

Environmental Knowledge Management from the Perspective of Young Employees: An Economic Sector Comparison

Riccardo Valente and Bartłomiej Kabaja

Kraków University of Economics, Poland

valenter@uek.krakow.pl

kabajab@uek.krakow.pl

Abstract: Currently, degradation of the natural environment led many companies to consider implementation of more sustainable practices. In the academic literature, environmental knowledge required and acquired by employees, moreover, is often considered part of knowledge management, with a growing number of researches focusing on Environmental Knowledge Management (EKM). In practice, however, EKM in firms from different sectors vary and interventions are sometimes lacking. The research objective of the current paper is to examine selected elements of the EKM in enterprises operating in different economic sectors. Three research questions connected with EKM functioning were thus enquired through a structured questionnaire, sent electronically to employees, using non-random, convenience sampling. Therefore, statistical analysis of the 297 collected questionnaires stressed a high relevance of environmental protection without differentiation between economic sectors, while the EKM assessment of employees varies between firms from different sectors. The evaluation of EKM, moreover, does not align with the relevance of environmental protection according to most of the employees, signalling – based on motivation expectancy theory – a moderate dissatisfaction with the functioning of EKM among young employees and the existence of an intensification potential of unused environmental protection policies in companies interested. These findings confirm that there is potential among staff to implement a more effective EKM system, yet in practice companies are not making use of it.

Keywords: Environmental knowledge management, Environment, Employees, Economic sector, Environment protection, Expectancy theory of motivation

1. Introduction

Current climate change and the prevailing consumer trends are encouraging companies to reduce the negative environmental impact of their operations. Upcoming regulatory changes and increasing public awareness of environmental issues are more compelling arguments for integrating EKM into the strategy and daily functioning of companies at all levels. Activity in this area offers the opportunity to build a competitive advantage, as well as to implement eco-innovations and sustainable practices. Combining industrial ecology with knowledge management (KM) tools and concepts leads to the creation of an EKM system (Wernick, 2003). Implementing this system and making it available to employees at all levels of the organisation enables them to achieve an appropriate level of environmental awareness and make environmentally sound decisions regardless of their position (Huang and Shis, 2009). Companies using EKM-based management can increase resource productivity and reduce waste generation. Environmental knowledge encompasses what employees know about natural environment protection, what raises their concern in connection to it, and their responsibility for environmental protection. Those elements then seem perfectly in line with the overall principles of sustainable development both at whole economy and single organization level (Frick et al., 2004). As market-oriented enterprises play the most significant role in generating negative environmental impacts, monitoring and improving their performance in this regard should therefore be a strategic priority (Wang et al., 2023). Despite the growing importance of environmental protection within companies, research to date has mainly focused on organisational strategies, manufacturing and production technologies, and the views of senior management. The opinions and perceptions of front-line staff on this issue have been analyzed much less frequently. This issue seems particularly important given the entry of generation Z into the labour market. The members of this group are characterised by high environmental awareness and high employer expectations.

2. Literature Review

KM within a company and knowledge utilisation are crucial for the achievement of organisation objectives. Knowledge base and its dissemination constitute, in fact, the foundation of an organisation's competitive advantage (Muscatello, 2003). During the progressive process of continuous improvement of business strategies, knowledge has become a valuable resource that determines competitiveness and fosters the creation of an innovative environment (Yusof et al. 2012; Lee and Lee, 2023). Since knowledge within an organisation is, by its very nature, dispersed, KM systems must integrate it from various sources (Mahmood et al., 2023). One of organisations main tasks is then to develop, disseminate, and utilise knowledge (Zhang 2024).

The characteristics of a KM system relate to principles such as: employee-centredness, treating employees as the primary resource for creating, accumulating, and applying knowledge, and increasing the effectiveness of activities through employee initiative (Edwards, 2022).

KM is one of the most important and strategic areas within organizations in the process of implementing and maintaining sustainable development (Hassanzadeh et al., 2023). A company's focus on KM in the context of sustainable practices determines its position as a responsible entity fulfilling its obligations regarding natural environment respect (Chopra et al. 2021). In this context, KM has emerged as an additional tool available to companies and supporting the implementation of sustainable development practices (Chang et al. 2018). Internal knowledge sharing is crucial to promote training and continuous improvement in EKM within companies, while employees' trainings are considered one of the key factors influencing their competencies (Tongsamsi and Tongsamsi, 2015). This process provides them with the knowledge, skills, and competencies necessary for the organisation to face new and changing requirements (Wedchayanon, 2009). Insufficient knowledge by employees leads to failure to achieve company objectives. The role and importance of training in the process of acquiring environmental knowledge are confirmed by the research of Moraes et al. (2019), which was carried out in the financial sector and confirms the impact of training on ecoefficiency in banking.

Further research on EKM was conducted by Goh et al. (2012), focusing on the environmental performance of companies in Malaysia, pointing out that socialization, externalization, and internalisation play a very significant role in employee engagement and EKM effectiveness. These research conclusions, moreover, stress the importance of further discussion on KM and potential initiatives concerning practices and mentoring, that will involve experts (Goh et al., 2012). Huang and Shish (2009) research based on metallurgical industry analysis stressed that information flow among employees has a significant impact on EKM. Based on a case study analysis, they pointed out that in particular this can take place through an institutionalised process, relaying on the creation, collection, sharing, utilisation, and internalisation of environmental knowledge. Based on such a study, continuous KM improvements have led to a reduction in water consumption and atmospheric emissions in the metallurgical sector (Huang and Shish, 2009). In turn, research by Scuotto et al. (2024), based on the touristic sector as an example, showed that behavioural intent and personality have a significant influence on attitudes towards environmental issues. These authors, furthermore, argue for the need to enforce and promote EKM in that sector (Scuotto et al. 2024).

Research conducted by Kabaja (2025) in the food service industry revealed that both training and the EKM system are lacking. Furthermore, there was a lack of commitment from the supervisors and the employees expected greater initiative and motivation from the management. The employees of this study reported that their companies could be more environmentally friendly, but the issue was not considered the most relevant (Kabaja, 2025). Meanwhile, Belijić et al. (2013) drew attention to good practices in the food and beverage industry. The research revealed that companies in this sector are highly aware of KM, although none of them has yet developed a specific KM policy or strategy.

Despite the growing number of studies dedicated to EKM, there are still relevant gaps to fill in the literature. The existing analyses, indeed, generally focus on single economic sectors (e.g., tourism, food services or finance), often hindering comparisons with other ones since each research uses a different scale and measurement method, or focuses on different geographical areas.

Furthermore, many studies address mainly the organisational or managerial level, overlooking the individual perspective of frontline workers. Yet, very often, workers are those who actually determine environmental outcomes, having an impact on environment through the many relevant decisions they take day by day. They, moreover, shape the organisational climate in which environmental protection and KM take place, influencing organisational culture practical application and its effects on firm functioning. When conducting EKM research, it is also important to take into account the general level of environmental awareness within the populations under study. An analysis of the findings of Piekarski et al. (2016) conducted in Poland demonstrates that environmental awareness is influenced by numerous variables. For example, people living in rural areas pay greater attention to issues of water or forest pollution (Piekarski et al., 2016). This confirms the existing and well-documented relationship in the literature between environmental awareness and the level of industrialization and urbanization of the respondent's place of residence. Therefore, the effectiveness of EKM practices may depend not only on organisational practices, but also on employees. Consequently, the effectiveness, suitability, and acceptance of environmental knowledge may vary among employees and depend on them.

Basing on expectancy theory of motivation and the associated motivational system effectiveness evaluation methodology (Lawler and Porter, 1967; Nadler and Lawler, 1977; 1989; 2007), moreover, the main factor that can affect employee behaviour and commitment to various goals and objectives is subjective worker expectations about potential outcomes of actions carried out in a given organisational context. These expectations are in turn affected by the subjective internal and intrinsic assessment by employees of a given value, the relevance of a goal, or the aim. As was originally done in the aforementioned studies, then current research assumes that each person differs from another in terms of needs, values, and behaviour in a given situation, while the same person reacts differently to various situations arising in the workplace, rationally making decisions about his or her own behaviour based on its expected outcomes. Therefore, a survey among employees of companies from various sectors was conducted, focusing in particular on young workers from generation Z in the early stages of their career. Based on data from the Polish Statistic Office, in 2024 generation Z employees - eg individuals born after 1995 (Różańska-Bińczyk, 2022) – constituted, indeed, between 15 and 16 % of the workers employed in the country, representing a relevant part of the workforce. As stressed by Różańska-Bińczyk (2022), in addition, in Poland generation Z respondents tend to evaluate highly environmental protection and ecology as a social goal in general and take into account such aspects as firm reputation for engaging in eco-friendly practices upon selecting their employer. In terms of motivation, then, this can be considered as a higher subjective value attributed to environment protection by generation Z employees. If, as emerges from data analysis, such workers highly praise interventions aimed at improving and extending environment protection, as per Kotter (1995) change implementation model, in turn, they can be considered as a very useful basin of potential change agents more willing than others to implement such policies and EKM strategies. According to Scuotto et al. (2024) – as well as based on more theoretical considerations based on the Holland (1997) person-environment fit model and the widespread use of personality questionnaires in worker selection – the prevalence of environmentally friendly values and attitudes among such types of employees can support the idea that they can be the loudest representatives of O'Connor's (1993) opponent style of behaviour to insufficient environmental protection practices. Moreover, exactly such factors can constitute a potential advantage for firms willing to implement or improve EKM policies and support the diffusion of eco-friendly practices. As a matter of fact, they can be able to use exactly such kind of workers attitude as a leverage to overcome the current status quo inertia, in the unfreezing and then refreezing phases of more eco-friendly policies implementation as per Lewin (1947) and Egan (1994) change models.

Although being partially an outcome of the focus on generation Z employees, finally, the high percentage of employees working for less than 5 years among the respondents can be considered a good proxy of the lower rank that the enquired workers have. It allows, thus, to assume the desired front-line workers' point of view in the analysis and to better assess the existence of unused potential for bottom-up environmental protection policies elaboration or the willingness of enquired category of employees to engage and adhere to more pervasive EKM top-down interventions.

Similarly to what happens with section A answers in the analysis of the Nadler and Lawler (1977; 1989; 2007) questionnaires, then the general relevance of personal environmental protection in the view of the respondents was first asked. As in section B of the aforementioned questionnaires, the respondents were then requested to provide their subjective assessment of various aspects of EKM functioning in the company in which they are employed. Therefore, it was assumed that precisely such subjective elements, arising from the interaction between, on the one hand, the actual measures taken as part of EKM within the company and, on the other, the personal preferences and evaluation of the situation by employees, can help to determine the desired direction of interventions aimed at improving EKM functioning in the companies considered and diagnose the eventual existence of unused potential for more extensive implementation of environmental policies.

In fact, the objective measures implemented within a given company were viewed merely as one of the factors influencing the actual functioning of the EKM within the company. These measures alone, however, would not allow providing an accurate assessment of the ultimate impact of the actions undertaken. They do not provide, in fact, sufficient information regarding the organisational context and climate in which EKM takes place. An analysis of the measures taken as part of EKM alone, as a matter of fact, would ultimately fail to take into account whether employees would be willing to increase their involvement in activities aimed at supporting environmental protection and if they are sufficiently motivated to do so without the need for additional incentives or the use of other persuasion and dissuasion means at the company end. Meanwhile, as any change implementation in firm operation practices and even more so in the case of overall strategic goals and policies

reshaping, improving or implementing from zero EKM in a given firm would need strong commitment from management and the highest possible support among employees to minimize resistance to change and improve the chances of success of such undertakings. Assessing the existence of attitudes supportive to EKM improvements and environmental protection practices among employees seems then a crucial aspect to consider, before even starting to conceive an actual EKM improvement policy and plan the actual kind of interventions needed.

According to the authors, the presented considerations thus justify the need for cross-sectional research, encompassing studies across various sectors and focusing on generation Z frontline staff and their subjective assessment of both environmental protection relevance as a corporate objective and actual EKM functioning according to them. This approach then provides an opportunity to examine the practical aspects of EKM and compare them between sectors.

The purpose of the study is therefore to examine the selected elements of the EKM system in companies from different economic sectors. Based on the literature review presented and the signaled importance of environmental protection in companies and generation Z employees, the following research questions have then been formulated:

RQ1 – Environment protection relevance differs significantly according to employees of firm operating in different economic sectors?

RQ2 – EKM evaluation differs significantly per sector basing on employees opinions?

RQ3 – The personal evaluation of selected elements of company EKM according to workers is aligned with the environment protection relevance for the same employee?

3. Methodology

Quantitative research methods were used to achieve the objective of the study and answer research questions. The tool used in the study was a questionnaire distributed to respondents via the Internet in an online format. Convenience sampling was used. The questionnaire was structured and based on a review of the literature. It consisted of two parts: a demographic section and a substantive section. In the first section, respondents provided information regarding: gender, age, length of service, and sector in which the firm hiring them operates. In the second part, the questions were developed based on an analysis of previous research results described in the review of the literature. The study population consists of company employees. Given the exploratory and diagnostic nature of the study, it was deemed that a sample size of 300 respondents would be sufficient at this stage – Tab. 1.

Before the study began, a pilot test was conducted in the presence of the interviewer, to refine the questionnaire and to check whether the questions and the format were suitable for the respondents. The findings from this stage were used to make iterative improvements, ultimately resulting in a finalized and refined version of the questionnaire, collected and distributed electronically via a Google form. To achieve the objective of the study and answer the research questions, the final questionnaire was organized into four sections, allowing one to assess, respectively:

- environmental protection relevance for the employee – two questions,
- the availability and quality of training and support regarding environmental protection knowledge in employee firm – four questions,
- access to knowledge about environmental protection in worker company – three questions,
- the perceived commitment of the company representatives to environmental protection according to the employee – two questions.

In total, the research questionnaire comprised 11 substantive questions and 4 classification questions.

Analogously to what happens in the case of Nadler and Lawler (1977; 1989; 2007) questionnaires analysis¹, moreover, four synthetic indexes were constructed, e.g.:

¹Where, considering the difference among section A and B answers as in the case SI4, motivational system effectiveness is usually analyzed: - per worker basing on averages of different answers concerning independent motivational factors, - per factor averaging the answers of whatever number of workers taken into account in the inquiry, - overall considering the average of all answers for each of the factors and all the respondents, as was done in the case of SI1, SI2 and SI4 (Cf. Krawczyk-Sołtys, 2009; Mikula, 1998).

1. SI1 – An index averaging the two answers from the section a. concerning environmental protection relevance
2. SI2 – An intermediate instrumental index grouping together the answers to two questions from the section b.
3. SI3 – An index averaging the aforementioned SI2 together with the remainder of the answers from section b., as well as all answers to questions from section c. and d., which can, thus, be conceived as a general measure of the overall EKM evaluation according to the employee,
4. SI4 – An index calculated as the difference of SI3 and SI1 (e.g.: $SI4 = SI3 - SI1$) measuring the alignment of firm EKM functioning according to the employees with environment protection relevance according to the same employee.

The distribution of the online questionnaire allowed to obtain a rich and diverse data set which – after excluding three questionnaires due to the inability to align the answers of the respondents with the final sector classification adopted for the subsequent analysis – is characterised by the structure of the classification variables reported in Tab. 1.

Table 1: Sample and raw-data features

Grouping variables	Categories	Structure indicator (%)
Gender	Female	41.75
	Male	55.89
	Others	0.34
	Refusal	2.02
Age	18-22	73.40
	23-26	21.55
	27-35	4.04
	36-45	1.01
Length of employment	up 2 years	65.66
	2-4 years	27.27
	5-8 years	5.05
	over 8 years	2.02
Sectors	Agriculture and food industry	5.39
	Manufacturing	20.54
	Education	5.05
	Constructions	1.68
	Gastronomy, Hotels and Entertainment	23.23
	Finance, Banking and Insurances	5.05
	Transport and Logistic	16.16
	Health, Cosmetics and Sport	4.71
	Commerce and e-Commerce	16.50
	Administration	1.68

The majority of the sample consisted of men (55.89%) and individuals of generation Z aged 18–22 (73.4%) and 23-26 (21.55%), who had been in employment for less than two years (65.66%) or 2-4 years (27.27%). The data were first pre-processed and then analysed using IBM SPSS software, specifically employing nonparametric K-group testing based on the Kruskal-Wallis test to account for the data ordinal and noncontinuous nature, as well as on descriptive statistics analysis.

3.1 Data-preprocessing and Analysis

First, to reduce the number of pairwise comparisons, initial raw data concerning sectors in which the firm employing the respondent is operating were regrouped, so that:

- Other Services category joins together Education, Administration, Health, Cosmetics and Sport, as well as Finance, Banking and Insurances initial sectors,
- Manufacturing and Constructions were joint in a single Industrial Production & Construction category – Tab. 2.

Table 2: Sectors used for group comparison in SPSS

Sectors classification		
Id number in SPSS	Sector name	Frequency
1	Food production & Agriculture	16
2	Industrial Production & Constructions	66
3	Gastronomy, Hotels & Entertainment	69
4	Transport & Logistic	48
5	Commerce & E-commerce	49
6	Other Services	49

To be able to address the research question RQ1, then, the synthetic index SI1 was elaborated, averaging the answers to section a. questions. It's worth signaling, then, that among the respondents there is not a significant (at a 0.05 level) differentiation per Industry of such an index basing on Kruskal-Wallis test – Tab. 3 and Fig. 1.

Table 3: SI1 and Environment Protection Relevance not significant differentiation among industries

SI1 test Statistics ^{a,b}	
Kruskal-Wallis H	3.517
Df	5
Asymp. Sig.	.621
a. Kruskal Wallis Test, b. Grouping Variable: Industries	

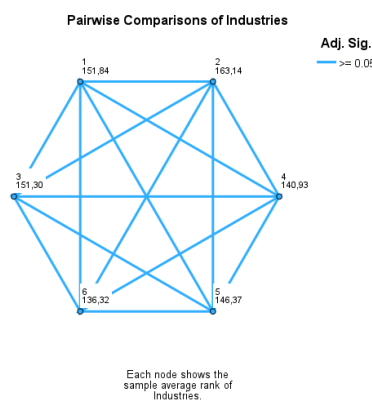


Figure 1: SI1 and Environment Protection Relevance pairwise comparison of Industries

Moreover, the overall distribution of the index supports a high value attributed by the respondents to Environment Protection overall (e.g. the theoretical mean value is 3.835, while the mode is 4.0 on a ten-mark ordinal 1 to 5 scale, with a visible higher frequency of 4.0; 5.0 and 4.5 values and the consequent right-hand skewness of the distribution – Tab. 4 and Fig. 2), confirming Różańska-Bińczyk (2022) results.

Table 4: SI1 and Environment Protection Relevance descriptive statistics

SI1 Descriptive Statistics				
N	Mean	Std. Deviation	Minimum	Maximum
297	3.835	.9460	1.0	5.0

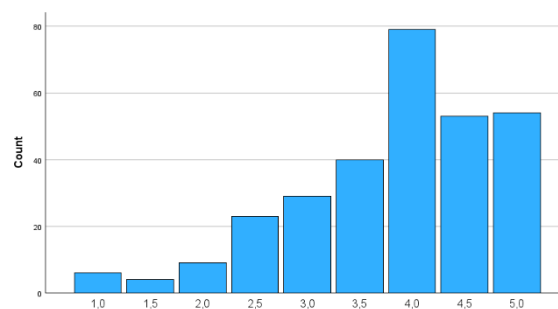


Figure 2: SI1 and Environment Protection Relevance distribution

To address RQ2, it seemed worth, then, considering and discussing in detail the information concerning EKM Evaluation according to employees, which was possible to analyse based on the answers to section b., c. and d. of the questionnaire. As to be able to elaborate the SI3 overall EKM evaluation synthetic index on a scale comparable to SI1, however, an instrumental SI2 index had to be created. The answers to two of the questions from section b., indeed, were initially conceived on a scale from 1 to 3 and had to be regrouped together to obtain an index concerning the EKM Policy adopted by the respondent firm measured on a scale from 1 to 5 – Tab. 5.

Table 5: SI2 EKM Policy construction

Training realization and environment defence responsible person		
Ordinal number in SPSS	Kind of EKM policy	Frequency
1	No training and no or unidentified responsible	212
2	Partial training and no or unidentified responsible	34
3	Dedicated training, but no or unidentified responsible and identifiable responsible, but no training	23
4	Identified responsible and partial training	18
5	Identified responsible and dedicated training	10

Similarly, since the answers to the other two questions from section b. were initially provided on a 1 to 6 scale, yet in both cases values of 5 and 6 were the less frequent, those two last kind of answers got collapsed in a single category, allowing the rearrangement of the answers on a 1 to 5 ordinal scale comparable with the rest of the answers from questions from other sections of the questionnaire and SI1.

It has to be pointed out, then, that, while not each of the questions in section b., c., and d. of the questionnaire is significantly differentiated across industries, based on Kruskal-Wallis test results, at least one of the indicators is different among at least one and in some cases even two or three different pairs of industries in each of the aforementioned sections of the questionnaire and areas of EKM functioning considered. The overall synthetic index SI3 concerning overall EKM Evaluation obtained considering all the different aspects asked at once, furthermore, is still significantly different in the industry of Industrial Production and Constructions compared to the Other Services one in general – Tab. 6. While the realized disaggregated analysis of the data in different areas has been omitted here and will be published in a separate paper for matter of space, it seems worth, thus, discussing the general differences emerging on an overall scale among sectors, when general EKM evaluation by employees is considered.

Such a synthetic index, indeed, can be considered as a general indicator of how EKM in place in their firm is evaluated according to workers perception and – after answers to questions from section b. rearrangement – it is an average of 11 different answers measured on a 1 to 5 ordinal scale and comparable with the formerly discussed SI1 synthetic index concerning Environment Protection Relevance according to a given employee.

Table 6: SI3 and EKM Evaluation significant differentiation among Industries

SI3 test Statistics ^{a,b}	
Kruskal-Wallis H	14.253
Df	5
Asymp. Sig.	.014
a. Kruskal Wallis Test, b. Grouping Variable: Industries	

It, moreover, differs significantly among the Industrial Production & Construction sector and the Other Services one (Tab. 7), which, based on Mean Ranks analysis (Fig. 3), is characterized by a lower level of satisfaction of the workers employed in firms from such industry in terms of overall EKM evaluation.

Table 7: SI3 and EKM Evaluation pairwise comparison among Industries

Pairwise Comparisons of the distribution of variable SI3 among industries					
Industries	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
6-5	13.480	17.331	.778	.437	1.000
6-3	17.709	16.026	1.105	.269	1.000
6-4	34.951	17.421	2.006	.045	.672
6-2	51.650	16.176	3.193	.001	.021
6-1	53.503	24.700	2.166	.030	.455
5-3	4.230	16.026	.264	.792	1.000
5-4	21.472	17.421	1.233	.218	1.000
5-2	38.170	16.176	2.360	.018	.274
5-1	40.024	24.700	1.620	.105	1.000
3-4	-17.242	16.123	-1.069	.285	1.000
3-2	33.941	14.770	2.298	.022	.323
3-1	35.794	23.802	1.504	.133	1.000
4-2	16.699	16.273	1.026	.305	1.000
4-1	18.552	24.763	.749	.454	1.000
2-1	1.853	23.904	.078	.938	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .050.
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

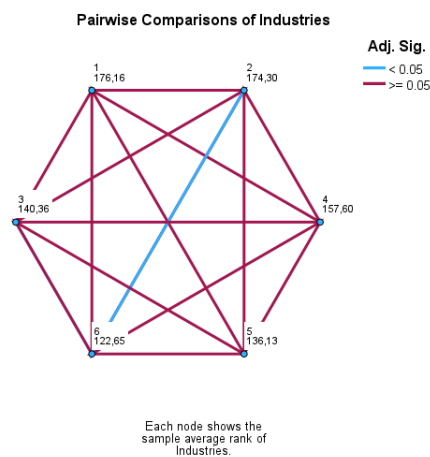


Figure 3: SI3 and EKM Evaluation pairwise comparison and significant Mean Ranks Differentiation among Industries

Considering RQ3, moreover, it is worth pointing out that SI4 index allows to measure the difference among the two formerly elaborated synthetic ones concerning respectively overall EKM Evaluation according to a given respondent (e.g. SI3) and the Relevance of Environment Protection for him (e.g.: SI1) is not significantly differentiated per sector.

Table 8: The not significant differentiation of SI4 and EKM Evaluation to Environment Protection Relevance alignment among Industries according to workers

SI4 Test Statistics ^{a,b}	
Kruskal-Wallis H	4.644
Df	5
Asymp. Sig.	.461

a. Kruskal Wallis Test; b. Grouping Variable: Industries

However, SI4 is characterized by a negative mean (eg -1.33 in a range of possible levels from -4.0 to +4.0 of the index value) and a distribution tested as not normal and evidently skewed toward the left range, signalling - based on its own construction and the similar interpretation of negative results of Nadler and Lawler

questionnaire analysis (Krawczyk-Sołtys, 2009) – the fact that the respondents consider their own employers overall EKM slightly lacking in comparison to how important Environment Protection is for them personally.

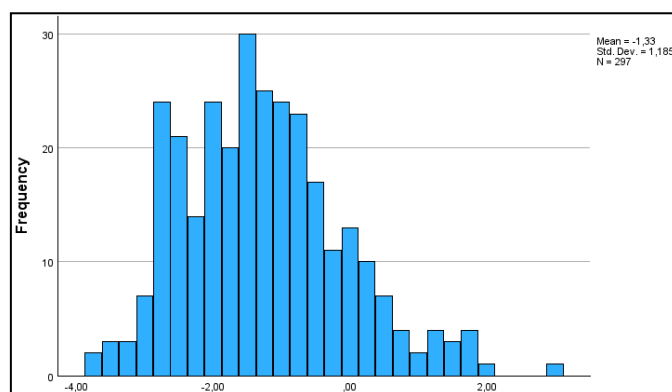


Figure 4: The negative and left-hand skewed distribution of SI4, EKM Evaluation to Environment Protection Relevance alignment index

The results then support the idea that it can be worth considering the improvement proposals provided by the employees and the disaggregated indexes per sector in different aforementioned areas of EKM functioning, which was possible to obtain based on the same questionnaire, in further research, delving more in depth into the matter of the possible ways in which analysed firms could increase the alignment of their EKM system with their own employees' expectations.

4. Conclusions

The current study points out that the workers in the question generation Z consider highly relevant environmental protection and that there is no significant differentiation of this aspect based on the sector in which the companies hiring them are operating. Therefore, such a result seems to rule out the possibility that the eventual inefficacy of the policies implemented by firms and aimed at improving the protection of the environment can be due to a lack of interest in this purpose in the interest of those employees. The inquired employees, moreover, evaluate the functioning of the elements analyzed of the EKM system in their own company differently depending on the sector in which the firm operates. In particular, workers from Other Services sector tend to evaluate worse their own firm EKM functioning in comparison to workers from Industrial Production and Construction sector. EKM system improvements and its better alignment with employees' expectations can thus be more urgent in the analysis that operate in the Other Services sector. EKM evaluations to Environmental Protection relevance alignment do not differ significantly per sector, yet, in most of the cases, a lack of alignment of those two factors is worth noticing. Current research signals, in fact, a general enquired employees' dissatisfaction with EKM system functioning in analysed companies. As a result, increasing the level of alignment among EKM perceived functioning and workers expectations, as well as improvements of EKM activities, strategies, and policies, can be useful and worth undertaking in most of the companies surveyed. Finally, the results show the existence of a, at the moment, not yet fully utilized, potential for intensifying and improving environment protection policies, independently from the activities already undertaken in the vast majority of the companies enquired and in all of the considered economic sectors. Considering that the majority of employees inquired were generation Z individuals, moreover, it seems possible to signal that focusing on such workers can be particularly fruitful for firms considering EKM system implementation, willing to improve the one already currently in place, or even aiming more in general to increase their commitment to environmental protection.

The obtained results overlap with those achieved by other authors. Similar indications of the high level of employees' and generation Z individuals' awareness and engagement as far as natural environment issues are concerned were already pointed out in Kabaja (2025) and Różańska-Bińczyk (2022). Beljić et al. (2013), as well, confirms similar results with respect to high-level environmental awareness among workers, although in this case managers instead of lower-level employees were considered. The results reported here are, moreover, not far from those achieved by Goh et al. (2012), who propose the increase of initiatives supporting the propagation of EKM assumptions in particular through additional mentoring and apprenticeships opportunities for workers, as well as motivating and encouraging them to share the knowledge they already possess.

A first limit of current research can be that the personal perception of environment protection relevance both according to workers and companies can abruptly change due to external shocks and under the effect of factors behind the direct control of any of the parts considered, as, for example, the armed conflicts lasting in Middle-East at the moment (Lawler and Porter, 1967; Nadler and Lawler, 1977; 1989; 2007). Due to the very methodology used, moreover, while it is possible to assess whether a particular individual or group of individuals is satisfied with EKM functioning in a particular context, giving practical advises for a given firm analysed, the possibility to generalize the results to other firms or groups of employees is limited. Only an actual analysis of the current situation in place in a given company can as a matter of fact confirm or negate that an unexploited potential as the one emerging in the case of employees and firms enquired actually exists. The very fact that it was actually possible to find common trends among generation Z workers taken into account can, however, support the idea that, although with caution, some kind of generalization of presented results can be attempted. Other limitations of this study include the use of convenience sampling, which should be borne in mind when analysing these results. However, as a final methodological consideration, it is worth mentioning that the use of a similarly constructed and structured questionnaire, as well as the analysis of obtained results based on analogous methods, can, according to the authors, be useful to assess the possibility or the need to take more measures to improve the functioning of EKM. As a matter of fact, according to them, it can be effectively used both in the case of a wider set of companies taken into account in academic researches realized by scholars, as well as at the single firm level, directly by interested managers and stakeholders, recurring to a similar method to evaluate the opportunity to improve or implement EKM in their own company and identify categories of employees on which the firm can rely to improve environmental protection practices.

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Ethics Declaration: According to the law in force in the country where the survey was conducted, consent was not required. All respondents voluntarily participated in the survey.

AI Declaration: The Writefull program was used to proofread the English text.

References

- Beljić, M., Panapanaan, V., Linnanen, L. and Uotila, T. (2013) "Environmental Knowledge Management of Finnish Food and Drink Companies in Eco-Efficiency and Waste Management", *Interdisciplinary Journal of Information, Knowledge, and Management*, Vol 8, pp 99–119. <https://doi.org/10.28945/1924>
- Chang, D. L., Sabatini-Marques, J., da Costa, E. M., Selig, P. M. and Yigitcanlar, T. (2018) "Knowledge-based, smart and sustainable cities: a provocation for a conceptual framework", *Journal of Open Innovation: Technology, Market, and Complexity*, Vol 4, No. 1. <https://doi.org/10.1186/s40852-018-0087-2>
- Chopra, M., Saini, N., Kumar, S., Varma, A., Mangla, S. K. and Lim, W. M. (2021) "Past, present, and future of knowledge management for business sustainability", *Journal of Cleaner Production*, Vol 328, No. 129592. <https://doi.org/10.1016/j.jclepro.2021.129592>
- Edwards, J. S. (2022) "Where knowledge management and information management meet: Research directions", *International Journal of Information Management*, Vol 63, No. 102458.
- Egan, G. (1994) *The skilled helper: A problem-management approach to helping*. Thomson Brooks/Cole Publishing Co.
- Frick, J., Kaiser, F. G. and Wilson, M. (2004) "Environmental knowledge and conservation behavior: exploring prevalence and structure in a representative sample", *Personality and Individual Differences*, Vol 37, No. 8, pp 1597–1613. <https://doi.org/10.1016/j.paid.2004.02.015>
- Goh G.G.G., Eze U.C. and Lim K.E. (2012) "Environmental knowledge management processes and supply chain management environmental performance of Malaysian manufacturing firms: An exploratory study", *Proceedings of the European Conference on Knowledge Management*, Academic Conferences International Limited, Sep., pp 406 - 414.
- Hassanzadeh M., Rahimian S. and Malekolkalami M., (2023) "Knowledge Management Education and Training in the Middle East", *Library Trends*, Johns Hopkins University Press, Vol 72, No. 2, November, pp 266-288.
- Holland, J. L. (1997) *Making vocational choices: A theory of vocational personalities and work environments*. Psychological Assessment Resources.
- Huang, P.-S. and Shih, L.-H. (2009) "Effective environmental management through environmental knowledge management", *International Journal of Environmental Science & Technology*, Vol 6, No. 1, pp 35–50. <https://doi.org/10.1007/bf03326058>

- Kabaja, B. (2025) "Environmental Knowledge Management in Food Service Industry. A Preliminary Empirical Research from Companies in Poland", *European Conference on Knowledge Management*, Vol 26, No. 1, pp 480–488. <https://doi.org/10.34190/eckm.26.1.3748>
- Kotter, J. (1995) "Leading change: why transformation efforts fail", *Harvard Business Review*, 73 (2), pp. 55-67.
- Krawczyk-Sołtys, A. (2009) "Poziom zgodności istniejącego systemu motywacyjnego z oczekiwaniami pracowników. Studium przypadku". In: Lewandowski, R., Walkowiak, R., Kautsch, M. (eds.) *Współczesne wyzwania menedżerskie w ochronie zdrowia*, Olsztyńska Wyższa Szkoła Informatyki i Zarządzania im. prof. T. Kotarbińskiego, Olsztyn, pp. 131-141.
- Lawler, E. E. III, and Porter, L. W. (1967) "The Effect of Performance on Job Satisfaction", *Industrial Relations: A Journal of Economy and Society*, 7(1), pp. 20–28. <https://doi.org/10.1111/j.1468-232x.1967.tb01060.x>
- Lee, E. L. S. and Lee, W.O. (2023) "Enabling Continuous Innovation and Knowledge Creation in Organizations: Optimizing Informal Learning and Tacit Knowledge", In: Evans, K., Lee, W.O., Markowitsch, J., Zukas, M. (eds) *Third International Handbook of Lifelong Learning*. Springer International Handbooks of Education. Springer, Cham. https://doi.org/10.1007/978-3-031-19592-1_68
- Lewin, K. (1947) "Group decision and social change." *Readings in social psychology*, 3 (1), pp. 197-211. <https://doi.org/10.1177/001872674700100103>.
- Mahmood, K., Mokhtar, R., Raza, M. A., Noraziah, A. and Alkazemi, B. (2023) "Ecological and Confined Domain Ontology Construction Scheme Using Concept Clustering for Knowledge Management", *Applied Sciences*, Vol 13(1), No. 32. <https://doi.org/10.3390/app13010032>
- Mikuła B., (1998) „Efektywność systemu motywacji. Badanie metodą Nadlera i Lawlera”, *Personel*, pp. 24-26
- Moraes, S. d. S., Chiappetta Jabbour, C. J., Battistelle, R. A. G., Rodrigues, J. M., Renwick, D. S. W., Foropon, C. and Roubaud, D. (2019) "When knowledge management matters: interplay between green human resources and eco-efficiency in the financial service industry", *Journal of Knowledge Management*, Vol 23, No. 9, pp 1691–1707. <https://doi.org/10.1108/jkm-07-2018-0414>
- Muscatello, J. R. (2003) "The potential use of knowledge management for training. A review and directions for future research", *Business Process Management Journal*, Vol 9, No. 3, pp 382-394.
- Nadler, D. A. and Lawler, E. E. III (1977) "Motivation: A Diagnostic Approach". In: Hackman, J. R., Lawler, E. E. (eds), *Perspective on behavior in organizations*. McGraw-Hill, New York.
- Nadler, D. A. and Lawler, E. E. III (1989) "Motivation: A Diagnostic Approach", In: Leavitt, H. J., Pondy, L. R., Boje D. M. (eds), *Readings in Managerial Psychology*. 4th Edition. The University of Chicago Press, Chicago and London, pp 3-19.
- Nadler, D.A. and Lawler, E.E. III (2007) "Motivation: A Diagnostic Approach", In: Osland, J.S., Turner, M.E., Kolb, D.A. and Rubin, I.M. (eds.), *The Organizational Behavior Reader*, 8th Edition. Pearson Prentice Hall, Upper Saddle River, pp 171-180.
- O’ Connor, C. A. (1993). "Resistance: The repercussions of change", *Leadership & Organization Development Journal*, 14 (6), pp. 30-36. <https://doi.org/10.1108/01437739310145615>.
- Piekarski, W., Stoma, M., Dudziak, A., Andrejko, D., and Ślaska-Grzywna, B. (2016) "How Location Shapes Environmental Awareness Among Inhabitants of Eastern Poland – An Empirical Study", *Polish Journal of Environmental Studies*, Vol 25, No. 2, pp. 733–740, <https://doi.org/10.15244/pjoes/60722>
- Różańska-Bińczyk, I. (2022) "Oczekiwania przedstawicieli pokolenia Z (C) wobec firm co do ich działalności proekologicznej–wyniki badań własnych", *Zarządzanie Zasobami Ludzkimi*, 145 (2), pp. 47-64.
- Scutotto, V., Karagöz, D., Farronato, N. and Alon, I. (2024) "A destination’s personality as a factor in tourists’ environmental knowledge management", *Journal of Knowledge Management*, Vol 28, No. 5, pp 1185-1203. <https://doi.org/10.1108/jkm-07-2022-0534>
- Tongsamsi K. and Tongsamsi I. (2015) "Influence of Training and Knowledge Management on Competency Among Quality Managers at Rajabhat Universities in Thailand", *Journal of Psychological and Educational Research*, Vol 23, No. 2, November, pp 54-72.
- Wang, J., Ma, M., Dong, T. and Zhang, Z. (2023) "Do ESG ratings promote corporate green innovation? A quasi-natural experiment based on SynTao green Finance's ESG ratings", *International Review of Financial Analysis*, Vol. 87, May, 102623. <https://doi.org/10.1016/j.irfa.2023.102623>
- Wedchayanon, N. (2009) "The study of comparing the difference in the application of competency model between public and private organizations", *NIDA Development Journal*, Vol 49(1 special issue), pp 67-100.
- Wernick, I. (2003) "Environmental Knowledge Management", *Industrial Ecology in North America*, Vol 6, No. 2.
- Yusof, A. N. M., Ahmad N., Nirmala and Lishudzaimah (2012) "Quality and effectiveness of knowledge management transfer using of Mentor-mentee Program and on Job Training in work place", *International Conference on Innovation Management and Technology Research*, Malacca, Malaysia, pp. 50-55, <https://doi.org/10.1109/ICIMTR.2012.6236359>.