

# An assessment framework for smart manufacturing

Sangkeun YOO\*, Yong-woon KIM\*, Hoon CHOI\*\*

\*Protocol Engineering Center (PEC)/ETRI (Electronics and Telecommunications Research Institute),  
218 Gajeong-ro, Yuseong-gu, Daejeon, KOREA

\*\* Department of Computer Engineering/CNU (Chungnam National University),  
99 Daehak-ro, Yuseong-gu, Daejeon, Korea

[lobbi@etri.re.kr](mailto:lobbi@etri.re.kr), [gkim@etri.re.kr](mailto:gkim@etri.re.kr), [hc@cnu.ac.kr](mailto:hc@cnu.ac.kr)

**Abstract**— This paper proposes an assessment framework for smart manufacturing in terms of the extent of Information & Communication Technologies (ICT) adoption to manufacturing process. For an assessment framework, this paper establishes assessment principles and identifies activities of manufacturing process to be assessed. In addition, maturity levels of smart manufacturing are defined in this paper. Each level has different characteristics and different extent of ICT adoption in manufacturing process.

Based on an assessment reference model, this paper gives a way of creating assessment indicators for each activities per each maturity levels. With answers to questionnaires/indicators, smart manufacturing can be assessed and expressed as a maturity level.

**Keyword**— Assessment, smart manufacturing, smart factory, digital manufacturing, automation enterprise, automation system



**Sangkeun Yoo** received the M.S degrees from Chungnam National University, Korea in 1999. He developed micro payment systems in start-up from 1999 to 2000. Since 2001, he has worked for ETRI in areas of information security, RFID, sensor networks and IoT, recently smart factory. He has been a Convenor of ISO/IEC JTC 1/WG 10 (Working Group on Internet of Things) since 2014. His current research interests include IoT, smart factory and digital manufacturing.



**Yong-Woon Kim** studied electronics engineering at Dong-A Univ. and majored in computer networks and communication for the MS degree at POSTECH. He is currently a principal research engineer at the Protocol Engineering Center, Electronics and Telecommunications Research Institute (ETRI), Daejeon, South Korea. His research interests include IoT applications and services in the fields of smart city, smart factory, smart grid and smart water grid, and also IT sustainability works in terms of standardization. His research results have been contributed to ITU-T and ISO/IEC JTC 1 for development of relevant standards where he is a vice chairman of ITU-T SG 5 WP 3 (ICT and Climate Change) and the convenor of ISO/IEC JTC 1/SC 39(Sustainability for and by IT)/WG 2(Green ICT).



**Hoon Choi** is a faculty member of the Department of Computer Science and Engineering, the Chungnam National University (CNU). Before joining the CNU in 1996, was he a senior member of technical staff at the Electronics and Telecommunications Research Institute (ETRI) in Korea since 1983. His research area is the mobile, distributed computing. He teaches various courses on computer operating systems and distributed systems of the undergraduate, graduate programs in CNU, and he received the Outstanding Teaching Award in 2004. He received a BSEE from the Department of Computer Engineering of Seoul National University, Korea in 1983, and an MS and a Ph.D. in computer science from Duke University in 1990 and 1993, respectively. He was awarded an IBM Graduate Fellowship in 1991 and 1992.