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# Training on Sustainable Use of Water in the Processing Industry

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## Abstract

The aim of this article is to present research results on the influence of factors of sustainable water use training (management support of training, co-worker support of training, incentives for using skills acquired during training) and the influence of this training on technical efficiency and employee efficiency. The article is based on an empirical study of 328 medium and large companies in the Slovene processing industry. The findings show that the training factors have a statistically significant and positive effect on sustainable water use training and that training has a positive effect on technical efficiency. They also offer new theoretical knowledge as well as practical guidelines for anyone working in the sustainable development management of natural resources.

**Keywords:** Management, water, processing industry, research, sustainable development, training.

## 1 Introduction

The current approach to managing natural resources, including drinking water, does not meet even the most fundamental needs of the world's population (Elliott, 2013). One of the biggest consumers of drinking water is the industrial sector (European Commission, 2012a; European Commission, 2012b). The industries that consume the most water are the paper, food, textile, and chemical processing industries (European Commission, 2012a; European Commission, 2012b). Industrial water is used for cooling, technological, sanitary, and other purposes (e.g., washing and cleaning). To increase competitiveness, industrial organizations are modernizing and increasing their production capacities (Krivograd–Klemenčič, Drev, Kompare, Jami, & Weissbacher, 2011). Consequently, global water demand is expected to rise by 50% by 2025 (European Commission, 2012a). The increased consumption of drinking water will also result in increased wastewater production. Reforms in water resource management are, therefore, necessary according to the OECD and will require governments to take decisive measures (OECD Environmental Outlook to 2050, 2013). The OECD suggests implementing two economic incentives that would improve water efficiency: increasing water prices and increasing penalties for water pollution (OECD Environmental Outlook to 2050, 2013). Although different strategies for stimulating development and economic competitiveness have been adopted on the EU and national levels, governments and institutions cannot take action in the place of business organizations and their management teams.

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The recession caused by the 2008 financial crisis brought to life weaknesses and unsustainable economic conditions in individual EU countries and led to the implementation of measures designed to stimulate the economy (Svet EU, 2011). In 2010, EU member states adopted the Europe 2020 strategy with the goal of building a smart, sustainable, and inclusive 21st-century European social market economy (European Commission, 2010, p. 10). EU member states further adopted "A Blueprint to Safeguard Europe's Water Resources" in 2012 (European Commission, 2012c, p. 3), which states:

> The EU needs to focus on green growth and become more resource efficient (including water) to achieve a sustainable recovery from the current economic and environmental crisis, adapt to climate change and build resilience to disasters. Tackling these challenges holds significant potential to boost the competitiveness and growth of the European water sector. There is also potential for green growth in other water-related sectors (water-using industries, water technology development, etc.) where innovation can increase operational efficiency.

More recently, in 2013, the EU signed into law the 7th Environment Action Programme "Living well, within the limits of our planet." One of the priority objectives of the program, which will guide EU environmental policy until 2020, is improving resource efficiency in the water sector, with a view to maintaining, achieving, and enhancing good water status in accordance with the Water Framework Directive (Uradni list EU 2013).

Slovenia took similar steps in 2005 with Slovenia's Development Strategy (UMAR, 2005), where sustainable development and competitive and faster economic growth were set as development priorities for the 2005–2013 period. In 2006, the strategy was followed by the Programme of Measures for Promoting Entrepreneurship and Competitiveness 2007–2013, which recommended measures for "strengthening human resources for needs of the economy by stimulating the share of highly educated people in the economy" (Ministrstvo za gospodarstvo, 2006, p. 5). The processing industry was listed as a sector employing very few highly educated people (p. 21). The same year also saw the adoption of the Operative Programme for Drinking Water Supply (Ministrstvo za okolje in prostor, 2006), which specified the funding of the drinking water supply. The Decree on Drinking Water Supply followed in 2012 (Vlada Republike Slovenije, 2012), establishing priorities and conditions for the country's drinking water supply.

Therefore, the functioning of an organization should be based on constant innovation, the maintenance of customer relations, the internationalization of business processes and training (Evans, 2013; Schermerhorn & Wright, 2014; Singh, Garg, & Deshmukh, 2008), as it is only in this way that organizations will develop, create, and maintain their current competitive advantage (Armstrong, 2009; Evans, 2013; Forslund, 2009; Jeston & Nelis, 2008; Jones, 2004; Robbins & Coulter, 2012; Robbins & Judge, 2013; Schermerhorn, 2012; Schermerhorn & Wright, 2014). The importance given to training on the sustainable use of water in industry, as well as support given to it by management and co-workers, has led us to examine the current state of this field.

This article consists of six parts. Following the introduction, we briefly describe the theoretical background and put forward our hypotheses. Then, the empirical data and research methodology are presented and the survey findings introduced. The final part consists of a discussion of the findings, the conclusion, and final remarks.

## 2 Theoretical Background and Hypotheses

### 2.1 Theory

Sustainable development is becoming an increasingly important factor in achieving and maintaining organizational success. Business costs can be reduced by encouraging the development and use of new technologies that reduce the need for raw materials, natural resources, and energy and by reducing the strain on the environment and increasing the recycling of raw materials (Elliott, 2013; Pearce & Barbier, 2009; Soyka, 2012). Sustainable development policies can also lead to greater corporate social responsibility and increased market share as consumers demand eco-friendly products and services (Elliott, 2013; Pearce & Barbier, 2009). Senior management plays a central role in introducing sustainable development policies and training into organizations (Blewitt, 2014; Dodds, Laguna-Celis, & Thompson, 2014; Elliott, 2013; Kralj, 2005).

The general consensus is that applying skills learned in training requires the cooperation and support of management (Rampersad, 2004; Schermerhorn & Wright, 2014; Spitzer, 2005). Research (Devos, Dumay, Bonami, Bates, & Holton, 2007; Wieland Handy, 2008) has also demonstrated that the success of training programs depends on support given by management. Our study focused on the following forms of management support: encouraging employees to undergo training, showing interest in what employees learn there, meeting employees to discuss their new skills, and giving employees goals that motivate them to apply their new knowledge.

Another important factor that contributes to successful training, according to research (Evans, 2013; Holton, Hsin-Chih, & Naquin, 2003; Schermerhorn & Wright, 2014; Wieland Handy, 2008), is co-worker support. Devos et al. (2007, p. 183) defined it as support given to other employees that encourages them to use new knowledge in the workplace. In our study, we defined it as the degree to which employees value sustainable water use training and encourage their co-workers to take advantage of the training opportunities offered in the workplace as well as the degree to which they support co-workers in using their newly acquired skills.

Feedback (helpful information given by co-workers, managers, and other employees) is required to transfer acquired knowledge into the workplace (Evans, 2013; Holton et al., 2003; Schermerhorn & Wright, 2014; Wieland Handy, 2008). If management combines training with incentives such as opportunities for pay rises or awards, the means they require for the use of new skills, as well as other forms of reward and promotion opportunities, the probability for a successful transfer of knowledge in the workplace can become very high.

Researchers have not arrived at any completely convincing conclusions about the effectiveness of any type of training, including sustainable water use training, on company efficiency (employee efficiency, technical efficiency, etc.). However, some empirical studies have tried to determine the effects of training on employees and companies (Barron, Black, & Loewenstein, 1989; Bartel, 1994; Blandy, Dockery, Hawke, & Webster, 2000; Campbell, 2006; Duncan & Hoffman, 1979). For example, training has been shown to affect employees' personal incomes: A 10% increase in training over 3 years can lead to a 1.5% rise in wages (Duncan & Hoffman, 1979; Mincer, 1994). Barron et al. (1989) and Blandy et al. (2000) tried to determine the relationship between training and productivity, concluding that a 10% increase in training leads to a 1% to 3% increase in productivity. In addition, Bartel (1994) and Campbell (2006) demonstrated that a 5% increase in training attendance in manufacturing companies led to a 4% increase in productivity. Huselid's (1995) work showed that conducting training courses on quality within the company led to increased product quality. A direct link between sustainable water use training and technical efficiency and employee efficiency was not detected. However, because training in general enables individuals to acquire the knowledge needed to do their work, the same is true for sustainable water use training (such as the implementation of new cost-effective technologies, tools, and methods for sustainable supply, use, and disposal of water in industry).

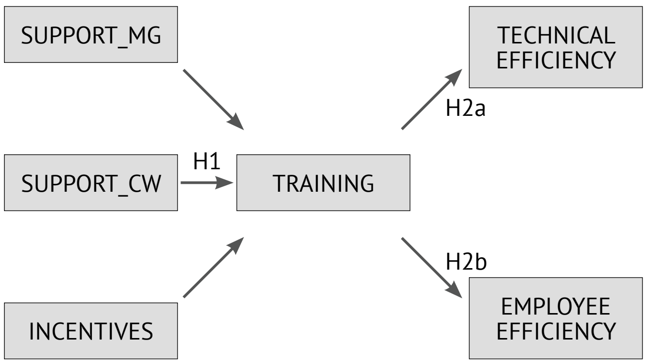
Following Škerlavaj, Indihar, Škrinjar, and Dimovski (2007), we defined technical efficiency as the improvement of work and process quality and of the technology of work processes as well as the implementation of improvements in work processes that lead to reductions in drinking water consumption. Similarly, employee efficiency was defined as the level of understanding of key organizational problems, work motivation, work quality, and average productivity.

## 2.2 Hypotheses

The aim of our study is to explore the factors of sustainable water use training (management support of training, co-worker support of training, incentives for using skills acquired during training) and the influence of this training on technical efficiency and employee efficiency of people working in the Slovene processing industry. A study of this kind has never been carried out in Slovenia.

After reviewing the existing literature, we proposed certain relationships between the three factors of sustainable water use training and training as well as between training and factors of technical efficiency and employee efficiency. We then formulated hypotheses based on the relationships between the variables. The research framework generated in this study is illustrated in Figure 1.

**Figure 1:** Research framework and hypotheses




Notes: Management support of training (SUPPORT_MG), Co-worker support of training (SUPPORT_CW), Incentives for using skills acquired during training (INCENTIVES).

We put forward the following hypotheses:

- Hypothesis 1: Management support of training, co-worker support of training, and incentives for using skills acquired during training affect sustainable water use training.

- Hypothesis 2: Sustainable water use training affects technical and employee efficiency.

  H2a: Training on the sustainable use of water affects technical efficiency.

  H2b: Training on the sustainable use of water affects employee efficiency.

## 3 Data in Methodology

### 3.1 Sample description

The biggest consumers of water in Slovenia in 2010–2012 were processing industry companies (holding type C: standard classification – SKD 2008) (SURS, 2013a). When this fact was compared to the 2013 statistical data (SURS, 2013b) on processing companies in Slovenia, which shows that the number of medium and large food processing companies decreased by 5.75% between 2010 and 2012, we arrived at the conclusion that water consumption from the public water supply (the consumption of drinking water) has not decreased significantly. Thus, we included 20% of the 608 medium and large (SURS, 2013b) processing companies (SKD 2008 Category C) in a random sample. The electronic questionnaire was sent by e-mail to a contact person in 122 companies in the processing industry, together with a note informing them of the goal and intention of our research. The contact person then sent the questionnaire on to all employees. All employees with company e-mail addresses were included in the survey. We received 386 questionnaires, 328 of which were complete and used for analysis. The incomplete questionnaires were excluded.

Table 1 shows the demographic profile of the respondents. In terms of gender, 68% of respondents in the sample were men, while female respondents accounted for 32%. The youngest respondent was 26 years old, the oldest was 63, and the average age of respondents was 43. Furthermore, 15.9% of respondents were employed in high management, 26.5% in middle management, and 27.7% in operations management, while 29.9% worked in other positions. In terms of length of employment, 19.8% of respondents had worked at their companies for up to 5 years, 47.6% between 5 and 15 years, and 32.6% for more than 15 years. In addition, 5.5% of respondents had up to 5 years of work experience, 30.5% had between 5 and 15 years, and 64.0% had more than 15 years of work experience. Finally, 1.5% of respondents had completed only secondary education, 10.1% had completed higher vocational education, 61.3% had completed higher education/undergraduate degree/specialization, 25.3% had earned master's degrees, and 1.8% had earned doctoral degrees.

### 3.2 Methodology

The instrument of the research was a closed-ended online questionnaire. The questionnaire statements about training

**Table 1:** Demographic Profile of Respondents

| Characteristics | Descriptor | Distribution (percent) |
|---|---|---|
| Gender | Male | 68.0 |
| | Female | 32.0 |
| Age | Min | 26 years |
| | Max | 63 years |
| | Average age | 43 years |
| Position | High management | 15.9 |
| | Middle management | 26.5 |
| | Operations management | 27.7 |
| | Other | 29.9 |
| Duration of employment in the organizations | Up to 5 years | 19.8 |
| | 5–15 years | 47.6 |
| | More than 15 years | 32.6 |
| Work experience | Up to 5 years | 5.5 |
| | 5–15 years | 30.5 |
| | More than 15 years | 64.0 |
| Education level | Secondary education | 1.5 |
| | Higher vocational education | 10.1 |
| | Higher education, undergraduate degree, specialization | 61.3 |
| | Master's degree | 25.3 |
| | Doctoral degree | 1.8 |

Sample size = 328

(non-formal education) on sustainable water use in the organization were based on the work of Dimovski, Škerlavaj, Kimman, and Hernaus (2006), Garvin, Edmondson, and Gino (2008), Holton et al. (2003), Škerlavaj et al. (2007), and Wieland Handy (2008). Statements regarding technical efficiency and employee efficiency were adapted from Škerlavaj et al. (2007). The questionnaire was tested on seven randomly selected employees from one of the analyzed companies. No comprehension problems were reported, so the questionnaire was not changed.

The questionnaire was divided into two parts. The first part consisted of six demographic questions (gender, age, position, duration of employment in the organization, work experience, education level). The second part consisted of 23 questions on sustainable water use training (informal education) and non-financial success (technical efficiency and work efficiency of employees). A 7-point Likert scale was used in the second part of questions, with 1 being "strongly disagree" and 7 being "strongly agree" for questions on sustainable water use training and 1 being "much worse" and 7 being "much better" for questions on technical and work efficiency of employees. Cronbach's alpha (Cronbach's alpha[1] = 0.909) was calculated as an estimate of the scales' internal consistency (Garson, 2013).

The data were collected in June 2013 through the Centre of Social Informatics at the Faculty of Social Sciences of the University of Ljubljana. The responses for every questionnaire were checked and analyzed using SPSS 19.0's descriptive data analysis functions: univariate analysis (frequency, arithmetic mean, and standard deviation) and multivariate statistical analyses (principal component analysis [PCA], correlation, and regression analysis).

[1] $\alpha \geq 0.9$ : Excellent consistency.

## 4 Descriptive Statistics

### 4.1 Training on sustainable use of water

Participants were asked to rate to what degree statements on sustainable water use were true for them. Table 2 shows that participants gave the statements "Our organization offers sufficient opportunities for training on sustainable water use" and "All employees receive occasional training on sustainable water use" the highest mean score (M = 4.40). The statement "The organization offers sustainable water use training" received the lowest mean score (M = 4.01). By looking at the mean scores, we see that no significantly high or low scores occurred.

### 4.2 Management support of training

Participants were then asked to rate statements about management support of training. Table 3 shows that participants rated the statement "Management values sustainable water use training" highest (M = 4.48). The statement "Management meets with employees to discuss how to use skills

**Table 2:** Training on Sustainable Use of Water in Industry (TRAINING)

| Variables | Mean score | Standard deviation |
|---|---|---|
| Our organization offers sufficient opportunities for training on sustainable water use. | 4.40 | 1.88 |
| The organization offers sustainable water use training. | 4.01 | 1.94 |
| Offered training programs on sustainable water use are of very high quality. | 4.29 | 1.92 |
| Training programs on sustainable water use are regularly reviewed and updated to keep up with changes in the environment. | 4.27 | 1.90 |
| All employees receive occasional training on sustainable water use. | 4.40 | 1.87 |
| All new employees receive suitable training on sustainable water use. | 4.28 | 2.08 |

**Table 3:** Management Support of Training (SUPPORT_MG)

| Variables | Mean score | Standard deviation |
|---|---|---|
| Management shows interest in what employees learn in sustainable water use training. | 4.24 | 1.77 |
| Management meets with employees to discuss how to use skills learned during training. | 4.20 | 1.75 |
| Management encourages employees to attend programs and workshops on sustainable water use. | 4.34 | 1.84 |
| Management values sustainable water use training. | 4.48 | 1.82 |
| Management gives employees goals that encourage the use of skills acquired during training in the workplace. | 4.47 | 1.78 |

learned during training" received the lowest mean score (M = 4.20). No significantly high or low scores occurred.

### 4.3 Co-worker support of training

Next, participants were asked to rate statements about co-worker support of training. Table 4 shows that the statement "Employees value training on sustainable water use" received the highest mean score (M = 4.54). The statement "Employees encourage co-workers to attend programs and workshops on sustainable water use" received the lowest mean score (M = 4.05). No significantly high or low scores emerged.

### 4.4 Incentives for using skills acquired during training

Next, the participants were asked to rate statements about incentives for using skills acquired during training. Table 5 shows that the statement "After training, the means that employees need to use the acquired skills are available" received the highest mean score (M = 3.42). The statement "When employees make use of skills acquired during training, they receive some form of pay raise or award" received the lowest mean score (M = 2.63). All statements received somewhat low scores.

### 4.5 Technical efficiency and employee efficiency

Finally, the participants were asked to rate statements about technical efficiency and work efficiency. Table 6 shows that the statement "Product and service quality" received the highest mean score (M = 5.77) whereas the statement "Work quality" received the lowest mean score (M = 5.30). No significantly high or low scores were evident.

**Table 4:** Co-worker Support of Training (SUPPORT_CW)

| Variables | Mean score | Standard deviation |
|---|---|---|
| Employees value training on sustainable water use. | 4.54 | 1.67 |
| Employees encourage co-workers to attend programs and workshops on sustainable water use. | 4.05 | 1.72 |
| Employees value co-workers who use skills acquired during training and encourage their use. | 4.46 | 1.71 |

**Table 5:** Incentives[2] for Using Skills Acquired During Training (INCENTIVES)

| Variables | Mean score | Standard deviation |
|---|---|---|
| When employees make use of skills acquired during training, they receive some form of pay raise or award. | 2.63 | 1.46 |
| After training, employees receive feedback on their use of acquired skills. | 3.32 | 1.76 |
| After training, the means that employees need to use the acquired skills are available. | 3.42 | 1.91 |

**Table 6:** Technical Efficiency and Work Efficiency

| Variables | Mean score | Standard deviation |
|---|---|---|
| Product and service quality. | 5.77 | 0.96 |
| Technology of work processes. | 5.75 | 0.86 |
| Implementation of improvements in work processes to reduce drinking water consumption. | 5.76 | 0.88 |
| Work quality. | 5.30 | 0.99 |
| Employees' understanding of key organizational problems and work motivation. | 5.33 | 1.02 |
| Average productivity of employees. | 5.39 | 1.01 |

[2] The statements represent opportunities and possibilities for employees for improved efficiency and greater personal satisfaction in the future. This is why we also asked about what happens after training.

## 5 Multivariate Data Analysis

In order to extract the relationships presented in Figure 1, a multivariate data analysis was performed in two stages:

- Stage 1—factor structures: To extract the factor structure, we used PCA with varimax rotation.
- Stage 2: We analyzed the relationship between the factors using correlation analysis and regression analysis (ENTER regression method).

### 5.1 Stage 1—Factor structures

PCA[3] was used to reduce each of the constructs (training on sustainable use of water, management and co-worker support of training, incentives for using skills acquired during training), as well as the constructs of technical efficiency and employee efficiency. The suitability of the data for PCA was assessed for each construct by using Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy. The KMO index ranged between 0.708 and 0.910, with 0.500 considered suitable for analysis (Bartholomew, Knott, & Moustaki, 2011). Factors with eigenvalues (the amount of variance accounted for by a factor) larger than 1 were carried for further analysis (Bartholomew et al., 2011; Mulaik, 2010). PCA on the training on sustainable use of water produced one factor that explained 76.88% of the observed variance for training on the sustainable use of water, as shown in Table 7.

The PCA on management support of training produced one factor that explained 69.36% of the observed variance for management's support of training, as shown in Table 8.

[3] PCA reduces the data down to the fundamental components, stripping away any unnecessary parts.

**Table 7:** PCA of Training on Sustainable Use of Water

| Factor | Factor loads | Eigen-value | Cum. % variance explained |
|---|---|---|---|
| **Factor 1: Training on sustainable use of water (TRAINING)** | | 4.613 | 76.877 |
| Offered training programs on sustainable water use are of very high quality. | 0.924 | | |
| The organization offers sustainable water use training. | 0.903 | | |
| Training programs on sustainable water use are regularly reviewed and updated to keep up with changes in the environment. | 0.869 | | |
| All new employees receive suitable training on sustainable water use. | 0.869 | | |
| Our organization offers sufficient opportunities for training on sustainable water use. | 0.849 | | |
| All employees receive occasional training on sustainable water use. | 0.844 | | |

KMO measure of sampling adequacy = 0.910; Bartlett test of sphericity = 1681.138; $p < 0.001$.

**Table 8:** PCA of Management Support of Training

| Factor | Factor loads | Eigen-value | Cum. % variance explained |
|---|---|---|---|
| **Factor 2: Management support of training (SUPPORT_MG)** | | 3.468 | 69.358 |
| Management values sustainable water use training. | 0.924 | | |
| Management shows interest in what employees learn in sustainable water use training. | 0.867 | | |
| Management encourages employees to attend programs and workshops on sustainable water use. | 0.828 | | |
| Management meets with employees to discuss how to use skills learned during training. | 0.790 | | |
| Management gives employees goals that encourage the use of skills acquired during training in the workplace. | 0.743 | | |

KMO measure of sampling adequacy = 0.854; Bartlett test of sphericity = 959.614; $p < 0.001$.

The PCA on co-worker support of training produced one factor that explained 72.91% of the observed variance for co-worker support of training (see Table 9).

The PCA on incentives for using skills acquired during training produced one factor that explained 77.23% of the observed variance for incentives for using skills acquired during training (see Table 10).

The PCA on technical efficiency and employee efficiency produced two factors that explained 72.82% of the observed variance for technical efficiency and employee efficiency. The Cronbach α for the underlying factors ranged from 0.85 to 0.76, again indicating a reliability of factors (see Table 11).

### 5.2 Stage 2—Relationship analysis

The correlation analysis showed significant relationships among almost all variables and factors. The correlations were positive. Three pairs had a weak association (Pearson correlation > 0.260 and < 0.510) while seven pairs had a good association (Pearson correlation > 0.510 and < 0.760).

**Table 9:** PCA of Co-worker Support of Training

| Factor | Factor loads | Eigen-value | Cum. % variance explained |
|---|---|---|---|
| **Factor 3: Co-worker support of training (SUPPORT_CW)** | | 2.187 | 72.909 |
| Employees encourage co-workers to attend programs and workshops on sustainable water use. | 0.877 | | |
| Employees value co-workers who use skills acquired during training and encourage their use. | 0.854 | | |
| Employees value training on sustainable water use. | 0.830 | | |
| | | | |

KMO measure of sampling adequacy = 0.708; Bartlett test of sphericity = 333.474; $p < 0.001$.

**Table 10:** PCA of Incentives for Using Skills Acquired During Training

| Factor | Factor loads | Eigen-value | Cum. % variance explained |
|---|---|---|---|
| **Factor 4: Incentives for using skills acquired during training (INCENTIVES)** | | 2.317 | 77.230 |
| After training, employees receive feedback on their use of acquired skills. | 0.894 | | |
| After training, the means that employees need to use the acquired skills are available. | 0.875 | | |
| When employees make use of skills acquired during training, they receive some form of pay raise or award. | 0.867 | | |

KMO measure of sampling adequacy = 0.729; Bartlett test of sphericity = 429.286; $p < 0.001$.

**Table 11:** PCA of Firm Technical Efficiency and Employee Efficiency

| Factor | Factor loads | Eigen-value | Cum. % variance explained |
|---|---|---|---|
| **Factor 5: Technical efficiency** | | 2.376 | 39.608 |
| Implementation of improvements in work processes to reduce drinking water consumption. | 0.959 | | |
| Technology of work processes. | 0.956 | | |
| Product and service quality | 0.655 | | |
| **Factor 6: Employee efficiency** | | 1.993 | 72.820 |
| Employees' understanding of key organizational problems and work motivation. | 0.803 | | |
| Work quality | 0.759 | | |
| Average productivity of employees. | 0.678 | | |

KMO measure of sampling adequacy = 0.718; Bartlett test of sphericity = 1336.089; $p < 0.001$.

**Table 12:** Descriptive Statistics and Correlation Analysis

| | Mean | S.D. | TRAINING | SUPPORT_MG | SUPPORT_EM | INCENTIVES | TECHNICAL EF. | EMPLOYEE EF. |
|---|---|---|---|---|---|---|---|---|
| TRAINING | 4.27 | 1.69 | 1 | 0.776** | 0.639** | 0.614** | 0.186** | 0.045 |
| SUPPORT_MG | 4.35 | 1.49 | | 1 | 0.688** | 0.688** | 0.206** | 0.030 |
| SUPPORT_CW | 4.35 | 1.45 | | | 1 | 0.612** | 0.136* | 0.026 |
| INCENTIVES | 3.12 | 1.51 | | | | 1 | 0.341** | 0.263** |
| TECHNICAL EF. | 5.76 | 0.81 | | | | | 1 | 0.526** |
| EMPLOYEE EF. | 5.34 | 0.79 | | | | | | 1 |

** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed)

**Table 13:** Results of Regression Analyses

| H | Regression analyses | Unstandardized Coefficients | | Standardized Coefficients Beta | t | p (Sig) | R | $R^2$ | F | Result |
|---|---|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | | | | | | | |
| **H1** | (Constant) | 0.139 | 0.193 | | 0.720 | 0.000 | 0.795 | 0.628 | 18.915 | **Supported** |
| | SUPPORT_MG | 0.658 | 0.059 | 0.579 | 11.240 | 0.000 | | | | |
| | SUPPORT_CW | 0.190 | 0.057 | 0.163 | 3.354 | 0.001 | | | | |
| | INCENTIVES | 0.144 | 0.053 | 0.128 | 2.707 | 0.007 | | | | |
| | TRAINING = 0.139 + 0.658 * SUPPORT_MG + 0.190 * SUPPORT_CW + 0.144 * INCENTIVES | | | | | | | | | |
| **H2** | | | | | | | | | | **Supported** |
| **a** | (Constant) | 5.378 | 0.120 | | 44.771 | 0.000 | 0.186 | 0.131 | 11.623 | |
| | TRAINING | 0.089 | 0.026 | 0.186 | 3.409 | 0.001 | | | | |
| | TECHNICAL EFFICIENCY = 5.378 + 0.089 * TRAINING | | | | | | | | | |
| **b** | (Constant) | 5.430 | 0.118 | | 46.026 | 0.000 | 0.045 | 0.002 | 0.653 | **Not supported** |
| | TRAINING | -0.021 | 0.026 | -0.045 | -0.808 | **0.419** | | | | |
| | ≠ | | | | | | | | | |

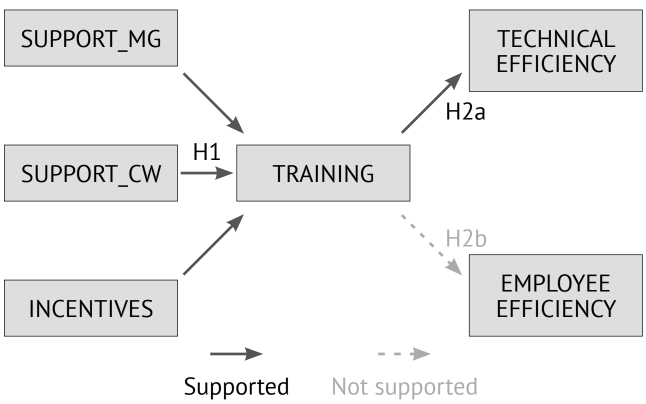
No pair had a very good association (Pearson correlation > 0.760), as shown in Table 12. We can deduce that higher levels of training, management and co-worker support, and incentives are associated with higher levels of technical efficiency whereas only higher incentives are associated with higher levels of employee efficiency.

The research framework generated in this study is illustrated in Figure 1 (a theoretical scheme), which was also our research model. Figure 2 depicts the main findings of the three regression analyses conducted using SPSS 19.0, which were analyzed according to regression diagnostics: all variance inflation factors[4] < 2 (ranged between 1.495 and 1.654); Durbin–Watson tests[5] were close to 2 (ranged between 1.986 and 1.998); and the normal distribution of residuals (Newbold, Carlson, & Thorne, 2013).

[4] The variance inflation factor (VIF) is used as an indicator of multicollinearity.

[5] The Durbin–Watson test is a test for first-order serial correlation in the residuals of a time series regression.

**Figure 2:** Results concerning the hypotheses




Notes: Management support of training (SUPPORT_MG), Co-worker support of training (SUPPORT_CW), Incentives for using skills acquired during training (INCENTIVES).

Table 13 shows the result of the regression analyses. The arrows in Figure 2 (with the exception of H2b ($p$ = 0.419)), which symbolize the supported associations, were statistically significant ($p < 0.05$). The findings show that management and co-worker support of training as well as incentives for using skills acquired during training positively influences sustainable water use training (Hypothesis 1). The multiple correlation coefficient (R), whose value was 0.795, showed a very strong relationship between sustainable water use training and the three independent variables: management support of training, co-worker support of training, and incentives for using skills acquired during training. The value of the coefficient of determination of $R^2 = 0.628$ indicates that 63% of the variance in sustainable water use training is explained by the independent variables. The F-test (F = 18.915) and the significance level ($p = 0.000$) also indicate the existence of a relationship. Furthermore, a weak relationship was found between technical efficiency and sustainable water use training ($p = 0.001$; R = 0.186; $R^2 = 0.131$; F = 11.623; Hypothesis 2a). However, no relationship was found between employee efficiency and sustainable water use training ($p = 0.419$; R = 0.045; $R^2 = 0.002$; F = 0.653; Hypothesis 2b).

## 6 Discussion and Conclusion

This article reported on a study of sustainable water use training in the Slovene processing industry, drawing on a sample of 328 firms. A theoretical framework was empirically tested to determine the relationship between training factors (sustainable water use training, manager and co-worker support, incentives for using skills acquired during training) and factors of technical efficiency and employee efficiency (product and service quality, improving technology of work processes, implementation of improvements in work processes to reduce drinking water consumption) in companies. In addition, various good associations emerged among four factors on the sustainable use of water. Thus, hypothesis H1 was supported. The results of the analysis also demonstrated that hypothesis H2a—namely, training on the sustainable use of water affects technical efficiency—was accepted. However, the relationship between sustainable water use training and employee efficiency (H2b), was not found to be significant.

These findings substantiate our conceptual model and offer several managerial implications. Managers of firms should put additional emphasis on training related to the sustainable use of water as it is an important instrument for the improvement of the technology of work processes, the quality of products and services, and the implementation of improvements in work processes in order to reduce industrial consumption of drinking water. We believe that these improvements would also lead to greater financial and non-financial success of companies.

Our study shows that management support of training plays a fundamental role in training for the sustainable use of water as it has the greatest regression coefficient. By giving support to sustainable water use training, management shows interest in what their subordinates have learned. By working with employees on learning objectives and solving any potential problems, management strengthens the impression that training is important and necessary.

Despite having the smallest regression factor, the use of skills acquired during training has a positive and significant association with sustainable water use training. With their attitudes toward training and the attention devoted to employees after training, management can encourage other important stakeholders in the company to make it possible for employees to apply skills learned during training to the workplace. New skills have the potential to lead to improvements in the technology of work processes, the quality of products and services, and work processes, which can in turn lead to a reduced consumption of drinking water.

Our findings give support to the idea that sustainable water use training ought to become an integral part of business strategy. Managers should recognize and manage training as well as incorporate it into their action plans. Two limitations of the study need to be acknowledged: This research was only carried out among medium and large companies in the processing industries, and only fully answered questionnaires were used for analysis. Nevertheless, we believe that our research offers a significant contribution to the subject of sustainable water use training. For a fuller understanding, we recommend that similar research be conducted in all companies in the processing industry.

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# Usposabljanje o trajnostni rabi vode v predelovalni industriji

## Izvleček

Namen prispevka je predstaviti izide iz raziskave o vplivih dejavnikov usposabljanja o trajnostni rabi vode (o podpori usposabljanju, ki jo kažejo nadrejeni in sodelavci, spodbudah za uporabo znanj in veščin, pridobljenih med usposabljanjem) in vplivu usposabljanja na tehnično in delovno učinkovitost zaposlenih. Empirično raziskavo smo opravili na vzorcu 328 srednje velikih in velikih podjetij v slovenski predelovalni dejavnosti. Ugotovili smo, da podpora usposabljanju, ki jo kažejo nadrejeni in sodelavci, ter spodbude za uporabo znanj in veščin, pridobljenih med usposabljanjem, statistično značilno in pozitivno vplivajo na uposabljanje o trajnostni rabi vode, uposabljanje o trajnostni rabi vode pa statistično značilno in pozitivno vpliva na tehnično učinkovitost. Izidi iz raziskave prinašajo nova teoretična spoznanja in praktične usmeritve za vse, ki se ukvarjajo z menedžementom trajnostnega razvoja z vidika ohranjanja naravnih virov.

**Ključne besede:** menedžement, voda, predelovalna dejavnost, raziskava, trajnostni razvoj, usposabljanje