

How Deutsche Bank's IT Division Used Design Thinking to Achieve Customer Proximity

Design thinking is a customer-centric approach for integrating end customers in the innovation process. This article describes the evolution of design thinking in Deutsche Bank's IT division and its role in solving specific problems, better integrating the business and IT divisions, and bringing the bank's IT closer to its customers. The lessons learned can be used by CIOs and other business leaders striving for customer-centricity in their value-creation processes.^{1,2}

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Customer-Centricity is a Challenge for Banks

Customers need to have more trust in their banks, and to achieve this, there needs to be more transparency in the way banks deliver products and services. One way of gaining trust is to incorporate customer-centricity in the innovation process and to provide information about the risks and potential benefits of a specific service. Despite a clear need for customer-centricity, banks (and other large companies) face barriers in fully taking account of customers' needs in their innovation processes.

Banks need to develop a deep understanding of customers' needs and be able to address customer concerns as they develop new services. This raises the question as to when banks should involve their customers in the development of new products and services. At present, they do not involve potential customers until they present them with finished, "perfect" solutions. However, banks would have a lot to gain if potential customers were engaged with unfinished solutions or prototypes and could therefore challenge ideas throughout the development process. Although this approach has succeeded in many other industries, it is rare in the banking sector.

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Moreover, even if bank customers are involved in the innovation process, they typically engage with a specific business division (e.g., the retail banking division) but rarely, if ever, with divisions such as IT. These divisions are instead involved only in the later stages of the innovation process, such as during implementation. Understanding and conveying the details of customer needs to a bank's IT division is complex. As the information passes from the business division to the software architect, to the coder and so on, misunderstandings and distortions can occur (as in "Chinese whispers").

The complexity of ensuring that IT fully understands customers' needs is at the heart of why integrating IT with business operations in large companies remains a major challenge. To address this challenge, the IT division needs to interact directly with potential customers and understand their needs as much as the business division does, so that both can build a common understanding of customers and their needs.

A problem that many banks now face is that customers receive very attractive financial services offerings from new, non-traditional, players. In fact, over 50% of the innovations in the financial sector are being made by non-traditional institutions.³ This means that banks' traditional development and innovation processes have to compete with the research and development environments of non-banks. Large technology players such as Google and Apple, which have acquired banking licenses, are starting to make inroads into the banking sector. Startups are targeting the financial services industry as well; these are highly agile organizations that can quickly bring to market powerful customer-centric services.

To respond to these challenges, traditional banking institutions clearly have to get better at innovation. Understanding this need, Deutsche Bank adopted an approach—based on the principles of design thinking (DT)—to increase its IT division's involvement with customers as new products and services were being developed. This approach allows the IT division to get customer feedback on quickly developed, and incomplete, prototypes of new services. It's the IT equivalent of the bank's highly agile DT team testing out

3 Oliveira, P. and von Hippel, E. "Users as service innovators: The case of banking services," *Research Policy* (40:6), 2011, pp. 806-818.

rough ideas, in the form of cardboard prototypes, at a German train station.

This article first provides an overview of the key elements of design thinking—a customer-centric approach for integrating end customers in the innovation process. (The research method used to create this case study is described in the Appendix.) We then explain how design thinking was embedded in Deutsche Bank and describe the radical changes the approach offered to the bank. Finally, we summarize the lessons learned from adopting design thinking at Deutsche Bank, which are valuable not only for CIOs but also for other leaders in large organizations.

Key Aspects of Design Thinking in a Corporate Context

Design thinking is a well-tested approach that enables organizations to see the world through the eyes of their customers. Applying the approach in the IT division will help CIOs and their teams to better understand the needs of end customers. Although the DT methodology has too many components and principles to describe here fully,⁴ there are a few that must be mentioned to understand why it was both helpful and challenging for Deutsche Bank.

Customer-centricity involves a systematic and iterative discovery of customer⁵ needs⁶ (which may be latent). A key aspect of customer-centricity is that end customers are continuously integrated into the organization's innovation process in a way that deepens the company's knowledge about their contexts, needs and motivations. The design thinking approach enables the organization to receive continuous feedback from end customers, thereby providing

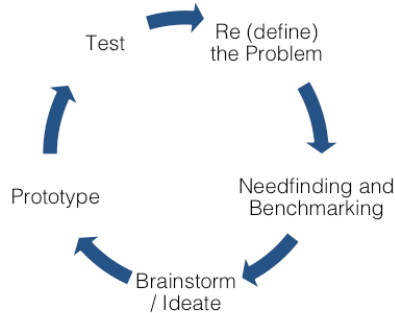
4 The following give a broad overview of design thinking: Cross, N. *Design Thinking: Understanding How Designers Think and Work*, Berg, 2011; Martin, R. L. *The Design of Business: Why Design Thinking is the Next Competitive Advantage*, Harvard Business Press, 2009; Brown, T. *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation*, Harper Collins, 2009; and the four *Design Thinking Research* volumes from HPI/Stanford published between 2010 and 2014. See also Vetterli, C. *Embedded Design Thinking in Organizations: A Literature Review*, University of St. Gallen, 2015.

5 "Customer" refers to the person or group that will be using the developed service/product and can be internal or external. For the rest of this article, we use the term "end customer" (of the solution).

6 Plattner, H., Meinel, C. and Leifer, L. *Design Thinking: Understand – Improve – Apply (Understanding Innovation)*, Springer, 2010.

the organization with access to the real needs of its customers beyond what the customers might have initially stated. Figure 1 shows how a potential customer is systematically involved in the iterative needs-discovery process. The process is illustrated below by a fictional example from the banking industry.

Figure 1: Needs-Discovery through the Design Thinking Cycle⁷



The first step of the cycle focuses on a “wicked problem”⁸ or a situation where the company feels it lacks customer-centricity. In the banking industry, such an issue might be whether physical credit cards will still be needed by the year 2020. The next step, *needfinding*, then focuses on and explores the credit card context via observations of end customers and involved parties, interviews, experiencing credit card usage and so on. This step creates “instant expertise” about credit-card-related issues. Needfinding may also delve more deeply into the context of end customers’ liquidity issues (their need for easy access to funds to pay for something) or even the issue of lending. A need that might emerge could be for liquidity in any situation. This would most probably vary around the globe, depending on whether the customer is on the streets of Zurich, at the flower markets of Bangkok or at the shopping center in an African airport.

The next step, *brainstorming*,⁹ focuses on generating a large number of ideas for several

needs, one of which might be the need for customers to have easy access to funds at all times. Ideas might include a smartphone application or a mobile money printing machine. Instead of discussing these ideas out of context, they are prototyped in a tangible way so they can be directly tested by end customers. This tangibility provides immediate feedback from (future) end customers. Suddenly, unexpected problems might emerge, such as the battery of the smartphone dies when the customer is standing at the cashier, or the mobile printing machine can print money only in one currency. This feedback often helps revise the team’s assumptions about customers’ needs as well as the initial problem.

In fact, a failed prototype can be as valuable as one that is close to a future solution. The iterations through successive prototypes will provide deeper insights into everything from who the customers are (for instance, by building personas), to the ideal customer journey (a common question would be, “And then what would you have?”) and to what concrete solutions need to be built (by producing tangible value-proposition prototypes) to ideally address the identified customer needs. This process, called rapid prototyping, not only helps test ideas concretely, it also helps the company understand its customers’ future needs and to put the customer continuously at the center of its efforts. The sequence of designed tangible prototypes follows the milestone-oriented project structure shown in Figure 2.

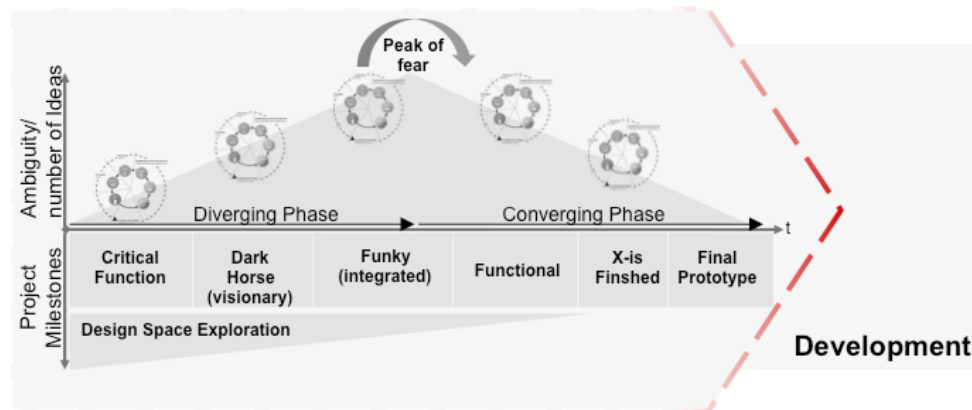
The diverging phase allows an in-depth exploration of the consequences of various potential solutions. The “dark horse” milestone explicitly moves the solution search outside of what might be normally considered reasonable; the result is that DT teams often hit on successful solutions that were previously considered to be too “crazy.” The diverging phase is followed by the converging phase, which integrates all the knowledge acquired in the diverging phase. One or two of the prototype solutions are created in depth before traditional IT development begins, which means the idea has been developed in depth before programming begins. Table 1 summarizes the prototype milestones. A DT project will involve several systematic needs-discovery iterations through these milestones.

7 Source: Mechanical Engineering Class 310 of Stanford University (ME310), which has had a decisive influence on the global design thinking movement. The design cycle originated as part of ME310 and serves as the base for many other authors and publications (see http://web.stanford.edu/group/me310/me310_2014/about.html).

8 Wicked problems are defined in Buchanan, R. “Wicked Problems in Design Thinking,” *Design Issues* (8:2), 1992, pp. 5-21.

9 Brainstorming is one way of ideating for creative ideas. Other methods include brainwriting, bodystorming, 6-3-5 Methods, brain-drawing, etc.

Figure 2: Milestone-Oriented Design Thinking Project Structure



The team creating prototypes of future services should be carefully constructed to include people with diverse backgrounds (in terms of, e.g., personality and education). The quest for diversity is typically a big challenge for a large company's HR department, since HR is usually involved in highly focused profile searching. However, including diverse personalities and different professional backgrounds—such as business, IT, HR and marketing, and also potential end customers—allows companies to overcome the constraints of their organizational silos.

It is crucial that all prototypes are tangible. Experts and end customers frequently misunderstand each other right up to when the product is in the development phase. Rapidly produced, tangible, prototypes provide a way to ground communications not only between team members but also between team members and end customers. Further, developing successive prototypes guarantees the team explores the greatest number of innovation opportunities.

Design thinking poses some specific challenges in addition to those already faced by companies pursuing innovation initiatives, especially in the

Table 1: Design Thinking Milestone Descriptions

Milestone	Description
Design Space Exploration (ongoing)	The problem design space is explored (concurrently with the following milestones).
Critical Functions	Critical functions are extracted from the problem space that need to be integrated in the ultimate solution.
Dark Horse (Visionary)	Previous assumptions are challenged to explore unlikely-to-succeed ideas, knowing that if they succeed the performance payoff will be relatively large.
Funky (Integrated)	The most successful elements from the previous milestones are connected; this milestone includes roughly connected concepts.
Functional	The first concrete preview of the ultimate solution that integrates working functionalities is developed.
X-is Finished	One key functionality, "x," is completed.
Final Prototype	The final prototype includes the solution for one/several key identified needs and delivers the experience of using the real product (even before development starts).

area of end-customer proximity. At present, in most large firms, especially banks and their IT divisions, developers are not in contact with end customers. Further, IT divisions are accustomed to having requirements delivered to them at the start of a project without questioning them. With the DT approach, project requirements are not only revised but continually developed as the understanding of customers' problems increases through iterative prototyping and discussions with customers. This results in a refined set of requirements that may be very different from what was initially thought.

Another challenge of the DT approach to innovation is that it goes against companies' desire to be "lean" and minimize waste. DT requires resources to be allocated to exploring new ideas, many of which will be abandoned. Moreover, the approach encourages "fail early and often," which runs directly counter to most business practices, especially in IT. Middle-European companies, which interpret failure as a sign of weakness and even of incompetence, find it particularly difficult to overcome this counterintuitive mindset. Thus developing prototypes that could lead to failure is not usually perceived as worthwhile.

In summary, the DT approach is a valuable option, but it can be hard to implement in large organizations. Providing the IT division with direct proximity to end customers is very different from current innovation practices. The case study of how Deutsche Bank faced the challenges of adopting the DT approach in its IT division provides insights into an evolutionary path for embedding this approach in IT operations.

Embedding Design Thinking in Deutsche Bank's IT Division

Deutsche Bank is a large multinational bank headquartered in Frankfurt, Germany. Founded in 1870 in Berlin, it is the largest bank in Germany and the largest currency dealer worldwide. The Group, Technology & Operations (GTO) division is the bank's "DNA." GTO provides the processes, systems, data and infrastructure needed for running the bank, enabling it to thrive in the market. GTO has about 24,000 employees, representing over 20% of Deutsche

Bank's total full-time-equivalents (the bank has about 100,000 employees worldwide).¹⁰ It is not surprising that design thinking, as a catalyst for change within Deutsche Bank, began in GTO.

In 2008, the bank's IT2B Director, who was responsible for business-IT alignment, started focusing on the problem of the IT division delivering solutions to the business divisions without being in touch with end customers. Though this is common in modern industry, he found it to be a very unsatisfactory situation. He was concerned about how the IT division could supply products and services to the business without having any idea of what end customers really wanted or how the solutions it provides are actually deployed. He was convinced that, to enable customer proximity and the alignment of IT and business, end customers must be involved directly at the intersection of business and IT.

The IT2B Director received substantial support from the CIO, who agreed that end customers' perspectives should have more influence on the business to enable it to deliver customer-centric innovations. Deutsche Bank's vision at that time was to be the leading customer-centric, global universal bank¹¹ with a focus on innovation. The IT division started to rethink how, on the one hand, end customers could be better embedded within customer-bank interactions and, on the other hand, how the CIO could get the IT division closer to the business processes. The CIO was aware that he needed to work intensively with the bank's end customers.¹² He determined that the DT approach should first target the redesign of branch advisory processes in retail banking, where he knew that new technologies can be easily implemented. Because the bank had not used DT previously, this first DT-driven innovation was, in essence, trying out DT.

The IT2B Director had an excellent IT background, and he recognized the increasing importance of IT for the banking industry and the growing competition from non-financial industries. He reached out to the University of St. Gallen, Switzerland, and its Institute of Information Management (IWI-HSG) to discuss the possibility of putting the IT division in direct

¹⁰ As of 2013.

¹¹ The vision is available at <https://www.db.com/en/content/company/Vision-and-Brand.htm>.

¹² Weill, P. and Woerner, S. L. "The Future of the CIO in a Digital Economy," *MIS Quarterly Executive* (12:2), 2013, pp. 65-75.

Table 2: Evolution of Design Thinking at Deutsche Bank

Dimension		Evolution Summary		
		Phase 1: Learning (year 1-2)	Phase 2: Adapting (year 3)	Phase 3: Diffusing (year 4 onwards)
Organizational Structure	Strength of connectivity between DT project structures and organizational structures	Weak—isolated from other initiatives	Stronger—simplifying DT elements for use and company projects	Strong—core management of all DT projects
	Project staffing of the DT team	Externally hired interns	Externally hired interns mixed with internal staff	Mixed team: externally hired interns; externally hired interns with internal staff; internal staff
Developing Customer Proximity Mindset	Employee design thinking capabilities	Key tools and interdependencies of tools	Understanding of holistic customer-centric innovation approach	Development of skillset for future work
	Understanding of customer integration	Singular exchange points	Institutionalized in DT projects	Institutionalized beyond DT projects
	Focus of DT	Business-IT alignment	Fostering customer-centricity and understanding customers	Application beyond DT projects
Evolution Triggers	Triggers for each phase	<p>Visibility of tangible project milestones and their outcomes</p> <p>Strong sponsorship from strategic level</p> <p>Externally coached learning for quick internal learning</p> <p>Speed of development</p>	<p>Simplifying DT project structure for different project needs</p> <p>Transfer of DT staff to development staff (especially after DT projects)</p> <p>Systematically managed and taught innovation community</p>	<p>Visibility of DT as methodology and innovation hub</p> <p>Standardization of DT toolbox</p> <p>DT principles taught at executive level, operational level, IT division and business division</p>
Projects	See descriptions in the boxes	E.g., Financial timeline (2009)	E.g., Accessing stored documents (2011)	E.g., Attracting new brokerage clients (2013)

contact with the bank's end customers. This was the starting point of embedding design thinking in Deutsche Bank's IT division. Embedded design thinking is the integration of DT in a company that focuses on continuous end customer integration and continuous needs-discovery, that follows successive prototyping phases, that adapts its organizational structure and that uses diverse team staffing. The Deutsche Bank projects described below illustrate how design thinking can be adapted for use within the financial services industry.

The Evolution of Design Thinking Within Deutsche Bank

The evolution of the still-developing design thinking practices at Deutsche Bank has, to date, spanned six years and many projects, communication initiatives, employee skill-building measures and the fostering of a common customer understanding. The key to success was to start with small projects and small teams, and then constantly grow the adoption of DT. This evolution can be divided into three phases: Learning, Adapting and Diffusing. All three phases are characterized by the dimensions given in Table 2.

Phase 1: Learning

Deutsche Bank started its DT journey in 2008 with a focus on fostering business-IT alignment. Although several alignment efforts had previously been initiated, none were successful or sustainable. Retrospectively, one key reason for this was that the IT division had not had any contact with end customers. DT provided a promising approach for involving end customers in the IT development process and thus fostering alignment. Due to resource scarcity, the set-up process for this new approach needed to be lean with a minimum of resources.

One difficulty was the requirement for every member of the newly created DT team to be assigned full time. Because the DT initiative was disconnected from all other IT projects, assigning three to five internal staff working on current projects and jobs would have been very difficult, given the short ramp-up time. At that time, Deutsche Bank wanted to learn about

design thinking and decide if it could add value in the future. The IT division therefore hired interns for the first DT project. This decision also provided the opportunity to hire people (such as engineers, designers, physicians, etc.) who did not have the typical profile of bank employees. The interns brought with them a fresh spirit and outlook; none of them had banking qualifications or had previously worked in the banking industry. This made it easier for them to get to grips with the new DT approach. Innovation was crucial at this point in the evolution of DT at Deutsche Bank.

The DT team, which comprised three to four people, was multidisciplinary. Experience of using the DT approach for innovation in other industries showed that mixed teams of this size were crucial for success. The downside of hiring interns, however, was that the DT team did not have a pre-existing network for accessing and interacting with the bank's staff.

Table 3 provides an overview of all the roles involved in the evolution of design thinking at Deutsche Bank, and Figure 3 shows how the roles relate to each other. This structure tapped into the full potential of end-customer integration and thus helped to overcome the constraints of the company's divisional silos. This role model, with the DT team at its heart, defined the completely disconnected DT project structure from the very beginning of the embedding evolution.

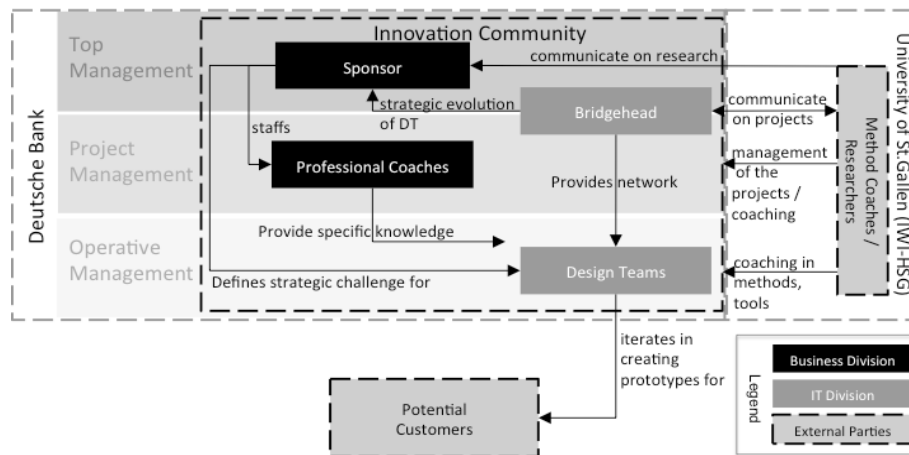
The bridgehead role served as a network and communication hub between the DT team and the rest of the organization, especially by ensuring that the team had space to work in free from interference by the usual stakeholders. Additionally, this role (in collaboration with the university) was responsible for the internal evolution of applying the DT methodology to meet the company's needs.

Other DT roles were situated at different organizational levels. The sponsor role provided the strategic perspective and was located in the business department, not in IT, for business-IT alignment reasons. Sponsors included professional coaches who provided situational internal expert knowledge for the DT teams. The researcher and method coach roles were performed by people from the university's Institute of Information Management, who were responsible for educating Deutsche Bank personnel performing the other DT roles, all of

Table 3: DT Role Descriptions

Role Descriptions	
DT Team	Applying the DT methodology to relevant strategic challenges at the core of all activities to create a final prototype.
Bridgehead	Responsible for the internal strategic evolution of DT. Also responsible for connecting the DT teams with the organization and vice versa through networking.
Sponsor	Representing top management, defining the challenge (with other members of the top-management panel) and assigning professional coaches to the DT teams.
Professional Coaches	Providing specific know-how and expertise to DT teams and attending the teams' activities (presentations, workshops, etc.).
Innovation Community	Not formally assigned to DT projects but showing interest in DT activities via attendance at (educational) workshops, communication activities (presentations, newsletters, etc.), spreading DT information by word of mouth; involves all internal roles at the bank.
Method Coaches (initially external but later internal)	Responsible for educating Deutsche Bank staff in the DT methodology and communicating method-related issues.
Researchers (external)	Identifying findings from DT projects and reintegrating the findings in future projects.

Figure 3: DT Organizational Structure Showing Role Interdependencies



whom did not have any experience in design thinking. The innovation community comprised those employees with an interest in DT and built the base for the wider adoption of DT. Interestingly, the DT roles have not changed much over time, although some have switched from external to internal (see the Phase 2 column in Table 2).

Because the DT team, located in the IT division, was in direct contact with potential end customers, learning about end customers took place in IT operations rather than within a business division. The business provided the challenges for DT projects, because the sponsor was from the business division. However, the DT initiative itself was attached to the GTO Retail

Innovation Team, which was represented by the Core Banking CIO reporting to the Group CIO. A panel, staffed from the top-management level, selected the challenges for the DT projects and ensured the fit with corporate strategies. The fit of the challenges was assured through the method coaches.

To get started, the DT team needed some basic tools. Team members attended a boot camp at the start of the evolution process to learn how to use these tools and to speed up their understanding of the DT methodology. The tools taught focused on iterative needs-discovery during the steps of the design thinking cycle (see Figure 1), with several tools being needed for each step. For example, tools for the needfinding step include ethnographic elements and interview and observation techniques to help create a deep understanding of the end customer within the targeted design space. Some DT team members already had experience of tools used at the ideation step (e.g., brainstorming).

A key success factor of the DT approach is the ability to prototype an idea immediately, to test it in a realistic environment and then to discuss the impact of the prototyped idea. The interdependency of the tools needed to achieve this ability required intensive coaching support because of the difficulty of moving from ideas to concrete prototypes.

Once prototypes had been tested and evaluated, the DT team communicated the results to interested internal parties during presentations at the project milestones shown in Figure 2. The reaction to the first prototypes was mixed and generated a lot of controversy. On the one hand, prototypes were seen as attractive because they could generate feedback easily at low costs; on the other hand, some of the interested parties were initially skeptical that “low-resolution” prototypes could provide valuable information about an innovation. Banking personnel were not yet accustomed to talking about unfinished products that had already been tried out by end customers. Nevertheless, the DT team persevered and created increasingly detailed prototypes, which helped to raise awareness of the importance of making more efforts to understand the bank's end customers. In fact, Phase 1 of the evolution showed the benefits of customer proximity.

Moreover, the speed of developing prototypes became obvious, especially when compared to other internal procedures.

The regular presentations showing the results of the DT team were combined with workshops on how to apply DT tools, which meant internal observers became familiar with the key tools. Additionally, the team was able to foster a rough understanding of the interdependencies between individual DT tools.

At this point of the evolution, the DT project structure was isolated completely from other IT projects, with DT projects focusing on singular end customer touch points related only to those projects. Inevitably, this led to fragmented views about customers' needs. However, during this Learning phase of the evolution, Deutsche Bank recognized that DT really did help in understanding customers, not least because of the tangible nature of the prototypes.

One factor that opened the path toward Phase 2 (Adapting) of the evolution was a managing director who continuously incorporated the DT results into strategic discussions and shepherded the market launch of the first final prototype. This managing director stated, *“I have the prototypes in my office—having them physically present is enough to start a relevant conversation with interested stakeholders.”* The visibility and communicative power of tangible prototypes at different operational levels was one reason why the IT division became interested in DT in the first place.

Another factor was that the innovation community within the bank was increasingly interested in seeing the DT tools being used. In addition to the continuous coaching of the DT team, to guarantee a wider and high-quality understanding of DT tools, external coaching staff started to offer workshops about a single tool, such as rapid prototyping, needfinding or visualization techniques. Rapid prototyping is one of the key DT tools; the true nature of the problem is often found only by trying out new ideas. Nevertheless, adopting an attitude of simply doing something proved to be one of the hardest things to foster.

Finally, the speed of development of the first DT project (11 months from initial idea to market launch—see box) attracted other business sponsors for the DT approach, who became

sponsors of new challenges for the next phase of the evolution. They were persuaded especially by what can be achieved with end-customer proximity, and how close IT was to end customers and how IT was building and testing prototypes embedded in an adequate (though still isolated) project structure.

Example Phase 1 DT Project: Financial Timeline for Drawing Younger Customers into Bank Branches

The business division identified the problem that was the first DT challenge for Deutsche Bank: most customers, especially younger ones, have hardly had any physical touchpoints with the bank in their lives. The final solution prototype (of the 23 different prototypes in total), developed over four months, was a financial timeline that drew young, potential customers into the bank and offered a fun way of planning their financial lives. These youngsters were attracted to the touch-screen application environment, which provided just enough concreteness about the financial wishes of the future customer. The requirements were defined in detail directly from the tangible final prototype and transferred into development.

Phase 2: Adapting

After the successful initial first application of DT within Deutsch Bank, Phase 2 of the evolution focused on adapting the structural and educational aspects of the approach. Although the DT project structure was still isolated from daily IT operations, the IT division did adopt some key DT elements, such as iterative needs-discovery and multidisciplinary teams. Structurally, the approach was simplified to single elements, such as single tools (e.g., rapid prototyping) and single project phases (e.g., one critical function and dark horse prototyping), although the DT team closely monitored how the simplification would impact the outcome.

The simplification had two main effects. First, Deutsche Bank succeeded in changing the IT division's approach to defining requirements. The traditional procedure strived to find the right solution. With DT, the problem scope expanded to search for and explore various solutions. As a

consequence, different and wider options, rather than a single right solution, emerged. Second, the simplification enabled not only radical innovation but also incremental innovation. This meant that the IT division had fewer problems integrating the DT results into its current project structures. Compared to DT activities in Phase 1, this was the biggest adaptation of the DT approach, with DT projects enriching existing project teams with a customer-centric perspective.

The focus of DT on business-IT alignment also evolved. Ongoing learning about DT helped shift the focus from business-IT alignment to end customers' journeys and thus helped to strengthen the focus on customer-centricity. Inferring concrete actions from the end-customer's journey helped the IT division to more holistically understand the customer's situation (motivation, beliefs, triggers), which meant it could see things from the end customer's perspective, not just from Deutsche Bank's perspective. This holistic view ensured that customer-centricity was institutionalized throughout the complete DT cycle for innovation projects.

Although DT roles did not change much in Phase 2, there was a general movement from external to internal resources. The trigger for this movement was in 2012 when the external method coaches from the university started to transfer DT method knowledge to a fully dedicated internal method coach; the transfer was completed in 2013. This dedicated method coach was supported by the bridgehead role, which raised the level of method competence.

Deutsche Bank also adapted the project staffing profile by assigning a long-term employee as a full-time member of the DT team, working with externally hired interns. Hence the DT team now included a mix of grounded Deutsche Bank knowledge and people without a banking background. As a consequence, involvement in DT became more attractive, and from Phase 2 onward, the DT initiative had more than one business sponsor and, therefore, more than one DT team. Up to three teams were now working concurrently on different strategic challenges.

The DT project structure shown in Figure 2 was also simplified, with the original diverging and converging prototyping phases being replaced by two sub-phases: diverging and

converging. The diverging sub-phase (known as “DT Lite”) was used as a pre-phase for IT projects, where it challenged the assumptions underlying traditional projects. This simplification shortened the DT project phase from four to two months without losing the learnings of the diverging sub-phase, which were directly integrated as a pre-phase of IT projects. The simplification also facilitated the transfer of projects from the DT team to the IT development team.

DT Lite proved to be very successful in a credit app project. The new head of the credit division needed to deliver something quickly to show that he was innovating. By using DT Lite, his group was able to meet a real customer demand instead of just producing something that enabled him to “tick a box.” Using DT Lite for this app demonstrated the value of gaining insights from customer needs.

DT Lite helped not only to enhance the perceived success of DT but also to speed up its adoption by reducing the cognitive dissonance between DT and the Deutsche Bank culture. The connection between design thinking milestones in DT Lite with common project structures was a real boost to the evolution of DT within Deutsche Bank.

DT Lite was mainly enabled through earlier Phase 1 DT project milestone presentations and full transparency of deliverables, and this continued in Phase 2. An increasing number of internal parties attending milestone presentations started to be interested in the DT approach, and their curiosity about prototypes that addressed a particular challenge created a growing innovation community. A Deutsche Bank professional coach said, *“We had to see how it works, but as soon as parts of the results were presented in the milestone presentations, we were sure that this would help change our working behavior!”*

To foster the innovation community, a systematic education program was developed that focused not just on DT tools but also on changing mindsets. For example, the program included conceptual discussions on how to continuously involve customers in different IT projects. This developed a well-educated innovation community, which comprised members of similar education levels and a continuously growing common mindset.

Another factor that triggered the Adapting phase of the evolution was the transfer of DT team members to the subsequent production development of the idea. This helped to transfer DT knowledge to IT development teams and was a key aspect of the upcoming Diffusing phase.

The IT division soon recognized that the primary focus of DT on the bank’s end customers could also be used for internal project needs (see box). The division continued to keep the focus on end customers, but the other involved parties (sponsoring business divisions) started to see the potential for internal projects.

Example Phase 2 DT Project: Optimizing Access to Stored Documents

The challenge addressed by this project was that the various forms needed by different departments were widely distributed over the intranet. Further, the structures of these stored documents were incompatible and inflexible. The IT document management team had worked on solving this problem for several years, but with limited success. The solution was a new way of visualizing hyperlinked forms, based on a “mostly linked documents” algorithm, and taking account of the different search patterns used by individuals.

This challenge was very important because it was the first DT project connected by content to an existing IT project team working on the same challenge, and it provided a good base to adapt the DT approach to the existing IT project structure. The inputs from the DT team were directly integrated into the existing IT project team. A direct comparison with the existing project structure showed that the DT team produced a customer-centric prototype in less than four months and with significantly less funding than the IT team was consuming annually on solving this problem.

Phase 3: Diffusing

The focus of Phase 3 (Diffusing) was to move beyond DT projects and the IT department. In this phase, the DT teams started to become contact points for problems that had arisen in the bank several times before but had never been solved.

Thus DT evolved to become a core methodology in the bank, with the DT teams perceived as reliable innovation partners. A person who was highly involved in the diffusion of design thinking said, *"For me, the biggest success is that people recognize a place within the bank that can be approached, especially for wicked problems that they were maybe already facing for a long time."* A managing director added the business view: *"We have a problem here with customer proximity, and they [the DT teams] have the approach to solve it."* Business divisions now accepted the need for tangible prototypes in their pursuit of innovation efforts. This showed that the understanding of customer integration was institutionalized far beyond IT projects. Moreover, there was a continuous "pull" from the business divisions to learn how to use this new problem-solving approach.

In Phase 3, organizational capabilities were deepened to use DT in a multitude of ways, including as a greenfield approach to gain totally new insights, or as a way of minimizing risks in an ongoing project. Employees throughout the bank became more aware of the need to consider end customers, and of the ways to approach them and use their inputs for innovation initiatives.

A standard DT "toolbox" was developed as part of an internal DT education program. Participants in this program came from very different management levels, ranging from a managing director to a development programmer. The program also included a one-day module integrated in the global graduate education curriculum. This class was held on a regular basis as part of the Graduate Program for Group Technology and Operations allowing the IT department to educate the next generation of IT managers on the value and benefits of customer proximity in IT.

Thus in Phase 3, the value of DT increased—and not only from the customer-centric point of view. Employees now recognized DT as a valid skillset for future work. One employee stated, *"I want to have that in my CV; it is also a useful tool for internal project staffing."*

As the evolution continued, DT teams were staffed in multiple ways. The externally recruited interns were mixed with internally recruited team members. The internal DT team members were strong ambassadors for DT after their

projects were completed. The bank realized that, compared to the start of the DT implementation process, mixed teams of internal and external members reduced the connectivity efforts needed within the organization. Additionally, the mixed teams were an excellent recruiting tool, with the bank acquiring new talent each year from the external members of the teams.

Diffusing DT as a customer-centric approach into regular project structures took six years. However, the experience of using DT over time helped to position the approach as a dominant way of challenging long-held assumptions. As a member of the innovation community stated, *"DT helped our team to constantly challenge the assumptions that we had built over the years; now, finally, we know that DT guaranteed the continuous integration of the customer's perspective in every project."* The deep diffusion of DT throughout the bank is confirmed by the common question now asked: *"Where is the tested prototype for that idea?"* Today, decision makers ask about prototypes almost more often than they ask about business case results. This is precisely what happened in the case described in the box.

Example of Phase 3 DT Project: Making a Brokerage System Attractive for New Clients

The purpose of this project was to find ways to attract new clients with no previous experience in brokerage to a self-service platform for the bank's brokerage business. A challenge for the project team was team members' own lack of brokerage experience. Without this knowledge, it was difficult to create a helpful tool for beginners in this area. The greatest need was to provide an easy way for potential clients to increase their knowledge about this kind of business, its products and rules. The solution developed by the DT team enabled the bank to create a financial education system that provided the required information in the language of the client and was easy to understand and use.

In summary, the evolution of design thinking at Deutsche Bank was characterized by organizational structures and mindsets, both of which focused on customer proximity. The IT division hosted the original DT team and was

charged with testing and developing the DT approach. The division addressed the challenges of achieving customer proximity by putting IT staff in direct contact with end customers and by creating an adequate project structure to enable continuous understanding of end customers' needs. The evolution resulted in a standardized DT skillset, in DT principles and tools being applied on projects at different hierarchy levels and different organizational divisions, and in ongoing communication about DT as a core methodology for innovation in Deutsche Bank.

Design Thinking Outcomes at Deutsche Bank

In Phase 1 (Learning), DT was mostly observed by members of the innovation community. As they saw results, they started to adapt and practice their own ways of using the DT approach, step by step (Phase 2: Adapting). They then started to diffuse these practices into the work culture, spreading awareness of customer-centric solutions (Phase 3: Diffusing). By 2015, the innovation community had grown to approximately 150 members, who regularly attend presentations and have built a knowledge- and experience-exchange community. The innovation community now has members from all divisions, which intensifies exchanges about DT between the IT division and other business-critical departments.

Another important outcome was the extent to which the DT teams located in the IT division had direct contact with the bank's potential end customers, which enhanced their understanding of customers and increased customer involvement. These contacts were made through needfinding and prototype testing. For each DT project, there were four iterations through the six milestones of the design cycle, leading to about 24 prototypes per project. Each prototype was tested directly with an average of about eight potential end customers. Thus there were about 190 direct customer contacts for each DT project, as well as about 20 more direct touchpoints. Finally, over 200 direct end customer contacts were created in an average four-month DT project. This meant that the IT team achieved a significant increase in contact with end customers.

The DT projects described in the boxes show how customer integration as well as customer understanding can be successfully addressed by applying the DT approach. As highlighted at the start of this article, speed is decisive in addressing bank customers' needs. The solutions of the first two DT projects, started 2009 and 2010, were implemented in less than a year from the first prototype (for the 2009 project) and less than 18 months (for the 2010 project).

Another significant outcome of embedding design thinking in Deutsche Bank was that it provided an efficient and effective way to launch new customer-centric services in a short time period. Over a five-year period, eight DT projects were finished: three final prototypes were implemented (2009, 2010 and 2013), one was abandoned (in 2010) because of personnel changes in the sponsoring business unit, and four were in different stages of development (2011-2012).

Lessons Learned

We have distilled five lessons for CIOs and other business leaders from the evolution of design thinking within Deutsche Bank. These lessons show that embedding DT in an organization takes time; it does not happen overnight.

1. Create an Enabling Organizational Structure

Sustainably embedding DT within a corporate environment requires an enabling organizational structure, the heart of which is an independent operational unit, that conforms to the role model described earlier. This organizational structure, together with space and prototyping budgets, helps to apply DT, even at the start of embedding efforts when DT is significantly different from current practices. An independent organizational structure that cuts across the existing silo structure creates a "safe zone" that enables the first steps of applying DT. Hence the enabling organizational structure needs to be placed at the intersection of business and IT, where it will also foster business-IT alignment.

This alignment occurs automatically when customer proximity is an integral part of the IT development process. The design thinking cycle shown in Figure 1 causes end customers'

needs to be continuously discovered and thus promotes customer proximity. The business relevancy of DT projects is ensured by choosing challenges that have strategic relevance. Overall, the stability provided by an independent enabling organizational structure ensures that the CIO and the IT division deliver customer-centric solutions and allows the DT approach to be embedded in a sustainable way.

2. Provide Design Thinking Education

Appropriate education is the key to success with DT. To follow an evolutionary path for embedding design thinking requires a well-thought-out mix of educational programs.

Design thinking is not just a set of principles; it also requires a certain mindset that is acquired by project-based training and experiences overseen by coaches who have previously acquired this mindset. It is absolutely essential to foster this mindset in team members from the very early stages of implementing DT practices. Applying DT principles without understanding the reasons for them and how they differ from current IT practices does not lead to real innovation in an IT context. Education on new DT tools and the required mindset should be phased, rather than trying to “swallow the elephant in one bite.” The education program might include modules that quickly instruct employees on how to use the new DT approach. But whatever techniques are used, DT education should clearly explain what works and what does not. To reduce the barriers to attendance, DT education and activities should be conducted in easily accessible physical spaces (e.g., at the entrance areas of buildings where IT employees are located), especially at the beginning of the embedding process.

When an education program is designed for employees at a wide range of levels and seniority, the use cases behind the course content is highly relevant. Although everyone will need to be familiar with the same underlying DT principles, different levels will need different DT perspectives to ensure they can recognize the relevance of DT to their particular circumstances.

3. Strategically Position Design Thinking Team Members

Strategically positioning people is crucial to overcome the typical walls between DT teams and

IT development teams. Key insights gained from the DT prototypes will be lost at the development stage if no one from the DT team works with the IT team to supervise the development of the production-ready product. Alternatively, a former DT team member can become a fully integrated member of the IT development team. Such a move especially helps to overcome the “not invented here” problem. An IT team member who has “changed sides” in this way is well positioned to persuade his or her new colleagues to try the DT approach.

Another way of strategically positioning people is to recruit internal staff who have worked in the organization for a considerable time and therefore have a well-developed network of contacts within the business. Such people can then be assigned as DT team members and later move back into the business. This quote by one such Deutsche Bank employee shows the impact of this tactic: *“It is not only about the knowledge and expertise that I have gained, it’s also about the curiosity toward innovation that started to grow.”* Because DT requires direct and continuous engagement with customers to understand their real problems, DT team members from the business are hugely respected by their business units. Their exclusive and deep knowledge about end customers automatically positions them in a very favorable light.

To follow an evolutionary process for embedding DT in the organization, DT teams should comprise people with strategic, innovative and communication profiles.

4. Use Prototyping as a Key Tool

One of the most important aspects of design thinking is the use of physical prototypes. At Deutsche Bank, prototypes were the medium of communication for all stakeholders. Digital newsletters and Twitter feeds were tried, but nothing was as successful at communicating the successes of DT as physical prototypes. An IT management representative said: *“You cannot imagine how long we have talked about this rudimentary financial timeline after the presentation in our group, because we had the possibility to see how it should look and try it out ourselves.”* Fully functional prototypes of ideas are not necessary for getting people involved; a rudimentary, tangible prototype of a unique

idea is sufficient to engage top-level managers and get them thinking about further usage scenarios, even during post-project phases. In fact, resources are more likely to be devoted to further development of ideas if senior managers are shown physical prototypes instead of presentation slides.

Deutsche Bank found that the series of prototypes from a DT project created a repository of ideas that may not be used in a particular final product but which might turn out to be key in the development of future products, provided developers have access to the discarded prototypes. However, prototyping can be hard to implement and, to follow an evolutionary approach to embedding DT, must be accompanied by experienced method coaching.

5. Take an Evolutionary Approach to Building a Design Thinking Culture

A Relevant Starting Point Helps to Gain Awareness. As with any culture change, there will be built-in inertia to building a DT culture. The key to overcoming this inertia is to start with small projects and small teams. As a starting point, the IT division should choose a DT challenge that is strategically important, not only from an IT perspective but also from the perspective of the entire organization. Solving real problems, especially with real customers, is the best way of promoting the DT methodology because people become curious about this new customer proximity approach. No one will be persuaded by “toy” examples. Finally, to assure continuity in awareness, the bridgehead role, combined with senior management support, is critical.

Long-Term Resources will be Needed. An evolutionary approach to culture change needs resources that allow the work to continue over a long period of time. It is almost certain that a culture change of the type described in the Deutsche Bank case study could not be achieved by simply directing existing staff to learn a new methodology. Rather, the culture change has to develop organically, building on successes and excitement. This takes time, money and people. If an organization really is committed to this type of change, it must allocate substantial resources, such as personnel, space, budget and freedom to work, to the initiative.

In Conclusion

Some say that in the context of large firms the term “innovative company” is an oxymoron because of the barriers to innovation large firms face. At first sight, this would seem to be especially true for large firms trying to use the DT approach for innovation initiatives. However, the Deutsche Bank case study shows that it is possible to overcome the barriers of using DT for innovation. The bank’s customer-involvement efforts, which aimed to deepen its understanding of end customers’ needs, helped to address the problems outlined at the start of this article. Moreover, the case shows that using the customer-centricity and physical prototyping features of design thinking leads to better alignment between business and IT operations.

Rather than trying to impose design thinking on the entire company at once, this innovation approach was introduced by Deutsche Bank using a kind of “guerrilla warfare” tactic. Once enough subversion had taken place, the new methodology was established as a part of the bank’s practices with the hiring of a Vice President for Design Thinking.

Deutsche Bank began its DT journey with a kernel of DT expertise provided by external method experts. These method coaches trained a small DT team, which then began to deliver successful DT projects. People from the DT team were then moved into the IT division, where they developed their own internal education program. Six years on, the internal use of design thinking in projects and the DT education program continue to expand in Deutsche Bank, not least to address the problem of recruiting in a competitive market for talent. Today, the evolution of design thinking within Deutsche Bank has reached the point where employees can receive help with “wicked” problems from dynamic, innovative rapid-prototyping-oriented teams that provide iterative, tangible prototypes and that can develop the final prototype into a production-ready solution. The time-to-market for these solutions is very much shorter than with traditional IT development processes. Moreover, the DT teams achieve all this with continuous and deep customer involvement.

Changing an organization’s innovation culture demands full commitment from numerous players and parties. To embed DT in the

organizational culture, each player and party must push customer-centricity to a level where customer involvement becomes a continuous part of a project. Customer-centricity is the key to creating a competitive advantage for the company through innovative offerings. It took Deutsche Bank six years to fully integrate the DT approach into its regular IT project development process. As many of the involved parties stated, there is no shortcut to reaching the level of maturity required to move on to the next phase of design thinking evolution.

Finally, the Deutsche Bank case not only offers important learnings for CIOs and IT directors, but also for other business leaders who are striving to achieve customer proximity in their innovation processes.

Appendix: Research Method

Since 2009, we have studied the application of DT in Deutsche Bank's IT division at its headquarters in Frankfurt, Germany, and other selected global locations (New York, Singapore and London). We used several research methods to create this case study, primarily semi-structured interviews with Deutsche Bank employees and detailed analysis of the company's structure and development over the years. We conducted 71 face-to-face interviews between July 2009 and February 2015 with executives and senior managers and other involved parties from the IT and business divisions. At least two researchers participated in all interviews. The interviews were recorded, transcribed and analyzed by two researchers using qualitative data analysis. Most of the involved people were interviewed several times over the years and therefore provided an evolutionary view on the development of DT within the bank (some were interviewed up to eight times over the course of the study). Additionally, the long-term analysis of the data ensured we gained a long-term critical perspective and helped us to investigate different reasons for certain developments. The analysis of the evolutionary cultural change toward customer-centric IT was complemented by intensive discussions with senior experts on organizational IT environments from university institutes as well as with IT managers in other companies.

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