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Assessment of Overall SCP State of the Company: New Integrated Sustainability Index I_{SCP}

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The encouragement of sustainable consumption and production (SCP) in order to continuously improve the well-being of present and future generations is the most important goal stated in the European Union (EU) Sustainable Development Strategy, which was renewed in 2006.

The challenge for every company on the way to SCP is not only to use appropriate methods and measures to solve their specific sustainability problems, but, first of all, to select appropriate performance indicators and implement an effective sustainability performance evaluation system. It may be useful to apply an integrated indicator as a single comparable index, reducing the number of sustainability decision-making criteria that need to be considered.

However, despite various approaches to create frameworks and methodologies for the development of integrated sustainability indicators that measure, monitor and assess the progress of an enterprise towards sustainability, there is still no comprehensive framework for integrated sustainability assessment of the overall company state on the basis of manufacturing processes, products/services as well as relationship with various stakeholders.

An algorithm is here presented in respect of this demand. This algorithm offers methodical suggestions to assess the customers' opinion about the presence of company's environmental and social sustainability activities and initiatives, to identify and select most appropriate sustainability indicators, to determine their significance according to analytic hierarchy process (AHP), and to solve the most important sustainability problems in 3 aforementioned levels by adapting most suitable tools. The final suggestions are based on the values of 3 sub-indices of a new integrated index for the overall assessment of the SCP state in the company, I_{SCP}.

Keywords: *sustainable consumption and production (SCP), companies, sustainability performance indicators, integrated index, analytic hierarchy process (AHP).*

1 Introduction

Sustainable Consumption and Production (SCP) was firstly put on the global policy agenda at the United Nations (UN) Conference on Environment and Development in Rio de Janeiro in 1992 (Szlezak *et al.*, 2008) where unsustainable consumption and production patterns were recognised as the main factors influencing unsustainable world's development (Jackson, 2006; Liu *et al.*, 2010; Szlezak *et al.*, 2008). According to the classical definition of sustainable development (SD), the UN Commission on Sustainable Development described SCP as the consumption of products and services that are necessary to satisfy essential needs and ensure better quality of life, while reducing consumption of natural resources, emissions of toxic substances and wastes through all their life cycles with the aim to cause no threat for the demands of future generations (Norris *et al.*, 2003; Welfens *et al.*, 2010; Welford *et al.*, 1998). Ten years after the Rio conference, during the World Summit on Sustainable Development (which took place in Johannesburg in 2002) transformations in SCP models were recognised as a fundamental goal on the way to SD (Jackson, 2006), since without essential changes in the production and consumption system the global sustainable development goal cannot be achieved (Szlezak, *et al.*, 2008; Watson, *et al.*, 2010).

Although consumption is the most important factor for economic growth (Abeliotis *et al.*, 2010), it can affect the environment in many different ways (Abeliotis *et al.*, 2010; Hansen & Schrader, 1997; Orecchia & Zoppoli, 2007). The current unsustainable pattern of consumption and production determines climate change, pollution, accumulation of hazardous wastes, depletion of natural resources and decline in biological diversity; it also influences an increase in global migration and differences in economic and social welfare between and within countries (Čiegis & Zeleniūtė, 2008; Nash, 2009). Higher levels of consumption influence higher levels of production, which require larger inputs of energy and material as well as generate larger quantities of waste by-products (Kletzan *et al.*, 2002; Orecchia & Zoppoli, 2007).

During the last decades, initiatives in sustainable production have successfully focused on improving the resource efficiency in manufacturing systems (Jackson, 2005; Sikdar, 2011). However, despite the improvement in results of environmental practices of many individual producers, an increase in the amount of general consumption often exceeds the achieved progress (the so-called *rebound* effect) (Staniškis & Stoškus, 2008; Staniškis *et al.*, 2012; Stø *et al.*, 2006). It is becoming obvious that technological approaches are not enough to realise the goal of SD without critical assessment of human choices (Hertwich, 2005; Jackson, 2005; Dahl, 2012). Thus, in order to determine the most suitable direction for the actions towards SCP, it is essential to analyse the relation between consumption and production systematically, considering not only producers and consumers, but also all the other interested groups in the SCP system, such as government, non-governmental organisations (NGOs), shareholders, suppliers, academic community and media, etc. (Gold *et al.*, 2010).

Integration of sustainability thinking and practice into an organisational structure requires a system approach with an appropriate management framework. However, there is no generic 'off-the-shelf' management framework for every organisation that could enable a systematic and structured approach to manage their corporate sustainability (Azapagic, 2003). Thus, the challenge for every company on the way to SCP is to use appropriate methods and measures to solve their specific sustainability problems (Carson, 2007). To manage integration of the tools and to ensure effective information flows for decision-making, selection of appropriate performance indicators and implementation of an effective sustainability performance evaluation system are needed (Staniškis and Arbačiauskas, 2009). It may be useful to use an integrated indicator as a single comparable index, linking many sustainability issues and, thus, reducing the number of decision-making criteria that need to be considered (Azapagic, 2003; Krajnc & Glavič, 2005a; Singh *et al.*, 2007, 2009, 2012).

Currently, there are various approaches to create frameworks and methodologies for the development of integrated sustainability indicators that measure, monitor and assess the progress of an enterprise towards sustainability. However, despite these attempts, there is still no comprehensive framework for integrated sustainability assessment of the overall company state on the basis of manufacturing processes, products/services as well as relationship with various stakeholders.

In respect of this demand, the algorithm for integrated sustainability assessment of the overall company state, which can help to solve the most significant problems in 3 levels – manufacturing processes/company's activities, products/services as well as relationship with various stakeholders – is presented. This framework proposes the assessment of current sustainability conditions of the company based on sub-indices of the composite index I_{SCP} for sustainability evaluation and, according to them, can help to select and introduce the most suitable SD tools for a particular enterprise to achieve its environmental and social performance goals.

2 The algorithm for evaluation of the impact of company's sustainability performance

There are a number of frameworks of sustainability assessment that evaluate the performance of companies (Singh *et al.*, 2009, 2012) as well as dozens of indicators that have been suggested for use in determining improvements made to processes, manufacturing sites or enterprises (Krajnc & Glavič, 2005, 2005a). However, only some of these measures have an integral approach taking into account environmental, economic and social aspects (sometimes the fourth dimension, namely institutional, introduced by the UN approach (Labuschagne *et al.*, 2005) is included as well), not focusing on only one of them (Singh *et al.*, 2009, 2012). A detailed discussion on sustainability indicators can be found in the publications of Azapagic & Perdan (2000), Veleva & Ellenbecker (2001), Azapagic (2003), Krajnc & Glavič (2005), Singh *et al.* (2009, 2012), Moldan *et al.* (2012) and others.

Sustainability reports usually introduce a set of SD indicators that can be used to measure sustainability performance of the company (Azapagic, 2003). Whilst it is important to identify and quantify all the relevant indicators, it may sometimes be difficult to make business decisions based on a large number of performance criteria (Azapagic, 2003; Krajnc & Glavič, 2005, 2005a; Singh *et al.*, 2007). To help decision makers in this respect, it could be beneficial to use integrated indicators that link many sustainability issues and hereby reduce the number of decision-making criteria (Azapagic, 2003; Krajnc & Glavič, 2005a; Singh *et al.*, 2007, 2009, 2012). Thus, composite indicators, being an innovative approach to evaluate sustainable performance, are increasingly recognised as a useful tool for policy making as well as public participation in sustainability discussion

(Krajnc & Glavič, 2005; Singh *et al.*, 2007, 2009, 2012).

Currently, there are various approaches to create frameworks and methodologies for the development of integrated sustainability indices that measure, monitor and assess the progress of an enterprise towards sustainability. Significant examples are presented in the publications of Azapagic (2003), Krajnc & Glavič (2005, 2005a); Singh *et al.* (2007, 2009, 2012), Kang *et al.* (2010); Kinderytė *et al.* (2010) and Kinderytė (2010, 2011, 2013) as well as Laurinkevičiūtė & Stasiškienė (2010). Despite these attempts and urgent demand to find better performance indicators (Dahl, 2012), there is still no comprehensive framework for integrated sustainability assessment of the overall company state on the basis of manufacturing processes, products/services as well as relationship with various stakeholders.

In respect of this demand, the algorithm (see Figure 1) was developed offering methodical suggestions to assess the customers' opinion about the presence of company's environmental and social sustainability activities and initiatives; to identify and select the most appropriate sustainability indicators; to determine their significance according to analytic hierarchy process (AHP); and to solve the most important sustainability problems in 3 levels – manufacturing processes/company's activities, products/services and stakeholders by adapting the most suitable sustainable development tools. The final suggestions of the algorithm are based on the values of the 3 sub-indices of a new integrated index for the overall assessment of the SCP state in the company, I_{SCP}.

The steps of the algorithm for integrated sustainability assessment of the overall company state based on the calculation of I_{SCP} are explained below.

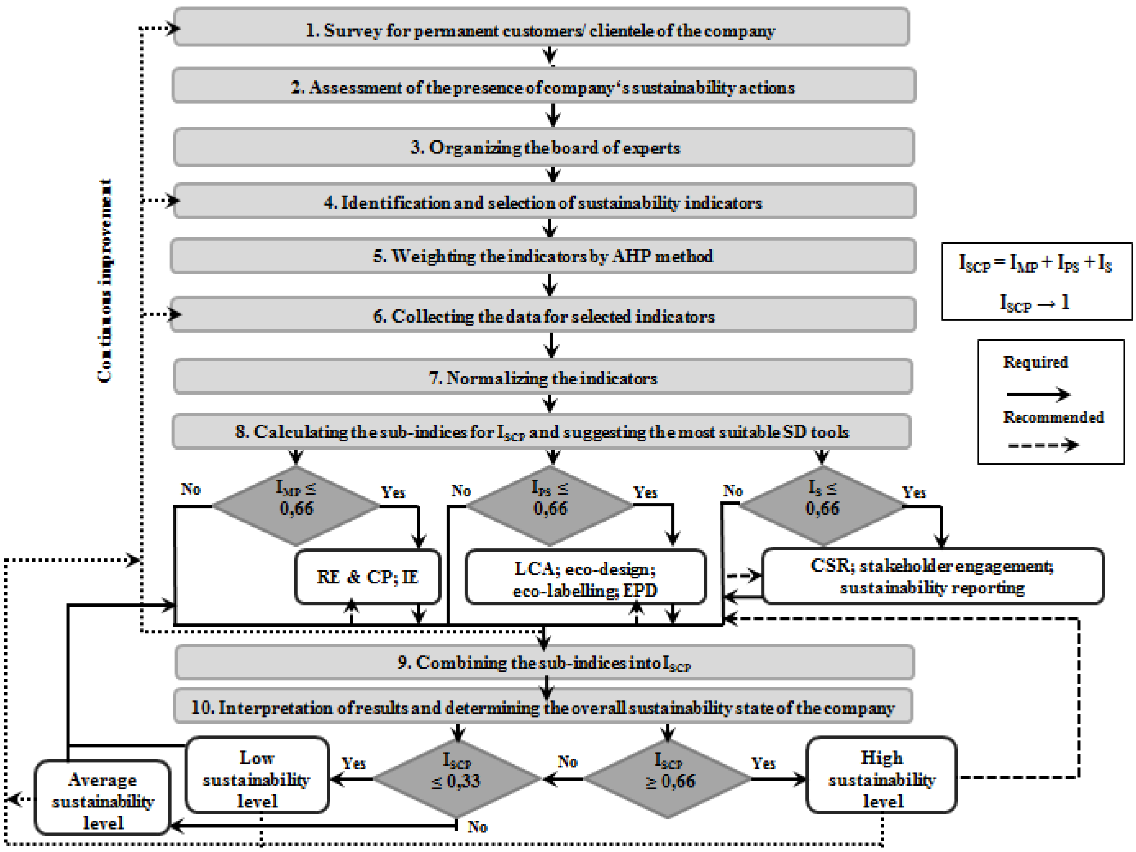

Figure 1. The algorithm for integrated sustainability assessment of the overall company state on the basis of manufacturing processes/company's activities, products/services as well as relationship with various stakeholders

2.1 Survey for permanent customers/clientele of the company

The aim of the survey is to assess the opinion of company's customers about the presence of environmental and social sustainability activities and initiatives of the enterprise in every of the 3 levels as well as to express their overall satisfaction regarding company's performance. The respondents are asked to evaluate each of 25 presented statements, related to manufacturing processes/company's activities (4 statements), products/services (4 statements) and collaboration with stakeholders (10 statements) as well as their general satisfaction regarding company's sustainability activities (7 statements) (Table 1). The formulation of some of these clauses is partially based on the statements for the green customers' satisfaction analysis proposed by Chen (2010). They are asked to rate these statements on a 5-point Likert scale, assessing the level of their (non)acceptance of each item (where 1 = strongly disagree, 5 = strongly agree). The results of the survey are compiled and the mean values of each statement as well as each set of statements are determined.

2.2 Assessment of the presence of company's sustainability actions

The presence of company's sustainability actions related to manufacturing processes/company's activities, products/services and stakeholders is based on the values of the coefficients K_j (K_{MP}, K_{PS} and K_S). These coefficients are evaluated recalculating the mean values of customers' answers in every of the 3 prime aforementioned sets of the statements to the parts of percentage (where 1 → 0; 2 → 0.25; 3 → 0.5; 4 → 0.75 and 5 → 1). The index of general green customers' satisfaction I_{GCS} is calculated similarly to the coefficients K_j, assessing the average results of the respondents' answers from the fourth set of statements.

Table 1. Sets of statements in the customers' survey related to manufacturing processes/company's activities, products/services, collaboration with stakeholders as well as general customers' satisfaction for company's sustainability activities.

Statements related to manufacturing processes/company's activities	
1.	Company implements and uses efficient and modern technologies, applies preventive management and organisational measures
2.	Manufacturing processes/company's activities correspond to or even exceed the environmental requirements and principles of social responsibility
3.	Company efficiently and economically uses all the materials, energy, water and other resources
4.	Company suitably manages, reuses and recycles all its wastes
Statements related to company's products/services	
1.	Company creates and designs products/services considering various environmental and social criteria and standards
2.	Company's products/services correspond to or even exceed the environmental requirements and principles of social responsibility
3.	Company increases the offer of environmentally friendly products and services in the market
4.	Company proposes clear, easy understandable and comparable information about the characteristics and impacts of its products/services
Statements related to company's cooperation with its stakeholders	
1.	Company promotes sustainability initiatives between its employees, raises their consciousness and motivation, organises special trainings
2.	Company incorporates sustainability criteria for products and services in its purchasing procedures (green purchasing)
3.	Company proposes requirements for its suppliers to correspond to the particular environmental and social criteria
4.	Company cooperates with other enterprises, learns from their sustainability initiatives, intercepts examples of best practices and motivates them to accept both environmentally and socially sustainable decisions
5.	Company enhances environmental consciousness of its customers/consumers, promotes sustainable consumption, educates them about environment protection, eco-labelling and other sustainability topics
6.	Company engages in public environmental initiatives and campaigns, participates in various events for society sustainability promotion
7.	Company closely cooperates with NGOs that promote sustainability initiatives, e.g. green movement organisations, associations for environment protection, etc.
8.	Company cooperates with educational and science institutions that support the increase in sustainability knowledge and perception as well as help to apply and implement technological and other innovations, etc.
9.	Company cooperates with media, publicising its environmentally and socially sustainable products/services as well as motivating and educating society to consume sustainably, etc.
10.	Company periodically represents the information about its environmental and social practices through publicly available reports
Statements related to general consumer satisfaction regarding environmental and social sustainability of company's activities and products/services	
1.	Company contributes to the realisation of SCP goals through its products/services
2.	The name/brand of the company associates with environmental sustainability and social responsibility
3.	I assess the company regarding its environmental and social practices better than other enterprises that produce analogous products and/or render analogous services
4.	Company sufficiently corresponds to the requirements and expectations of environmentally responsible consumers
5.	I believe that I contribute to the realisation of SCP goals when I choose products/services of this company
6.	I will buy products/services of this company in the future
7.	I recommend products/services of this company to my family members, friends and acquaintances, etc.

2.3 Organising the board of experts

As different stakeholders of the company have different priorities, needs and expectations, they could share the decision-making power with corporate management (Madsen & Ulhøi, 2001) in the following steps of identification, selection and weighting of sustainability indicators. Ideally, the board of experts should include representatives from all the internal and external stakeholder groups of the company.

2.4 Identification and selection of sustainability indicators

For the assessment of sustainability, a number of indicators exist, which are used to evaluate organisation's progress towards sustainability (Krajnc & Glavič, 2005a). However, every indicator is not relevant for each branch of the industry and it may not be useful to put all these indicators into the proposed framework (Singh *et al.*, 2007). To make sustainability performance evaluation meaningful in terms of better enterprise management, the company has to develop its own individual set of indicators that reflect its profile and needs (Labuschagne *et al.*, 2005; Staniškis & Arbačiauskas, 2009). The set of indicators can be identified in a number of ways, including theory findings, empirical analysis, consultations with stakeholders, etc. (Azapagic, 2003; Singh *et al.*, 2007).

As indicators guide management control and strategic planning, they should be defined with care and should take the specific interests of the company into account (Krajnc & Glavič, 2005). Azapagic (2003) suggests that indicators should be quantitative whenever possible; however, for societal aspects of sustainability, qualitative descriptions may be more appropriate (Krajnc & Glavič, 2005a).

Decision-makers of companies have different views and are interested in different indicators; thus, they should be selected by taking into account appropriate communities of interest (Singh *et al.*, 2009, 2012). This task is realised through the board of experts, including representatives from all stakeholder groups of the company. In this step, quantitative and qualitative sustainability indicators related to manufacturing processes, products/services and collaboration with stakeholders are identified. It is recommended to use the list of performance indicators from the Global Reporting Initiative (GRI) guidelines as a primary set of indicators to perform this identification. In order to ascertain the most relevant indicators for a particular company, every individual from the aforementioned board of experts is asked to rate each of them on a 5-point Likert scale. The results are compiled and the mean value of each indicator is determined. The best-rated indicators for each level are selected for further weighting procedure in step 5.

2.5 Weighting the indicators by AHP method

To determine the weights of indicators, evaluators are often confronted with a lack of data. Therefore, a pairwise comparison technique is used in order to derive relative weights of each indicator practically. The pairwise comparison technique is based on the method developed by operation research pioneer Saaty (1980) and is called the Analytic Hierarchy Process (AHP) (Krajnc & Glavič, 2005a). The AHP has been accepted as a leading multi-attribute decision model both by practitioners and academics (Krajnc & Glavič, 2005; Singh *et al.*, 2007) and has been widely applied in many areas including SD (Singh *et al.*, 2007). The AHP method was already applied to the development of composite sustainability performance indices in the earlier publications of Krajnc & Glavič (2005, 2005a), Singh *et al.* (2007) as well as Laurinkevičiūtė and Stasiškienė (2010).

Pairwise comparisons between each pair of indicators are made by posing the question which of them is more important with respect to the ultimate SCP goals of the company, namely resources and energy savings as well as an increase in consumers' acceptance and satisfaction. The intensity of preference is expressed on a factor scale from 1 to 9 (where 1 = equal indicators, 9 = 1 indicator is 9 times the importance of the other). The same process of comparison is repeated for each column of the matrix, making independent judgments over each pair of indicators (Krajnc & Glavič, 2005, 2005a; Singh *et al.*, 2007). Saaty (1996) has shown that solving the right eigenvector of the matrix will provide an excellent estimate of the relative weights W_{ji} of the indicators evaluating their priority level (Singh *et al.*, 2007).

2.6 Collecting the data for selected indicators

This step of the algorithm involves collection of reliable, high quality quantitative and qualitative data for previously selected indicators, reflecting the performance of the company for the period of 1 year or 3 years. As Kinderytė (2010, 2011, 2013) has suggested, the evaluation of the company's sustainability according to qualitative indicators is built on a 3-level scale: worst evaluation – 0; medium evaluation – 0.5 and best evaluation – 1.

2.7 Normalising the indicators

The main problem of aggregating a set of indicators into an integrated one is the fact that they may be expressed in different units. One way to solve this problem could be to normalise each indicator (Kinderytė, 2010, 2011; Krajnc & Glavič, 2005, 2005a). Many methods for normalisation of the indicators are reported in the literature and the selection of an appropriate method depends on the data and the analyst (Singh *et al.*, 2009, 2012).

The normalisation of all the indicators in the presented algorithm is recommended to be made by applying Min-Max (Kinderytė, 2010, 2011, 2013; Krajnc & Glavič, 2005, 2005a) or Z-score (Singh *et* *al.*, 2007) methods using formulas (Equations 1, 2, or 3):

$$I_{N,ijt}^{+} = \frac{I_{A,ijt}^{+} - I_{min,jt}^{+}}{I_{max,jt}^{+} - I_{min,jt}^{+}} \quad (1)$$

$$I_{N,ijt}^{-} = 1 - \frac{I_{A,ijt}^{-} - I_{min,jt}^{-}}{I_{max,jt}^{-} - I_{min,jt}^{-}} \quad (2)$$

where $I_{A,ijt}^{+}/\,I_{A,ijt}^{-}$ – indicator whose increasing value has a positive/negative impact on sustainability; $I_{min,jt}^{+}/\,I_{min,jt}^{-}$ – indicator with minimum value and positive/negative impact on sustainability; $I_{max,jt}^{+}/\,I_{max,jt}^{-}$ – indicator with maximum value and positive/negative impact on sustainability; $I_{N,ijt}^{+}/\,I_{N,ijt}^{-}$ – normalised indicator whose increasing value has a positive/negative impact on sustainability; i – sustainable development indicator; j – group of sustainable development indicators: manufacturing processes/company's activities, products/services and collaboration with stakeholders; t – time in years.

$$I_{N,ijt} = \frac{(I_{A,ijt} - I_{avg,jt})}{SD} \quad (3)$$

where $I_{avg,jt}$ – average value of indicator; SD – standard deviation of indicator.

Moreover, in order to minimise the sensitivity of the Min-Max normalisation method, the following normalisation conditions, suggested by Kinderytė (2013), were defined (Equations 4 – 8):

1. If an indicator whose increasing value has a negative impact has constant minimum values, then it is assumed as the best possible value and by normalisation 1 is assigned:

if $I_{A,ijt}^{-} = I_{min} = const$, then $I_{N,ijt}^{-} = 1$. (4)

2. If an indicator whose increasing value has a positive impact has constant maximum values, then it is assumed as the best possible value and by normalisation 1 is assigned:

if $I_{A,ijt}^{\mp} = I_{max} = const$, then $I_{N,ijt}^{+} = 1$. (5)

3. If an indicator whose increasing value has a positive impact is expressed in percent, then by normalisation: $I_{N,ijt}^{+} = I_{A,ijt}^{+}/100$. (6)

4. If an indicator has a constant but not possible maximum or minimum value, then by normalisation 0.5 is assigned:

if $I_{A,ijt} = const$, then $I_{N,ijt} = 0.5$. (7)///

5. If values of indicators are not constant, but the difference is very small, then by normalisation 0.5 is assigned:

if $\frac{I_{A,ijt}}{I_{A,ijt+1}} \geq 0.99$, then $I_{N,ijt} = 0.5$. (8)

2.8 *Calculating the sub-indices for I_{SCP} and suggesting the most suitable SD tools*

The sub-indices $I_{S,jt}$ for all the 3 levels – manufacturing processes/company's activities (I_{MP}), products/services (I_{PS}) and stakeholders (I_S) – are evaluated according to the formula (Equation 9) (Kinderytė, 2011, 2013; Krajnc & Glavič, 2005, 2005a; Singh *et al.*, 2007), considering the weights of every indicator W_{ji} (Equation 10), which were generated during an expert weighting procedure as well as coefficients K_j from the consumers' survey:

$$I_{S,jt} = (\sum_{jit}^{n} W_{ji} I_{N,ijt}^{+} + \sum_{jit}^{n} W_{ji} I_{N,ijt}^{-}) \times K_j \quad (9)$$

$$\sum_{ji}^{n} W_{ji} = 1, W_{ji} \geq 0 \quad (10)$$

Each of these sub-indices shows the tendency of company's sustainability development regarding the SCP in one of the corresponding levels. The minimal value of a particular sub-index indicates that the related level is the weakest in the whole system; thus, the condition of it should be improved by applying suitable tools and measures. If the lowest value is recorded at the level of manufacturing processes/company's activities ($I_{MP} \leq 0.66$), the model suggests realising resource efficiency and cleaner production (RE & CP) as well as industrial ecology (IE) opportunities. Poorest conditions regarding the characteristics of products and services ($I_{PS} \leq 0.66$) can be fixed by applying life cycle assessment (LCA) based measures, such as eco-design, eco-labelling and environmental product declarations (EPD). If the weakest area of the enterprise seems to be relations with stakeholders ($I_S \leq 0.66$), corporate social responsibility (CSR) according to an international standard ISO 26000, various stakeholder engagement initiatives as well as improvements in sustainability reporting should be reconsidered.

2.9 *Combining the sub-indices into I_{SCP}*

Finally, the calculated sustainability sub-indices $I_{S,jt}$ are combined into an integrated index for the assessment of the overall SCP state of the company, I_{SCP}, using the formula (Equation 11):

$$I_{SCP,t} = \sum_{jt}^{n} W_j I_{S,jt} \quad (11)$$

where W_j denotes the factor for representing *a priori* the weight given to group j of SD indicators (manufacturing processes/company's activities, products/services and relations with stakeholders), reflecting the hierarchies and/or priorities in the opinion of decision-makers (Krajnc & Glavič, 2005, 2005a). In the final calculation of the I_{SCP}, an approach that uses estimated weights can be considered;

however, it is recommended to use equal weights for all the sub-indices (Kinderytė, 2011, 2013; Krajnc & Glavič, 2005, 2005a).

2.10 Interpretation of results and determination of the overall sustainability state of the company

In general, the integrated index helps to make decisions about the overall level of enterprise's sustainability (Azapagic, 2003; Kinderytė *et al.*, 2010) and highlight the achieved progress (Azapagic, 2003; Krajnc & Glavič, 2005a; Singh *et al.*, 2007). As the composite indicator integrates a large amount of information into an easily understood format for a general audience (Singh *et al.*, 2007), it can be used to inform decision-makers and various interested parties of SD trends in the company. The higher is the value of the index, the greater is the improvement of the company towards sustainability. The same is true for sustainability sub-indices as well. For any given year, the composite index and sub-indices reveal the performance of the company in that year compared with other years (Krajnc & Glavič, 2005a). Also, if analogous methodology and similar indicators for index calculation were applied to different companies, it would be possible to compare and rank them according to the current sustainability state (Krajnc & Glavič, 2005, 2005a).

The integrated index I_{SCP} that is proposed in the algorithm can help to disclose the overall SCP state of the company. If this index is lower than the value 0.33, the particular company can be named as unsustainable and must urgently rethink the whole business strategy, implementing all the possible actions and measures in all the system levels with the purpose of improving its overall sustainability condition. If the calculated value lies between 0.33 and 0.66, the enterprise shows the average level of the sustainability state regarding the implementation of SCP practices. In this case, it is strongly recommended to implement suitable measures and tools, especially in those particular levels, which show the worst results according to the values of sub-indices. And finally, if I_{SCP} exceeds the critical value of 0.66, it can be stated that the enterprise is on the right way to become comprehensively sustainable and its overall sustainability is as high as the value of I_{SCP} is closer to 1. However, even on a high level of sustainability, the company can still improve its current sustainability state by implementing additional measures and tools and, thus, exploiting all its sustainability potential.

Furthermore, the value of the green customers' satisfaction index I_{GCS}, determined from the average results of customers' answers in step 2, can also be helpful as an additional parameter to appreciate purchasers' general satisfaction regarding environmental and social sustainability of company's activities and products/services. Analogous to the integrated index I_{SCP}, the general satisfaction of sustainably engaged customers is as high as the value of I_{GCS} is closer to 1.

2.11 Periodical review of customers' opinion and periodical assessment of company's sustainability state

Periodical review of the customers' opinion and periodical assessment of the company's sustainability state compose a very important part of the algorithm that guarantees continuous improvement of the enterprise's sustainability state. These assessments could help to estimate the results of sustainability enhancement concerning newly implemented measures and to observe changes in the customers' opinion. Periodical review and assessment can be realised in 3 levels – by applying the algorithm from the very beginning or by performing the inner evaluation selecting new sustainability indicators or barely collecting data for the indicators that have been already chosen to estimate the changes in 3 levels of company's activities.

3 Conclusions and recommendations

The presented algorithm can help to assess current sustainability conditions of the company and, according to them, select and introduce the most suitable tools to achieve SCP goals. This algorithm offers methodical suggestions to assess the customers' opinion about the presence of company's environmental and social sustainability activities and initiatives; to identify and select most appropriate sustainability indicators; to determine their significance according to analytic hierarchy process (AHP); and to solve the most important sustainability problems in 3 levels – manufacturing processes/company's activities, products/services and stakeholders – by adapting the most suitable tools. These final suggestions were based on the values of the 3 sub-indices of a new integrated index for the overall assessment of the SCP state in the company, I_{SCP}. Moreover, a simple additional parameter to appreciate customers' general satisfaction regarding environmental and social sustainability of company's activities and products/services – the green customers' satisfaction index I_{GCS} – was also introduced.

This framework is created as a guidance to apply a theretofore designed SURESCOM (SUstainable and RESponsible COMpany) model (Jonkutė and Staniškis, in press) based on a classical closed-loop cycle scheme for an integrated management system and suggests a plan for consistent integration of SCP principles in organisation's practices; it can, therefore, be easily incorporated into a common management system of any enterprise.

As the subjected algorithm is still theoretical, there is an urgent necessity to verify its real potential in particular enterprises. The verification procedure performed in different sectors, including both manufacturing and service companies, could disclose all the opportunities of this framework.

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Įmonės bendros darnumo būklės įvertinimas tausojančio vartojimo ir darnios gamybos atžvilgiu: naujas sudėtinis darnumo rodiklis I_{SCP}

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Tausojančio vartojimo ir darnios gamybos skatinimas, siekiant nuolatos didinti esamų ir būsimų žmonijos kartų gerbūvį, yra svarbiausias tikslas, išreikštas 2006 m. atnaujintoje Europos Sąjungos Darnaus vystymosi strategijoje.

Kiekviena įmonė, norėdama įgyvendinti tausojančio vartojimo ir darnios gamybos tikslus, susiduria su iššūkiu ne tik naudoti tinkamus metodus ir priemones, siekiant išspręsti konkrečias darnumo problemas, bet, visų pirma, pasirinkti tinkamiausius darnumo vertinimo rodiklius ir diegti efektyvią veiklos darnumo vertinimo sistemą. Įmonėms gali būti naudinga turėti vieną palyginamąjį sudėtinį rodiklį, sumažinantį darnumo vertinimo kriterijų, į kuriuos reikia atsižvelgti, kiekį.

Nepaisant įvairių bandymų sukurti gaires sudėtinių darnumo rodiklių, skirtų įmonės progreso darnumo link matavimui, kontrolei ir įvertinimui, išsamių metodinių rekomendacijų įmonės bendros darnumo būklės įvertinimui, atsižvelgiant į jos gamybos procesus, gaminius (paslaugas) ir santykius su suinteresuotomis šalimis, vis dar nėra.

Atsižvelgiant į šį trūkumą, straipsnyje pristatomas algoritmas, teikiantis metodinius pasiūlymus, vertinant pirkėjų (klientų) nuomonę ir pasitenkinimą įmonės vykdomos veiklos aplinkosauginiu ir socialiniu darnumu; nustatant ir atrenkant įmonei tinkamiausius darnumo rodiklius; įvertinant jų reikšmingumą, taikant analitinį hierarchijos procesą (AHP); ir sprendžiant svarbiausias problemas trijose anksčiau minėtose srityse, diegiant tinkamiausias darniojo vystymosi priemones. Šie galutiniai algoritmo taikymo rezultatai pagrįsti trijų naujo sudėtinio rodiklio įmonės bendros darnumo būklės įvertinimui tausojančio vartojimo ir darnios gamybos atžvilgiu I_{SCP} skaitinėmis vertėmis.

Raktiniai žodžiai: *tausojantis vartojimas ir darni gamyba, įmonės, darnumo vertinimo rodikliai, sudėtinis rodiklis, analitinis hierarchijos procesas*.