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ANALYTIC HIERARCHY PROCESS ASSESSMENT FRAMEWORK FOR BLOCKCHAIN IN RENEWABLE ENERGY

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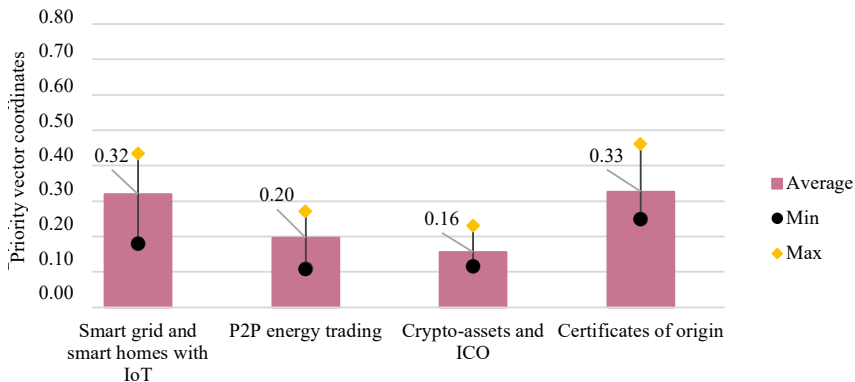
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Abstract – The urgency to reach net-zero emissions until 2050 has created a vast interest in innovative technologies for renewable energy sector. At the same time, the need for trusty and unflinching solutions will rise, considering the increasing amount of decentralized and decarbonized energy systems. It has previously been described in the literature that the aforementioned characteristics could be combined by blockchain technology. Therefore, this study focuses on the practical side of the problem – the opinion of industry experts about the use of blockchain technology in renewable energy. By using analytic hierarchy process analysis, the goal of this study is to develop a methodology for the selection of the most appropriate blockchain applications in renewable energy and to identify and evaluate the possible types of use taking into account socio-economic, political and legal, technological and environmental factors. The results of this study highlight the important influence of political, legal and technological factors, such as the involvement of government institutions and possible attacks on the system, but considers the economic factors as the least significant for the introduction and use of blockchain technology in the renewable energy sector. The most promising use cases for blockchain would be associated with reliable and immutable certificates of origin for renewable energy and use in smart grid (including smart metering), smart homes and relevant Internet of Things applications. The use of cryptoassets and initial coin offerings for renewable energy development should be viewed with precaution and willingness to inform and educate considering social factors like public opinion and societies’ knowledge on crypto-assets.

Keywords – Analytic Hierarchy Process (AHP); blockchain; net zero; renewable energy



Overall assessment of blockchain application scenarios in renewable energy (n = 6).