Research Critique

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**Abstract**

The following paper is a critique of the journal article, “Green and Clean: Reviewing the Justification of Claims for Nanomaterials from a Sustainability Point of View”. The purpose of this critique is to evaluate the content within each section of the article. The critique is guided by from step-by-step guide to critiquing quantitative research (M, P, & F, 1992). In the critiqued journal article, Pallas, Peinjneburg, Guinee, Heijungs, and Vijver outline a study examining the significance and validity of nanomaterial LCA (life cycle assessment) claims. Additionally, the article evaluates the environmental impact, with respect to carbon emissions, concluding that nanomaterials have a high cradle-to-gate energy demand resulting in high carbon emissions (Pallas, Peinjnenburg, Guinee, Heijungs, & Vijver, 2018).

Keywords: nanomaterial, green and clean, LCA, carbon emission, cradle-to-gate

**Introduction**

The “introduction” section provides data and statistics supporting the need for the research on the nanotechnology sector. “It is estimated that 300-400 thousand employees in Europe work in the nanotechnology sector and that non-technological products in 2015 has an estimated global volume of 2 trillion euros” (Pallas, Peinjnenburg, Guinee, Heijungs, & Vijver, 2018). This citation and the data was supported by the authors. The introduction of jaw-dropping data grabs the reader’s attention, leaving them in suspense for more information, factoids, and data. The introduction also alludes to what the journal article will achieve, which is to provide a definitive conclusion on if the data supports the claims of green and clean nanomaterials from a sustainability point.

**Literature Review**

Unfortunately, there is not a “literature review” section in this quantitative research journal article of 17 pages. However, there is some mention of a review of several studies, books and research programs in the “introduction” section. Disappointedly, the authors mention very few details on the literature used. For example, the authors state: “In addition to the role of nanomaterials in technological competitiveness and innovation, there are many books and reports, including innovation and research programs such as EU Horizon 2020, which state that nanotechnologies will have a significant contribution to the transition to sustainability” (Pallas, Peinjnenburg, Guinee, Heijungs, & Vijver, 2018). Lastly, and interestingly, the “discussion” section discusses the limitations of the study, which is premature for the journal article.

**Methods**

The quantitative study does mention the sources of the data from which was used to create table 1. The authors use bulleted form referencing the data source as shown below:

* Only studies that had 5 or more citations at the time of our search were included in our analysis.
* Next, we excluded studies that only mention LCA without actually performing an LCA.
* For the articles selected, a one by one screening was conducted, because not all of them are relevant to a comprehensive life cycle analysis of nanotechnologies. The number of studies that actually perform life cycle assessment of nanomaterials for the different sectors and have more than 5 citations, they are 18 in total. 8 studies for the solar sector, 5 studies for the polymer sector, 3 studies for the energy sector, 1 study for the food sector and 1 study for the medical sector. No relevant studies that have performed life cycle assessment of nanomaterials were found for the biomolecules and photo (electro) chemistry sector.

Again, the references and methodology are lacking details, formulas, software, and specifics. Moreover, there are no citations or references linking the bulleted sources until the results section. The methodology on how data table 1 was generated, which has the results, is lacking credibility, because we cannot validate the calculations.

**Results**

The “results” section of the quantitative research are mostly communicated via table 1, which certainly lacks specifics and is extremely vague. The results do have a reference number, which credible, but how the authors generated the results is missing. The table is overwhelming with acronyms and abbreviations and is not aesthetically pleasing to the eye.

**Discussion**

The “discussion” section has the majority of content and is most informative with details on five different clean and green sectors. As mentioned there are seven clean and green sectors: Solar Sector, Polymer Sector, Energy Sector, Medical Sector, and Food Sector. Each sector of was written by at least one author, because they are subject matter experts on that particular subject. For example, Vivjer discusses the Solar Sector and how is not supported by the finding of the quantitative study. Furthermore, Vivjer goes on to reference the data and findings, explaining it in great detail as he is the subject matter expert.

**Conclusion**

The journal article title was appropriate with a total of 15 words, which provided the reader a quick descriptive summary. The quantitative study lacks a “literature review” section and mentions very few references in the introduction. Preferably, there should be some scientific means connecting the dots when generating a table and the “methodology” section lacks that. Overall, when it comes to credibility, all five authors contributed as subject matter experts provide affluent content to the article and their findings. The “discussion” section is organized, concise and well written. The “discussion” section has the most useful content within the journal article. Overall, there were a total of 36 references for the 17 page journal article, which indicates the robustness of the study. The article was written by five individuals, whom were subject matter experts in particular parts of the quantitative study, making the results significant. The “conclusion” section did provide a definitive finding and reiterated several points that were made thru ought the article. In addition the conclusion does offer suggestions for life cycle assessment. Specifically the authors state “The application of LCA to nanomaterials should be further developed with emphasis given in data collection, scenario development for scaling up to industrial level and development of impact models and data for nanomaterials” (Pallas, Peinjnenburg, Guinee, Heijungs, & Vijver, 2018).

# References

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