

Research Report

Artificial Intelligence: How to Develop Organizations to Succeed

DIGITAL TRANSFORMATION COUPLED WITH THE SIMPLIFIED AVAILABILITY OF DATA BRINGS ARTIFICIAL INTELLIGENCE (AI) CLOSER TO COMMERCIAL USE. FOR THE DATA-DRIVEN FINANCIAL INDUSTRY, AI IS OF INTENSIVE INTEREST WITHIN PILOT PROJECTS. STILL, FEW AI APPLICATIONS HAVE BEEN IMPLEMENTED SO FAR. THIS STUDY ANALYZES DRIVERS AND INHIBITORS OF A SUCCESSFUL AI ADOPTION IN THE FINANCIAL INDUSTRY BASED ON PANEL DATA COMPRISING 22 SEMI-STRUCTURED INTERVIEWS WITH EXPERTS OF AI IN FINANCE, INCLUDING INTERVIEWEES FROM LEADING SOFTWARE PROVIDERS SUCH AS SAP, IBM, SALESFORCE, AND MICROSOFT. FOR APPLYING AI SUCCESSFULLY, THE GUIDELINES REVEAL SEVERAL DATA CONDITIONS, AI-SPECIFIC ROLE MODELS, AND OVERCOMING MORAL CONCERNS AS CRUCIAL BEFORE TRAINED ALGORITHMS WILL HAVE REACHED A QUALITY LEVEL TO OPERATE WITHOUT HUMAN INTERVENTION.

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Introduction

Recent technological developments and the emergence of big data have led to an increasing interest in AI worldwide. Some even propagate "AI first" as a mantra and symbol for a massive disruption of business models: Internet giants, such as Google, Amazon, Apple, or Facebook, invest millions in AI to provide AI-based applications and services. Google, Amazon, Tesla, and Facebook are regularly publishing their AI libraries, forcing their accessibility to a broad mass of developers.

The popularity of AI is a direct response to the ever increasing amount of "big data", that asks for expanded ways of data analytics to capture value for businesses. Huge amounts of structured and unstructured data are a significant leap forward to harvest the potential of AI for business applications. AI allows for pattern recognition and smarter ways of data utilization in an automated way, leading to an improved intelligence about, e.g., customer needs and markets. In addition, tools for integrating AI

are now offered by many major software vendors, e.g., Salesforce Einstein, IBM Watson, or Microsoft LUIS, which allow first steps to take AI out of the labs and into production.

In finance, Deutsche Bank, for instance, operates a digital asset manager called "Robin" (abbreviation of robo-invest). The financial industry shows great potential for AI since data – more specifically customer and transaction data – is the main resource which banks and insurance companies collect, sort, process, and link every day. In principle, the business models of financial institutions are completely digitizable; the emergence of 21st-century digital-born financial technology companies (FinTechs) as well as increases in customer demands pressure the incumbent

finance sector. Thus, in this study, we are interested in how financial institutions deal with the need for adapting and adopting AI and how they are coping with related challenges.

Sample and Methodology

To analyze drivers and inhibitors for AI adoption, we interviewed a panel of AI experts from the German financial industry and supporting sectors. The qualitative empirical data was collected through 22 semi-structured expert interviews. The interviews covered experts from leading software providers in the finance industry, such as SAP, IBM, Salesforce, and Microsoft, supplemented by interviews with experts at CxO level, e.g., the CEO or CIO level. Three different target groups were taken into account (Figure 1). (1) The first group consists

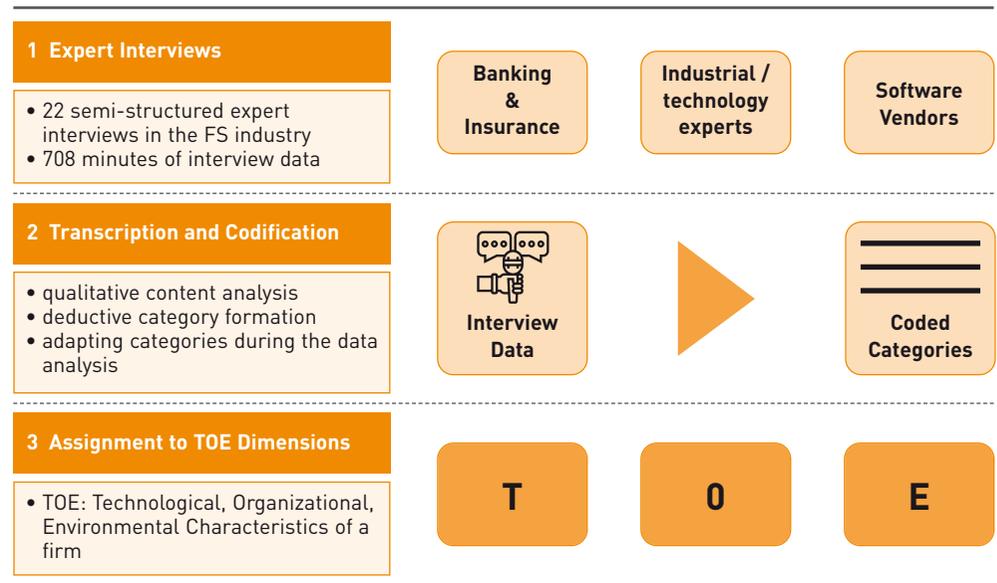


Figure 1: Three-Step Exploratory Procedure

of leading banks and insurance companies, representing important players in the German financial industry. The interviewed experts were predominantly project leaders with specific working experience in the field of AI or with an IT background. (2) SAP, Microsoft, IBM, and Salesforce, four of the world's largest software manufacturers represent the second group. Specialized in offering AI products or platforms, participants of these companies were predominantly digital advisors and specialists familiar with the company's own AI product offerings. (3) The third group consists of industrial and technology experts in the field of AI derived from the consulting service provider PwC.

A semi-structured interview is a useful instrument in explanatory research since it offers the opportunity for an open exchange with the participants. In total, about 708 minutes of interview were transcribed and further analyzed by procedures of a qualitative content analysis. As theoretical lens, we structured our results using the technology-organization-environment (TOE) framework. This organization-level theory presents the three elements technology, organization, and environment, influencing the process to adopt and implement innovations within a firm (Tornatzky and Fleischer, 1990).

Empirically Derived Challenges and Guidelines for AI Adoption

In the following, main challenges and respective guidelines associated with the adoption of AI within the German financial industry are extracted from the executed data collection. Based on the TOE framework, the results are

structured into the three dimensions technology, organization, and environment. To follow the entire procedure, please consider the complete study of this article (Kruse et al., 2019).

Technological Dimension

Two-thirds of the interviewees state a lack in the *availability and quality of training data* as prohibiting further AI adoption. This phenomenon derives from an imminent AI characteristic: the way an AI system fulfills its purpose is trained, which means that the algorithm learns from exposure to known examples of input and output data. The immense benefit from an AI system is highly depending on its prior training. Therefore, AI requires a sufficient amount of available data for training the system. To correspond to this challenge, companies need to make sure the data needed is digitally available and provides a level of quality and complexity where it can be used to draw value-adding conclusions.

Some of the experts claim a *lacking market overview* as prohibitor in enhancing data quality. This is more surprising since today AI engines are offered by large software providers, such as Microsoft LUIS, IBM Watson, Amazon Lex, SAP Leonardo, or Salesforce Einstein. Our guidelines recommend to achieve an extended market overview on AI providers to gain the ability to evaluate solutions.

The interviews reveal that the *existing IT architectures* often form a legacy ballast which is difficult to reform and which limits digital transformation and, therefore, the use of AI. With regard to a companies' entire IT infra-

structure, these changes imply an IT of two speeds ("2-speed IT"): The traditional IT infrastructure keeps operating, designed for security and stability of the core banking/insurance system – complemented by a second infrastructure supporting fast and flexible application development and deployment, e.g., for AI.

Referring to the factor of technological characteristics, the study finds that the *lack of transparency* into the AI "black box" is often met with reserve and leads to a slow AI transition. Since one core element of AI is training, products and processes with AI components will act differently over time. This also implies specific risks for businesses since the generated output may not be aligned with ethical standards. Still, it is desirable that AI results are transparent and comprehensible. Banks and insurance companies need to ensure a system that is trustable and explainable. The analyzed risk complex demands for AI-adapted risk management, possibly embedded in specific mechanisms of AI governance and control. Furthermore, the compliance requirements need to be fulfilled especially for systems operating "live" and direct in customer interaction.

Organizational Dimension

Most importantly, the experts state that organizations are facing a severe knowledge gap regarding *digital skills* of their workforce. Job profiles such as data scientists or so-called requirement engineers are desperately needed. Thus, internal skill development as well as technology enablement among existing employees plays a major role with regard

to successful AI adoption. Hiring additional employees with professional expertise in AI or bordering fields appears appropriate. In order to make the interaction between humans and machines a success, firms and society need to massively invest in digital education and information literacy to fulfill the demand of changing process competencies.

Many of the surveyed experts outline that, in the future, it will be less a question of hard skills but, instead, of the mindset and the employees' *willingness to change*. Within the existing traditional top-down hierarchy, there is small room for employees to change: Considering constellations such as in the incubator model will provide a protected space to develop AI skills and roles, resulting in digital labs or AI units ideally. Especially reflecting the AI-specific data quality of training algorithms, many interviewees, for instance, consider the position of an "AI trainer", who would be involved in the development and improvement of an AI system during ongoing operations.

Some participants state that as long as digital natives have not yet reached top management positions, upcoming technologies will continue to collide with old ways of thinking and existing structures. *Top management support* is, therefore, identified as an important factor for successful AI adoption. The role of the Chief Digital Officer (CDO) is of particular importance; and, as a "next step", expanding the role of the AI trainer towards a chief artificial intelligence officer (C"AI"O) is increasingly being discussed amongst large enterprises.

Environmental Dimension

The surveyed experts underlined that the finance industry is still concerned about losing control on their own data, even more since this data is the core value of their business. While AI requires massive data analysis, this can only be realized by managing large data volumes flexibly, for instance, using decentralized data centers, namely “the cloud”. Overcoming *traditional data protection* may serve as key to open the “gold treasure” of proprietary data for further analysis that have been collected over the years (Figure 2). Expectation management is essential to understand that AI is neither a miracle cure nor a killer robot. While companies should focus on making AI trustable, explainable, and valuable, politicians should focus on defining ethical standards, such as an “AI code of conduct” to answer *moral concerns*.

On the other hand, the *market pressure by FinTechs* functions as accelerating AI adoption within the financial industry. The emergence of FinTechs and their products force established players to change since these digital-born companies especially benefit from their leanness, agility, and innovation strengths. FinTechs pressure the established firms to optimize their processes, systems, and products. In this field of high competition, desensationalized discourses around the topic of AI may be one more argument to overcome traditional data protection since the focused utilization of the large amounts of proprietary data may forearm traditional banks and insurance companies against FinTechs.

In addition to the previous findings, the surveyed experts further outline that especially traditional financial providers are confronted with a huge number of regulatory requirements. *Regulatory requirements* shall leave companies enough space for creating innovation with AI. Over-regulation binds financial resources and leads to organizational inertia instead of stimulating for innovation.

Discussion of the Results

Modern technologies like AI do not provoke change on their own – this study demonstrates

that AI adoption still faces great demands in the financial industry. Applying the TOE framework to structure the results, the analysis of the conducted expert interviews shows that AI adoption is subject to critical success factors. The derived guidelines demonstrate how employees and organizations as a whole must be prepared to integrate AI technologies in the financial sector in order to draw value-adding conclusions from AI in daily operations.

Numerous derived challenges and guidelines are related to data issues, since – more specifi-

cally – customer and transaction data are the main resource gained, processed, and maintained in the financial industry. The study reveals that (mainly traditional) financial institutes still find it difficult to take advantage of this “gold treasure”: In contrast to FinTechs, the study finds a majority of companies as still trapped in analogical mindsets. Role definitions supporting AI (“AI trainer”) or even a C“AI”O have to be introduced to extant IT job descriptions in order to take advantage of AI applications. Moral concerns prohibit the use of flexible cloud solutions instead of analyzing a huge amount of proprietary data. Specified AI governance, e.g., AI risk and compliance management, helps to contain the feared damage of degenerated “black box” computed AI results. As some interviewees imply, the flood of financial regulations serves as welcome excuse to stay in traditional structures rather than facing the opportunities and necessities serving from the all-encompassing digital transformation.

References

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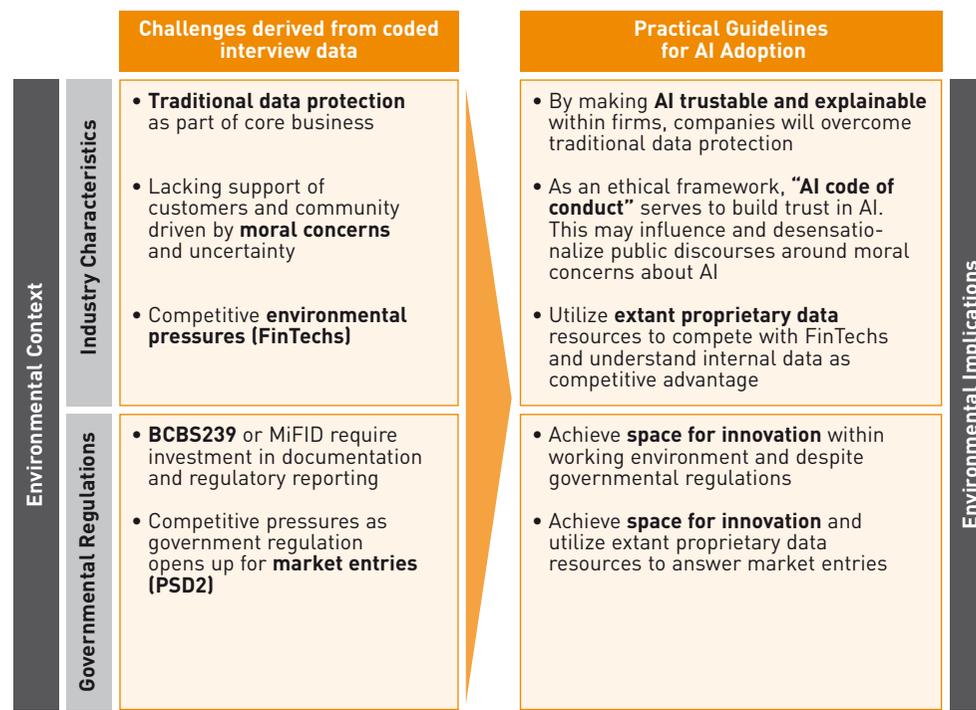


Figure 2: Study Results, Environmental Dimension