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Sustainable Business Process Management in the FMCG Sector

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Abstract:

Purpose: *This paper aims to analyse how green practices are incorporated across business processes (operational, support, and management) within various stages of the process management cycle and what metrics are used to assess the implementation of Green BPM.*
Design/Methodology/Approach: *The computer-assisted telephone interview (CAWI) method was used to survey the chief executive officer [CEO] or other equivalent operations executives of FMCG sector companies. The research sample was eventually composed of 150 entities operating in Poland. Data were tested for construct reliability using Cronbach's Alpha and further descriptive statistics were used for understanding the implementation of Green BPM practices and metrics.*
Findings: *Results reveal that Green BPM practices are most extensively present in operational processes, particularly in the implementation phase. Common practices followed by the FMCG companies include energy, water consumption or waste reduction. A possible area for improvement that was identified is the use of recycled or eco-friendly resources. Finally, energy and water usage are widely monitored and metrics associated with the use of such resources are in place.*
Practical Implications: *The findings highlight the potential of Green BPM in advancing sustainability within FMCG. By implementing Green BPM, companies can improve operational efficiency, comply with environmental regulations, and improve customer and stakeholder perceptions. The adoption of green metrics and practices can also support ESG strategies and reporting, as well as competitive positioning.*
Originality/Value: *The paper extends the literature by focusing on the FMCG sector, a field with significant environmental impacts and sustainability potential. The research also highlights the operationalisation of Green BPM, focusing on different levels of process structures as well as phases within the process management cycle. Finally, the study stresses the importance of integrating environmental metrics into traditional performance frameworks to drive continuous improvement and sustainability-focused transformation.*

Keywords: *Sustainable Business Process Management, green practices, BPM, FMCG, ESG.*

JEL codes: *M10, M11, M14.*

Paper type: *Research paper.*

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1. Introduction

In today's world, effective management decisions increasingly depend on understanding the intricate connections between social and environmental systems. Achieving the goal of net-zero emissions by 2050 requires significant transformations in the execution of business processes (Baudoin *et al.*, 2022).

Green business process management (Green BPM), a relatively recent perspective on process management, lacks a universally agreed-upon definition (Couckuyt and van Looy, 2020). This approach builds upon traditional BPM frameworks (Nowak *et al.*, 2011) by integrating both technical and managerial considerations. Given that every organisational process impacts the environment, the way these processes are carried out significantly influences an organisation's carbon footprint (Lan, 2012), along with its production of waste and consumption of energy, water, and other resources (Pagkalou *et al.*, 2024).

By adopting Green BPM, organisations can embrace a sustainable, process-driven approach rather than focusing solely on the sustainability of their end products and services (Rozman *et al.*, 2015).

Since BPM emphasises the analysis, evaluation, and enhancement of business processes (Hoesch-Klohe *et al.*, 2010), it presents a valuable opportunity to foster environmentally sustainable practices within organisations. Organisational sustainability serves not only as an objective but also as a mechanism for driving change within existing processes. It encompasses activities such as identifying, documenting, modelling, analysing, simulating, and implementing ongoing improvements to business processes, with a specific emphasis on minimising the environmental impact of their execution (Seidel *et al.*, 2012).

Green BPM involves reconfiguring existing processes while considering the needs and expectations of various stakeholders (Couckuyt and van Looy, 2020). From this perspective, Green BPM encompasses all management activities designed to monitor and mitigate the environmental impact of processes across their lifecycle—from design and improvement to implementation, operation, and disposal.

The adoption of Green BPM typically pursues two main objectives: minimising environmental harm and fostering cultural shifts within the organisation to follow values and behaviours aligned with sustainability (Opitz *et al.*, 2014; Hernández González *et al.*, 2019).

The remainder of the paper is structured as follows: Section 2 briefly provides a literature review and information on the concept of Green BPM. Section 3 outlines the methodology of the study, followed by section 4, where research results are presented and discussed. Finally, in the last section, brief conclusions are articulated.

2. Literature Review

J.C. Maciel (2017) defines Green BPM as the result of combining the concepts of sustainability and business process management. According to this author, the implementation of operational processes in a company always has an impact on the environment. Accordingly, Green PBM is understood as an approach to process management that generates business value with minimal environmental impact and thus does not compromise the availability of environmental resources for future generations.

K. Hoesch-Klohe *et al.* (2010) define the concept of Green BPM in relation to the application of various technologies (including IT) that enable processes to be designed, analysed, executed and monitored in a way that considers the carbon footprint of their execution.

S. Seidel *et al.* (2012) stress the need to extend the current approach to process management towards the concept of green BPM, which includes sustainability as an objective and enabling tool for managing and improving processes. In particular, three important aspects of this concept are highlighted:

1. Organisations contribute to environmental degradation through the processes they implement. To become environmentally sustainable, organisations need to implement environmentally friendly/neutral processes.
2. The concept of Green BPM involves understanding, documenting, modelling, analysing, simulating, implementing and continuously improving processes with a focus on the consequences for the environment and environmental aspects.
3. Information systems play an important role in the collection, processing and dissemination of information related to the reduction of negative environmental impacts and thus should support the implementation of the Green BPM concept in practice.

Among the activities that can be identified as typical of incorporating the concept of green process management into business operations, Houy *et al.* (2012) proposed the following:

1. Collaborative planning of sustainability strategies for the organisation and its processes.
2. Modelling of business processes considering sustainability indicators.
3. Execution of processes considering efficient use of resources.
4. Optimisation of process realisation considering maximising the efficiency of resources needed for process realisation.
5. Environmentally conscious implementation of business processes based on workflow management systems and supported by information systems.

6. Analysing the data collected during process implementation and relating it to established sustainability indicators.
7. Continuous process improvement considering monitoring data and sustainability indicators.

3. Research Methodology

The aim of the presented study was to assess the application of selected Green BPM practices undertaken in operational, support and management processes in Fast-Moving Consumer Goods (FMCG) companies.

The FMCG sector can be characterised by high-volume production, short-lifecycle products, rapid turnover, and extensive supply chains, and it was chosen for this research for several reasons.

Firstly, the FMCG sector is one of the leaders when it comes to the implementation of sustainable/green practices (OECD, 2024). Therefore, it is a suitable area of research when it comes to identifying Green BPM-related practices.

Secondly, the FMCG sector is resource intensive. This means heavy use of energy, water, and raw materials, which contributes to environmental pollution and resource depletion (Zhu *et al.*, 2017). Since the use of resources is largely driven by operational processes, their optimisation towards Green BPM can address the results of intensive use of resources.

Thirdly, FMCG companies usually manage complex and very often global supply chains (multi-tiered and spread across regions). As processes are the key component of those supply chains, a focus on their sustainable (green) side can impact significant reduction of energy consumption, waste, and emissions within these supply chains (Chardine-Baumann and Botta-Genoulaz, 2017).

The computer-assisted telephone interview (CAWI) method was used to survey the chief executive officer [CEO] or other equivalent operations executives of FMCG sector companies. The research sample was eventually composed of 150 entities operating in Poland and is characterised in Table 1.

Table 1. *Research sample characteristics*

Item	**Range**	**Total**	**Total %**
Number of employees	10-49	108	72.0%
	50-249	37	24.7%
	More than 250	5	3.3%
Sector	Food products	60	40.0%
	Beverages	17	11.3%
	Spirits	8	5.3%
	Cosmetics	31	20.7%

	Cleaning products	16	10.7%
	Tobacco products	2	1.3%
BPM maturity	BPM is not used and not planned	7	4.7%
	BPM is not used but planned	3	2.0%
	BPM is used for 0-2 years	6	4.0%
	BPM is used for 3-5 years	57	38.0%
	BPM is used for 6-10 years	48	32.0%
	BPM is used for 10 years	29	19.3%

Source: *Own research results.*

All variables (Table 2) were measured with a 7-point Likert scale, where 1 indicated that the feature is not implemented at all or is not important/relevant, and 7 indicated that the feature is fully implemented or very important/relevant.

Table 2. *Measurement instruments*

Variables/Constructs	**Items/Scales**	**References**
Types of processes (To what extent are environmental impact reduction/green practices taken into account in the various types of processes?)	Operational processes (e.g. manufacturing) Supporting processes (e.g. maintenance, procurement) Management processes (e.g. human resources management)	Klessascheck et al., 2024; Ghose et al. 2020; Opitz et al. 2014; Recker et al., 2012; Seidel et al., 2011
Process management cycle (To what extent are environmental impact reduction/green practices taken into account at the various stages of process management?)	Identification Design / Modelling Implementation Analysis / Assessment Improvement	Opitz et al. 2014; Recker et al., 2012; Seidel et al., 2011
Green practices (To what extent are the green practices applied in operational / support / management processes?)	Energy consumption reduction Water consumption reduction Other resources consumption reduction Use of green and/or recycled resources Waste reduction Emissions reduction Environmental impacts reduction	Brajer-Marczak et al. 2022; Ghose et al. 2020; Opitz et al. 2014
Green metrics/indicators (To what extent are the green metrics/indicators used to monitor the implementation of processes?)	Energy consumption Water consumption Other resource consumption Degree of use of ecological and/or recycled resources Amount of waste produced Degree of reuse of waste	Brajer-Marczak et al. 2022; Ghose et al. 2020; Hernández González, 2018; Houy et al., 2012

	Volume of CO2 (and other greenhouse gas) emissions Volume of other emissions	

Source: *Own research results.*

4. Research Results and Discussion

The first step in the analysis of data was testing the reliability of constructs (Table 3) to determine their internal consistency using Cronbach's Alpha (Cortina, 1993).

Table 3. *Research sample characteristics*

Variables/Constructs	**Internal Consistency (Cronbach's Alpha)**	**Interpretation**
Types of processes	0.86	Good internal consistency (reliable)
Process management cycle	0.93	Excellent internal consistency (high reliability)
Green practices - operational processes	0.70	Acceptable internal consistency (adequate reliability)
Green practices - support processes	0.88	Good internal consistency (reliable)
Green practices - management processes	0.76	Acceptable internal consistency (adequate reliability)
Green metrics/indicators	0.88	Good internal consistency (reliable)

Source: *Own research results.*

Since the constructs proved to be reliable enough, descriptive statistics were introduced to analyse the research results. Table 4 presents the extent to which environmental impact reduction and green practices are considered for various types of processes and stages of the process management cycle.

Table 4. *Environmental impact reduction/green practices vs types of processes and management cycle*

Variables/Constructs	**Items/Scales**	**Mean**	**SD**
Types of processes (To what extent are environmental impact reduction/green practices taken into account in the various types of processes?)	Operational processes	5.29	1.36
	Supporting processes	4.69	1.42
	Management processes	4.39	1.41
Process management cycle (To what extent are environmental impact reduction/green practices taken into account at the various stages of process management?)	Identification	4.9	1.37
	Design / Modelling	4.7	1.51
	Implementation	5.2	1.40
	Analysis / Assessment	4.9	1.49
	Improvement	4.7	1.35

Source: *Own research results.*

The companies surveyed focused on the operational processes to the largest extent when it comes to environmental impact reduction. However, other types of processes were also considered. It should be noted that integrating environmental impact reduction and green practices within operational, supporting, and management processes is important for achieving sustainable development goals.

For example, attempts to minimise resource consumption emissions and waste, as well as implementing energy-efficient technologies in operational processes (e.g. manufacturing) align with global climate targets (Zhu *et al.*, 2013). Supporting processes (e.g. maintenance or procurement) can benefit from green practices implementation by meeting regulatory regulations (Kumar *et al.*, 2016).

In the case of management processes, taking environmental considerations into account can encourage a culture of sustainability throughout the organisation (Cheng *et al.*, 2023).

Finally, it can be claimed that the focus on environmental impact reduction across all process types can enhance the reputation of the organisation and appeal to environmentally conscious customers and stakeholders.

Regarding the phase of the process management cycle, implementation was the one with the highest result for addressing green practices. Although the results for different phases varied, integrating environmental impact reduction across all stages of process management should be essential for achieving sustainable development.

During the process identification or at the process design/modelling stage, early recognition of environmental aspects can help to address potential impacts in a proactive way and further lead to more sustainable results (Kleindorfer *et al.*, 2012; Ahi and Searcy, 2013). Such an approach also ensures that green practices are embedded into operations, allowing the reduction of resource consumption and emissions (Zhu *et al.*, 2013).

Nevertheless, the adequacy of green measures taken should be continuously evaluated, which can be done in the analysis/assessment phase and fine-tuned in the improvement phase, leading to changes in, e.g. process design or implementation that could further result in improved operational and environmental performance (Hervani *et al.*, 2015; Darnall *et al.*, 2018).

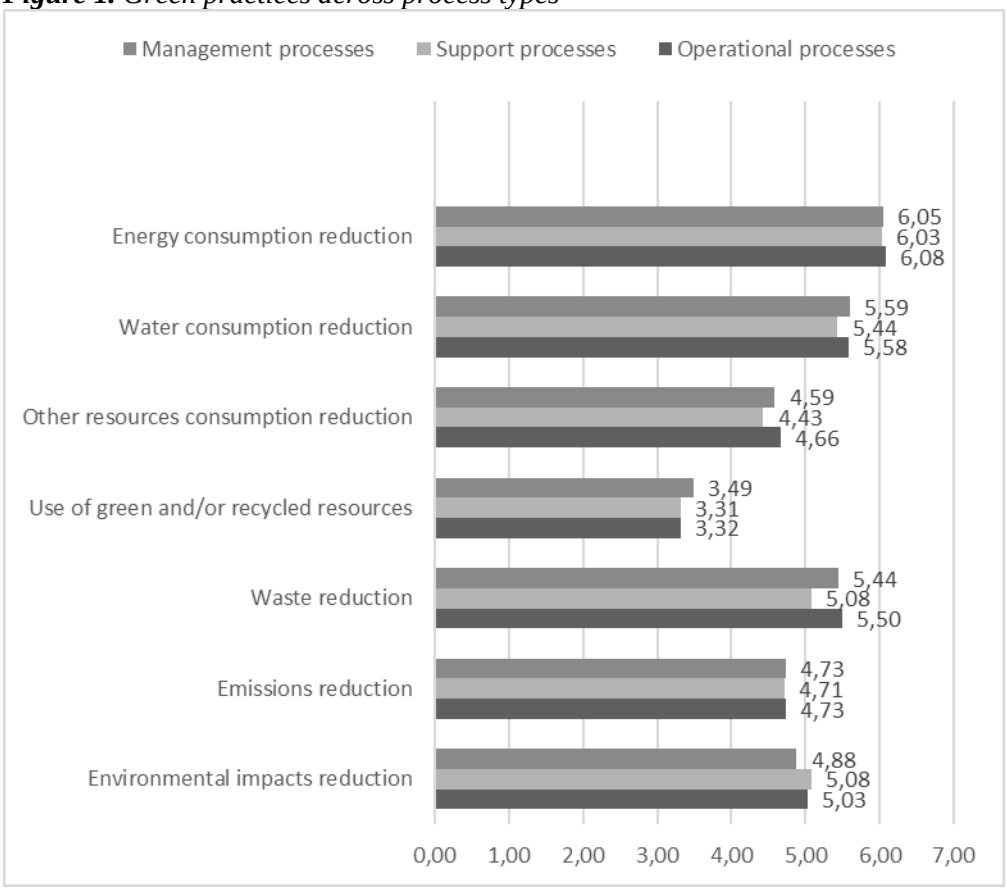
Table 5 and Figure 1 present the extent to which green practices in operational, supporting, and management processes are considered across the process types. Figure 1 provides an additional graphical representation of the Table 5 dataset for the clarity of comparisons between different groups of processes.

Table 5. *Green practices across process types*

Variables/ Constructs	**Items/Scales**	Operational processes		Supporting processes		Management processes	
		Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
Green practices (To what extent are the green practices applied in operational / supporting / management processes?)	Energy consumption reduction	6.1	1.03	6.03	1.12	6.0	1.13
	Water consumption reduction	5.6	1.54	5.44	1.60	5.6	1.54
	Other resources consumption reduction	4.7	1.34	4.43	1.49	4.6	1.48
	Use of green and/or recycled resources	3.3	1.90	3.31	1.87	3.5	2.00
	Waste reduction	5.5	3.66	5.08	1.64	5.4	4.46
	Emissions reduction	4.7	1.84	4.71	1.82	4.7	1.80
	Environmental impacts reduction	5.0	1.62	5.08	1.59	4.9	1.66

Source: *Own research results.*

Figure 1. *Green practices across process types*



Source: *Own research results.*

In the case of green practices implemented in different process types, the results spread even, showing that the implementation of different means to minimise environmental impacts is similarly significant for different process types. The FMCG companies indicated that reducing the energy consumption in all process types is the most important activity.

Other examples of significant practices include water consumption and waste reduction. On the contrary, the use of green and/or recycled resources was indicated as the least significant. Implementing green practices in business processes, regardless of their position in process structure, is critical for enhancing sustainability and achieving long-term economic benefits.

Reducing energy and water consumption, as well as minimising waste and consumption of resources, is not only beneficial for the natural environment but can also lead to savings and improve operational efficiency (Zhu *et al.*, 2013).

The adoption of green or recycled (eco-friendly) resources can be important for businesses whose customers are environmentally conscious and represent increasing demand for environmentally neutral products. Such an approach also helps companies build a positive corporate reputation and can lead to a competitive advantage against businesses not following the sustainability agenda (Kumar *et al.*, 2016). Table 6 presents the extent to which green metrics and indicators are used to monitor the implementation of processes in the surveyed companies.

Table 6. *Green metrics and indicators*

Variables/Constructs	**Items/Scales**	**Mean**	**SD**
Green metrics/indicators (To what extent are the green metrics/indicators used to monitor the implementation of processes?)	Degree of use of ecological and/or recycled resources	3.4	1.36
	Volume of CO2 (and other greenhouse gas) emissions	4.3	1.85
	Degree of reuse of waste	4.5	1.92
	Volume of other emissions	4.6	1.83
	Other resource consumption	5.1	1.67
	Amount of waste produced	5.4	1.58
	Water consumption	5.9	1.31
	Energy consumption	6.1	1.24

Source: *Own research results.*

When it comes to green metrics and indicators, the results echo those for green practices. Similarly to the previous dataset, the metrics used most often are energy consumption, water consumption and amount of waste produced and the metric that was the least taken into consideration is the degree of use of ecological and/or recycled resources.

Metrics and indicators are essential for effective monitoring of the process

performance. Metrics can provide quantifiable data on the use of all resources required for the realisation of business processes, as well as emissions or waste, enabling businesses to assess their environmental impacts in a more accurate manner.

Monitoring the use of energy or water can help to identify inefficiencies in processes, which in turn can be used as input data for targeted improvements leading to improved performance (Zhu *et al.*, 2013). Green metrics and indicators can also be used as strategic decision-making factors and help managers shape strategies towards ESG requirements (Epstein and Buhovac, 2014).

It should also be highlighted that implementing Green BPM may require the expansion or adaptation of ways to measure the processes using classic KPIs (Key Performance Indicators), but also introducing KEIs (Key Ecological Indicators). A wide range of such indicators are proposed in the literature (Hernández González, 2018), and a selection of these metrics was included in the performed study. KEIs cane be critical for organisational performance and should be not only set at the processes level but also include activities and whole organisation levels and relate to the efficiency, cost and quality of products offered.

5. Conclusions

Green BPM can be viewed as a sustainable business model emphasising a positive impact on the environment by altering value-creation processes (Bocken *et al.*, 2014). As a fusion of sustainability principles and process management, Green BPM aims to generate business value while minimising ecological impact ensuring the preservation of environmental resources for future generations (Maciel, 2017).

The surveyed FMCG companies take green practices into consideration (with different intensity, though) in all phases of the process management cycle and at all process levels. Additionally, it should be highlighted that the implemented processes are measured with green metrics and indicators.

The benefits of applying sustainability principles presented in the discussion, as articulated by different scholars, are indisputable and can attract the concept of Green BPM to entities that might not fully follow the sustainability principles yet.

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