The User Experience Perspective of Internet of Things Development

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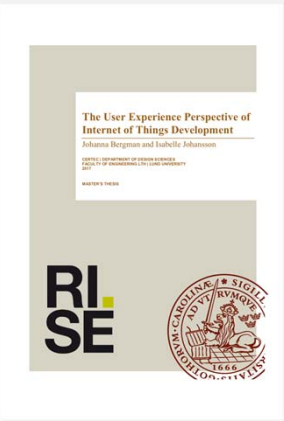
Background

- Master's thesis Lund University & RISE 2017
- Conference paper presented at REFSQ 2018



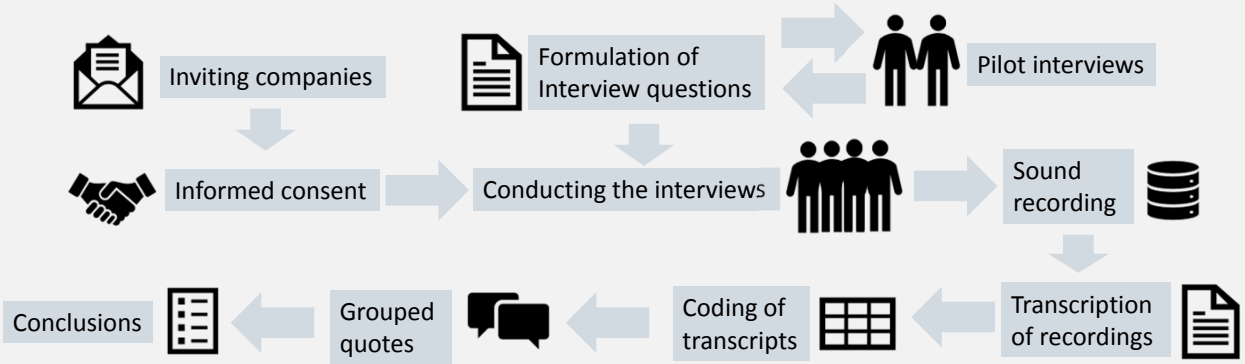
Research Questions

RQ1. How are UX requirements elicited in the context of IoT development in general?

RQ2. How are data-driven methodologies specifically utilised for IoT development to elicit UX requirements?

RQ3. Which are the challenges for UX and IoT?

Method



Participating Companies

4 startup companies 8-70 employees

1 large product company 100 employees (innovation department)

6 consulting companies 8-4000 employees

RQ1 Elicitation

- The product companies do not generally define UX requirements

"[It] is also that it's about Internet of Things. That is to say, it's unknown ground. The value is entirely untried."

- For the consulting companies, it depends on their profile and their customers

"Both market research and then concept testing…"

" …usually, it's enough to use our knowledge…"

RQ2 Data

- The product is not finished when released to the market

"It's not the traditional business mindset that you develop a product for a long time and then you release it and everyone will have access to it at the same time."

- Quantitative data has to be complemented with qualitative data

"It's usually just a catalyst, an indication that here's something strange."

- The companies that collect data do not always know how to make use of it

Qualitative and quantitative methods

Company	Qualitative	Quantitative
A	-	-
B	Prototyping, user tests	User data
C	Prototyping	-
D	Prototyping	*Unknown*
E	Occasional user tests, depends on customer	-
F	Mock-ups, user feedback	-
G	User research, user tests, scenarios, story boards, personas	User data, A/B testing
H	Prototying, simulations, user tests, personas, surveys, interviews with end-users	Google analytics, A/B testing
I	Conceptual sketches, indirect user feedback	-
J	User research, feedback from beta testers, personas, focus groups, sketches	Google analytics, in-house A/B testing
K	User research, user feedback, prototyping	*Unknown*

RQ3 Challenges

- Early decisions vs. agile
- User experience and security
- An ecosystem of experiences
- Standards and interoperability

”The great challenges are when you have to build on systems that aren’t that good”

“[Security] is not necessarily a technical challenge, it is a UX challenge"

Conclusions

Adapting to the situation

- There is no simple answer – one needs to adapt to the context
- There is a risk that prototyping can undermine user research activities
- Data-driven methodologies are used either as confirmatory or to indicate that something is wrong
- Quantitative data has to be complemented with qualitative data
- Common sceptisism regarding how useful the quantitative data is
- Other factors probably play a greater role in affecting the companies’ design processes than the fact that they develop IoT

”We don’t have that many customers yet. So we dare not risk that one particular solution may be bad.”

Conclusions

Proactive or reactive

- Connection between maturity of products and choice of techniques
- Creative and proactive techniques
- Confirmatory and reactive techniques

*”Data-driven approaches may simply lead to the most average HCI design ever created”**

*de Haan, G.: HCI Design Methods: Where Next? From User-centered to Creative Design and Beyond. Proceedings of the European Conference on Cognitive Ergonomics 2015

Conclusions

The system context

- The experience becomes less controllable
- Collaboration requires standardisation – standardisation requires collaboration

”IoT can be seen as an ecosystem of experiences”

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