THE DIGITAL JOURNEY OF BANKING AND INSURANCE

VOLUME I

DISRUPTION AND DNA

EDITED BY
Volker Liermann & Claus Stegmann

The Digital Journey of Banking and Insurance, Volume I

"Not everything is changing, but most of the things changing can be of a disruptive character—so I'm happy that *Disruption and DNA* is picking up exactly this intention."

—Gerhard Lahner, *COO of Vienna Insurance Group*

"In *Disruption and DNA*, finally someone is saying out loud that not everything is changing, but most of the things changing can be of a disruptive character."

—Dr. Carsten Stolz, *CFO Baloise Group*

"This first volume *Disruption and DNA* of the book series *The Digital Journey of Banking and Insurance* offers an extensive market view of digital transformation, including special insights into accounting and risk management. The book explores the often underestimated topics culture and project management."

—Bernhard Hodler, *Former CEO Julius Baer Group*

"Virtually all financial institutions have embarked on ambitious digital journeys, both to provide better products and customer experience more efficiently and in response to the threat of industry disruption by FinTech competitors. There is no doubt that there will be winners, and there will be losers. I am convinced that *The Digital Journey of Banking and Insurance* series is indispensable reading for the future winners."

—Thomas C. Wilson, *CEO, President and Country Manager at Allianz Ayudhya*

"This first volume of the incredible book series sets the stage just right for digital transformation with the interplay between change (disruption) and stable objectives (DNA)."

—Erik Podzuweit, *Founder, Co-CEO Scalable Capital*

"We do remember when we started our digital journey, but we do not know when it will be over. Therefore, we are definitely in the middle. The book series *The Digital Journey of Banking and Insurance* is a must-read for of all of us."

—Christian Peter Kromann, *CEO, SimCorp*

Volker Liermann · Claus Stegmann
Editors

The Digital Journey of Banking and Insurance, Volume I

Disruption and DNA

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ISBN 978-3-030-78813-1 ISBN 978-3-030-78814-8 (eBook)
https://doi.org/10.1007/978-3-030-78814-8

Cover credit: Stutterstock/Yevhenii Chulovskyi

This Palgrave Macmillan imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Introduction to the Book Series

Disruption is a word often used when the groundbreaking changes in the financial industry are summarized and to a broad extent it is true. While singing the song "everything is changing" to the financial industry, the prophets forget that not everything is changing in a world driven by digital transformation.

The first differentiation to be made is what we do and how we do it. This is when we look at the internal departments, such as settlement, accounting and risk management. The tasks (settle transaction, make a balance sheet or predict the repayment ability) are still the same, but the way we perform these tasks changes to more automation, more analyzing of data and using the discovered patterns to optimize (make better decisions) and accelerate the tasks (make quicker decisions or provide information for decision-making quicker). In this area of inside digitalization, institutes still do—to a broad extent—the same things (DNA), but they change the way of doing them. The picture looks different in the context of external digitalization, especially the customer-oriented part. Fintech,[1] Big Tech[2] or more generally the platform operating companies have moved closer to the customer and therefore have

[1] Fintech is an abbreviation for financial technology and summarizes technology and the innovative delivery of financial services in competition with traditional players in the financial services market.

[2] The Big Tech, sometimes also referred to as Tech Giants or the Big Five, are the largest companies in the information technology sector. Another abbreviation is GAFA(M) for Google, Amazon, Facebook, Apple and Microsoft or BATX in China for the largest internet companies there (Baidu, Alibaba, Tencent and Xiaomi).

the opportunity to cut out the traditional providers of financial services from direct customer contact. This intermediary pattern was more established in the insurance industry than in the banking industry. The game-changer is not the existence of an intermediary, but the strength of the intermediary and the willingness to better understand the customer needs. While some institutes still try to sell products, fintech companies aim to discover and solve problems for customers.

In the past, an insurance broker connected the customer to the insurance company and to the products of the insurance company. If the broker was smart, they had a good understanding of the customer's needs, but were restricted to the product spectrum of the insurance companies they worked with. There was a possibility to trigger product innovation, but it was far from a lean, agile process.

A successful fintech or insurtech company is excellent at understanding the customer and their needs. Additionally—and this is the major point—it is able to adjust the tools provided to the customer to solve the customer's problem. It is even more successful if it has the ability to juggle and to compose existing products (maybe through a third party or a platform). [3] This intelligent composition of on-time and user-/problem-specific own products and cheap and available existing product components from third parties gives the challenger in the financial service sector the decisive competitive edge.

After this general analysis, we now look a bit closer into the two main sectors of the financial industry: banks and insurance companies.

Banking-Specific Digitalization Challenges and Structures

The banks face challenges on the revenue side, such as low interest rates (and in some countries even negative interest rates) and flat interest rate curves, making it difficult to generate additional profit from interest rate arbitrage. Regulatory requirements have risen since the financial crisis one decade ago in terms of the amount (more capital and more liquidity) and complexity of the requirements (especially in the Pillar II of Basel III (Basel Committee on Banking Supervision 2021)). In addition, new competitors (fintech companies, but also tech companies) are about to or have already entered the market, bringing additional pressure to the already historically low margins. The COVID-19 induced economic downturn will put further

[3] This product outsourcing is one of the important components of Open Banking.

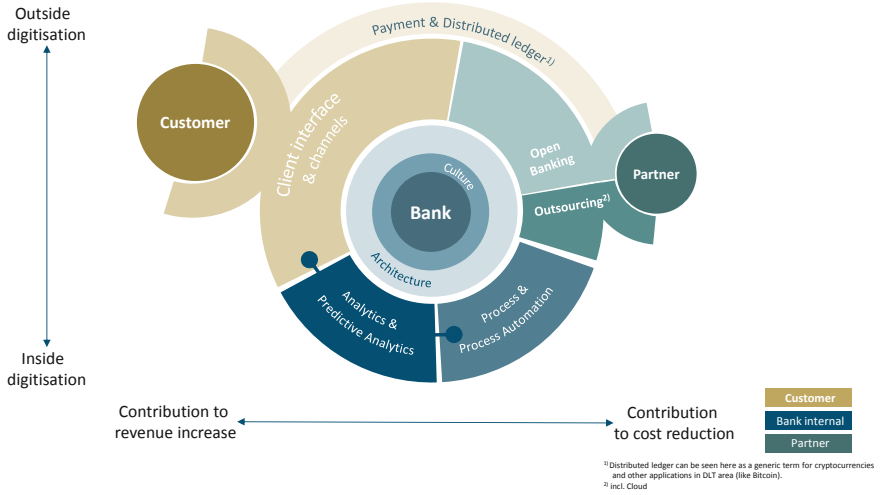

Fig. 1 Overview digitalization areas—banking © ifb SE

pressure on the P&L and balance sheet, narrowing the room to move towards a significant change in digital transformation.

Another field of disruptive change is payments: (A) Bitcoin and other distributed-ledger-based payment frameworks can carve out the banks as intermediaries, (B) competitors (PayPal, Klarna, …) offer a more convenient way to pay and again the Big Tech (here Apple and Google) bring their own offers into direct customer contact (Apple Pay and Google Pay). While the latter (PayPal, Klarna, Apple, Google) just improve the customer convenience and experience without changing the infrastructure for settlement outside[4] these companies (which in most cases traditionally involves settlement by credit or debit card), distributed-ledger-based payment has more disruptive potential because it goes beyond the companies' borders.

Figure 1 shows eight popular areas in banks where digital transformation is happening. The three main acting entities are illustrated as circles, from left to right: the customers, the bank and the partners.

The areas are positioned along the dimensions contribution (x-axis) and digitalization focus (y-axis). The contribution spans from revenue increase to cost reduction, and the digitalization focus spans from outside digitalization to inside digitalization. The location of the areas is not an exact quantitative location, instead it is a more approximate position with some blurriness.

[4] PayPal and Klarna offer to transfer money from one account (within PayPal/Klarna) to another (within PayPal/Klarna).

Cross-Cutting Areas (Culture and Architecture)

The corporate culture of a credit institution represents the values, norms and attitudes lived within its own organization and influences the actions and cooperation of employees across hierarchical levels. Digital transformation promises to meet current and future customer expectations more quickly and easily and to reduce costs in order to work more profitably through the use of new technologies.

A company-wide internalization of the vision and meaning of a bank's digital agenda requires consistent communication of goals and collaboration with employees to overcome reservations about the opportunities and challenges of digitalization.

Culture is the most important and most underestimated ingredient for a successful digital transformation. Fintech companies not only have the more cutting-edge infrastructure and tools. They have a culture and a way of doing things that differentiate them (FiCuTech would be a more appropriate abbreviation for the banks' challengers, emphasizing the differentiator culture).

Due to the combination of monolithic applications and individual solutions, the software architecture of credit institutions has a complexity that poses challenges for the implementation of digital transformation or regulatory measures. For the profitable integration of novel technologies, a preparation of the system architecture is necessary to adapt products and services to changing market conditions in the digital transformation ecosystem.

In order to prepare the existing system architecture for digital transformation, it is necessary to restructure the system architecture according to processing system components and presentation-oriented system components. This supplements an orchestration layer and enables participation in the service economy of digitalization and a quick reaction to changing market conditions and customer expectations by combining different system components or by adding service offerings from partners.

The cultural aspects are addressed in Part V of this first volume (especially in Chapter 12, (Merkt, Lang and Schmidt, Digi-Cultural Mindset 2021)). The project culture and framework alternatives are a major component of this part. Other cultural aspects are additionally touched on in Chapter 2 (Merkt, Thiele and Dinges, Digitalization Landscape Banking 2021), Chapter 3 (Stegmann and Ludwig 2021) and Chapter 4 (Negenman 2021).

Architecture is a more technological subject, so most of the parts in volume III address this component in one way of digital transformation or the other.

Chapter 6 (Krätz and Morawski 2021) in particular opens up new data architecture patterns incorporating streaming and its opportunities. Nonetheless, some articles in this first volume touch on the architecture subject (Chapter 2 (Merkt, Thiele and Dinges, Digitalization Landscape Banking 2021)).

Client- and Payment-Related Aspects

Banks have multiple ways to interact with their clients. The different channels (branch with human contact, phone via a call center, websites on the internet and smartphone-based apps) have improved, driven by ongoing digitalization.

Banks have continuously improved on combining these channels to contact and serve the customer in a way that is most appropriate and convenient for them. Furthermore, banks have improved on the timing of the solutions and offers presented. Data analysis focusing on the next best offer (NBO) or on the next best action (NBA) guide[5] the banks regarding when and what to offer to the customer.

Distributed ledger technology (DLT) is assigned to the decentralized databases, which do not require a central administration instance to legitimate a transaction between network participants. The data for a transaction is stored on each participating node in the network, so that there is a consensus about the truthfulness. Participants within a DLT network have unlimited read and write rights. A distinction is made between "permissioned" and "unpermissioned" distributed ledgers[6] when participating within a network. Participants in a "permissioned" DLT network are unpermissioned and authorized for the network before participating in an exam to ensure a basis of trust. An "unpermissioned" distributed ledger network is accessible without restriction. The basis of trust in this network is established through proof-of-work mechanisms. An example of an "unpermissioned" network is the blockchain used for transactions of crypto currencies. Storage of transactions in the blockchain is subject to specific rules and, after a transaction has been authorized, forms a block that is added to the historized chain of blocks. DLT opens up a variety of business opportunities for storing internal and external transaction data across company boundaries, e.g. in securities transactions. In order to use the technology to increase turnover and reduce costs in credit institutions, regulatory framework conditions must be defined in cooperation with credit institutions, use cases must be worked out and the system architecture must be adapted for implementation.

[5] For details on NBO and NBA see (May 2019).

[6] In the area of blockchain private and public blockchains are more common expressions.

The client-facing aspects are viewed in Chapter 4 (Negenman 2021) of this volume and in Chapter 10 (Floß and Velauthapillai 2021) of the third volume. Distributed ledger technology is appraised in the context of self-sovereignty in Chapter 12 in volume III.

Aspects of Internal Optimization

Due to the digitalization of business processes and the intensification of information technology, the volume of data within companies is constantly growing. The networked storage of business management and system data enables past-, present- and future-oriented evaluation of data in order to make well-founded business decisions.

For the instrumentalization of data analyses and the implementation of future-oriented data analyses, relevant data sources must be identified and assumptions for the creation of algorithms must be developed in cooperation with companies in order to derive recommendations for action or to uncover customer needs based on behavioral patterns, dependencies and the relationship structure. Through the targeted combination and analysis of business management and system data, optimization potential and trends in the business processes of a credit institution become visible and the persons responsible are enabled to decide on preventive or mitigating measures.

Processes are a totality of successive, influencing procedures within a company, which achieve business objectives by transporting information and materials. The process landscape of a credit institution defines the daily work routine within an organization and is mapped in the system landscape and corporate structure. In order to reduce costs, an automation of process steps that can be standardized by using technology is aimed for. The goal of automation is to handle the elements of a process using technical components with little manual effort. The manual effort results from the initiation of the process and the evaluation of the process results.

The use of novel technologies enables the visualization of the lived process landscape with the help of data analyses beyond system boundaries in order to compare these with the desired process images, to recognize optimization potential and to bring about a holistic reduction of process complexity. By reducing complexity and standardizing process activities, a targeted automation of process activities is achieved with the help of suitable technology.

Many of the use cases presented in the second volume are located in the area of analytics and predictive analytics and process and process automation. Part 2 of volume III collects many aspects of these two areas. In part 4 of volume II, the whole process subject is given some space to explore

and illuminate the aspects of RPA, process mining and processes as part of digitalization in general.

Partner-Related Aspects

Open banking enables credit institutions to realize the principle of platform economy and to open up new sources of income without high implementation costs by cooperating with partners. The exchange between the credit institutions and partners takes place via technical interfaces, e.g. APIs, which are integrated into the banks' system architectures. These interfaces enable the inclusion of additional offers in the portfolio and their provision via the distribution channels of the credit institution.

By integrating APIs into the system architecture of a credit institution, the credit institution is enabled to extend and optimize internal processes through partner offers, e.g. data analysis activities and the formulation of their own function offers for external partners. A central orchestration layer is responsible for the administration and monitoring of interfaces to and from partners.

Business models consist of a variety of cross-departmental or cross-company activities that rely on different infrastructure, hardware, software and human intelligence. In order to reduce time-to-market cycles and costs, standardizable and repeatable activities can be grouped as services to enable the offering or obtaining of services via XaaS[7] and to adapt business models and processes to individual requirements by mixing the use of internal and external services.

Instrumentalizing the advantages of XaaS requires a network of internal and external services as well as an active orchestration of services in order to provide customer-oriented, cost-sensitive and value-added services to the customer in a way that is profitable for the credit institution.

The technically driven volume III partially addresses some of the outsourcing and open banking aspects as architecture is one of the important goals in this area.

[7] Anything-as-a-Service, (e.g. Platform-as-a-Service, Software-as-a-Service, Reporting-as-a-Service).

Other Aspects

Another aspect of distributed ledger is tokenization. In the past, distributed ledger technology was primarily associated with payment (like Bitcoin, Etherium and e-central bank money). The tokenization of real-world assets is gaining momentum. The key defining (value-defining and value-driving) data is mirrored into a distributed ledger where the constant characteristics of the asset are held immutable and only some (like owner) can be changed by a predefined process.

An early example of tokenization of real assets is Everledger, where characteristics and ownership of diamonds[8] were tokenized. Just at the beginning of 2021, the certificates for electronic art (based on DLT or, to be more precise, NFT[9]) were discussed by a wider public.[10]

Another popular example is the tokenization of real estate documenting the construction materials used, construction descriptions and other building-defining characteristics. This kind of tokenization can address some of the issues raised by ESG[11] and the information demand regarding these assets. The demand can arise from direct investments but also from the financing of real estate. The impact of ESG is so far-reaching that anything supporting the delivery of the relevant information in an approved and quality-assured way is in high demand.

The Internet of Things is traditionally rooted in the context of insurers. In recent years, a product whose nature is close to traditional asset leasing has gained relevance. The digitalization of machines produces sensor data to characterize the usage and maturity of the machines. A common approach for insurance companies (usage-based insurance (UBI), pay-as-you-drive (PAYD), pay-how-you-drive (PHYD)) is based on sensor data. This is transferred to the financing context. The idea for the solution originates from the customers' need for the usage of a machine (and not the need for product financing). This machine financing is implemented in a DLT, [12] and sensor data (oracle[13]) is used to illustrate the usage, which is processed to calculate the financing rate. The corporate has an instant usage-dependent financing product (which differs from standard asset leasing).

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[8] Everledger is best known for diamonds and was extended to a wider set of real objects (art, general gemstones, …).

[9] Non-fungible tokens.

[10] For example, the art of Mike Winkelmann (Beeple) or Chris Torres.

[11] Environment, Social, Governance.

[12] Distributed ledger technology.

[13] An oracle (blockchain) is any device or entity that links off-chain data (sensors or price feeds) to a blockchain.

While tokenization (in the distributed ledger context) normally refers to the digitalization of ownership and rights, additional potential arises for storing data regarding the real-world asset, such as size and material,[14] including sensor data (IoT, illustrating the asset's use).

Insurance-Specific Digitalization Challenges and Structures

Insurance companies have similar—but insurance-specific—challenges, such as regulatory requirements (Solvency II) and changes in accounting standards (e.g. IFRS 17), but also different challenges and chances that come with the availability of more and more granular data and the ability to connect all data to a holistic view.

Certain areas in Fig. 2 are to some extent similar to the areas already discussed in the banking context. These areas are client interface & channels, analytics & predictive analytics and process & process automation. Naturally, the aspects are set in the context of an insurance company (analytics & predictive analytics have an impact on the actuarial aspects).

But there are some interesting areas that differ significantly from the banking setting: client interface claims, IoT[15] & tokenization, insurance contacts via partner (broker) and reinsurance.

The aim of Fig. 2 is not to display all details of digitalization in an insurance company and it does not intend to be exhaustive. Figure 2 should help to understand the building blocks on a certain level (flying altitude).

The continuous improvements in data availability open up the chance of improvements in pricing or even completely new products. Scalable infrastructures provide the ability to process this size of data on affordable hardware. Open-source frameworks can deliver new models for improving prediction quality and enabling new business opportunities.

[14] In the real estate context.

[15] Internet of Things (see (Veneri und Capasso 2018)).

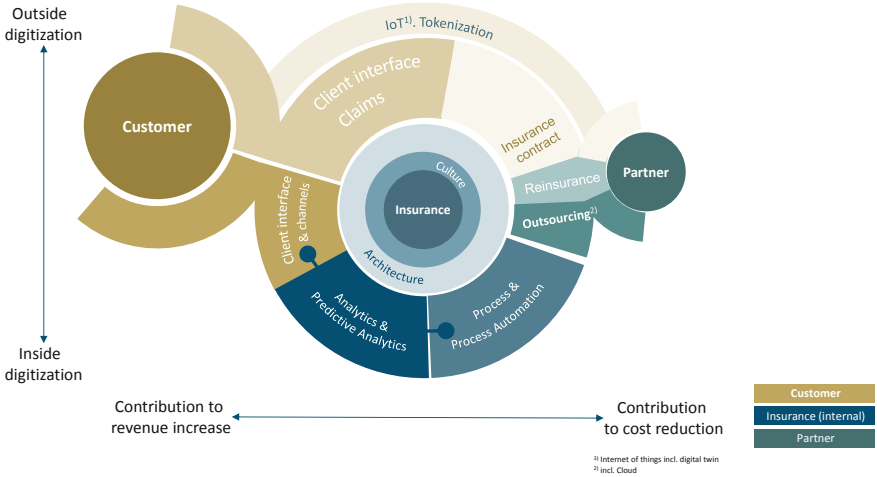

Fig. 2 Overview digitalization areas—insurance © ifb SE

Summary of the Setting

On the customer side (outside digitalization), the key components are the willingness to understand the customer's problems in combination with the ability to solve (execute) the problem by a cost optimal composition of individualized (to the problem) and common product components (leveraging the involved partners' economies of scale by using APIs[16] for a smooth integration). Therefore, cost-efficient mass-individualization is possible, serving the client's needs. The traditional institutes struggle with the culture needed to act agilely and achieve a more dynamic product cycle through this.

On the internal side, the tasks themselves have a stability (apart from the regulatory requirements or the ongoing improvements in accounting standards). The way these tasks are performed has become more automated.

Overview of Book Series "The Digital Journey of Banking and Insurance"

This book is the first volume of the three-volume book series "The Digital Journey of Banking and Insurance". The first volume "Disruption and DNA" focuses on change and the components staying stable in the banking and

[16] Application programming interface is more than a computing interface because it offers significant simplification by modularizing by a meaningful structure.

insurance market (outside view) as well as the effect on accounting, risk management and regulatory departments (inside view). The inside view is completed by an analysis of cultural alterations. The second volume "Digitalization and Machine Learning Applications" mainly emphasizes use cases as well as the methods and technologies applied to drive digital transformation (such as processes, leveraging computational power and machine learning models). In the last volume of the series, "Data Storage, Processing and Analysis", the shifts in the way we deal with data are addressed. The angle shifts over the volumes from a business-driven approach in the "Disruption and DNA" volume to a strong technical focus in the "Data Storage, Processing and Analysis" volume, leaving the "Digitalization and Machine Learning Applications" volume with the business and technical aspects in-between.

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Foreword

The banking and insurance are facing profound challenges. The world is experiencing remarkable advances in computing and communications technology even as we take these changes more and more for granted. Adapting effectively to such pervasive changes requires that we keep some basic principles in mind. One of these is encapsulated in a quote from The Leopard by Giuseppe de Lampedusa that reads:

> If things are to remain the same, things will have to change.[1]

To unpack this rather enigmatic quip we must distinguish between the two occurrences of "things." The first refers to those things that are central to an institution's mission and its value system. The second refers to secondary circumstances that serve the core mission but are not themselves fixed and immutable. Too often people become so attached to this second class of "things" that they fail to appreciate their secondary character. Clarifying this distinction is essential to coping successfully with periods of profound change.

My own experience has been focused on the banking sector where the central mission is effective allocation of savings into real investments with positive expected returns. Prior to even that basic goal, however, is the need to attract depositors' savings by providing competitive services and a reputation for competence and honorable behavior.

[1] I was first introduced to this quote and its analysis by Peter de Jager of Technobility.

Attracting deposits is closely tied to customer relationship management. Providing competitive tools and services that assist customers in managing their own financial resources is essential. The same can be said for insurance companies providing support to assist customers in managing their personal and corporate risks across multiple dimensions. Remaining competitive amid rapid technological change requires continuing insight into customers' priorities and preferences. This is further complicated by intergenerational differences in such preferences. How to maintain effective customer contact through multiple channels of interaction is one of the important topics of the three volume *Digital Journey* project.

For banks, meticulously accurate and timely processing of transactions is taken for granted by customers. Falling short of this expectation is the fastest way to lose business. Advancing technology provides ever better means of achieving both speed and accuracy, but it is like running on a treadmill. Success requires adopting new tools continuously as they become available to meet ever more demanding customer expectations. Staying ahead of the competition is only possible with agile software systems built with state-of-the-art twenty first Century system architecture.

Cost optimization and control is as important as ever. What has changed is the need to focus on dynamic rather than static efficiency. The cost of computer processing and data storage has fallen steadily over the past forty years. Traditional computer software architecture was designed to economize on these resources but it resulted in systems that were rigid and difficult to modify. Twenty first Century system architecture is designed to make such continuous modifications far easier and largely foolproof, as illustrated by the seamless evolution of applications on our tablets and smart phones. This enables continuous enhancement of features and functions without steadily rising maintenance costs.

Modern system architecture also enables far more effective application of predictive analytics. Data can be stored and indexed in far less structured form compared to traditional relational databases. This opens the data to meaningful access and analysis across multiple product types, organizational components and geographic areas. It also avoids constraints, inherent in relational database designs, on the types of inquiries that can be supported. Unexpected vectors of interest across enterprise data that arise suddenly can be addressed on a timely basis.

This architecture also changes the perennial buy-versus-build dilemma. Specialized proprietary components can be incorporated far more easily and seamlessly than was traditionally possible.

In summary, remaining competitive in today's environment of rapid technological change and rising customer expectations poses a daunting challenge. Meeting that challenge demands two things:

- Clear definition of an institution's core principles and standards and constant reinforcement of these to employees, customers, regulators and the general public.
- Recognition of secondary factors that an institution must be prepared to alter if it is to remain competitive in a period of rapid technological and social change.

The Digital Journey of Banking and Insurance is a guide to the many secondary factors and processes of banks and insurance companies that must be subjected to constant scrutiny and revision if an institution is to avoid falling behind the competition. Its appearance could not be timelier as we enter the third decade of the twenty first Century. It should be required reading for all senior financial executive teams.

Saddlebrooke, Arizona David M. Rowe, Ph.D.[2]

[2] The author is President of David M. Rowe Risk Advisory. For sixteen years Dr. Rowe wrote the Risk Analysis column in Risk and is the author of *An Insider's Guide to Risk Management—Relearning the Lessons of the Global Financial Crisis*.

Acknowledgments

The three-book series was the natural next step from the book "The Impact of Digital Transformation and FinTech on the Finance Professional" and an exciting project for us. We look back with gratitude at the many discussions with clients, partners, and colleagues at ifb. Without this vital community, such an undertaking would not be possible.

We would first like to thank all contributors (clients, partners, and colleagues), whose expertise was invaluable in exploring and formulating such a comprehensive work with a wide overview and deep insights. Their insightful feedback helped us to sharpen this work to this amazing level.

In addition, we would like to thank Tula Weis and her team from Palgrave Macmillan for advice and support in this project.

We like to thank Satzanstalt for supporting us in development and realization of the book cover idea.

We would also like to thank our colleagues Julia Horstmann, Davin Radermacher, and Jenny Klein for their support in all the small, but important things that make such an undertaking a success.

Volker Liermann
Claus Stegmann

Introduction to Volume I—Disruption and DNA

This volume "Disruption and DNA" focuses on the business aspects of digital transformation. The first part analyzes the situation banks and insurance companies face. This part also explores different strategies to implement digital transformation. The subject spans from projections of digital capabilities and digitalization strategies up to disruptive approaches such as greenfield.

The second part focuses on the accounting and controlling subject in the digital context. This part explores how to deliver the tasks for a CFO in a more efficient way. The chapter puts the spotlight on the importance and improvements of the planning process. In addition, a practical example is presented of how data collection and machine learning helped to improve accounting.

The third part looks at the possible improvements demanded in risk management. Both financial risk and non-financial risk are addressed in this part. The financial risks paradigm of a one-year horizon is relaxed and extended to a multi-period scenario-based analysis. In the area of non-financial risk management, a framework is presented to link and connect the silos in non-financial risk (the non-financial risk categories) to a risk-category-specific and risk-category-joining approach.

The last part (Culture and Projects) is dedicated to the way things are done. The topics range from the overall culture to the modern and agile project approaches. The deep dive into project management includes the solutions for remote project delivery.

Contents

Notes on Contributors

Eljar Akhgarnush is Implementation Consultant at ifb group since April 2018. He gained knowledge in software and financial sector topics during his studies as well as the various positions he has since held. Starting out with a focus on financial supervision and regulation, he soon shifted his attention to the technical side and agile project management. After having received his B.Sc. in Business Administration from CAU Kiel, he gained his M.Sc. in International Economics and Policy Consulting at OvGU in Magdeburg. He has since remained keen on exchanging knowledge and exploring new areas.

Uwe Beister is Head of the Program and Project Management Team in the ifb group. He has almost 25 years of professional experience in managing projects on both the technical and IT side, as well as in the development of project management structures and processes in various financial institutions. He is a trained bank officer, holds a university degree in Business Administration and is, among other things, certified on the basis of PRINCE2. Based on our diverse projects, he and his team develop new project management approaches and standardization approaches for supporting projects through a PMO. Furthermore, he is responsible for training and further education in the areas of project management and PMO in the ifb group.

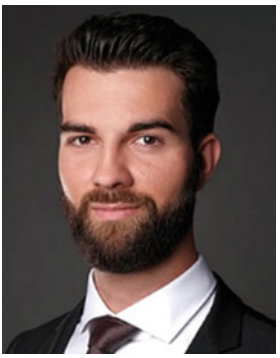
Susanne Brindöpke is Director at ifb group, and has been working in the financial industry for more than 13 years, ten of them as a Management Consultant. She started her career in quantitative risk management and later worked on various projects with a focus on implementing regulatory requirements related to solvency and risk. Her areas of interest include digitalization in enterprise risk management processes and actuarial data science.

Susanne has a degree in Business Mathematics from the University of Hamburg.

Fabian Bruse is Director at ifb group, and has worked here since 2011. He started his career in the regulatory reporting sector as a software tester and later moved on to SAP BW and SAP BA development with a particular focus on IRR and CRA modules for customers in Germany and Luxembourg. His more recent projects include modern ETL and reporting processes where he has the role of a—partially remote—Scrum Master (PSM2 certified). Since 2017, he has also coordinated the technical part of the ifb Blockchain Team and administrated the ifb Hyperledger system on Kubernetes. Fabian has a degree in Physics from the University of Bonn.

Florian Dinges is Senior Consultant at ifb group. He obtained his degree in Mathematics and Physics at Goethe University Frankfurt along with management studies. He has been working in the area of enterprise architecture and strategic consulting for over two years. Additionally, he is interested in financial risk management, machine learning, and innovation.

Dr. Harro Dittmar is Senior Consultant at ifb SE. He is a passionate programmer with a confident and structured approach to the modeling of complex systems. His aspiration is the thorough understanding, implementation, and troubleshooting of scenario calculations, predictions, and optimization problems from a holistic perspective. After his academic career in statistical modeling and pattern recognition of molecular systems, he started a career in the banking sector. His consulting focus includes quantitative risk modeling, strategic approaches to the optimization of data architectures, and data management.



Philipp Enzinger is Managing Consultant at ifb and responsible for insurance analytics and risk topics. At ifb, Mr. Enzinger leads the digitalization work group for insurance data science. As project manager and subject matter expert, he has been advising financial institutions on credit risk and financial transformation topics for more than five years. In recent years, Mr. Enzinger has focused on insurance companies' IFRS 17/9 implementation—in particular new risk calculations as well as impacts on planning, reporting, and financial steering. Mr. Enzinger holds an M.Sc. in Economics from the University of Cologne.

Manuela Führer has been Group Leader at Landesbank Hessen-Thüringen (Helaba) for over ten years in the Accounting division, responsible for the accounting of financial instruments under local GAAP (HGB) and IFRS. With more than 20 years of experience in the financial sector, as a consultant, in treasury and accounting, she has a deep knowledge of financial instruments, IFRS9, hedge accounting and impairment, accounting processes, and functional and technical reporting architectures. In 2019, she initiated and managed the proof of concept for the use of artificial intelligence in impairment accounting and the subsequent roll-out of the ML model in line operations.

Sören Hartung is Project and Investment Manager at Helaba. He has spent his entire career to date working on the digital transformation of financial institutions. He is interested in emerging technologies (e.g., machine learning, distributed ledger technologies) that enable new digital business models and optimize process flows. As an investment manager, he seeks investment opportunities in innovative tech start-ups to support Helaba's digitalization strategy. He has a Master of Science in Finance & Information Management from Goethe University, Frankfurt.

Ben Hofer is Senior Consultant and Manager Digital Communications at ifb group. For more than six years, he has advised insurance companies and banks in the field of digital transformation. The expert for operational excellence focuses on agile project management, change management, and process topics such as process mining, robotic process automation, and Lean Six Sigma. He holds a degree in business informatics and is certified as Professional Scrum Master (PSM), Professional Product Owner (PSPO), Lean Six Sigma Green Belt (PEEC/IASSC), and Professional for Requirements Engineering (CPRE).

Jens-Peter Jensen is Solution Manager at SAP SE. He heads the department Finance, Risk and Data Management Solutions for the financial services industry. Throughout his career, he has held various roles with a focus on solution innovation and global go-to-market in banking. He has driven solution innovations in the area of bank analyzer, risk management and regulatory reporting, financial services data platform, and financial products subledger. His current focus is on the changed role of the CFO in times of digitalization and data-driven financials. He studied Business Administration and Economics at the University of Mannheim.

Dr. Veronika Lang has a strong focus on enabling organizations during change processes with a strong user-centered approach. Her neuroscience background, systemic coaching expertise as well as experience as a consultant (ifb, 2016-2019) make her an expert regarding the development and roll-out of tailored employee development solutions. At Forever Day One, we initiate starting points for reinvention of organizations regarding the development of new digital services and transforming company culture. Forever Day One also means that learning to learn and adapt is at the core of our work. We believe that an agile learning workforce is the key to overcoming the challenges of the future.

Volker Liermann is Partner at ifb group, and has worked in the banking industry for over two decades, primarily focusing on financial risk management. Throughout his career, he has focused on developing integrated and comprehensive frameworks to help organizations correctly project risk at a strategic and tactical line of business and departmental level. He has also focused on developing frameworks to integrate stress testing and regulatory stress tests. In recent years, his focus has shifted to digitalization, machine learning, and digital processes including improvements to classical financial and non-financial risk management. He has a background in Economics and a degree in Mathematics from the University of Bonn.

Dr. Sven Ludwig is Senior Advisor, Governance, Risk and Compliance at ifb group. In addition, Sven holds the position of Regional Director at PRMIA, the international risk management association with more than 50,000 members globally.

Before joining ifb group, Sven held several management positions at FIS™. He served as global Head of Subject Matter Experts and Advisory, among other roles at FIS. During his career, Sven was also responsible for trading and risk management IT at a major German bank. He started his professional career as a financial consultant for trading and risk management.

Sven studied Economics at Friedrich Wilhelm University of Bonn in Germany. He conducted his doctoral thesis in the field of mathematical economic research and behavioral finance.

Dr. Rainer Merkt has more than 20 years of consulting experience in the banking industry and has his background in risk, regulatory, and overall bank controlling. For more than one decade, he has been working on concepts and models for enterprise architecture and strategy. Rainer is especially interested in state-of-the-art and visionary approaches for holistic enterprise models including environmental, cultural, and sociological aspects of the digi-human hybrid ecosystem.