

# Green Intellectual Capital

Subjects: **Environmental Studies**

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Green intellectual capital (GIC) is a distinctive intangible asset that may assist organizations in pursuing sustainable development strategies.

green intellectual capital

green human capital

green organizational capital

## 1. Introduction

Environmental management has recently become a major field of management <sup>[1]</sup>. In the contemporary business environment, sustainable companies succeed in the market, as they are able to secure resources and develop competencies to meet the challenges of environmental limitations <sup>[2]</sup>. Consequently, balance should be maintained among economic, social, and environmental goals <sup>[3]</sup>. The motives behind the greening of economic activities are the growth in the awareness of and the responsibility for the conditions of the natural environment, the reinforcement of provisions on environmental protection, and the growing demand for ecological products <sup>[4]</sup>.

Intellectual capital has recently come to the forefront as part of the search for methods that improve corporate environmental effectiveness <sup>[5][6]</sup>. Intangible assets are commonly considered to be competitive advantages and as such may effectively stimulate achievement of sustainable corporate goals <sup>[7][8]</sup>. Despite diverse publications focusing on intellectual capital (IC), its full potential for building sustainable organizations has not yet been 'unlocked'. This is demonstrated by a small number of studies on green intellectual capital (GIC) <sup>[9][10][11]</sup>. The prime focus of research is on the impact of IC on corporate performance and competitiveness. However, the relationship between green intellectual capital and sustainable development is under-investigated <sup>[12]</sup>. The limited availability of publications addressing the issue of green intellectual capital leads one to assume that the concept is unknown, given the Polish conditions. This fact inspired the researchers to research the implementation of practices supporting GIC accumulation in young Polish enterprises.

## 2. Literature Review of Green Intellectual Capital

### 2.1. Sustainable Development and Its Objectives

Given the harsh international regulations concerning environmental protection and high green awareness of consumers, it is critical to adopt an innovative approach to contemporary organization management. This will pave the way towards new paradigms, which will show the route to follow in order to attain a lasting competitive edge. Sustainable development is based on the pursuit of best economic performances, while respecting the natural

environment and social development [13]. According to the World Commission on Environment and Development, sustainable development is development that satisfies the needs of the present generation without preventing the ability of future generations to meet their own needs (World Commission on Environment) [14]. The concept draws upon/accomplishes goals in three areas:

- Environmental—stopping environment degradation and eliminating environmental threats;
- Economic—capturing the use of technical and technological solutions in order to satisfy material needs that, at the same time, constitute minimum threats to the environment;
- Social—eradicating famine and poverty; focusing on health protection, safety, and education development [15].

As noted by Komiyama and Takeuchi, within the concept of sustainable development, there is considerable pressure on liquidating growth barriers, poverty, implementing innovative solutions, environmental protection, and resource restoration, which are crucial, given the new global conditions [16]. Sustainability means finding a balance between the developmental needs of the organization and environmental protection [17]. The main vector of sustainable development is the “green economy” [18].

In 2015, in New York, 193 UN states unanimously adopted a new 2030 agenda, consisting of 17 sustainable development goals and 169 sustainable development tasks. The agenda started a new era of international-level cooperation, obliging all states to undertake a number of sustainable development-centered actions. Countries must seek ways to prevent poverty, increase welfare, and meet the health, education, and sporting needs of people, while protecting the environment [19].

Implementing sustainable development goals requires corporate sustainability in economic, environmental, and social areas. Economic sustainability involves increasing corporate profit ability through efficient use of resources, effective projects and undertakings, and good management practices. Ecological sustainability requires protecting the environment by sparing the use of natural resources [20] and promoting renewable resources. The core of social sustainability is to recognize and consider the needs of the local population [21]. Sustainable development is an unending process of change management because it requires permanent modifications of habits, values, awareness, and behaviors of employees, consumers, company owners, decision-makers, and managers. A shift in ecological awareness is particularly relevant [22].

The subject literature demonstrates an increasing popularity of the thesis—that the key elements of the modern sustainable management strategy are intangible assets, above all, green intellectual capital [12][23]. This is due to the fact that research studies corroborate the positive impact of GIC on corporate environmental performance [24].

## 2.2. Green Intellectual Capital and Its Components

Green intellectual capital (GIC) is defined as a “total of knowledge about the use of the process of environmental management in order to gain competitive advantage” [25]. This knowledge is demonstrated in various ways. It

includes knowledge present in employees, databases, internal relations, external relations, processes, or systems. GIC comprises three components [\[7\]\[26\]\[27\]](#):

- Green human capital (GHC);
- Green organizational capital (GOC);
- Green relational capital (GRC).

The three GIC components interrelate and interact with each other [\[28\]](#).

Green human capital (GHC) is made up of employees who demonstrate knowledge, qualifications, and experience in the field of environmental protection, and who present environmentally-friendly attitudes [\[7\]](#). GHC is a green workforce that understands, appreciates, and undertakes green initiatives. It is the staff who aim to develop eco-friendly working environments and who are committed to ecological principles, not only at work but also in their private lives [\[29\]](#). These individuals represent extensive involvement and pride in green initiatives. They form a distinct group known as “green-collar workers”, i.e., workers who are committed toward limiting the negative natural environmental impacts of organizations [\[30\]\[31\]](#). These may be lower-, middle-, or higher levels of physical or intellectual employees. Green jobs include, among others, ecological auditors, ecological campaign management specialists, or energy efficiency advisors [\[32\]](#).

GHC are workers who [\[33\]](#):

- Feel responsible for the condition of the natural environment;
- Use natural resources sparingly;
- Avoid activities leading to environment destruction;
- Engage in pro-ecological initiatives;
- Take care of green working conditions by limiting the amount of paper used in offices, use energy-saving equipment and renewable energy sources, and participate in recycling programs.

Green organizational capital (GOC), also known as structural capital, captures intangible and legal assets, databases, and invisible assets, such as green organizational culture, philosophy, systems of management of environmental knowledge, and processes, methods, and structures pertaining to environment protection and supporting green initiatives [\[7\]\[8\]\[24\]\[34\]](#). It provides the necessary support to GHC to achieve corporate environmental goals [\[9\]\[35\]](#). Unlike human capital, organizational capital is the property of the company and it may be traded, reproduced, or shared within the company [\[36\]](#).

Green organizational culture is a critical component of GIC. GOC is based on the regulations shaping the pro-ecological behaviors of employees [37]. Such culture fosters green practices among employees and that is why it plays a major role in the formation of sustainable companies [38][39]. As a result, green culture development is viewed as an underlying condition for continuing the growth of the environmental effectiveness of an organization [40][41].

Another vital element of GOC is environmental management. It is oriented at product greening and implementing environmentally-friendly manufacturing processes. It is shaped by management boards and should encompass the following [42]:

- Priorities and objectives of environmental protection;
- Methods to meet all legal requirements;
- Company attitudes to environmental requirements concerning the recipients of goods and services;
- Direction of development of environmental requirements, with respect to the suppliers of raw materials and consumables;
- Rules to reduce the environmental burdens of companies and to produce goods;
- Methods to coordinate environmental policies with other company activities.

Pursuing any environment management strategy is associated with the need to conduct an environmental review, design action schemes, plan the execution of adopted tasks, and provide suitable staff.

The final component of GIC is green relational capital (GRC). GRC is defined as knowledge based on relationships with stakeholders. It is composed of relations with customers, suppliers, strategic partners, institutions, and other members of networks related to environment management and green innovations, which lead to sustainable operations [7][8][24]. These relationships are based on trust built up between partners through past interactions [43]. GRC is of major importance to the formation of human and structural capital [44]. Both the organization and its stakeholders can benefit from relational capital development [45]. It enhances communication, augments willingness to cooperate, and spurs engagement in the joint creation of an added value [46][47][48]. According to Woo et al. [49], one effect of GRC is improved cooperation between the purchaser and the supplier in terms of environment protection. This is because GRC helps supply chain members share knowledge about ecological production. It facilitates cooperation in environmental protection, green innovation, and in developing business processes committed to reducing adverse environmental impacts [50][51].

One component of GRC is green reputation, also known as green corporate image or corporate environmental reputation [52][53]. Studies have demonstrated that green corporate image reinforces its industry position and simplifies competitive advantage development [54]. Other studies confirm the presence of positive correlations

between corporate reputation and customer satisfaction and their loyalty [55]. Green reputation attracts customers who seek products that have positive impacts on the natural environment, strengthening customer relations. Moreover, it stimulates cooperation with stakeholders who feature environmentally-friendly attitudes. All of the above contributed to GRC improvement.

Another constituent of green image development is green reporting connected with green bookkeeping [56]. According to Dilling [57], environmental accounting proves the environmental and social responsibility of companies, whereas green reporting is an element of construing relations with the stakeholders [58]. The portrayal of how (and to what extent) a given company contributes to sustainable development [59] is the foundation of communicating an organization's green actions to its internal and external stakeholders [60]. It serves as evidence of a company's commitment to environmental issues, which spurs green corporate image development [61].

Another crucial factor in GRC formation is green marketing, which is a type of social marketing. It ensures that the links in the production chain perform their tasks in socially and environmentally responsible manners [62]. Vilkaite-Vaitone et al. [63] defined green marketing as strategic, tactical, and operational marketing activities that support the creation and delivery of green products. It encompasses, among other things, the promotion of packaging, and products that are safe for the environment [64]. Green marketing not only favors a green corporate image, it also plays a crucial role in increasing the environmental awareness of partners in a network of relations.

Overall, green intellectual capital comprises a series of intangible assets that affect each other within an organization. It includes diverse types of knowledge about environment protection collected both in the heads of the staff and in databases, procedures, systems, and relationships with stakeholders. Given the complex structure of GIC, an important research issue is to identify the GIC components that may have the greatest impacts on the sustainable development of organizations.

## 2.3. The Impact of Green Intellectual Capital on Corporate Development

Various researchers have analyzed the contributions of intangible resources to the development of corporate effectiveness, including environmental performance. Asiaei and Jusoh analyzed the contribution of intellectual capital toward improving company performance in Tehran. Their research results demonstrated that three of the capital forms, i.e., human, structural, and relational capital, occupied central roles in improving company performance [65].

Chen, in his research conducted on a group of enterprises located in Taiwan, showed that all three forms of GIC have powerful impacts on their competitiveness [7]. In turn, Yadiati et al. focused on investigating the contribution of GIC and company reputations to the development of corporate environmental performance. They determined that strengthening all three forms of GIC increased the environmental effectiveness of enterprises [4].

Moreover, Yusliza et al., in their research carried out in Malesia, demonstrated that green intellectual capital had a positive impact on both economic performance and environmental and social results [24]. Sidik et al. arrived at similar conclusions when studying manufacturing enterprises in Indonesia. Their research confirmed the positive

and profound impacts of GIC on the improvements of both corporate environmental performance and competitive advantage [66].

On the other hand, Yong et al. drew attention to the value of environmental practical placement in the area of human resource management. The researchers argued that said practices might help organizations adjust their business strategies to environmental requirements [8]. Malik et al. likewise emphasized that green human resources management and green intellectual capital are major elements of sustainable business development [27].

Chen and Chang conducted a study amongst Taiwanese manufacturing companies. Their study findings showed that environmental ethics had a positive impact on the development of green relations and green innovation capability. Moreover, it was established that green human capital is involved in the development of positive relations among corporate environmental ethics, green relations, and green innovation performance [1]. Whereas Lin and Chen reported that green knowledge sharing and green service innovations were related to green competitive advantages [67].

The study of Greek companies conducted by Papadas et al. asserted the role of green marketing in the development of permanent competitive advantages [68]. Moreover, a study conducted in Indonesia, involving a group of companies listed on a stock exchange, showed that even though GIC had a positive impact on financial performance, its effect was minor [69].

To confirm or deny the findings of the analysis of the source literature, the researcher undertook a research study on the relationships between GIC and corporate environmental development, in attempt to assess the contributions of individual practices focused on creating green intellectual capital, from the point of view of the potential to develop sustainable organizations. The researcher considers sustainable development an environmental achievement.

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