IMKM Group 30

COMBINATIVE CAPABILITIES

CASE STUDY ON BMW'S PLATFORM FOR AUTOMOTIVE ONBOARD APPS

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Knowlify Consult is a leading consulting firm in the automotive and digital platform industry.

Founded in 2021 as part of the Initiative for Mondane Knowledge Management (IMKM), Knowlify acquired excessive expertise in the identification, definition, analysis, evaluation and resolution of challenges pertaining the automotive industry. The team provides inter-industry experience resulting from projects with large companies from the IT and Automotive sectors and is eager to lead your company in the bright future of platform enabled digital processes and trades.

01

Case Study Introduction

Overview of most important aspects of the case study on BMW's Automotive Onboard Platform for this Presentation

02

Extension of Kogut & Zander's classification

Extension + BMW case study

03

Combinative Capabilites

Assess how BMW's platform team enhances its "combinative capabilities

The Paradox of Replication

04

Discuss how the paradox applies to BMW

Discussion

05

01

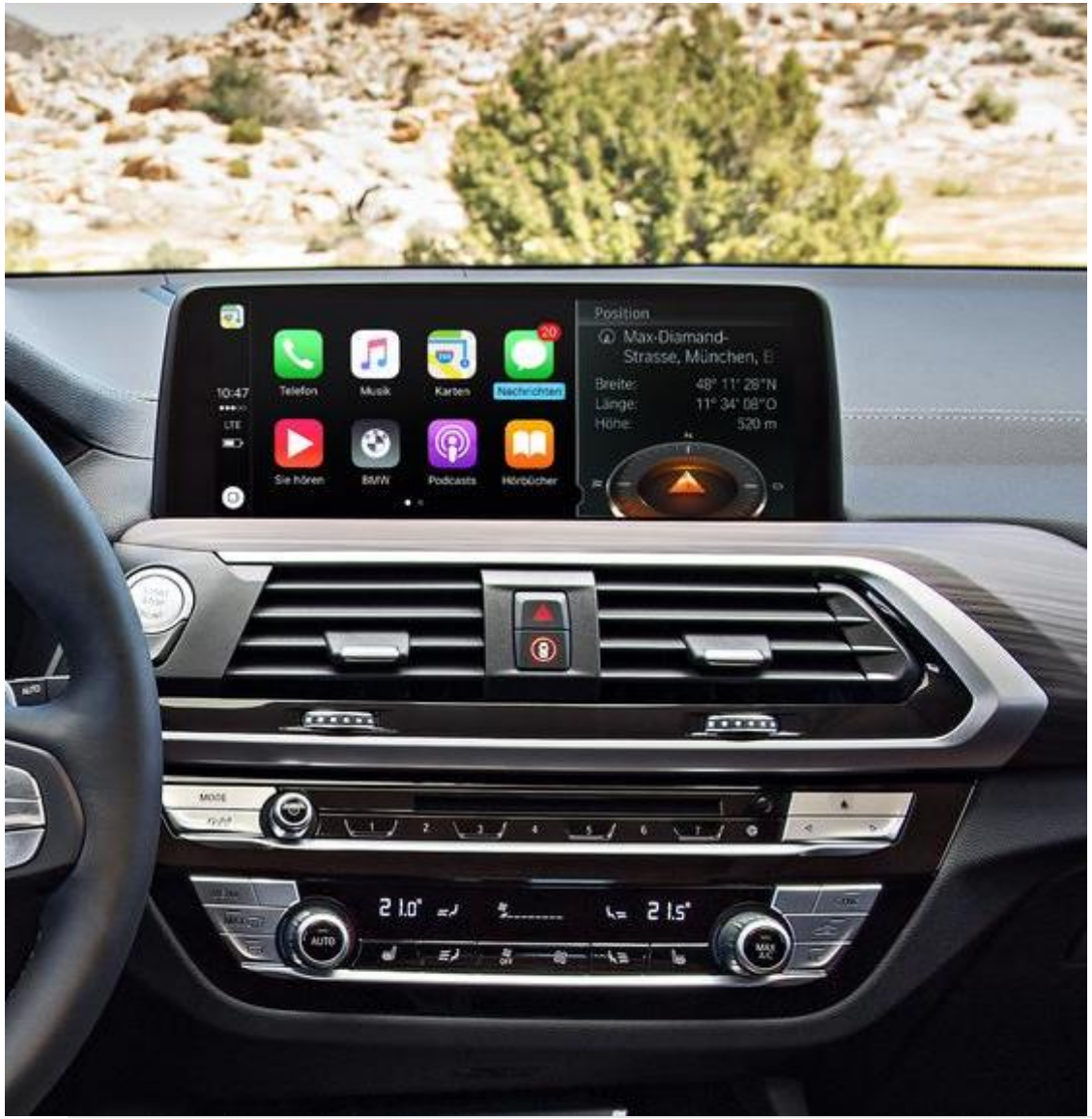
CASE STUDY INTRODUCTION

BMW Group

BMW

Facts and Figures

- Internationally operating manufacturer of cars and bikes
- Founded 1916 in Munich
- Total Number of Employees in 2019: 133.778
- Revenue in 2019: 104.32bn€
- Global Manufacturing Locations: 13
- Global Product Brands: BMW, Rolls-Royce, Mini
- Global Service Brands Share-, Reach-, Park-, Charge-, FreeNow



CASE STUDY OVERVIEW

AUTOMOTIVE ONBOARD PLATFORM

Pre-Conditions

- Car considered as digital device
- Options for extensions and customization via Apps required

Automative Onboard Platform - Overview

- Enables modular SW deployments as part of BMWOS 7.0
- Release in Summer 2018 with more than 20 Apps

Development - Overview

- Development Start in May 2016
- Learning Events Clustered in 4 major episodes

02

BMW platform extension

SUMMARY OF THE RELEVANT KEY ASPECTS

- A central competitive dimension of firms is the **capability to create and transfer knowledge** within an organization.
- Codification and simplification of knowledge increases the **likelihood of imitation**.
- Company's growth is depending on transfer of knowledge **to least capable user**, threat of imitation by **most capable competitor**.
- In terms of make-or-buy decision, they „propose that firms maintain capabilites in house that expect to lead to **recombination of economic value.**"

DEFINITION INFORMATION:

Knowledge which can be transmitted without loss of integrity once the syntactical rules required for deciphering it are known. (Kogut & Zander 1992)

DEFINITION KNOW-HOW:

Accumulated practical skills or expertise that allows us to do something smoothly and efficiently. (Hippel 1988)

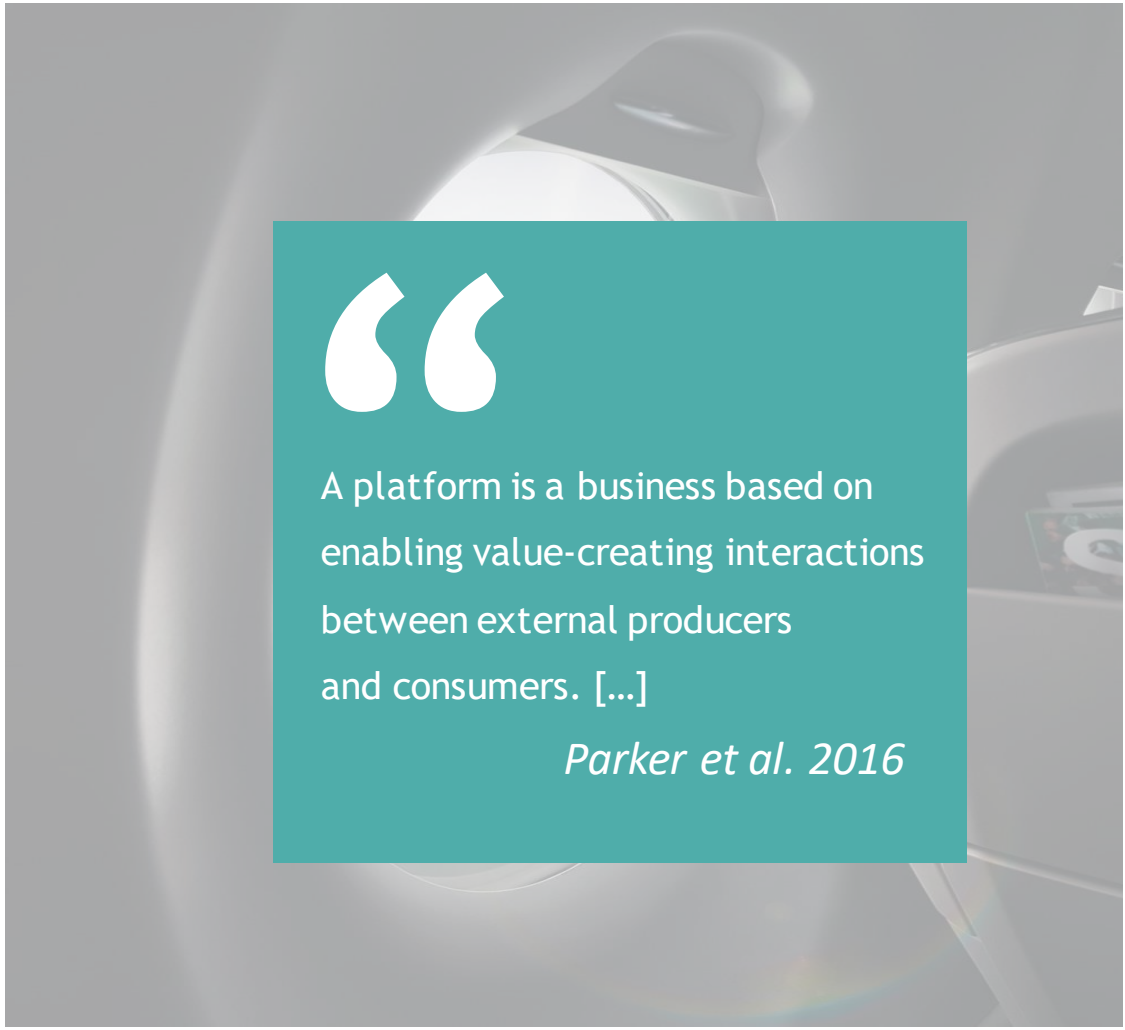
APPLICATION TO PLATFORMS

Efficient and convenient facilitation of transactions (Tiwana 2014)

- Requires information about customers and suppliers
- Required in-depth knowledge and understanding of transactions

Provision of affordances making the digital platform a breeding ground for innovation (Yoo et al. 2012)

- Requires understanding and influencing of market and surrounding factors



> A platform is a business based on enabling value-creating interactions between external producers and consumers. […]
>
> *Parker et al. 2016*

KOGUT & ZANDER'S (1992) CLASSIFICATION OF INFORMATION AND KNOW-HOW

THE EXTENDED MODEL

	Individual	Group	Organization	Network	Platform
Information	- Facts	- Who knows what	- Profits - Accounting data - Formal & informal structure	- Prices - Whom to contact - Who has what	- Customers and suppliers - Transactional data - Market surrounding (innovations, laws, …)
Know-How	- Skills of how to communicate - Problem solving	- Recipes of organizing such as Taylorist methods or craft prouction	- Higher-order organizing principles of how to coordinate groups and transfer knowledge	- How to cooperate - How to sell and buy	- How to analyse transaction data to provide value added - How to influence surrounding factors

THE EXTENDED PLATFORM AT BMW

FOUR MAJOR EPISODES OF LEARNING

DEVELOPER PORTAL

BMW DOCS:

- Contains all information and resources required for app development
- SPOT available to any employee at BMW

BMW Answers:

- Open support infrastructure with searchable content

1

STARTER APP

Surround system to reduce efforts of onboarding new developers:

- Basic implementation mechanisms
- Support scripts and tools
- Basic UI examples

Later basis for every new App

2

APP REVIEW

Mandatory review process including three basic gates

- Rough App description
- Concrete technical concept
- Final App Review

Later platform to automate large part of App review process

3

EXTERNAL CONTRIBUTION

Code ownership at platform team created bottleneck for new platform extensions

External contributions paved way for a designated external contribution process:

- Contribution guidelines for platform SDK
- Reviews of actual code and concepts

4

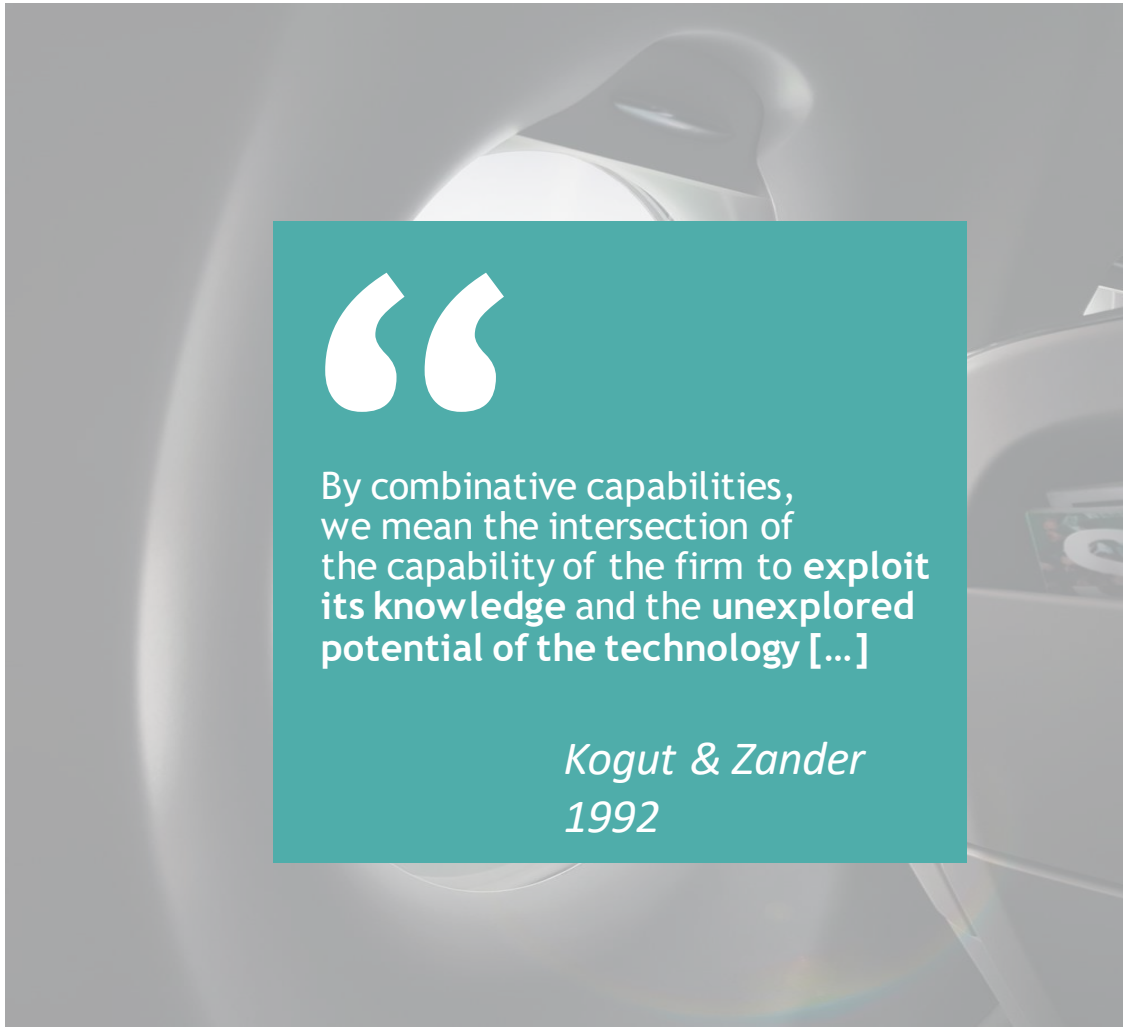
03

Combinative Capabilites

KOGUT & ZANDER (1992)

COMBINATIVE CAPABILITIES

- In learning theory being taught the functional skills of how to do something is very different than being taught how to create it. This knowledge can't be transferred easily.
- New learning, such as innovations, are products of a firm's combinative capabilities to generate new applications from existing knowledge.
- If current knowledge is not suffcient, most certainly a firm does not know what changes would be required in the existing structure of the organization to acquire it.
  → Knowledge advances by recombinations because a firm's capabilities cannot be separated from how it is currently organized.



ENHANCEMENT OF COMBINATIVE CAPABILITES

Transfer of Perspective

Platform owner takes perspective of an developer and collects experience through own app development activites.

- Extends the knowledge and causes changes in his cognition
- Enables to detect insufficiencies of platform and improve them

Example: Discovered API design flaw through implementation of SDK feature for Starter App

1

Transfer of Knowledge

Interactions of app developers and platform owner enables a transfer of gathered knowledge.

- Transfer via boundary resources such as BMW Answers
- Exchange and interaction between teams through emergence of community

Example: Voluntary feedback on SDK release on knowledge sharing platform

2

Transfer of Artifacts

Platform owner is able to learn from externally created solutions of app developers.

- Platform team learns about potentials for improvement and artifact can be integrated in the core platform
- Accessibility extremely relevant for external contributions to the platform

Example: Starter App initiated as project within one dev team for their new team members

3

04

The Paradox of Replication

Application to BMW's onboard app platform

Reduce cost and preserve quality through codification of knowledge

- Codification of knowledge through starter app and explicit documentation
- Iterative improvement of the blueprint, thus codification of innovation and best practices

Codification of knowledge invites imitation

- Danger of code stealing as starter app and SDK is available for whole organization
- A competitor could reverse engineer the car's exposed APIs and copy the UI

- The possibility of using a technology does not mean one can replicate a technology from ground up
- Without codification of knowledge community building is hardly possible
- A community of app and platform developers is hard to replicate

Application to platforms in general

- Paradox of replication is a balance act of how much of the internal knowledge becomes explicit and therefore potentially copied by the competition
  - A developer API documentation is such an example
  - Even a browser log statement that is visible in a production environment is explicit knowledge that gives a deep insight into the core functionality

Will OEMs develop IT systems in the future or just adapt to Apple Carplay/Android Auto?

Make or Buy: Should car manufacturer continue to extend their platform with in-house voice systems or just use Alexa?

How scalable is BMW's developer community at the initial stage (before BMW Answers & the Starter app) and now?

Q & A

Thanks for your attention.

SOURCES

Bruce Kogut, Udo Zander (1992): Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology – Source: https://doi.org/10.1287/orsc.3.3.383

Weiss, Wiesche, Schreieck & Krcmar (2020), „Learning to be a Platform Owner: How BMW Enhances App Development for Cars", forthcoming In IEEE TRANSACTIONS ON ENGINEERING MANAGEMENT