

A hierarchical framework for index computation in sustainable manufacturing

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ABSTRACT

Environmental regulations, the desire for market leadership and social stewardship along with pressing environmental crises have shifted manufacturing industries from focusing on traditional, purely profit-based strategies into pursuing the sustainability of manufactured products and manufacturing processes. However, assessing the sustainability levels of manufacturing industries poses a challenge due to the lack of holistic methods when in performing such assessments. In this area, current literature has embarked on computing an aggregate index for assessing sustainability performance. Nevertheless, approaches in computing sustainable manufacturing index are scarce in the literature. This paper presents a preliminary framework for computing a sustainable manufacturing index using the analytic hierarchy process. In this context, sustainability is interpreted from a triple-bottom line approach and the set of elements that comprise the index obtained from the US National Institute of Standards and Technology sustainable manufacturing repository. The use of this repository highlights a holistic approach in aggregate index computation as it offers a comprehensive list of elements of the triple-bottom line within the context of the manufacturing industry. Preliminary results have provided valuable insights into measuring sustainable manufacturing levels and could serve as a basic framework for index computation. The contribution of this work is on presenting a simple yet holistic approach towards computing a sustainable manufacturing index.

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Hierarhični okvir za izračun stopnje trajnostne proizvodnje

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POVZETEK

Okoljski predpisi, konkurenčnost in socialna odgovornost so skupaj z okoljevarstvenimi zahtevami preusmerili proizvodno dejavnost od strategij, ki temeljijo le na dobičku, k zasledovanju trajnostnih učinkov industrijskih izdelkov in proizvodnih postopkov. Vrednotenje trajnostnih ciljev predstavlja izziv zaradi pomanjkanja celostne obravnave področja. Obstoječi viri, ki so precej redki, se vrednotenja lotevajo z računanjem skupne stopnje za ocenjevanje uspešnosti trajnostnega razvoja. V članku je predstavljen preliminarni okvir za izračunavanje stopnje trajnostne proizvodnje s pomočjo analitičnega hierarhičnega postopka. Trajnostna proizvodnja je vrednotena s tremi cilji (tj. okoljskimi predpisi, konkurenčnostjo in socialno odgovornostjo) in temelji na pristopu *od spodaj navzgor*, vsebuje pa elemente iz zbirke napotkov ameriškega nacionalnega inštituta za standarde in tehnologijo (angl. US National Institute of Standards and Technology sustainable manufacturing repository). Uporaba zbirke napotkov obsega celosten pristop pri agregatnem izračunu stopnje, saj ponuja celovit seznam elementov treh poglobitvenih ciljev trajnostne proizvodnje. Preliminarni rezultati so omogočili koristen vpogled v kakovost določanja stopnje trajnostne proizvodnje in lahko služijo kot osnovni okvir za izračun stopnje trajnostne proizvodnje. Članek tako predstavi preprost in celosten način za izračun stopnje trajnostne proizvodnje.

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PODATKI O ČLANKU

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