Icon made by Freepic from www.flaticon.com

Internet of Things (IoT) in real estate

Designing guideline for employee-oriented IoT implementation in office real estate

P4 Reflection
17 May 2019

Hanna Maria Majchrzak
Student number: 4742982

Colophon

Document information

Research title:	Internet of Things (IoT) in Real Estate
Research subtitle:	Designing guideline for employee-oriented Internet of Things (IoT) implementation in office real estate
Date:	17.05.2019 (handed over) 24.05.2019 (presented)
Submission:	P4 Reflection

Personal information

Name:	Hanna Maria Majchrzak
Student number:	4742982
Email:	H.Majchrzak@student.tudelft.nl
	majchrzakhannamaria@gmail.com
Phone:	CONFIDENTIAL

Research institution information

Educational institution:	Delft University of Technology
Faculty:	Faculty of Architecture and the Built Environment
Master track:	Management in the Built Environment
Graduation lab:	Smart Real Estate Tools
First mentor:	Prof. Alexandra den Heijer
	A.C.denHeijer@tudelft.nl
Second mentor:	Dr. ir. Alexander Koutamanis
	A.Koutamanis@tudelft.nl
Third mentor:	Ir. Bart Valks
	B.Valks@tudelft.nl
Delegate of the Board of Examiners:	dipl. ing. B. Jurgenhake
	B.jurgenhake@tudelft.nl
Internship company:	CBRE, Amsterdam
	Smart Solutions (Workplace Strategies)

1. Reflection

The following section presents personal reflection on the process of conducting master thesis. The reflection touches upon various elements such as: (1) relationship between the research, selected graduation laboratory and master track, (2) reflection on the appointed research methodology, (3) match between the research output and research disseminations, (4) graduation internship (5) 'practice' observation and finally (6) reflection on the research process.

1.1. Relationship between the research, SRET laboratory and MBE

The thesis falls under the Graduation Laboratory called 'Smart Real Estate Tools' organized in line with Master Track 'Management in the Built Environment' (MBE). The goal of the master thesis was to conduct an academic research based on which the author can formulate the guideline. The guideline had been specified as '*information intended to advise CRE managers on how to shape smart technology implementation initiative which benefits office employees'*. In order to reach this goal it was necessary to specify more precisely what does the guideline consist of. Two elements were selected as an input for the guideline: (1) process design and (2) recognizing the added value of smart technology in offices.

Designing the process clearly corresponds with the MBE track, since the process management and REM had been emphasised throughout significant part of the studies. At the same time, recognizing added value of smart technology directly links to the (C)REM practices and integration of four thought perspectives. The final output links to the 'Smart Real Estate Tools' however while looking at the previously developed student master theses, the research took a bit different form: focusing on the process design and elaboration upon investigated smart technology. Nevertheless, the research output still fits well within the graduation laboratory.

1.2. Appointed research methodology

Clarifying research objectives in order to select appropriate research methods

After the feedback received on P2, the master student has undertaken the following steps in relation to research methodology:

- Setting clear research objectives,
- Improving largely research methodology: philosophical underpinning, frameworks for cases analysis and specified research output,
- Interview protocol based on theoretical framework (improved).

At this point, the P5 report clearly presents aspects related to the appointed research methodology. Author follows the steps of literature review, in-dept interviewing and desk research. Due to lack of publications related to the theme the case study method had become the primary research methodology.

Author is aware that it would be best to use an additional research method which will ensure that data are reliable and clear. That is why desk research is necessary. In order to clarify the research process multiple graphs had been created and are presented in part II of this P5 report.

The research itself had a primary explorative character. The literature study had created knowledge basis for the further case studies research. That was a good starting point, however a lot of information had been missing in order to create the final research output. Long

interviews and detail interview protocol provided the researcher with valuable knowledge which had been later translated into intended guideline (research output).

Interviewees selection

The selection of interviewees was challenging due to described below circumstances. Ideally the master student had been looking for facility managers who had been responsible for smart technology implementation at the office real estate. The reality has shown, that the facility manager is almost never responsible for conducting this process. Most often, an additional person is temporarily appointed, for such an initiative, within an organization. The actor can be therefore named in various ways, which were confusing while the researcher was making a decision about choice and number of interviewees.

Luckily, the snowball effect based on broad social network allowed the researcher to recognize actors which were involved in the smart technology implementation process within the appointed case studies. Those were in the end various actors: project manager, development manager, IoT department manager, Smart Solutions team leader, product excellence director, and finally a facility manager. These actors agreed to contribute to the research by giving an interview.

1.3. Match between the research output and research disseminations

The research had been intended to provide valuable information to professionals who contribute to the process of IoT implementation within RE. Due to the strong focus on office workers the pinpointed persona was first recognized as a facility manager who aims at adding value to end users of RE. Within time the research has also indirectly started to address remining CREM stakeholders and additional actors. Practice shows that there can be a specific (unique) position created within organizations, which is appointed to manage the initiative (such as the SMART team). In that case, this professionals can also benefit from learning the outcome of this study. Furthermore remaining actors can benefit due to being provided with clear process overview.

As intended, the 1st part of the guideline (research output) presents possibilities for end users involvement in the implementation process, whereas the 2nd part of the guideline (research output) helps office employees to better understand the opportunities related to the new technology. Due to adaptation and implementation of this double sided framework (dedicated to CREM and to office end users) privacy concerns and process related barriers can be overcome.

Until now, author did not recognize scientific literature which would integrate information about SRE development process and IoT/smart technology added value. The master thesis research paper adds knowledge to the scientific framework.

1.4. Graduation internship

Half January 2019 the master student had started a graduate internship at CBRE. The internship was closely linked to the development of the CORE (smart office, one of the case studies). Although the research could dive deeply into one organization and one project development, author sought for more case studies so that the findings can be generalized.

The intern position has helped a lot while having a trouble with scheduling interviews and looking for appropriate interviewees. Being involved in the Smart Solutions team has helped the master student to better understand and learn CREM practices, SRE development process and most importantly gain an experience of SRE end user.

The process design had been shaped externally, that means that the team neither the board were able to adopt it at the already handed over office building. The discussion included in the research paper touches upon missing elements and undefined links which the researcher had discover. Few days ago, the organizational board and CREM members had evaluated their office development and have made couple of points which should have been planned differently through the process. The evaluation results were very sati factionary for the researcher since they have confirmed discussed research findings: IT involvement, 1st smart technology selection and integration by IT, delivery of smart installation brief, conducting permanent testing loops and establishing an permanent onboarding program.

1.5. 'Practice' observation

The researcher had gained a deep understanding of smart technology implementation while following the graduation internship and conducting the case studies research. The research findings indicate that the smart technology implemented within office portfolio should respond to both, a RE strategy and an organizational strategy. Practice observations reveal that sometimes those strategies are not reflected in the smart office equipment/technology. Furthermore, the observations shows that CREM tends to implement as many smart technologies as possible (available on the market) without thinking the concept through. In the end, the 'practice' observation confirms the research relevance and strengthen the importance of the research findings.

1.6. Reflection on the research process

The research process has started in September 2018. Back then, the research proposal development had been mainly steered by the researcher personal interests and brief, explorative literature studies. The researcher had struggled with defining the research scope for quite a long time. In winter 2018, the researcher had a chance to contact multiple professionals involved in the IoT implementation initiatives (Geert Stam, Onno Willemse, Roy Halstead). Those men had helped the researcher to understand the IoT implementation initiative in practice, by having extensive discussions about the IoT implementation initiatives and their shortcomings. Soon after that, the researcher had an opportunity to get involved in the process of the CORE (smart) development. Ever since then the scope of the research had become concise and clear.

Throughout the process the researched had always tried to comply with (or at least respond to) the feedback received from the metros. In retrospect, the researcher believes that the feedback moments could have happen more often. That would bring more clarity toward the feedback and the research development.

The workload in the period within P2 and P5 had been very intensive. The process have ren rather smoothly within the last 5 months – after the research objectives were clearly defined. The 'data collection phase' had a bit of the delay, which in the end have an indirect impact on the research limitations discussed before in part VI.