Work in Progress:

Patient acceptance of in vitro capsule- and microrobots.

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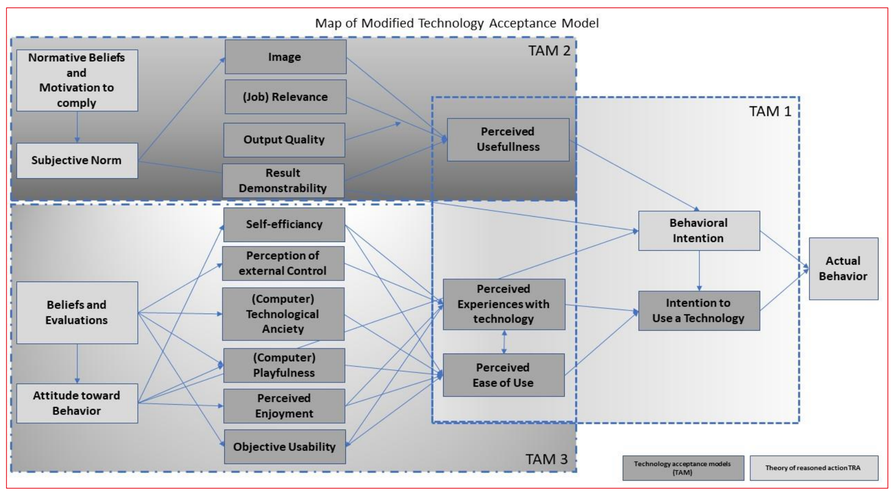
DHBW TRANSFER CONGRESS

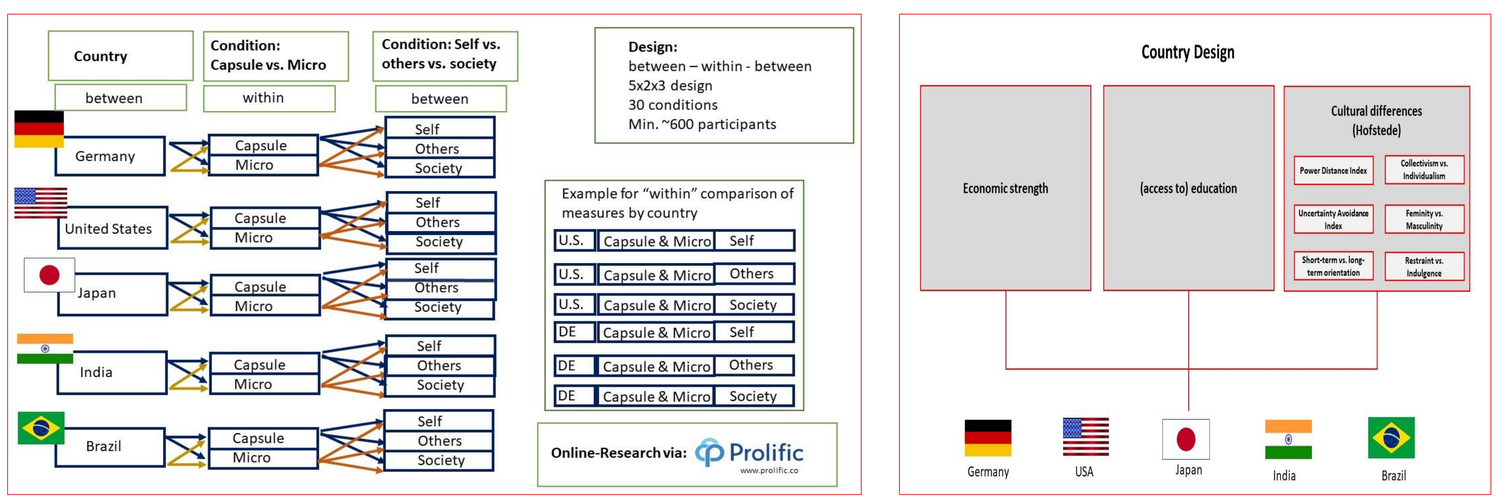
The first generation of robots small and robust enough to enter the human body have entered the medical market (a, b) [1] or on their way to market access (c) [10] .

Types of in vitro capsule- and microrobots [1,8,9,10]

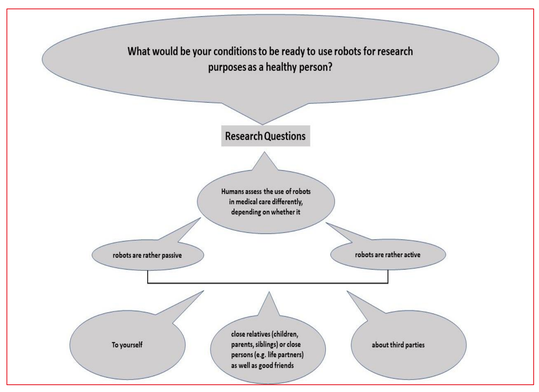
We evaluate the acceptance of those two robot systems [1,2] utilizing an adapted version of an ethically extended Technology Acceptance Model [3,4].

The acceptance is crucial for the technology adoption, the choice of organizations and medical providers to acquire and use this technology. Another important aspect to be analyzed is the willingness of individual patients to use this technology? Without knowing about these dynamics, development, marketing, market access, feasibility, and actual use of capsule and micro robots remain questionable. Non-rational behavioral economic criteria can also have an influence.





To separate the sensitizing effects an attitude evaluation of in-vitro robots pre-treatment can have, we employ a Solomon four-group design [5]. In addition to systemic considerations, online questionnaires (placed in prolific) in five countries are applied, which are selected on the criteria of economic strength, education (access to education) and cultural differences (according to Hofstede [6,7]).



We assess for both robot types the perceived usefulness, perceived ease of use, perceived risks, perceived ethical implications and the intention to use for self, others, and on a societal level as predictors of technology use. We also assess attitude changes towards in-vitro robots before and after being presented with the different robot scenarios and explanations of the robot's abilities.

Further hypotheses on relevant aspects were made with regard to their participation in the process of acceptance.

Further Hypotheses

- **The more diffuse or unexplored or alternative a clinical picture is, the higher the willingness to agree to the use of robots**
- **The less can be seen from the outside or even influenced, the greater the resistance when using robots**
- **The willingness to use robots depends on age**
- **The willingness to use robots depends on gender**
- **The willingness to use robots depends on education**
- **The willingness to use robots depends on ethnicity**
- **The willingness to use robots depends on religion / worldview / spiritual orientation**

Preleminary Results

What could have changed if capsule- and micro-robots are frequently used in medicine?
Looking at the research the different usage of the nanotechnologies in different countries is striking. People have individually plausible reasons to do it this way.
What are people's fears and assumptions on these robotics and how do they cope with the permanent uncertainty of such robots?
It is certainly not possible to find a linear causal chain of causes and effects, but rather a multidimensional network structure for decision-making and argumentation on this topic.
Emotional and (cross-)cultural feedback loops are certainly involved.

Outlook

The outcome of this research will inform how to relay information to patients about capsule- and microrobots and predict the acceptance of new in-vitro robot technologies.

The goal is to increase the number of early adopters and early majority of users.

What are the national, (cross-)cultural or other characteristics that make the difference in choosing in-vitro robot technologies according to cultural diversity an transcultural perspectives?

Our research can give an indication of how the use, benefits, opportunities and risks of capsule and micro-robots should be communicated to society and patients. The Results can be included in an health technology assessment.

Cooperative Partner

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DANIEL FELIX RITCHIE SCHOOL OF ENGINEERING & COMPUTER SCIENCE

Quellen

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