How maker spaces boost the innovative capability of established companies

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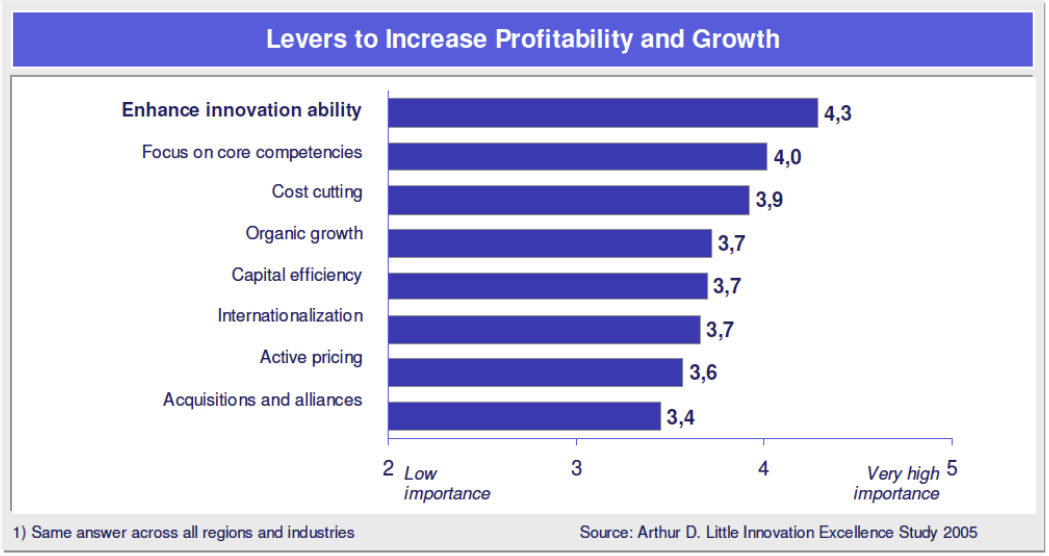
Studies show critical importance of innovative capability for a company's competitiveness

Companies believe that enhancing innovative ability is today the most important lever to increase profitability and growth[1]



- *"Die **Fähigkeit kontinuierlich Innovationen hervorzubringen** avanciert in der komplexen und dynamischen Wirtschafts- und Arbeitswelt von heute zum **entscheidenden Schlüsselfaktor** – die Frage der **Wettbewerbsfähigkeit wird zur Frage der Innovationsfähigkeit**." [1]*

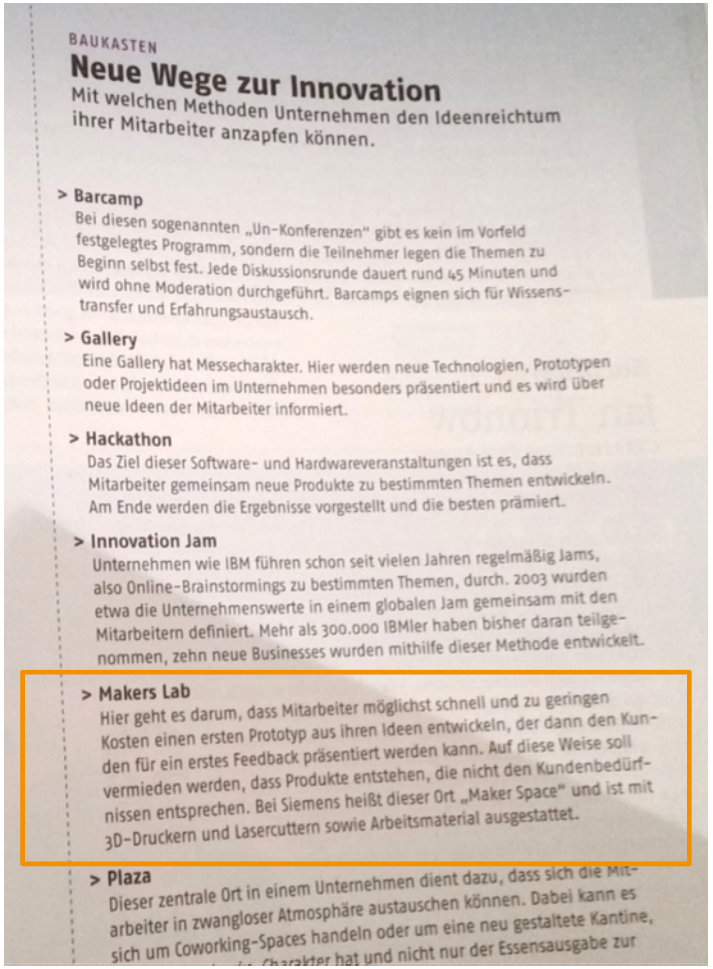
- *"Unternehmen sind heute einem **ständig steigenden Innovationsdruck** ausgesetzt. Die **Innovationskraft** einer Unternehmung wird daher immer mehr zum **wichtigsten strategischen Erfolgsfaktor.**" [2]*

- *"Most companies face significant challenges in terms of innovation. The ability **to be continuously innovative is critical** for most companies today, **regardless of** their **industry**." [3]*

- *"Innovative capability is becoming the critical success factor for the **long-term survival of companies and economies."** [4]*

1 Trantow et. al. (2011); 2 Pircher (2014); 3 Steiber (2014); 4 Bullinger (2006)

Maker spaces as a new way to foster the innovative capability of companies



BAUKASTEN

Neue Wege zur Innovation

Mit welchen Methoden Unternehmen den Ideenreichtum ihrer Mitarbeiter anzapfen können.

> **Barcamp**
Bei diesen sogenannten „Un-Konferenzen" gibt es kein im Vorfeld festgelegtes Programm, sondern die Teilnehmer legen die Themen zu Beginn selbst fest. Jede Diskussionsrunde dauert rund 45 Minuten und wird ohne Moderation durchgeführt. Barcamps eignen sich für Wissenstransfer und Erfahrungsaustausch.

> **Gallery**
Eine Gallery hat Messecharakter. Hier werden neue Technologien, Prototypen oder Projektideen im Unternehmen besonders präsentiert und es wird über neue Ideen der Mitarbeiter informiert.

> **Hackathon**
Das Ziel dieser Software- und Hardwareveranstaltungen ist es, dass Mitarbeiter gemeinsam neue Produkte zu bestimmten Themen entwickeln. Am Ende werden die Ergebnisse vorgestellt und die besten prämiert.

> **Innovation Jam**
Unternehmen wie IBM führen schon seit vielen Jahren regelmäßig Jams, also Online-Brainstormings zu bestimmten Themen, durch. 2003 wurden etwa die Unternehmenswerte in einem globalen Jam gemeinsam mit den Mitarbeitern definiert. Mehr als 300.000 IBMler haben bisher daran teilgenommen, zehn neue Businesses wurden mithilfe dieser Methode entwickelt.

> **Makers Lab**
Hier geht es darum, dass Mitarbeiter möglichst schnell und zu geringen Kosten einen ersten Prototyp aus ihren Ideen entwickeln, der dann den Kunden für ein erstes Feedback präsentiert werden kann. Auf diese Weise soll vermieden werden, dass Produkte entstehen, die nicht den Kundenbedürfnissen entsprechen. Bei Siemens heißt dieser Ort „Maker Space" und ist mit 3D-Druckern und Lasercuttern sowie Arbeitsmaterial ausgestattet.

> **Plaza**
Dieser zentrale Ort in einem Unternehmen dient dazu, dass sich die Mitarbeiter in zwangloser Atmosphäre austauschen können. Dabei kann es sich um Coworking-Spaces handeln oder um eine neu gestaltete Kantine, [illegible] hat und nicht nur der Essensausgabe zur

Trend (2016)

Löten, Kleben, Feilen: Firmen wie Bosch oder Siemens wollen kreative Ideen. Darum schicken sie ihre Ingenieure wieder in die Werkstatt – zum Basteln

www.zeit.de (2016)

- *„ ... the **next great hardware products won't be born within the walls of large, traditional corporations, but in garages, makerspaces, and hardware incubators.**" [1]*
- *"Makerspaces werden in Zukunft **signifikanten Einfluss auf das Innovationsverhalten** von Unternehmen haben – Stichwort Open Innovation" [2]*
- *"This is **where innovation is occurring** and Intel has a great interest in helping spur innovation." [3]*

1 Geyer (2015), 2 Interview Infineon (2015), 3 Intel's CEO Brain Krzanich (2014)

Emergence of many maker spaces worldwide

Hackerspace - 1996

- **c-base space station** (Germany)
- Community-operated workspace, where people with **focus on computers**, technology and science work together on projects

FabLab - 2002

- Founder: **Neil Gershenfeld** (MIT, Boston)
- A FabLab is a technical prototyping platform with **digital fabrication tools** for innovation and invention, for learning and local entrepreneurship, **open access**

www.fabfoundation.org/about-us

TechShop - 2006

- Founders: **Mark Hatch, Jim Newton**
- America's first nationwide open-access public workshop; **for-profit organization**

„Maker space" is used as a sort of **generic term** for Hackerspaces, FabLabs or TechShops for the sake of clarity.[1]

1 Smith et. al (2013)

To bolster their ability to innovate fast and try out new ideas, large organizations are increasingly using maker spaces

Renault (2011) - Creative People Lab

- Changes the **company culture**
- Different way of working: **more agility, more fun, more try & learn attitude!**
- **Innovative dynamics** between people
- Way to be a **learning company**

Airbus (2013) - Protospace

- Employees can **build prototypes** and **develop new product ideas**
- **4 locations** (Hamburg, Toulouse, Filton und Madrid)
- **Reduction of development times**
- **Higher quality of solutions**

BMW (2015) – MakerSpace

- UnternehmerTUM: Center for **Innovation and Business Creation**
- High-tech workshop **open to the public to strengthening Munich's position** as a high-tech center
- BMW employees use the Maker Space for **prototyping**

Press release by Ford Motor Company

Jun 1, 2013 | Dearborn, Mich.

TechShop and Ford Celebrate One Year of Innovation in Metro Detroit; Benefits Emerge from Entrepreneurial Spirit

- TechShop Detroit – a do-it-yourself workshop and fabrication studiowhere prospective inventors, makers and hackers can rent space to have access to high-tech equipment – celebrates its first anniversary with an event June 1
- In the past year, Ford's Employee Patent Incentive Program, in conjunction with TechShop, has in part led to 50 percent more patentable ideas by Ford employees
- TechShop offers members a chance to tinker and test out new, innovative ideas with equipment on site to better enable invention

" 50% more patentable ideas "

media.ford.com

FORD: Employee Patent Incentive Program could increase the patent applications by 50 percent of their employees within one year

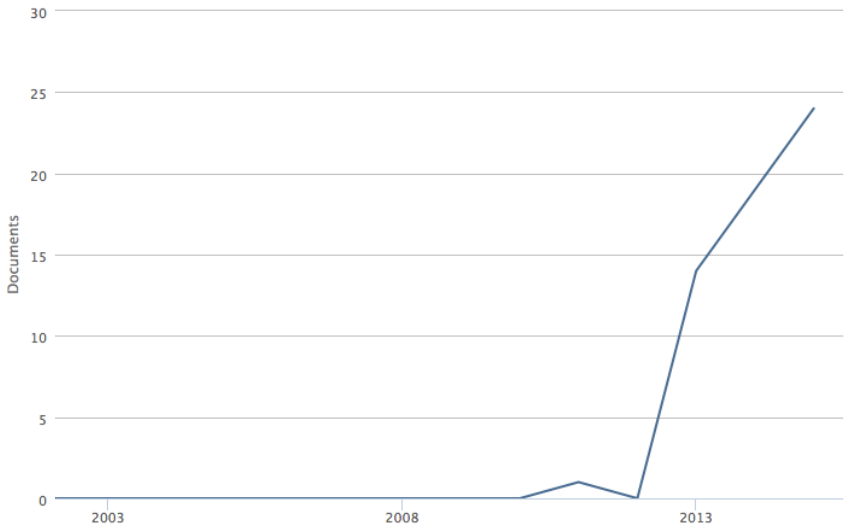
- Ford employees who invent something receive a **free three-month membership** to TechShop.
- Ford employees are free to use the space day or night, for **projects related to their work or personal projects**.
- Employees who create patentable projects related to the auto industry **receive a portion of revenues** generated from the patent.

*"An **idea on paper is easy to kill**, but when you create a prototype of it and a supervisor can see it and experience it, it's harder to say no. Once someone starts **thinking creatively it's hard to turn** that **off**. **People** stop seeing problems and start **seeing opportunities**."*

Bill Coughin, President & CEO at Ford Global Technologies

The scientific world focuses on education and learning sciences, so there is still a lot to research on the maker movement trend

Search result for “maker movement” [1]



- The same trend applies to “maker space” and “fab lab”
- Scientific interest in the field is on the rise

- O’Connell, Brian (in progress): ***Makerspaces as interactive learning environments***, Dissertation, Tufts University
- Litts, Breanne K. (2015): ***Making Learning – Makerspaces as learning environment***, Dissertation, University of Wisconsin
- Wilczynski, Vincent (2015): ***Academic maker spaces and engineering design***, Paper, Yale University
- Forest et. al (2014): ***The Invention Studio: A University Maker Space and Culture***, Journal Article
- Schön, Sandra; Ebner, Martin; Kumar, Swapna (2014): ***The Maker Movement. Implications of new digital gadgets, fabrication tools and spaces for creative learning and teaching***, in: In-Depth, Journal Article
- Rosenfeld, Erica; Sheridan, Kimberly M. (2014): ***The Maker Movement in Education***, in: Harvard Educational Review, Journal Article

*“In effect, the maker movement has **only just begun**.”* [2]

1 from Scopus (22.01.2016), documents per year; 2 Morin (2013)

The implications of maker spaces on the innovative capability of companies has not yet been scientifically investigated

Hypothesis

The implementation of a **maker space** within an established industrial company **leads to increased innovative capabilities** of the company

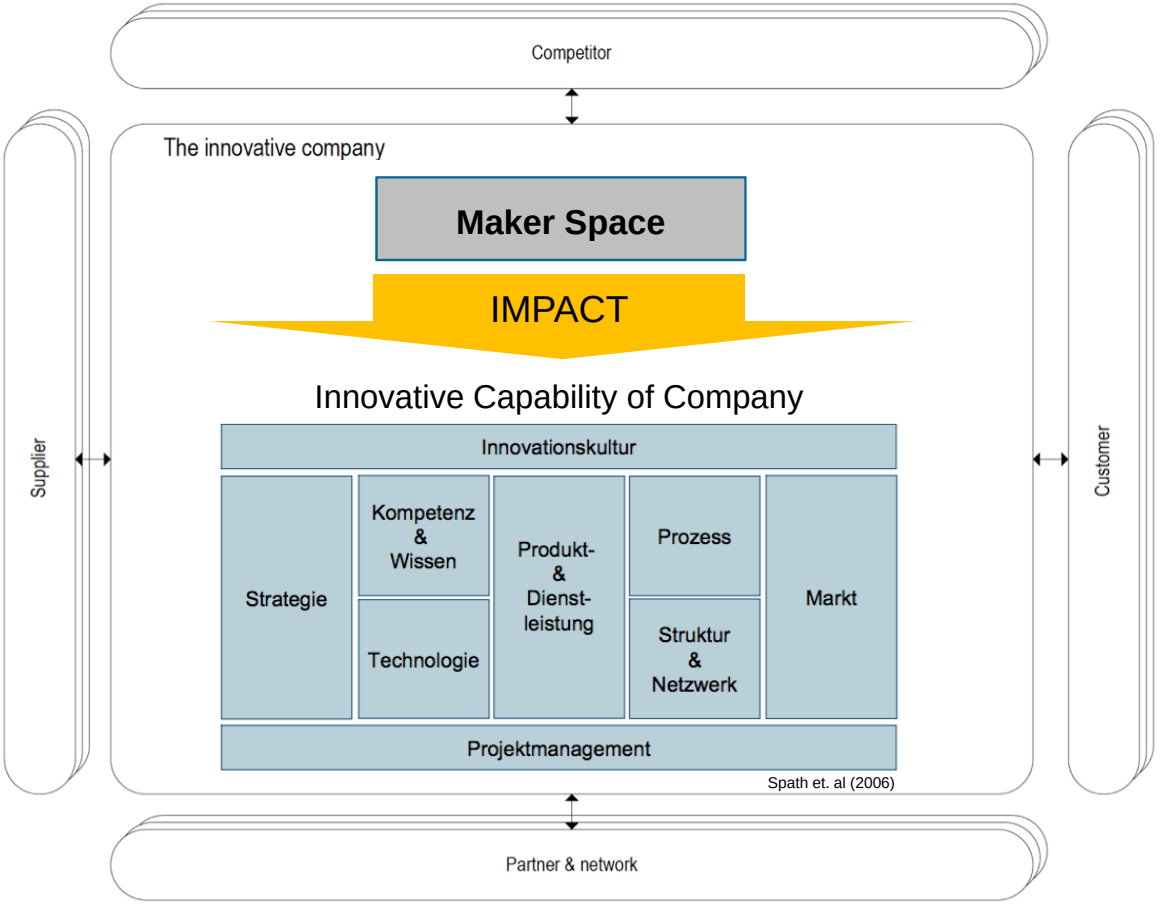
Research Questions

Implications and procedure model

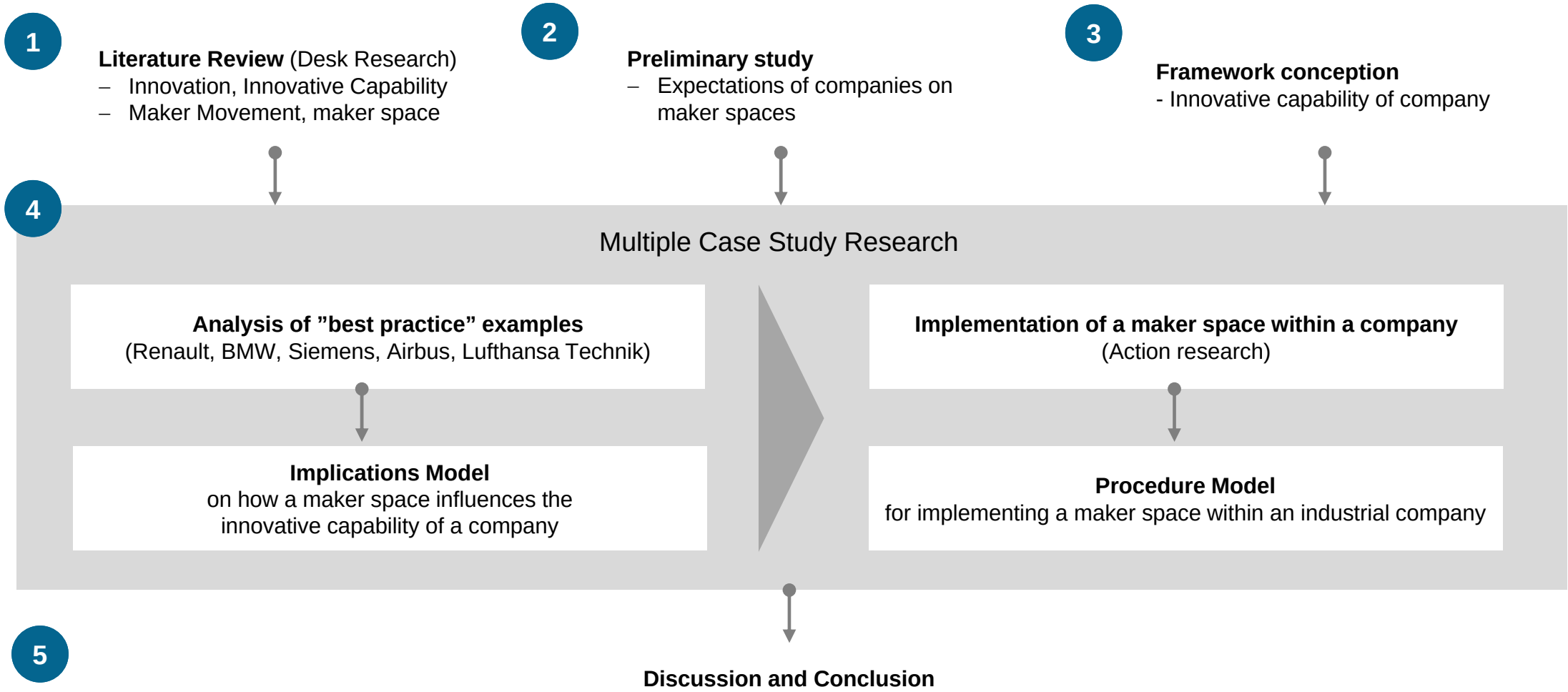
① How does a maker space impact the innovative capability of companies?

② How can a procedure model look like to implement a maker space within a company?

③ How can successful implementation and sustainability be ensured?



Research design is based on case study research methodology



Summary and outlook

- ✓ Investigation on **innovative capability, maker movement** and **maker spaces**
- ✓ **Relevance** of the research field
- ✓ Formulation of **research questions** and selection and adaption of **scientific methodology**
- ✓ **Pilot study** on expectations of companies towards maker spaces
- ✓ First steps towards a **procedure model** for implementing a maker space within a corporate innovation system

Next steps

- **Preparation** for case studies (data collection procedures, screening available documents, interview guidelines etc.)
- **Implementation** of a maker space within a company
- **Data analysis** (steps of analyses, techniques of analysis etc.)