

## **An Introduction of Social Impacts to the Production Processes from Life-Cycle Perspective: A Case Study of a Toy**

VASJA OMAHNE, MIHA VOGEL, PETRA VIDERGAR, ANDREJ LISEC &  
REBEKA KOVAČIČ LUKMAN

**Abstract** The sustainability aspects are becoming more and more important and individuals are becoming aware about environmental and social problems, although they are not included in the research and practice. This paper introduces an evaluation of social aspects via the whole life-cycle of the product (S-LCA), based on a case study of a toy from secondary materials, produced in Slovenia. The life-cycle perspective was used to evaluate the social impacts of a toy, which was observed through its three life-cycle phases.

**Keywords:** • Social Life-cycle assessment • sustainability • social responsibility • toy • case study •

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CORRESPONDENCE ADDRESS: Vasja Omahne, University of Maribor, Faculty of Logistics, Mariborska cesta 7, 3000 Celje, Slovenia, e-mail: [vasja.omahne@student.um.si](mailto:vasja.omahne@student.um.si). Miha Vogel, University of Maribor, Faculty of Logistics, Mariborska cesta 7, 3000 Celje, Slovenia, e-mail: [miha.vogel@student.um.si](mailto:miha.vogel@student.um.si). Petra Vidergar, Faculty of Logistics, Mariborska cesta 7, 3000 Celje, Slovenia, e-mail: [petra.vidergar@student.um.si](mailto:petra.vidergar@student.um.si). Andrej Lisec, PhD, Associate Professor, University of Maribor, Faculty of Logistics, Mariborska cesta 7, 3000 Celje, Slovenia, e-mail: [andrej.lisec@um.si](mailto:andrej.lisec@um.si). Rebeka Kovačič Lukman, PhD, Associate Professor, University of Maribor, Faculty of Logistics, Mariborska cesta 7, 3000 Celje, Slovenia, e-mail: [rebeka.kovacic@um.si](mailto:rebeka.kovacic@um.si).

## 1 Introduction

Many countries, including in European Union are adopting sustainability oriented laws and also consumers are becoming more aware about social and environmental problems, which lead to the growth of the sustainability evaluation of processes, products and services. This encourages industries and companies to assess their products through the perspective of a life-cycle and carrying out a sustainability evaluation. In the sustainability evaluation a gap exists, which is a lack of the social aspect as identified by Ma *et al.* (2018), and can be addressed via the social life-cycle assessment (S-LCA), introduced by the United Nations Environment Program (UNEP). UNEP developed several indicators that can be used in S-LCA (Benoît Norris *et al.*, 2011) to better evaluate the social impacts of products, processes and services.

Also, Ekener-Petersen and Finnveden (2012) claim that considering social aspects in the sustainability assessment, more precisely in implementation of the S-LCA, can provide new insights to stakeholders about social impacts of a product system. This approach can identify important aspects that might otherwise be neglected. S-LCA can also help companies to conduct business in a socially responsible manner by providing information about potential social impacts caused by the activities in the life-cycle of their product (Dreyer *et al.*, 2006). Benoît Norris *et al.* (2010) state that S-LCA is best used for increasing knowledge, informing choices, and promoting improvement of social conditions in a product's life-cycles.

The major concern of S-LCA is that the methodology is not standardised, as for example the life-cycle assessment (LCA). The guidelines, published by UNEP, identify the following five main categories, that effect S-LCA. Those are workers/employees, local community, society, consumers and value chain factors (Upananda *et al.*, 2009). The value chains are also closely interlinked with the logistics. In our research a focus was been given to the selected product - a toy for children that is made by the company Avantus zaposlitveni center, d.o.o. and for which S-LCA was carried out. In order to avoid the vagueness of the methodology, numerical indicators were developed to evaluate social aspects.

## 2 Methods

A framework for an evaluation of the social aspects within the life-cycle of a product is a methodology called S-LCA. A methodology enables studying the direct and indirect positive or negative impacts of the product on the social aspect through its life-cycle. It also integrates traditional life cycle assessment by having social aspects as focus (Sala, *et al.*, 2015). When conducting the S-LCA for our study, first a life-cycle model that consists out of three phases was designed, including all the processes. The three phases are production, usage and end of life. S-LCA indicators were selected, based on the UNEP methodology as well as other relevant numerical indicators were added, to comprehensively assess the impact of the company's product on the society. The most demanding was a definition of indicators, since it is often challenging to design social indicators in a way that they are not subjective and are at the same time measurable. Therefore, the following social indicators were used for the first phase (production):

- fraction (in %) of local suppliers in terms of the national average and a share of local suppliers in the company
- fraction (in %) of employees from a vulnerable environment
- fraction (in %) of psychologists in the company
- fraction (in %) of men/women in the company
- number of work hours per week
- employee satisfaction at the workplace
- satisfaction with an employer or manager.

In order to obtain the information about the satisfaction at the workplace in the company, an anonymous questionnaire was carried out. This questionnaire was spread out to all the employees and analysed.

It was also challenging to determine the indicators for the usage phase, since we did not have contacts with the users of the product. Thus, our results are based on previous research studies about how similar toys influence users (usually children). For the last phase, end of life, other options, excluding disposal were considered, especially to define the possibility of further re-usage and re-manufacturing of the product. The total structure of S-LCA and its steps are shown on Figure 1.

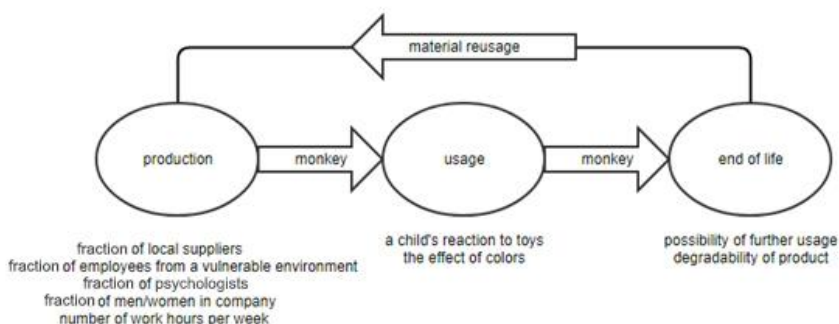


Figure 1: A product life cycle.

### 3 Results

Results emphasize the social aspects of the product throughout its entire life cycle (production, usage and end of life phase) by each indicator as explained in previous section.

#### 3.1 A fraction of local suppliers

The aim of this indicator was to introduce a relation between the studied company and suppliers. The higher the number the keener the company is on cooperating with local suppliers.

The company Avantus has 5 suppliers for this product, 3 of which are located in Maribor, therefore 60 % of their suppliers are regarded as local. Taking into at a statistical report the area's average is only 27.2 %, for this reason our studied company is above the average (SURS, 2017).

#### 3.2 A fraction of employees from vulnerable environment

First, it was defined a category of a worker from a vulnerable environment. The law defines these as handicapped workers in a way that it keeps them from finding and performing a regular job (Zakon o urejanju trga dela (Ur. l. RS, št. 80/10, 40/12 – ZUJF, 21/13, 63/13, 100/13, 32/14 – ZPDZC-1, 47/15 – ZZSDT in 55/17)). Second, our studied company is classified as a social company, therefore it needs to employ a certain number of people from a vulnerable environment in order to receive state funding.

In this case the company has in total 16 employees, 10 of them fall under the social category. This result (62.5%), proves they are socially responsible, according to the indicator.

### **3.3 A fraction of psychologists and social workers**

The psychologists and social workers represent the availability of support for work related or personal issues of such nature. It shows a care from the side of the company as the higher the number of such workers the more comprehensive their support is. Out of the 16 employees 5 are available of offering psychosocial and social related support, which means that their coverage is quite attentive.

### **3.4 A fraction of men/women in the company**

A gender equity raises a high level of concern with an intention to fairly allocate the resources (e.g. decision-making, salaries, imbalances in benefits, etc.) without any discrimination on the basis of gender. The studied company employs 13 women and only 3 men, which represents an imbalance in a favour of women. But in this case the higher number of women is because of the distinct line of work that the company offers.

### **3.5 Number of work hours per week**

The amount of work hours that the average worker needs to perform in a week can show if workers are being overworked and made advantage off. The standard in Slovenia is 40 hours per week so anything above could be problematic, whereas anything below can show the company's willingness to accept flexible schedules. In this case it was found that the average working hours per week are 36.25. It was expected for a company that employs people from vulnerable environments to allow their staff more down time.

### **3.6 Satisfaction survey**

To find out about the satisfaction of the workers regarding the company an anonymous survey was conducted. It consisted of 7 statements that were split into two groups. One was focusing on the workplace satisfaction and the other on satisfaction with the employer and management. The first group had the

maximum number of points set to 12, while the second had 9. After analysing a survey, the averages were 10.67 and 8.53, respectively. Thus, it can be concluded that the employees are very satisfied with their work and employer.

### **3.7 Effects of the toy on children**

Toys have an influence on children mental and emotional perspectives, which are both important. The three main pillars of a quality toy are the looks, the shape and the feel of it. The toy in the case study was in majority colourful, of a neutral shape and soft to touch. Bright colors intrigue children and appear more interesting to them. The neutral shape is important as it is not predefined and it encourages them to use their imaginations to fill in the blanks. Also, the soft feeling reinforces a feeling of comfort and security (Sončeve punčke, 2017; Bibaleze, 2017). In conclusion it was realized that the stuffed monkey checks all the boxes and should be a quality toy for children to play with.

### **3.8 Possibility of further usage**

This indicator is for finding out the possibility of re-using and re-manufacturing the toy. In itself the toy already represents the concept of a circular economy as it is made out of recycled materials (socks). The other components are polyester, rice and threads. While the amount of thread is negligible, the other materials are possible to reuse. Rice is biodegradable, so it can be used as a fertilizer or re-used for filling up new toy. Also, socks can be shredded and used as filling instead of polyester, which is not biodegradable. This would make the components of the next generation of toys completely biodegradable and of natural origin.

## **4 Discussion**

Observing the results of S-LCA and reasons for why S-LCA is a good tool, it can clearly be seen that the social aspects should be emphasized, when assessing the sustainability of a particular products. With the S-LCA stakeholders can get new insights about the social impacts of a observed product, which was in our case study a toy. Following the results it can be concluded that the company's social responsibility above the average, considering several indicators. Furthermore, this can be argued because 62.5% of the employees are from a vulnerable environment.

Conducting the S-LCA increased the knowledge and information about the effects of the toy on the local environment, since the results show the production process of a product supports local companies by using their services. The studied company is also very employees friendly, because they have a high number of psychologists and social workers, which provide help to employees when needed. Assessing the social impacts, it was found out that the company is willing to offer flexible schedules to their employees, and it is not discriminatory towards both genders.

The usage phase was assessed with subjective indicators, which were used to analyse the impact of the toy on children, and are based on the previous studies. The results indicate that the toy has a positive impact on children, mainly because of the bright colours and patterns. Another advantage is that toy does not comprehend any hard parts, but it is soft to the touch.

The results of our study support the outcomes of Benoît Norris *et al.* (2010), arguing that the S-LCA analysis promotes improvements of social conditions in a products life cycle. It is also supported by the fact that the toy can be reused. This makes the product environmentally friendly.

## 5 Conclusion

The S-LCA has been carried out according to the selected social indicators, using questionnaires and information provided by the company. It was found out that the company cooperates with local suppliers, employs people from vulnerable groups, and that the vast majority of employees is very satisfied with management. It can be also concluded that the product has a positive impact on the users, during the usage phase. It was found that the toys are made of socks in attractive and warm colours that stimulate the development of imagination in children. Furthermore, the toy is soft and made of natural materials, and thus reflects gentleness.

The results of our case study have shown a usefulness of the UNEP framework for assessing the social aspect of the toy, and bringing additional insights to all the stakeholders. Also, a flexibility of UNEP's framework has to be emphasized allowing the users to include additional case related indicators (e.g. local suppliers) in the methodology, increasing the comprehensiveness of the study. The challenge

that can be identified in the S-LCA are not clearly defined indicators, without which the assessment the social aspect of particular product can be questionable.

## Acknowledgements

The authors would like to thank to the Public Scholarship, Development, Disability and Maintenance Fund of the Republic of Slovenia for funding this research within the project entitled – Evaluation of the production process from the perspective of sustainable development and the introduction of new logistics business models in a disabled company, Contract No. 11081-6/2018.

## References

- Paragahawewa, U., Blackett P., Small, B. (2009). Social Life Cycle Analysis (S-LCA): Some Methodological Issues and Potential Application to Cheese Production in New Zealand.
- Statistično poročilo o javnih naročilih, oddanih v letu 2016 [Direktorat za javno naročanje – Statistični urad Republike Slovenije]* (2017). Retrieved on 20th June 2018 on: [http://www.djn.mju.gov.si/resources/files/Letna\\_porocila/Stat\\_por\\_JN\\_2016.pdf](http://www.djn.mju.gov.si/resources/files/Letna_porocila/Stat_por_JN_2016.pdf)
- Vpliv igrač na otrokovo zavest [Sončeve punčke]*. Retrieved on 4th June 2018 on: [http://www.sonceve-puncke.si/page/vpliv\\_igrac\\_na\\_otrokovo\\_zavest](http://www.sonceve-puncke.si/page/vpliv_igrac_na_otrokovo_zavest)
- Ekener-Petersen, E., Finnveden, G. (2012). Potential hotspots identified by social LCA—part 1: a case study of a laptop computer. *The International Journal of Life Cycle Assessment* (2013) 18:127–143.
- Dreyer, L. C., Hauschild, M., Schierbeck, J. (2006). A Framework for Social Life Cycle Impact Assessment. *The International Journal of Life Cycle Assessment* (2006) 11: 88–97.
- Benoît Norris, Catherine & Norris, Gregory & Valdivia, Sonia & Ciroth, Andreas & Moberg, Åsa & Bos, Ulrike & Prakash, Siddharth & Ugaya, Cassia & Beck, Tabea. (2010). The Guidelines for Social Life Cycle Assessment of products: Just in time!. *The International Journal of Life Cycle Assessment*. 15. 156-163. 10.1007/s11367-009-0147-8.
- Paragahawewa, U., Blackett, P., Small, B. (2009). Social Life Cycle Analysis (S-LCA): Some Methodological Issues and Potential Application to Cheese Production in New Zealand. *Agrresearch*.
- Benoît Norris, Catherine & Vickery-Niederman, Gina & Valdivia, Sonia & Franze, Juliane & Traverso, Marzia & Ciroth, Andreas & Mazijn, Bernard. (2011). Introducing the UNEP/SETAC methodological sheets for subcategories of social LCA. *The International Journal of Life Cycle Assessment*. 16. 682-690. 10.1007/s11367-011-0301-y.
- Ma, J., Harstvedt, J. D., Dunaway, D., Bian, L., Jaradat, R. (2018). An exploratory investigation of Additively Manufactured Product life cycle sustainability assessment. *Journal of Cleaner Production*, Volume 192, str. 55-70./
- Sala, S., Vasta, A., Mancini, L., Dewulf, J. & Rosenbaum, E. (2015). Social Life Cycle Assessment: State of the art and challenges for supporting product policies.



Luxemburg: Publications Office of the European Union. Retrieved on 10th June 2018 on: <https://biblio.ugent.be/publication/8529658/file/8529660.pdf>

*Skriti vpliv igrač [Bibaleze]*. Retrieved on 4th June 2018 on: [http://www.bibaleze.si/clanek/igrajmo\\_se/skriti-vpliv-igrac.html](http://www.bibaleze.si/clanek/igrajmo_se/skriti-vpliv-igrac.html)

Zakon o urejanju trga dela. *Uradni list RS*, št. 80/10, 40/12 – ZUJF, 21/13, 63/13, 100/13, 32/14 – ZPDZC-1, 47/15 – ZZSDT in 55/17.

