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Method for Selecting and Prioritising Smart Services in Manufacturing Companies

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Abstract : This paper presents a comprehensive investigation into the topic of smart services and IIoT-Platforms, focusing on their selection and prioritization in manufacturing organizations. First, a literature review is conducted to provide a basic understanding of the current state of research in the area of smart services. Based on discussed and established definitions, a definition approach for this paper is developed. In addition, value propositions for smart services are identified based on the literature and expert interviews. Furthermore, the general requirements for the provision of smart services are presented. Subsequently, existing approaches for the selection and development of smart services are identified and described. In order to determine the requirements for the selection of smart services, expert opinions from successful companies that have already implemented smart services are collected through semi-structured interviews. Based on the results, criteria for the evaluation of existing methods are derived. The existing methods are then evaluated according to the identified criteria. Furthermore, a novel method for the selection of smart services in manufacturing companies is developed, taking into account the identified criteria and the existing approaches. The developed concept for the method is verified in expert interviews. The method includes a collection of relevant smart services identified in the literature. The actual relevance of the use cases in the industrial environment was validated in an online survey. The required data and sensors are assigned to the smart service use cases. The value proposition of the use cases is evaluated in an expert workshop using different indicators. Based on this, a comparison is made between the identified value proposition and the required data, leading to a prioritization process. The prioritization process follows an established procedure for evaluating technical decision-making processes. In addition to the technical requirements, the prioritization process includes other evaluation criteria such as the economic benefit, the conformity of the new service offering with the company strategy, or the customer retention enabled by the smart service. Finally, the method is applied and validated in an industrial environment. The results of these experiments are critically reflected upon and an outlook on future developments in the area of smart services is given. This research contributes to a deeper understanding of the selection and prioritization process as well as the technical considerations associated with smart service implementation in manufacturing organizations. The proposed method serves as a valuable guide for decision makers, helping them to effectively select the most appropriate smart services for their specific organizational needs.

Keywords : smart services, IIoT, industrie 4.0, IIoT-platform, big data
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