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Impact of Employee Sustainability Knowledge on Employee Sustainable Behavior: A study of manufacturing sector and Service Sector employees

Impacto do conhecimento dos colaboradores sobre sustentabilidade no comportamento sustentável dos colaboradores: um estudo com funcionários dos setores manufatureiro e de serviços

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Resumo

A sustentabilidade tornou-se um imperativo empresarial fundamental no atual regime da Indústria 4.0. O sucesso das organizações neste mundo VUCA depende de inovações sustentáveis, que, por sua vez, dependem da compreensão da sustentabilidade por parte dos colaboradores e do comportamento sustentável decorrente disso. Muitos estudos empíricos demonstraram o impacto positivo do conhecimento sobre sustentabilidade por parte dos colaboradores sobre o seu comportamento sustentável em diversas organizações. As organizações precisam investir em treinamento corporativo em sustentabilidade para ampliar o conhecimento dos colaboradores sobre os Objetivos de Desenvolvimento Sustentável (ODS) e impulsionar comportamentos sustentáveis. Este artigo examina a relação entre o conhecimento dos colaboradores sobre os ODS e o seu comportamento sustentável entre colaboradores dos setores de manufatura e serviços. O estudo também explorou o impacto do gênero no conhecimento e nos comportamentos dos colaboradores em relação aos ODS.

Palavras-chave: sustentabilidade, indústria 4.0, treinamento corporativo em sustentabilidade, conhecimento dos Objetivos de Desenvolvimento Sustentável (ODS) dos funcionários, comportamento sustentável dos funcionários

Abstract

Sustainability has become a key business imperative in the contemporary Industry 4.0 regime. The success of organizations in this VUCA world depends on sustainable innovations, which in turn depend on employees' understanding of sustainability and the resulting sustainable behavior. Many empirical studies have shown the positive impact of employee sustainability knowledge on employee sustainable behavior across organizations. Organizations need to invest in Corporate Sustainability Training to improve employees' SDG knowledge and drive sustainable behavior. This paper examines the relationship between Employee Sustainable Development Goals Knowledge and Employee Sustainable Behavior among those working in the manufacturing and service sectors. The study also explored the impact of gender on employees' SDG knowledge and behaviors.

Keywords: *sustainability, industry 4.0, corporate sustainability training, employee sustainable development goals knowledge, employee sustainable behavior*

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Introduction

In the age of Industry 4.0, Sustainability has become a significant issue at hand across the global market. Organizations lacking sustainability may suffer substantial financial losses and a loss of market reputation (Jamwal et al., 2021).

Many empirical studies have highlighted sustainability as a pillar of smart factories. It has assumed center stage to the extent that it is said that the success of organizations in the future depends on their ability to handle sustainability challenges effectively. Thus, organizations are forced to reinvent how they serve customers sustainably (Severo et al., 2020). Corporate sustainable Innovation is the key to organizational success, which, in turn, depends on employees (Delmas & Pekovic, 2018). The major challenge for organizations is to explore ways to engage employees beyond statutory compliance and bring attitudinal change. Organizations need to invest in employee training to drive sustainable innovation (Ketata et al., 2015).

This paper examines SDG Knowledge and behavioral differences between employees in the manufacturing and service sectors. The study also explored the impact of gender on employees' SDG knowledge and behaviors.

Gender and Sustainability

Many studies have investigated the gender differences influence of gender on sustainable lifestyles.

Research suggests that females exhibit a stronger pro-environmental attitude, concern, and behavior than males (Scannell & Gifford, 2013). A study undertaken in 14 countries in the US, Latin America, and Europe also revealed similar gender differences in pro-environmental attitudes and behaviors (Zelezny, Chua, & Aldrich, 2000). Females tend to be more upset about anti-environmental activities and events occurring around them, but they have lower knowledge of environmental issues than their male counterparts (Levine & Strube, 2012). Similar findings have been reported in other studies regarding lower awareness among females of environmental problems (Stern et al., 1993).

There is a relationship between people′s gender identity and their knowledge of the environment (Tikka et al., 2000). Women are willing to pay more for eco-friendly products but exhibit lower participation in environmental activities across European countries (Torgler, 2008). As far as private environmental behavior is concerned, women outdo their male counterparts; however, no significant gender differences have been found in their public environmental behavior (Hunter et al., 2004).

However, a study conducted in China reported a reverse trend, with females exhibiting lower environmental concern than males (Xiao & Hong, 2010). No significant gender difference has been found in anxiety about global environmental problems (Xiao & McCreight, 2010).

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Sustainability Knowledge and Sustainable Behavior

Any behavioral change results from learning. Learning about a situation develops an individual's motivation to make the change (Kilvington & Allen, 2001). Environmental knowledge can be classified into two types, namely procedural knowledge and informational interventions. Awareness and understanding of recycling materials, methods, and disposal processes significantly impact pro-environmental employee behavior. Employees who are knowledgeable about their organization's waste management practices are more likely to engage in more sustainable behaviors (Tudor et al., 2008). Individuals' awareness and attitudes towards environmental hazards encourage them to engage in pro-environmental behaviors (Poortinga et al., 2004). These pro-environmental actions may take the form of recycling (Schultz & Oskamp, 1996) and the adoption of green electricity (Ozaki, 2011). A case study of a manufacturing company operating in the construction sector found that interventions to raise environmental awareness and staff training on environmental performance led to recycling behavior among employees (Jones et al., 2012). Another case study of the Canadian chemical industry reported that environmental performance was more likely to improve if operators were sensitized to their environmental duties (Boiral, 2005). A case study on a Public School District that compared the electricity usage among two schools found that one of them was able to reduce its electricity use by 50% over several years by driving its staff to indulge in sustainable behaviors through consistent reminders to turn off the lights and computers (Schelly et al., 2011).

Some empirical studies have established the relationship between an individual's knowledge about sustainability and sustainable behavior. Learners' sustainability knowledge improves through Education for Sustainable Development programs, resulting in transformative behaviors (Alsaati et al., 2020). Environmental education, imparted in either a formal or an informal setting, goes a long way toward improving learners' environmental skills, awareness, and behavior.

Existing literature has shown that employee sustainability knowledge positively impacts sustainable behavior across organizations. However, no studies have directly compared employee sustainability knowledge and sustainable behavior across manufacturing and service-sector employees. Furthermore, few studies have included gender as an indicator of employee sustainability awareness and behaviors. This study attempts to address these research gaps.

Research Methodology

The present study uses a cross-sectional survey research design. The data for the study were collected from 271 respondents working in manufacturing and service-sector organizations, ranging from entry-level to mid- to senior-level executives. The respondents were selected using non-probability convenience sampling. There were 51 percent male and 49 percent female respondents. The questionnaire used for data collection consisted of eight items adapted from (Zamora-Polo et al.,2019) that measured SDG know-how of the respondent, while

seventeen items measuring the employee's sustainable behavior were adapted from (Gericke et al.,2019). All the questions were answered using a five-point Likert

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scale ranging from 1 ("Strongly disagree") to 5 ("Strongly agree"). The questionnaire was distributed online via Google Forms. Reliability for each construct was assessed using Cronbach's alpha, which was 0.946 for SDG Knowledge and 0.975 for Employee Sustainable Behavior. A high level of internal consistency was found among the items of the construct, as the Cronbach's alpha value is above the prescribed cut-off of 0.7.

Results

Analysis of Table 1 reveals the average level of employee understanding of sustainability, as indicated by the mean Sustainable Development Goals knowledge score of 28.42 (sd. 6.88). The mean of Employee Sustainable Behavior is 62.42 (sd. 14.6). The total scores for Employee SDG knowledge and Employee Sustainable Behavior were 38 and 82, respectively. A significant gap can be observed between the minimum and maximum values for the employee's understanding of the Sustainable Development Goals and sustainable behavior.

Table 1

Descriptive Statistics – Employee SDG Knowledge and Employee Sustainable Behavior

Variables	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Employee SDG Knowledge	271	18.00	38.00	28.4244	6.88051	47.341
Employee Sustainable Behavior	271	38.00	82.00	62.4465	14.62557	213.907

Employee SDG Knowledge and Employee Sustainable Behavior between Genders

Gender-wise comparison of mean scores for Employee Sustainable Development Goals Knowledge revealed no significant difference between males and females, with a mean difference of 0.24, as per Table 2. The gender wise comparison of mean scores for Employee Sustainable Behavior also yielded similar results. No significant difference between males and females was found in sustainable behavior, with a mean difference of 0.47.

Table 2

Gender wise Descriptive Statistics – Employee SDG Knowledge and Employee Sustainable Behavior

Variables	Gender	N	Mean	Std. Deviation
Employee SDG Knowledge	Male	137	28.3066	6.68686
	Female	134	28.5448	7.09613
Employee Sustainable Behavior	Male	137	62.1971	14.88675
	Female	134	62.7015	14.40501

Employee SDG Knowledge and Employee Sustainable Behavior between Sectors

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Analysis of Table 3 reveals the sector-wise mean scores of Employees Sustainable Development Goals Knowledge, which for manufacturing employees stands at 29.82 (sd.6.51) and for Service sector employees is calculated as 27.05(sd 6.97). Thus, manufacturing-sector employees have greater knowledge of the Sustainable Development Goals than service-sector employees, with a mean difference of 2.77.

As far as sector-wise mean scores of Employees' Sustainable Behavior are concerned, manufacturing sector employees stand at 64.87 (sd. 14.37) and service sector employees at 60.05 (sd. 14.56). Thus, manufacturing-sector employees demonstrate more sustainable behavior than service-sector employees, with a mean difference of 4.82.

Table 3

Sector-wise Descriptive Statistics – Employee SDG Knowledge and Employee Sustainable Behavior

Variables	Sector	N	Mean	Std. Deviation
Employee SDG Knowledge	Manufacturing	134	29.8209	6.51759
	Service	137	27.0584	6.97450
Employee Sustainable Behavior	Manufacturing	134	64.8955	14.32662
	Service	137	60.0511	14.56896

Employee SDG Knowledge and Employee Sustainable Behavior between Sectors and Genders

To determine whether statistically significant sectoral and gender-based differences exist among employees in Employee SDG Knowledge and Employee Sustainable Behavior, an independent-samples t-test was conducted, as shown in Table 4. There were significant differences, df= 269, p= .001, in the scores, with the mean score for Manufacturing sector employees (M= 29.82, SD =6.51759) higher than for service sector employees (M=27.06, SD= 6.97450). Thus, the results of the test supported the alternative hypothesis that there is a significant difference in Employee SDG Knowledge between employees in the manufacturing and service sectors.

With respect to Employee Sustainable Behavior, statistically significant differences were also observed. There were substantial differences, df= 269, p= .006, in the scores, with the mean score for Manufacturing sector employees (M=64.89, SD =14.32662) higher than for service sector employees (M=60.05, SD= 14.56896). Thus, the results of the test supported the alternative hypothesis that there is a significant difference in Employee Sustainable Behavior between employees in the manufacturing and service sectors. However, no significant differences were seen in Employee SDG Knowledge and Employee Sustainable Behavior between genders.

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Table 4

Equality of Variances & Independent Samples t-test

Variable	F	P Value	t	df	p-value
Sector wise difference					
Employee SDG Knowledge	8.252	.004	3.370	269	.001
Employee Sustainable Behavior	2.156	.143	2.759	269	.006
Gender wise Difference					
Employee SDG Knowledge	2.475	.117	-.284	269	.776
Employee Sustainable Behavior	1.935	.165	-.283	269	.777

Association between Employee SDG Knowledge and Employee Sustainability Behavior

The study also examined the association between Employee SDG Knowledge and Employee Sustainability Behavior, and a correlation coefficient was calculated. Pearson coefficient of Employee SDG Knowledge and Employee Sustainable Behavior was found to be very highly positive. Statistically significant ($r = .909$, $p < 0.05$), thereby supporting the alternative hypothesis that an increase in Employee SDG Knowledge would lead to an increase in Employee Sustainable Behavior, as per Table 5.

Table 5

Correlation Analysis

	Employee SDG Knowledge	Employee Sustainable Behavior
Employee SDG Knowledge	1	.909
Employee Sustainable Behavior	.909	1

* *. Correlation is significant at the 0.05level (2-tailed).

Discussion

This study intends to examine the SDG Knowledge and Sustainable Behavior of the employees across sectors. Results of the analysis indicate that employees in both the manufacturing and service sectors are aware of SDG topics, as indicated by the average scores.

Despite average SDG Knowledge scores being decent, manufacturing sector employees reported higher SDG Knowledge scores than service sector employees.

Employees from both sectors also exhibited a certain level of sustainable behavior. The mean scores from both sectors exceeded 60 on a scale of 82. However, manufacturing-sector employees have demonstrated more sustainable behavior than those in the service sector. This difference is explicitly shown in Table 4. A possible reason for the same could be a lower level of sustainability training being provided in service-sector organizations. This was established during the analysis, when only 35% of respondents in the service sector agreed that they had received sustainability training

in their organizations, compared with 52.98% of respondents in the manufacturing sector.

This paper also examined the impact of gender on Employee SDG Knowledge and Employee Sustainable Behavior. The results suggest no significant difference between genders in Employee SDG Knowledge and Employee Sustainable Behavior. However, the age-old debate has been going on about the impact of gender on SDG knowledge and sustainable behavior.

The study's findings confirm a close relationship between Employee SDG Knowledge and Employee Sustainable Behavior. The analysis states that increased employee training on SDGs will lead to greater sustainable behavior, aligning with existing research.

Implications of the study

The study establishes that the more SDGs an employee possesses, the more sustainable behavior they exhibit. This clearly indicates that if organizations want their employees to behave sustainably, they need to secure buy-in for sustainability at the core by raising employees' awareness. This requires organizations to plan their communication with employees meticulously throughout the employee life cycle, with a sustainability focus.

The organization's sustainability focus must be reflected in the recruitment advertisements and job descriptions posted on the career page to create a strong initial impression of the organization as a sustainable employer brand.

Induction training should include sensitizing employees to the Sustainable Development Goals, their significance, and the organization's commitment to them. Organization-wide corporate sustainability training must be undertaken to provide employees with factual knowledge to make prudent decisions and cultivate behavioral change. To increase employee engagement, gamification components can be introduced into sustainability training, such as sustainability quizzes and poster competitions. Employees must be encouraged to take up MOOC courses related to Sustainable development. Furthermore, employees' sustainable behaviors can be linked to their performance appraisals, since rewarded behaviors are the ones that are exhibited. Organizations' social media pages can be extensively used to communicate their sustainability focus.

Conclusion

This study has established a strong relationship between knowledge of Sustainable Development Goals and Sustainable behavior among employees working across sectors. The findings clearly shed light on the role that employee training can play in eliciting sustainable employee behavior. Manufacturing sector employees exhibit more sustainable behavior because they have greater knowledge of sustainability through formal training programs and workshops conducted within their organizations. By making corporate sustainability training mandatory in service organizations as well, more sustainable behavior can be expected from service-level employees. Also, performance management processes can be linked to sustainable

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behavior among employees to encourage them to adopt a more sustainable way of living. Organizations need to recognize that the path to sustainable innovation lies in sustainable employee behavior, which can be achieved by equipping employees with the necessary sustainability know-how. Most importantly, the time has come for organizations to undertake sustainability measures in true spirit and action, rather than limit them to short-term greenwashing.

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Appendix

Questions that were asked of respondents:

Employee SDG Knowledge

No	Items
1	I know what the Sustainable Development Goals are.
2	I know the countries to which the Sustainable Development Goals are addressed.
3	I know the time horizon for which the Sustainable Development Goals are designed.
4	I know the number of Sustainable Development Goals and could indicate one of their goals.
5	I have received information about the Sustainable Development Goals on Social Networks.
6	I have received information about the Sustainable Development Goals from the traditional media (press, radio and/or television).
7	I have received information about Sustainable Development Goals in formal education.
8	I have received information about the Sustainable Development Goals in formal training (e.g. sustainability training, workshops, seminars, conferences etc.)

Employee Sustainable Behavior

No	Items
1	Where possible, I choose to cycle or walk when I'm going somewhere, instead of travelling by motor vehicle.
2	I never waste water
3	I recycle as much as I can.
4	I pick up rubbish when I see it out in the countryside or in public places
5	I do think about how my actions may damage the natural environment.
6	I always separate food waste before putting out the rubbish when I have the chance.
7	I have changed my personal lifestyle in order to reduce waste (e.g., throwing away less food or not wasting materials).
8	When I use a computer or mobile to chat, to text, to play games and so on, I always treat others as respectfully as I would in real life.
9	I often make lifestyle choices which are not good for my health.
10	I work on committees (e.g., CSR committee etc) in my organisation.
11	I treat everyone with the same respect, even if they have another cultural background than mine.
12	I support an aid organization or environmental group.
13	I show the same respect to men and women, boys and girls.
14	I do things which help poor people.
15	I often purchase second-hand goods over the internet or in a shop.
16	I avoid buying goods from companies with a bad reputation for looking after their employees and the environment.
17	I watch news programs or read newspaper articles to do with the economy.

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