Moe Abdula, Ingo Averdunk, Roland Barcia,
Kyle Brown, Ndu Emuchay

The Cloud Adoption Playbook

Proven strategies for transforming your organization with the cloud

WILEY

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Dedications

Moe: To my grandmother, a rock against which many leaned. Illiterate by circumstance, wisest by experience, she raised a tribe on her own. I also want to dedicate this to my family, *without* them there would be *no* me, really, gratitude.

Ingo: To my darling wife, Kathleen, and my sons Sebastian, Alex, and Leonard. You are important to me; I could not imagine a life without you.

Roland: All Glory to God the Father and My Lord Jesus Christ. As always, thanks to my wife, Blanca, for putting up with my schedule; I love you. I love my kids (Alyssa, Savvy, Joseph, and Amo); they rock.

Kyle: To my darling wife, Ann — thank you for putting up with yet another book project, even when you didn't think it was possible for me to be any more stressed out than I was. You're the greatest, dear.

Ndu: To my family, and especially to my brother Acho, whose memory lives on in our hearts.

About the Authors

Moe Abdula is one of the passionate and enthusiastic leaders of IBM's Cloud portfolio. As Vice President of the IBM Cloud Garage and Cloud Architecture and Solution Engineering, Moe leads a global practice of 13+ innovation Garages, powered by a team of Cloud solution, design thinking, enterprise delivery experts and distinguished engineers with focus on defining, implementing and enabling a key set of technology and industry patterns. During the last 20 years, Moe has held numerous development and field roles in IBM Software — most recently in Software Lifecycle Management, Operations Management and Mobile Platforms. Moe attended the University of Leeds in the UK, where he received an honors bachelor's degree in Electronic and Computer Engineering. Apart from contemplating clouds, Moe has passionate interests in football (soccer) and the unexpected experiences of life his two beautiful children drag him into!

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Ndu Emuchay is the Global CTO, IBM Cloud Adoption and an IBM Distinguished Engineer, with extensive experience working with some of IBM's largest clients around the world and across industry. Ndu leads work on incubating next generation technologies, enabling the confluence and application of capability, expertise and experience in support of IBM clients, strategic IBM initiatives, thought leadership, and innovation. Over many years, Ndu's focus has been in working immersively with our clients and partners, driving solution design and technical leadership development to deliver business outcomes. Ndu holds a number of patents and is a member of IBM Academy of Technology. Ndu holds a Bachelor of Science degree and a Master of Science degree in Architecture & Design, and a Master of Science degree in Information Systems and Technology. Ndu lives in the Live Music Capital of the World — Austin, Texas; loves architecture, travel, music, food, culture, art and formula 1.

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Roland: Thank you to the many authors who contributed to the architecture center, which provided much content for us to use. Thank you to The Solution Engineers and Garage Method Team for the hard work and putting up with me.

Ndu: I'd like to thank the great talent I have had the privilege to cross paths with in life and work. I hope this book reflects in some important way the knowledge and wisdom our interaction has imparted to me.

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Foreword

By Steve Robinson, GM, IBM Hybrid Cloud

Over five years ago I took the opportunity to lead a startup team within IBM, which included some of the authors of this book, to develop a product that we thought would disrupt the industry. That product became IBM Bluemix PaaS, which is now at the heart of IBM Cloud. It certainly required disruption within IBM, as we had to build the product in ways that were transformational and new to us. It required us to move away from traditional models, and to learn how to develop natively for the cloud. We knew we had to embrace this new way of working to meet our clients' changing needs.

What I heard over and over again from our clients was that they needed to drive their own disruption, otherwise they risked being disrupted. If they didn't accelerate their own innovation, then a handful of programmers may just do it for them. They saw how agile organizations are disrupting industries and leaving established players in their wake like yesterday's business model. They knew they needed to innovate faster and bigger, at enterprise scale, to reap the benefits of industry disruption and market change.

For any enterprise, it was evident, change was inevitable. Transformation leveraging cloud as an underpinning of a new digital business was a requirement to survive. Understanding how best to adopt cloud leveraging tried and tested techniques was key to accelerating such transformation.

The challenge enterprises face is making this real. How do they accelerate innovation like a startup, have clear line of sight to users, and scale to the enterprise? Clients turned to us and asked how we transformed ourselves, and how we can help them do the same. They heard that we adopted agile and DevOps practices broadly with impressive results in velocity, and they wanted to know our secret sauce.

This need in the marketplace for enterprise transformation was the impetus for me to form another startup team (again with many of the authors of this book) focused on developing a different way of consulting with our clients. We became the IBM Cloud Garage.

Supported by proven methods and hardened architectures, the Garage captures the essence of a digital economy: maniacal focus on the client experience, minimum viable products with rapid iterations, modernization of existing systems, and equal emphasis on culture, processes, and tools.

When we opened the doors of the IBM Cloud Garage, we applied similar practices for our enterprise clients, showing them how to harness the energy of a startup culture and apply it to their organizations at scale. We've helped executives and developers alike achieve a culture of continuous innovation — resulting in faster delivery, time to market, and customer satisfaction.

What this group has done combines industry best practices on IBM Design Thinking, Lean Startup, Agile Development, and DevOps to help enterprise organizations adopt the cloud and accelerate all phases of the application design, development, and delivery lifecycle. This book captures that secret sauce of the Garage and the Cloud Architecture and Solution Engineering team into one reference, and shows you how to make the cloud real in an enterprise.

Steve Robinson
General Manager, Client Technical Engagement
IBM

Introduction

In a very real sense, the cloud is ubiquitous. We would find it hard to believe that there's a single reader of this book who doesn't consume some type of cloud service. Whether it be a cloud music service like Apple Music or Spotify, or cloud storage such as Dropbox, or a Software as a Service (SaaS) application like Salesforce running on the cloud, cloud services touch all our lives.

But these examples are just the tip of the proverbial iceberg. Cloud technologies such as Infrastructure as a Service (IaaS) and Platform as a Service (PaaS) are redefining how Information Technology (IT) organizations develop and deliver solutions to their customers. If you're an IT professional and you are not using the cloud in one of these ways already, you soon will be.

Who This Book Is For

Ever since Beal and Bohlen[1] defined the technology diffusion process in 1957, technologists have divided up the different waves of technology adopters into four different groups: Early Adopters, Early Majority, Majority (or Late Majority), and Laggards (or Non-Adopters). Those groups are often represented as different quartiles of a normal distribution or bell curve, as Figure I-1 shows[2]. Geoffrey Moore, in his classic book *Crossing the Chasm*, informed us that not all technologies make it past the Early Adopter stage; there's a large gap, or a "chasm" between Early Adopters and the Early Majority.

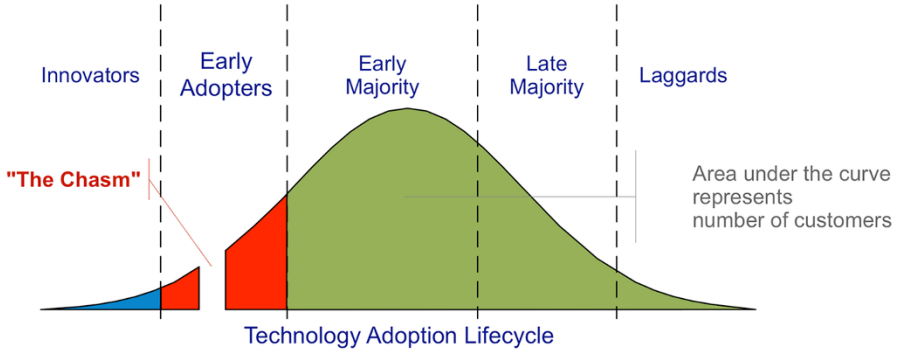

Figure I-1: Technology Adoption Curve.

What we can state, with finality, is that the cloud has made it past the technology adoption chasm. In a 2017 Forbes article[3], Louis Columbus quoted from an Intel survey that showed fully 80 percent of all IT budgets would be committed to cloud applications and solutions. The cloud has now clearly moved beyond the early adopters into the two majority quartiles.

That fact is what drove us to write this book. In our customer-facing work we have seen that the vast majority of IT departments, in all industries, are now facing the problem of deciding how to adopt cloud technologies, and are somewhere in the process of formulating strategies and approaches for how to go about changing their organizations to handle this new set of technologies. But what we have seen is that the process of formulating a successful cloud adoption strategy, and what's more, the process of implementing that strategy is not at all easy. What we will do in this book is show you how we have worked with many of the successful early adopters of the cloud and tell you their stories and share the lessons we have learned in working with them.

But we're not only writing this book to speak to the early majority and late majority of cloud adopters; we're writing it for a more specific audience — the enterprise audience. Our definition of an enterprise is simple; we mean a business that is not in the business of IT. So by this we exclude technology startups, which live in a different ecosystem and often work by different rules. If you are looking for tips and techniques on using the cloud to find your next round of venture capital, you're looking in the wrong place. However, if you work for an Insurance Company, a Bank, a Manufacturer, a Retailer, or any of the thousands of other businesses that use IT but aren't defined by IT, then you're a member of our core audience. The size of your business doesn't matter; we've worked with both large and small enterprises, and even startups, but the lessons that we present will be specifically tailored to helping you reach out to your most important stakeholders; your customers, both internal and external and transform that relationship to be more productive, responsive, and forward-looking by using the cloud as part of a larger ongoing digital transformation.

So whether you are the Chief Information Officer (CIO) or Chief Technology Officer (CTO) of an enterprise, or if you report to them in a more specific capacity such as Enterprise Architect, Chief Information Security Officer (CISO), Director of Engineering, or Director of Operations, this book is for you. In fact, we have written our chapters to speak specifically to each of those roles, as you will see later on. But this book is not only aimed at the C-Suite; if you work as a team member for any of the roles named above, you'll also gain valuable insight on how cloud will affect your job by reading this book.

Sports Analogies or the Lack Thereof

We have named this book *The Cloud Adoption Playbook*. There are two reasons for this; first, we're following in the footsteps of our friend and colleague Sanjeev Sharma, who wrote the *DevOps Adoption Playbook* in 2017. This book can be considered a companion volume to that book, as the two are complementary. You don't need to read Sanjeev's book to gain from this book but if you do read his book, and we recommend you do, you will learn a lot about many of the same subjects from a different perspective.

But the second reason is that we call this a playbook for the same reason that Sanjeev called his book a playbook. We're both drawing from the sports analogy where a playbook (in either basketball or American football) is the book that contains the plans and actions that a team carries out during a game.

Unlike Sanjeev's book, we're going to go super-light on the sports analogies; in fact, you'll not find another sports analogy beyond the introduction. But we do want to tell a story about an early sports playbook that inspired us. Glenn Scobey (Pop) Warner was an early American football coach that pioneered many of the precursors of modern American football plays. Much of his most innovative work was done at the tiny Carlisle Indian Industrial School where he was football coach at the turn of the 20th century. He was an expert at poring through the rulebooks and finding creative ways to bend the rules of football to allow his team to "punch above their weight". As a result, his team was able to beat teams from much larger colleges such as Columbia and Penn.

Warner's spirit of innovation is what inspired us. Cloud technologies and digital transformation hold the same promise; they can allow smaller enterprises to "punch above their weight" and can help make larger enterprises more nimble and agile. But sometimes you have to bend a few rules, or at least change the way in which your enterprise has traditionally done things in order to make that happen. Finding ways of dealing with the constant tension between innovation and the realities of working inside an enterprise will be one of the ongoing themes of this book.

What to Expect in Our Playbook

In Chapter 1, we will discuss the business drivers that lead enterprises to adopt cloud, as well as how elevated customer expectations drive new requirements that force you to the cloud. We will discuss how highly competitive

environments are forcing organizations to move more quickly, and how the evolving regulatory-requirements landscape is also forcing change into existing organizations.

In Chapter 2, we will present an overview of our cloud adoption and transformation framework: its themes, the important dimensions along which an enterprise can gauge where it is and where it needs to be, and how it enables you to take a structured, holistic, and pragmatic approach to cloud adoption.

In Chapter 3, we will share our experience in developing a cloud adoption strategy, presenting the key attributes of such a strategy and providing a prescriptive approach to developing your own strategy. We will share examples of how other companies have developed such strategies and discuss the components of successful cloud adoption strategies.

In Chapter 4, we will focus on how cultural change is the basis for success with the cloud. Often, our clients tell us that cultural change is the most important and challenging aspect of cloud adoption and digital transformation. Culture directly relates to the most critical asset of your organization: your people.

In Chapter 5, we will describe a viewpoint on architecture and technology, showing you how new cloud platforms, service types, and programming models (such as microservices) offer potential competitive advantages. More importantly, we'll show you how to strike a balance between developing "architecture for architects" and how to communicate in the language of the developer.

In Chapter 6, we will discuss security, risk, and compliance. New technology approaches introduced by the cloud such as pooling and sharing of resources, new deployment models, and multivendor arrangements, mean that we must think differently about security, risk, and compliance. We'll show you how to take steps to keep up with rapid innovation while providing a safe, secure, and compliant environment for business.

In Chapter 7, we will discuss several technologies and trends that are having a profound effect on business and the technology platforms that support them. These emerging technologies are changing the nature of services available to your users. By the very nature of innovation, the only constant is change and learning how to deal with that change is the central theme of the chapter.

In Chapter 8, we will explore the IBM Cloud Garage Method that we have codified and refined over many client engagements and in our internal development at IBM. These codified insights and best practices are the keys to rapidly scaling an organization's capabilities. We'll discuss the origins of our approach, our lessons learned, and how a holistic view of practices from many different