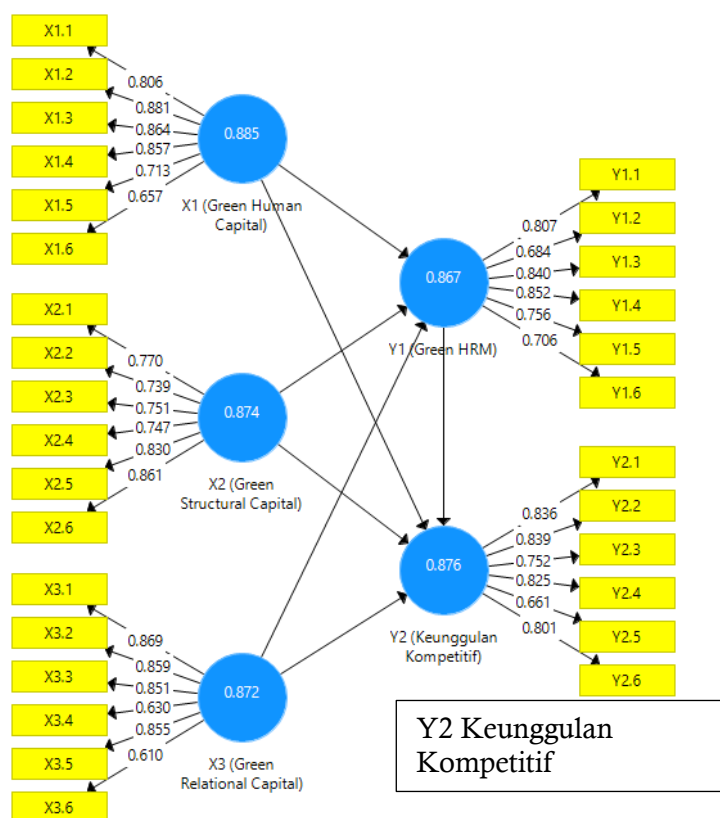


Figure 2. Outer model

The outer model analysis, depicted in Figure 2, assessed convergent validity and internal consistency reliability to ensure the robustness of the measurement model. Convergent validity was evaluated through outer loadings and average variance extracted (AVE). All indicators had outer loadings above 0.6, with t-statistics exceeding 1.96, indicating a strong correlation between indicators and their respective constructs.

Table 2. Average variance extracted (AVE)

Variable	(AVE)	Information
Green human capital (X <sub>1</sub> )	0.641	Validate
Green structural capital (X <sub>2</sub> )	0.615	Validate
Green relational capital (X <sub>3</sub> )	0.619	Validate
Green human resources management (Y <sub>1</sub> )	0.603	Validate
Competitive advantage (Y <sub>2</sub> )	0.622	Validate

As shown in Table 2, AVE values for all constructs surpassed the threshold of 0.50: green human capital (0.641), green structural capital (0.615), green relational capital (0.619), green human resource management (0.603), and competitive advantage (0.622). These values confirm that each construct explains more than 50% of the variance of its indicators, meeting convergent validity criteria.

**Table 3.** Cross loading of each indicator on research constructs

No		X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	Y <sub>1</sub>	Y <sub>2</sub>
1.	X <sub>1.1</sub>	0.806	0.411	0.374	0.527	0.551
2.	X <sub>1.2</sub>	0.881	0.440	0.449	0.526	0.580
3.	X <sub>1.3</sub>	0.864	0.377	0.392	0.489	0.526
4.	X <sub>1.4</sub>	0.857	0.383	0.313	0.433	0.514
5.	X <sub>1.5</sub>	0.713	0.381	0.414	0.472	0.517
6.	X <sub>1.6</sub>	0.657	0.324	0.307	0.423	0.442
7.	X <sub>2.1</sub>	0.349	0.770	0.407	0.418	0.438
8.	X <sub>2.2</sub>	0.262	0.739	0.381	0.333	0.424
9.	X <sub>2.3</sub>	0.420	0.751	0.466	0.483	0.537
10.	X <sub>2.4</sub>	0.314	0.747	0.386	0.350	0.404
11.	X <sub>2.5</sub>	0.441	0.830	0.409	0.483	0.483
12.	X <sub>2.6</sub>	0.453	0.861	0.462	0.514	0.540
13.	X <sub>3.1</sub>	0.413	0.444	0.869	0.491	0.536
14.	X <sub>3.2</sub>	0.438	0.450	0.859	0.480	0.531
15.	X <sub>3.3</sub>	0.370	0.410	0.851	0.423	0.454
16.	X <sub>3.4</sub>	0.243	0.389	0.630	0.399	0.403
17.	X <sub>3.5</sub>	0.489	0.479	0.855	0.555	0.603
18.	X <sub>3.6</sub>	0.201	0.342	0.610	0.385	0.348
19.	Y <sub>1.1</sub>	0.433	0.408	0.469	0.807	0.518
20.	Y <sub>1.2</sub>	0.409	0.425	0.431	0.684	0.527
21.	Y <sub>1.3</sub>	0.534	0.439	0.515	0.840	0.602
22.	Y <sub>1.4</sub>	0.537	0.490	0.497	0.852	0.586
23.	Y <sub>1.5</sub>	0.446	0.420	0.409	0.756	0.481
24.	Y <sub>1.6</sub>	0.423	0.415	0.390	0.706	0.456
25.	Y <sub>2.1</sub>	0.535	0.595	0.549	0.614	0.836
26.	Y <sub>2.2</sub>	0.550	0.488	0.506	0.527	0.839
27.	Y <sub>2.3</sub>	0.522	0.428	0.453	0.557	0.752
28.	Y <sub>2.4</sub>	0.556	0.493	0.504	0.513	0.825
29.	Y <sub>2.5</sub>	0.431	0.406	0.416	0.520	0.661
30.	Y <sub>2.6</sub>	0.497	0.441	0.497	0.499	0.801

Discriminant validity was tested using cross-loadings, presented in Table 3, where each indicator's highest loading was on its intended construct (e.g., X1.2 at 0.881 for green human capital, X2.6 at 0.861 for green structural capital, and X3.1 at 0.869 for green relational capital). The Fornell-Larcker criteria further confirmed discriminant validity, with the square root of AVE for each construct (e.g., 0.801 for green human capital) exceeding correlations with other constructs (e.g., 0.485 for green human capital and green structural capital).

**Table 4.** Composite reliability and cronbach's alpha values of research construct variables

Variable	Composite reliability	Cronbach's alpha
Green human capital (X <sub>1</sub> )	0.914	0.885
Green structural capital (X <sub>2</sub> )	0.905	0.874
Green relational capital (X <sub>3</sub> )	0.905	0.872
Green human resources management (Y <sub>1</sub> )	0.901	0.867
Competitive advantage (Y <sub>2</sub> )	0.907	0.876

Reliability was assessed through composite reliability and Cronbach's alpha, as shown in Table 4. All constructs exhibited composite reliability values above 0.9 (ranging from 0.901 to 0.914) and Cronbach's alpha values above 0.8 (ranging from 0.867 to 0.885), indicating high internal consistency and reliability of the measurement instruments.

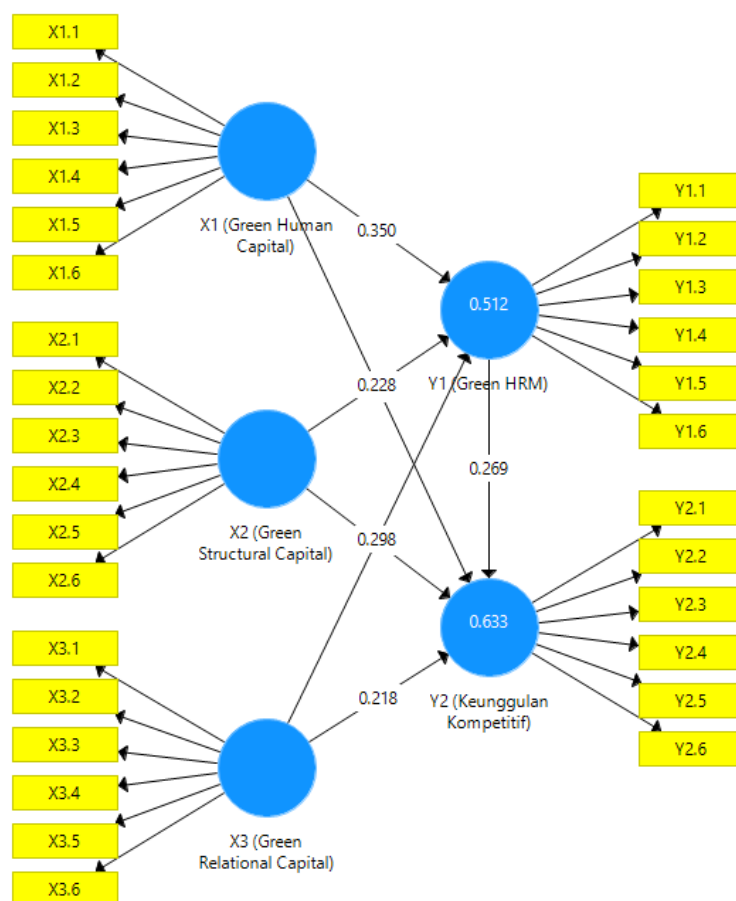


Figure 3. Inner model (Structural model)

The inner model analysis, illustrated in Figure 3, evaluated the structural relationships among constructs using the SmartPLS bootstrapping procedure. The R-squared values indicate the explanatory power of exogenous constructs. Green human resource management had an R-squared value of 0.512 (51.20%), suggesting a moderate influence from green human capital, green structural capital, and green relational capital. Competitive advantage had an R-squared value of 0.633 (63.30%), also indicating moderate explanatory power. The Stone-Geisser Q-square test yielded a value of 0.821 (82.10%), confirming the model's strong predictive relevance.

Table 5. Direct effect test results

Variable	Original sample	Standard deviation	T statistics	P values	Information
X <sub>1</sub> -> Y <sub>1</sub>	0.350	0.062	5.630	0.000	Significant
X <sub>2</sub> -> Y <sub>1</sub>	0.228	0.055	4.139	0.000	Significant
X <sub>3</sub> -> Y <sub>1</sub>	0.298	0.052	5.700	0.000	Significant
X <sub>1</sub> -> Y <sub>2</sub>	0.295	0.048	6.119	0.000	Significant
X <sub>2</sub> -> Y <sub>2</sub>	0.196	0.050	3.922	0.000	Significant
X <sub>3</sub> -> Y <sub>2</sub>	0.218	0.051	4.282	0.000	Significant
Y <sub>1</sub> -> Y <sub>2</sub>	0.269	0.060	4.481	0.000	Significant

Direct effect tests, presented in Table 5, showed significant positive relationships: green human capital ( $\beta=0.350$ ,  $t=5.630$ ,  $p=0.000$ ), green structural capital ( $\beta=0.228$ ,  $t=4.139$ ,  $p=0.000$ ), and green relational capital ( $\beta=0.298$ ,  $t=5.700$ ,  $p=0.000$ ) significantly influenced green human resource management, supporting hypotheses H1, H2, and H3. Similarly, green human capital ( $\beta=0.295$ ,  $t=6.119$ ,  $p=0.000$ ), green structural capital ( $\beta=0.196$ ,  $t=3.922$ ,  $p=0.000$ ), green relational capital ( $\beta=0.218$ ,  $t=4.282$ ,  $p=0.000$ ), and green human resource management ( $\beta=0.269$ ,  $t=4.481$ ,  $p=0.000$ ) significantly affected competitive advantage, supporting hypotheses H4, H5, H6, and H7.

**Table 6.** Indirect effect test results

Variable	Original sample	Standard deviation	T statistics	P values	Information
X <sub>1</sub> -> Y <sub>1</sub> -> Y <sub>2</sub>	0.094	0.026	3.637	0.000	Significant
X <sub>2</sub> -> Y <sub>1</sub> -> Y <sub>2</sub>	0.062	0.023	2.644	0.008	Significant
X <sub>3</sub> -> Y <sub>1</sub> -> Y <sub>2</sub>	0.080	0.021	3.749	0.000	Significant

Indirect effect tests, shown in Table 6, confirmed the mediating role of green human resource management: green human capital ( $\beta=0.094$ ,  $t=3.637$ ,  $p=0.000$ ), green structural capital ( $\beta=0.062$ ,  $t=2.644$ ,  $p=0.008$ ), and green relational capital ( $\beta=0.080$ ,  $t=3.749$ ,  $p=0.000$ ) influenced competitive advantage through green human resource management, supporting hypotheses H8, H9, and H10. These findings indicate partial mediation, as both direct and indirect effects were significant.

The results highlight the critical role of green intellectual capital and green human resource management in enhancing the competitive advantage of wood SMEs. The high appreciation for green human capital, green relational capital, green human resource management, and competitive advantage, contrasted with the moderate rating for green structural capital, suggests that while employee competencies and stakeholder relationships are strong, organizational systems require further development to fully support green initiatives.

## DISCUSSION

In the context of wood SMEs, green structural capital plays an important role in facilitating and strengthening the implementation of green HRM. Relationships with sustainability-focused customers can put pressure on wood SMEs to adopt green human resource management practices. Wood SMEs build a positive reputation in the eyes of customers, the community, and the wider market as businesses committed to sustainability. Good relationships with local communities enable wood SMEs to participate in environmental conservation initiatives, by developing corporate social responsibility programs that involve employees in environmental activities. Through networking with organizations, governments, or other non-governmental institutions, wood SMEs can gain the knowledge and support needed to implement effective green human resource management. The results of this study are consistent with previous findings by Olander et al., (2016), Sudin and Saad (2018) and Shehzad et al. (2024) which showed a positive relationship between green human capital, green structural capital, green relational capital, and green human resource management (green HRM). The better the green human capital, green structural capital, and green relational capital, the better the relationship between green human resource management and environmental protection (Budiarti, 2017; A'yuni & Muafi, 2020). Green human resource management is indicated by the alignment of employees with the organization's environmental strategy in the field of human resource management (Alkaf et al., 2023).

Green intellectual capital plays a significant role in enhancing the competitive advantage of woodworking SMEs. Green structural capital, through environmental management systems and green technologies, drives operational efficiency and regulatory compliance. Green relational capital strengthens long-term relationships with customers and partners, enables access to green raw materials and sustainable technologies, and builds consumer loyalty. The positive reputation of SMEs increases amidst growing environmental awareness. In addition, green human resource management plays a role in ensuring that employees consistently implement green practices, which ultimately strengthens the competitiveness and sustainability of woodworking SMEs. Previous studies by Chen and Chang (2013) and Chalal and Bakshi (2014) showed that green human capital, green structural capital, and green relational capital drive innovation that tends to achieve or secure competitive advantage. Green HRM can be used as a tool to achieve competitive advantage. Successful Green Human Resource Management, with its unique attributes, provides outcomes that enable environmentally conscious

employees to influence competitive advantage (Huang & Kung, 2011; Narith & Thavan, 2024).

Green human resource management plays a significant mediator role in the influence of green intellectual capital on the competitive advantage of wood SMEs. In the context of green human capital, green HRM focuses on training and developing environmentally friendly skills for employees, so that they are able to implement sustainable work practices that improve efficiency, product quality, and corporate reputation. In the influence of green structural capital, green HRM ensures that employees can operate environmental management systems and green technologies effectively through special training. This supports the creation of innovative and efficient production processes, which increase competitiveness amidst sustainability-oriented market demands. Meanwhile, in relation to green relational capital, green HRM helps employees build and manage productive relationships with customers, suppliers, and partners who are committed to green practices. Through a strong understanding of sustainability, employees are able to utilize these networks strategically, strengthen supply chain collaboration, and create sustainable added value. Thus, green HRM is key in linking green capital to the competitive advantage of SMEs. The results of this study are consistent with the findings of previous studies Mishra (2017), Astuti and Wahyuni (2018), Zaid et al. (2018), Gharibeh (2019) and Mustafa et al. (2023) namely saying that green HRM plays a role in the internalization of ideology among employees, mediating green human capital, green structural capital, and green relational capital so as to have a competitive advantage both through innovation and cost reduction.

## **CONCLUSION**

Green human capital, green structural capital, and green relational capital have a positive effect on green human resource management and competitive advantage in wood SMEs in Badung Regency. In addition, Green HRM is also proven to have a direct effect on competitive advantage, as well as being a significant mediating variable in strengthening the influence of the three forms of green capital on competitive advantage. This means that the stronger the management of human resources oriented towards sustainable practices, the greater the potential for SMEs to achieve sustainable competitive advantage.

This study provides a theoretical contribution by presenting a mediation model that explains how Green HRM becomes an important link between green intellectual capital and competitive advantage. These findings confirm that Green HRM is not just an administrative tool, but a key strategy in optimizing the value of environmentally friendly human, structural, and relational capital. In the context of wood SMEs, the implementation of green management practices has been shown to increase efficiency, product innovation, environmental presence, and market reputation. Directions for further research suggest exploring other roles as additional moderators or mediators, such as green organizational culture, innovation orientation, or top management environmental commitment. Further research can also include other industrial sectors or different geographic regions to test the generalizability model. Mixed methods are also recommended to dig deeper into the perceptions of managers and employees regarding the implementation of Green HRM, so that they can produce more applicable and contextual policies in increasing the competitiveness of SMEs in the era of a sustainable economy.

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