# The Transformative Role of Bimodal IT in an Era of Digital Business

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## Abstract

*Digital transformation is challenging the traditional expectations of the IT function, as organizations demand a more agile IT function, capable of exploring innovative uses of IT in a digital business context. Using qualitative executive interview data, this paper explores the bimodal approach organizations can use to create an IT function that effectively supports and drives the organization's digital agenda. The study finds that for many organizations, a bimodal IT design, of which we found three distinct archetypes to exist, serves as a transitional stage in the pursuit of embedding a higher level of agility and a stronger exploration focus in the IT function, which ultimately operates unimodal. This study's investigation into bimodal IT has significant implications for how the IT function transforms in the digital business era and is of relevance to practitioners as digital transformation affects organizational structure, culture, and methods of working.*

## 1. Introduction

Academics and practitioners alike have observed the rise in the strategic value of information technology (IT). However, they have also challenged the ability of a firm's IT function to support the organization in achieving its strategic objectives [6]. With the increased focus by organizations on digital transformation, a trend that is often driven by changing customer behaviors and new market entrants with digital business models, the emphasis on the IT function to support the organization in developing digital capabilities has intensified.

Established firms often face challenges exploiting opportunities that arise from digitization. Organizations often need to work within the constraints of existing legacy information systems (IS) and with an IT function, which is frequently focused on "keeping the lights on", rather than on conducting exploratory activities. New firms have entered the market with digitally supported offerings, which have in some cases secured significant market share, and are posing threats to established firms and their traditional business models. These threats, actual or perceived, as well as the lucrative digital opportunities available, if successfully exploited, have caused established firms to focus on IT agility and IT exploration to enable digital transformation. A frequently adopted mechanism, for example, is the implementation of "digital labs", where employees are located in an environment focused on entrepreneurship and innovation. This supports the creation of digital innovations which often take the form of externally facing services that facilitate increased customer engagement (e.g., through mobile applications) as well as automation (e.g., business-to-business platforms).

Digital transformation does not just affect products, services, and business models of organizations, but also affects the internal organizational landscape, including leadership roles and responsibilities [2, 13, 18]. Many firms are aware of the need to transform themselves, including their processes and culture, to achieve their digital objectives. This has frequently resulted in the restructuring of organizations and the creation of new executive roles, such as the Chief Digital Officer (CDO) [21]. The implications of digital transformation for the IT function lie in the revised business expectations of IT. Many business executives previously perceived IT primarily as a cost center. However, they now require the IT function to increase its agility and become a driver of digital innovation.

Bimodal IT is a concept developed by practitioners [3], which argues that the traditional design of the IT function is often not suited to effectively balancing both exploratory and exploitative tasks. Instead, to have the agility to support the business with exploratory digital innovation, while at the same time maintaining superior traditional IT operational performance, the IT function should operate in two parallel modes [3, 8]. The two modes differ structurally and typically follow different management principles, as they are set up to achieve different objectives. Mode 1 represents a traditional approach to IT governance, with an emphasis on safety and accuracy, while Mode 2 emphasizes agility and speed by operating non-sequentially in multiple iterations. Throughout this paper, we are referencing these two modes by referring to them as Mode 1 and Mode 2. Both modes typically have their own methodologies, structures, governance principles, and culture as well as varying attitudes toward risk acceptance. With performance being of highest value,

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Mode 1 typically utilizes waterfall-driven (sequential) approaches to managing IT projects and facilitates a risk averse culture. In Mode 2, customer experience and business outcomes are in the foreground, with teams often applying agile (iterative) project management methodologies (e.g., "scrum" techniques [1]), targeting short release cycles, and working on endeavors with less certain outcomes. Bimodal IT, also sometimes referred to as "two-speed IT", encompasses the provision of platforms optimized for stability and resilience alongside platforms to develop and run customer-facing applications. In a bimodal design, this is realized by an architecture of segregated platform domains, with one domain managed for fast-paced iterative delivery (Mode 2) and the other managed for back-end transactional integrity (Mode 1) [3].

Practitioners have extensively discussed whether bimodal IT is a desirable form of design for the IT function. While there are mixed opinions in praxis, our study investigates the drivers, manifestations, and future path of this concept and aims to guide practitioners by laying out the implications.

## 2. Conceptual background

Although research on bimodal IT is still in its infancy, initial studies that contrast the characteristics of "traditional IT" and "digital IT" in a bimodal setup exist [14]. However, there is little guidance from IS research on the approach that an organization should take to leverage this trend. At the same time, this has not inhibited practitioners from developing their own concepts around bimodal IT [1, 3, 8], leading to a situation where practice leads research. In practice, organizations have explored a range of structural and managerial options to reliably maintain existing IT infrastructure and applications while at the same time pursuing mechanisms to harness digital innovations [4].

In this section, we briefly provide some background on digital transformation and its implications for the IT function as well as introduce the concepts of IT ambidexterity and IT agility, as they are relevant for explaining the findings of our study.

### 2.1. Digital transformation and its implications for the IT function

Technological change and innovation as well as the rapid adoption of digital products and services by consumers in recent years have significantly affected our modern society. Describing the implications for businesses, the term "digital transformation", often used synonymously with "digitization", has become a popular phrase among practitioners in this context. We view digital transformation as encompassing the digitization of sales and communication channels and the digitization of a firm's offerings (products and services), which replace or augment physical offerings. Furthermore, digital transformation entails tactical and strategic business moves that are triggered by data-driven insights and the launch of digital business models that allow new ways of capturing value [2, 20, 24].

This has resulted in a paradigm shift in the perception of the IT function and has extended the IT function's role beyond its traditional service provider role [13, 25]. Today, the business demands an IT function that is at the forefront of exploring digital options that create competitive advantage for the firm [24]. Previously, the approach to IT strategy creation has focused on aligning functional IT strategy with business strategy [14]. However, digital transformation now influences the firm's strategy formation, resulting in increasing reliance on digital business components to drive value. As a result, the distinction between business and IT is becoming increasingly indistinct [2].

In order to truly harness the power of digital transformation, organizations need to manage significant changes, including changes to the design of the IT function [10], especially with regard to IT agility and IT exploration capabilities. A firm's Chief Information Officer (CIO), the most senior IT executive, is often challenged with finding the optimal balance of explorative and exploitative IT endeavors as well as provisioning agility besides high reliability, all of which regularly relate to the choice of structural design, management style, and working methods in the IT division. IS research and practice have long debated the question of how to organize the IT function best in order to effectively contribute to the firm's performance [3, 8] and this discussion has only intensified in the context of digital transformation.

In the past, IS research has focused on describing the types of operating models rather than the actual underlying arrangement of activities that enable the IT function to support the organization in its pursuit of digital business opportunities. Meanwhile, practitioners have created novel approaches to organize firms' internal IT functions, with bimodal IT designs receiving a great amount of attention from CIOs and IT leaders who wish to maintain and enhance traditional IT while being able to respond to business demands for exploring digital innovation options [1, 3]. Simultaneously, practitioners have identified that traditional governance structure and rules are "putting the brakes on" the necessary experiments and innovations required for the business to thrive in the digital economy [8].

While the implications of digital transformation for firms across industries have received significant attention in practice and academia [3, 24], the

implications of digital transformation for the IT function in terms of optimal governance structures, management methodologies, organizational setup, working methods, processes, and culture are thus far scantly researched.

### 2.2. IT ambidexterity

The concept of ambidexterity describes the ability to balance competing and conflicting priorities, which in an organizational context are typically explorative and exploitative actions [17]. Accordingly, IS research views IT ambidexterity as the IT function's ability to simultaneously explore new IT opportunities and innovations (IT exploration) as well as exploit existing IT resources and practices (IT exploitation) [16].

Supported by early research in this field, firms initially attempted to achieve ambidexterity through multiple structurally separated divisions with different exploratory and exploitative mandates [9]. However, the mechanisms that allowed this structural separation to occur were cumbersome and expensive to implement. Thus, the concept of ambidexterity was expanded to enable individual divisions to become "contextually ambidextrous" by requiring each division to pursue exploratory and exploitative activities in balance [23]. However, in the context of digital transformation, there appears to be a reversion to structural ambidexterity on the business side, with business units undertaking explorative digitization initiatives by forming separate innovation teams that exist outside traditional organizational structures.

### 2.3. IT agility

IT agility encapsulates the ability of the IT function to sense opportunities to innovate and to respond rapidly [11]. This enables the IT function to seize opportunities that arise with "speed and surprise" as well as quickly adapt to external developments in areas such as technology and regulation [7, 22]. An agile IT function is capable of being proactive and driving the changes that the firm's competitors will need to respond to. Moreover, it is able to comprehend changes in the firm's environment and respond rapidly. Conceived as an antecedent to organization agility, IT agility allows firms to rapidly respond to competitive actions from a greater repertoire of responses [22] and, in the context of alignment, enables swift correction of misalignment between business and IT [27].

The concept of IT agility has been extended in the context of digital transformation. Firstly, with digital disruption increasingly affecting traditional business models, IT must not only support the organization in increasing its agility, but the IT function itself must also gain agility [27]. Secondly, IT agility needs to be complemented by an organizational culture that fosters agility. The effectiveness of an agile IT function is limited if the organization's culture does not facilitate entrepreneurship, as the responsiveness of the IT function will be underutilized due to a lack of impetus by the overall organization to innovate [26].

In summary, digital transformation encompasses significant changes for firms across industries, implicating increased desirability of high levels of IT ambidexterity and IT agility. While there has been extensive research on each of these disciplines, IS research has paid scant attention to bimodal IT and its propensity to enable IT agility and IT ambidexterity. To address this research gap, our study poses the following three research questions:

1. When and under what conditions do companies consider a bimodal IT design?
2. What implementation options are predominant?
3. How does bimodal IT promote the IT function's evolution?

## 3. Research methodology

### 3.1. Research design

We used a field study approach to investigate bimodal IT, utilizing data from 19 European companies. This approach has previously helped to explore various managerial research topics, particularly in areas where little prior research exists [12]. Utilizing field data across a variety of contexts rather than analyzing individual cases allows us to increase the generalizability of the results [15].

We examined companies with similar organizational characteristics (i.e., large and very large European firms) in various industries. Companies participating in our study had to have a minimum of 250 employees, annual revenues of at least 50 million Euros, and an internal IT function with a history of at least 15 years. We initially approached CIOs of 60 companies and received confirmations for interview appointments from 19 CIOs who were subsequently interviewed either by phone or in person. In three cases, the CIO delegated the interview to a direct report due to the CIO's unavailability. Following the interview, the CIO was requested to refer us to an executive on the business side who is particularly concerned with digital business topics (namely the CDO in cases where such a role existed). Table 1 provides an overview of the 19 cases and lists information on firm size, industry affiliation, as well as the reporting level and functional role of the interviewed business and IT executives.

### 3.2. Data collection and analysis

To ensure comparability and reliability of the results, we employed an interview guide for conducting semi-structure interviews with the executives. The interviews were completed in the timeframe from February to May 2016 and were scheduled for a duration of 60 minutes, with actual interview durations ranging from 45 to 100 minutes. Although the interview topics were the same for both business and IT executives, the specific interview questions depended on the role of the interviewed executive. For example, CIOs were asked to assess past developments and share future plans around the design of the IT function, while business executives were asked to discuss their perceptions of changes in the IT function's design as well as expectations regarding an IT design that would provide optimal digitization support for the organization.

We also gathered complementary quantitative data from business executives and CIOs using a follow-up questionnaire in order to increase reliability and validity of our findings. The questionnaire items covered aspects such as the organizational support for IT (as perceived by the CIO) and IT vision and contribution (as perceived by the business executive).

All interviews were recorded and transcribed. In cases where the interview language was not English, the interview transcript was translated into English before coding the data. The coding process involved two coders and codes were only accepted where both agreed on the codes; however, no substantial disagreement occurred. We supplemented interview and questionnaire data with secondary data, including press releases and publicly available reports on the companies as well as internal documents that were made available to us.

We then prepared the coded interview data, questionnaire data, and supplemental data using data reduction methodology [19]. We deduced the different states and archetypes of bimodal IT by using a coding tree that is grounded in key characteristics of each case, such as the structure, working methods, and governance of the IT function (as perceived by the IT executive and the business executive). We furthermore compared the cases to identify similarities in relationships and facts, using cross-case analysis techniques [19]. Our early conclusions were confirmed by relating various manifestations of bimodal IT with IT ambidexterity and agility. Eventually, we aggregated our findings into a framework for bimodal IT that is grounded in the collected data.

**Table 1**. Overview of investigated cases

| Case ID | Firm Size [1] | Industry | Interviewee's Reporting Level to CEO [2] | |
|---|---|---|---|---|
| | | | IT Executive | Business Executive |
| Case 1 | Very large | Insurance | + 1 (CIO) | + 1 (Operations) |
| Case 2 | Very large | Media | + 2 (CIO) | + 2 (Strategy) |
| Case 3 | Very large | Travel/Transport | + 2 (CIO) | + 1 (Digital Business) |
| Case 4 | Large | Professional Services | + 1 (CIO) | + 1 (Sales) |
| Case 5 | Large | Banking | + 1 (CIO) | + 1 (Strategy) |
| Case 6 | Large | Travel/Transport | + 1 (CIO) | + 1 (Operations) |
| Case 7 | Very large | Wholesale/Trade | + 2 (Group CIO) | + 1 (Digital Business) |
| Case 8 | Very large | Banking | + 3 (CIO + 1) | + 2 (Digital Business) |
| Case 9 | Very large | Retail | + 2 (CIO) | + 1 (Digital Business) |
| Case 10 | Very large | Media | + 2 (CIO) | + 2 (Digital Business) |
| Case 11 | Very large | Retail | + 1 (CIO) | + 1 (Digital Business) |
| Case 12 | Very large | Utilities | + 2 (CIO) | + 1 (Marketing) |
| Case 13 | Large | Banking | + 2 (CIO) | + 1 (Operations) |
| Case 14 | Large | Media | + 2 (CIO) | + 2 (Digital Business) |
| Case 15 | Very large | Manufacturing | + 3 (CIO + 1) | + 3 (Operations) |
| Case 16 | Very large | Automotive | + 2 (Group CIO) | + 2 (Digital Business) |
| Case 17 | Large | Health Care | + 2 (CIO) | + 3 (Innovation) |
| Case 18 | Very large | Health Care | + 3 (CIO + 1) | + 2 (Digital Business) |
| Case 19 | Large | Professional Services | + 1 (CIO) | + 1 (Digital Business) |

[1] Firm size: Large = employees > 250 & annual revenue > EUR 50 mil.; Very large = employees > 1,000 & annual revenue > EUR 500 mil.
[2] Reporting level to CEO: +1 = direct report; +2 = 2 levels below CEO; +3 = 3 levels below CEO; (CIO + 1) = 1 level below CIO

## 4. Results

Our data analysis reveals three key findings. Firstly, we find agility and ambidexterity are the two primary reasons why companies decide to implement a bimodal IT design. Secondly, the data identifies three different archetypes of bimodal IT manifestations. Thirdly, we find that bimodal IT is an interim transition step in the overarching transformation of the IT function, as digital transformation places different demands on IT, rather than being an end state for the IT function.

### 4.1. Finding 1: Why companies decide for a bimodal IT design

In general, our data shows that the transition to a bimodal IT design correlates with business demand for more effective digitization support as companies realize the implications of digital transformation. Strong and rapidly increasing internal and external pressure to develop digital business solutions such as ancillary end-customer facing digital services, digital customer communication channels, and the digitization of the firm's offerings itself demands a level of IT agility and IT exploration that traditional IT governance has not historically been designed for.

**4.1.1. The need for IT ambidexterity.** Many companies have developed a strong focus on IT exploitation in the past. Digital transformation, however, is about exploring innovative uses of IT rather than optimizing costs and affecting incremental IT improvements. Several interviewed executives identified that this is important, including the CIO in case 9, as "*it takes a mindset change, the courage to experiment, a culture that accepts failure, and different working methodologies, which takes time to implement*". In response to strong demand for support of digital business innovation, Mode 2 can serve as a means to cultivate an environment of IT exploration. "*Our [Mode 2] digital unit has the mandate to identify and experiment with relevant new technologies. We set new standards with regards to creative working, decision making, and collaboration,*" stated one of the CDOs (case 11), explaining why the company established the CDO's group outside of the traditional IT division that operated in Mode 1.

**4.1.2. The need for IT agility.** Dissatisfaction with the responsiveness of the traditional operating mode of IT, rigid system landscapes that allow little flexibility, and waterfall-driven approaches to IT project management are major reasons for IT functions to introduce Mode 2 as an alternative in a bimodal design. "*[Mode 2] allows us to quickly take on new topics and build solutions incrementally in short cycle times,*" stated the CIO in case 10, while other interviewed executives made similar remarks. The introduction of a separate mode is often a desirable choice because of dichotomous expectations of IT in many firms as "*top management is constantly questioning the high cost of IT, but at the same time demands agility*" (Business executive, case 18). A bimodal IT design can assist in balancing both.

### 4.2. Finding 2: Three archetypes of manifestations of bimodal IT

Of the 19 companies in our study, 14 companies exhibited an IT design that operates in two distinct modes. While those firms employed varying forms of bimodal IT, our data analysis identified three distinct archetypes (A), (B), and (C) with different intensities of structural split between the two modes. In the least strict split between Mode 1 and Mode 2, the mode is chosen on a project-by project basis (archetype A). Choosing a more intense approach, some companies introduce a distinct split between operating in Mode 1 and Mode 2 within the IT function (archetype B), while others further articulate the spit by implementing Mode 2 as a separate divisional entity outside of the IT division (archetype C). Figure 1 depicts the three archetypes of bimodal IT. The state of bimodal IT and the archetype chosen in each of the cases is contained in Figure 2.

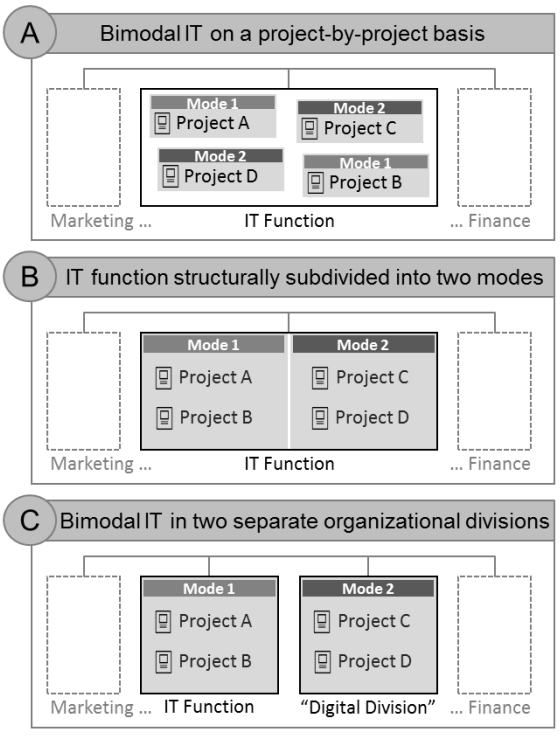


**Figure 1**. Three archetypes of bimodal IT design

**4.2.1. (A) Bimodal IT on a project-by-project basis.** A frequently chosen approach to the operationalization of bimodal IT is to implement a second mode that is adopted for selected projects. Starting a new project requires prior selection of one of the two modes.

The CIO of a large European airport (case 6) described how the introduction of an "*agile project mode*" in the IT division allows project teams to follow "*more startup-like processes"* to support digitization projects. Previously, the IT function had been perceived by the business as non-innovative and too slow to respond. "*However, our biggest challenge is getting our IT staff to adopt the new working mode. Working under the agile mode means purposefully allowing failure, trying ten things, throwing away seven, and continuing with three,*" explained the CIO as he described the challenges relating to the more explorative style of Mode 2 that his employees are not used to yet. "*We have now successfully managed two projects under the agile mode and are going to manage more projects like this, once we have more people trained on the new processes and they embrace the new working style.*"

Establishing a Mode 2 for IT projects can be challenging, especially in highly regulated industries with strict processes and tight governance around IT implementations. Case 5, for example, describes a large European bank that has been historically very conservative, but has recently begun to experience "*a growing appetite for risk when realizing the potential of digital innovation in the financial technology space*" (CIO). The IT function has developed a "*fast path approach*" that follows a "*light touch governance model*" and allows projects to "*skip certain process steps in order to gain speed and agility,*" explained the CIO. Yet, "*this approach cannot be followed by all projects due to regulatory requirements and service level stipulations*". Project teams operating under the "*fast path approach*", however, have the freedom to experiment with digital innovations and launch new services quickly. "*We have successfully developed a web chat application for online banking and released it into production. However, by declaring it a pilot, the project team can get around certain IT service elements and the stipulation to have complete process descriptions, which slow other projects,*" explained the CIO, highlighting the more agile and explorative approach these projects are taking. The business is aware of the "*implications of having unsupported prototypes in production*" but accepts the risks in exchange for speed, agility, and explorative learnings.

**4.2.2. (B) IT function structurally subdivided into two modes.** Companies that structurally subdivide their IT function into two distinct groups that operate under the two modes have an increased level of bimodality.

The automotive manufacturer in case 16, for example, introduced such a split in response to implementing its digital business strategy. "*Our traditional core IT has large commodity components to it,*" stated the interviewed Group CIO, explaining how this type of IT requires a separate operations mode than "*the agile IT division, which is highly connected to the digital strategy and implementing the digital vision we have for the company*". "*Our IT division has to work in two modes now because we cannot just switch off or stop supporting the old systems and applications, while another group within the IT function has the mandate to innovate and lay the foundation for flexible information systems that combine, aggregate, and analyze data utilizing today's digital possibilities,*" added the interviewed business executive.

The CIO of a media company (case 2) compared his bimodal IT divisions with "*tankers*" and "*speedboats*". "*On one hand, you have a big tanker where system stability and reliability are of highest value. On the other hand, you need speedboats to experiment with new technologies and bring digital innovation to the market quickly. You have to be careful not to slow down the speedboats too much by linking them too tightly to the tanker. We have experienced in the past that these speedboats need to be organizationally separated from the tanker to guarantee speed and flexibility.*"

A professional services company CIO (case 4) subdivided his IT division into two groups with one group "*working on customer-facing IT solutions where we see a strong demand for agility and innovation*" and the other group "*delivering traditional IT services*". "*[The former] requires a different skill set than what we find in our traditional IT unit and a more business-minded, almost consultant-like, way of thinking,*" explains the CIO as he provides reasons for splitting the department into Mode 1 and Mode 2 units. The business recognizes the value of the bimodal model, with the interviewed Head of Sales stating, "*On one hand, we want to spend less on traditional IT; on the other hand, we demand our IT function to evolve into a more agile digitization support unit that has a deep understanding of our business and customers, so [the bimodal design] fits well into our digital transformation strategy.*"

**4.2.3. (C) Bimodal IT in separate organizational divisions.** A less common but even more intense approach to bimodal IT is to implement Mode 2 completely outside the traditional IT function. In such cases, the division operating in Mode 2 is frequently under the leadership of a Chief Digital Officer and often referred to as "digital division".

Case 11, for example, describes a multi-divisional retail firm that is challenged by stagnating revenue streams from its traditional business models. The senior

leadership team of the company decided to diversify into ancillary digital services through digital channels and introducing digital customer touchpoints at the firm's thousands of small retail outlets. A digital laboratories unit outside of the IT function was formed and a CDO was hired to head the new division, which operates in Mode 2. "*We intentionally wanted to cause [internal] disruption by forming a new unit*," stated the CDO, referring to his mission to "*ultimately foster a more innovative mindset and culture across the organization*". "*Insufficient knowledge of our core business and a cost-driven focus on keeping our legacy IT operational*" are the key reasons stated by the CIO for why the IT division has been unable to explore and experiment with innovative digital end-customer services. "*My IT department was not the right place for the digital labs,*" stated the CIO.

Another way in which companies achieve a bimodal IT design with separate organizational divisions is through strategic acquisitions. The multinational pharmaceutical company in case 18, for instance, acquired a digital leader in its industry in order to accelerate its own digital transformation. "*We kept the highly innovative IT division of [the acquired company] deliberately separate from our classical IT in order to protect the culture, the resources, and the innovative spirit we have there*" stated the interviewed business executive, adding that "*the value of the [acquisition] deal would be destroyed if we were to integrate it with our traditional IT division.*" Hence, the acquired firm became the digital division of the company. The interviewed IT executive explained how "*we needed to protect an alternative environment to work on digital solutions in the horizon of days and weeks rather than months and years,*" which are common cycle times in the traditional IT space. "*We realized that digital is not the same as IT; digital exploration requires a completely separate process framework that is different from the robust processes we have in place in large parts of our IT department.*"

Each archetype comes with its specific advantages and disadvantages. Depending on the circumstances, a company might prefer one to another, but we did not identify a general hierarchy of archetypes. It is also worth noting that alternating between archetypes is possible. We noted that IT functions of several firms had previously changed their bimodal IT design. Although shifting from archetype A to B or from B to C is more common than other transitions, our data does not support the concept that the development of bimodal IT in firms begins with archetype A and then sequentially moves to B and C.

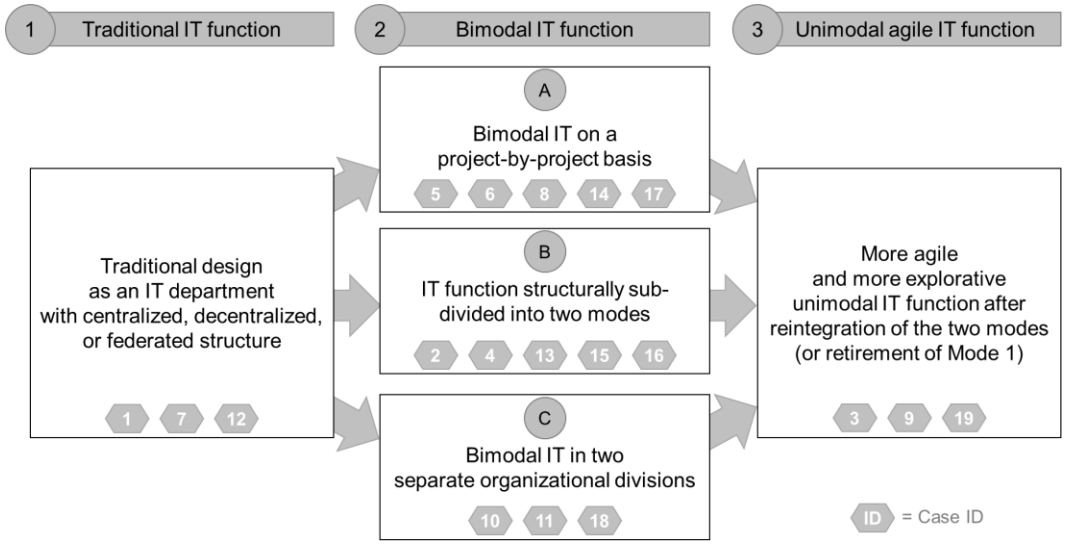


**Figure 2**. Concept of bimodal IT as a transition stage toward a more agile and explorative IT function

### 4.3. Finding 3: Bimodal IT as a temporary transition stage

Considering the research question of how bimodal IT fits into the evolutionary development of the IT function, our data analysis provides a clear answer: bimodal IT is an interim short-term stage in a larger transformational process that the IT function undergoes as the business demands more effective digitization support from IT. Figure 2 depicts this evolution.

Only three companies in our study solely operated with a traditional design. However, the interviewed executives in all three cases indicated that switching to a bimodal design in the future was a possibility. "*As*

*an energy utility [compared to other industries], we arrived fairly late to the digital age. We just started our very first digitization project, but our IT division still operates in a traditional design*," stated the Chief Marketing Officer in case 12. His CIO counterpart strictly opposed the idea of operating under an archetype B or C design because "*it contradicts the culture we have in our IT organization*". However, the CIO could envision "*working with an adaptive speed on a project-by-project basis*," stating, "*agile methods of working might be more suitable to support emerging fast-pace digital initiatives in our company*." The CIO of a wholesale and trade company (case 7) explained how the need for a bimodal design is currently surfacing: "*we are still working with traditional release cycles and long lead times from requirements gathering to design, development, and testing. However, we see growing business demand for taking a step-by-step approach to jointly working on innovative digital solutions at much faster speeds. Yet, we do not have the people who are capable of working in this mode. Our newly appointed CDO is now going to build such a division from the ground up.*"

Yet, we found that companies seldom plan to keep the bimodal IT design in the long term. In nearly all cases, IT executives had the ambition to transition their IT function to a unimodal agile IT function that largely embraces agility and IT exploration. Bimodal IT is predominantly viewed as a temporary means of transformation. "*Senior management has plans to roll [Mode 2] out across the entire IT organization […]; we have already started giving training to various groups in the corporate IT organization in order to spread the culture and the way of working*," stated one of the interviewed IT executives (case 18). Another CIO (case 13) elaborated, "*Outsourcing is a core aspect of our IT strategy and might bring us to a point where our [Mode 1] IT division can be fully dissolved.*" The Head of Strategy of a large bank (case 5) explained his vision of how, "*in an ideal world, we don't have two modes of IT, but we have a highly agile single-mode IT, where IT operations are fully integrated into the digital business innovation processes. In fact, at some point, I see IT not existing as a division anymore, but as a competency fully embedded within the business.*"

Three companies in our study had already taken the next step and transitioned from a bimodal design to a unimodal design. The large retail firm described in case 9, for example, had a bimodal IT design with two separate organizational divisions (archetype C) for several years in order to develop an e-commerce presence. "*We decided to spin off our digital endeavors as an autonomous entity in fear of being slowed down by the rest of the organization, not just with respect to IT but also our traditional approach to marketing, procurement, etc.*," stated the former head of the division who now fills the CDO role of the company. "*Now that our online sales platform has become a mature pillar of our business, we decided to reintegrate the divisions of the e-commerce entity into our company and build a multi-channel organization*," added the CIO. By reintegrating the Mode 2 e-commerce IT team with the Mode 1 corporate IT function, the company managed to "*transfer technological knowledge, competencies, cultural aspects, and working methodologies*" (CIO), thereby enhancing agility and ambidexterity of IT. Case 3, which describes a passenger transport company, provides another such example. The company had successfully developed a strong online and mobile presence for ticket sales and on-trip digital customer engagement in an archetype B structurally separated IT division. "*We chose to merge the two divisions back together although this meant a huge culture clash*," explained the CIO, remembering how "*[the] classical [Mode 1] IT division used to have two software releases per year and conflicts about the prioritization of requests commonly led to escalations.*" "*Now [after merging Mode 1 and Mode 2] we are designing a common platform for both online and offline sales systems with an architecture that allows for a high degree of flexibility and fast-speed development, which will shift the mode of our entire IT organization to weekly release cycles*," stated the CDO who had formerly been responsible for the Mode 2 IT division and is now a top management board member.

## 5. Discussion

### 5.1. The bimodal IT phenomenon

This paper introduces the concept of bimodal IT to the academic discourse as being the division of the IT function into two modes. Mode 1 is focused on stability and enabling the IT function to provide continuous IT services to the business and Mode 2 is focused on assisting the organization in rapidly responding to external market forces and driving digital innovation. Through the accumulation of these two modes, the IT function as a whole can assist the organization engage in explorative and exploitative endeavors. This definition is consistent with the experience described by practitioners [8].

Moreover, we extend the concept of bimodal IT in two major ways from that discussed in practitioner literature, which presents a direct contribution to both academic and practitioner knowledge. Firstly, we found three archetypes of bimodal IT to exist in

practice: project-by-project mode selection, a structural division of the IT function into two modes, and implementing Mode 2 entirely outside of the existing IT division. Organizations implementing these approaches are able to adopt one archetype and later adjust to another archetype as a result of changing requirements and the experience with the previous archetype. Secondly, we discovered that bimodal IT is not the end destination for the IT function. Instead, bimodal IT is used in practice to achieve the next evolutionary state where the different exploratory and exploitative modes are combined again in a unimodal IT function, which is more agile than at the beginning of the IT function's transformational journey.

### 5.2. Implications for IT ambidexterity

Academics and practitioners alike have been discussing tensions between conflicting and competing tradeoffs in IT. While these tensions have existed for some time, we argue that the bimodal IT design presents a solution to transform the IT function into a more ambidextrous one. As the impact of digital transformation on business increases, the IT function is required to contribute to the organization's exploratory endeavors, which entails the IT function taking on similar exploratory traits. Specifically, we find that an initial separation into two modes helps achieve this and enables the IT function to transform.

Bimodal IT represents to some extent (especially in archetype B and C) a return to structural ambidexterity, where one division focuses on exploratory activities while another division focuses on exploitative activities. Yet, the approach to separate the IT function into two modes is novel compared to existing methods of creating contextually ambidextrous IT functions, which principally rely on individual staff members conducting exploratory and explorative activities in the right amounts under the direction of IT leadership. Rather than striving for contextual ambidexterity from the outset, firms should initially utilize structural ambidexterity through a bimodal IT design to commence the transition.

However, separating the IT function into two modes requires mechanisms, which are often costly to implement, and can inflict a deep cultural division and cause tensions between the different teams. In the long term, firms should resolve this by merging the IT function back into a single operating mode through creating a single division rather than relying on structural mechanisms to implement ambidexterity.

### 5.3. IT function transformation

While there are mixed views by practitioners on the ability of the bimodal IT concept to improve the performance of the IT organization and the organization as a whole [5], this study finds that firms implementing bimodal IT can use it as a pathway to enable the IT function to transform itself. Practitioners can conduct this transition by following these guidelines:

(1) Assess the current state. Even if it has not been formally introduced, the IT division might already have adopted a bimodal design. Especially, archetype A is often adopted informally.
(2) Find the appropriate bimodal IT archetype for the firm. Consult business and IT leadership teams to assess the advantages and disadvantages of each of the three archetypes identified in this paper, given the specific organizational circumstances.
(3) Periodically assess the success and maturity of the organization's bimodal IT setup. Consider changing archetypes as appropriate. Reintegrate the two modes and share learnings across modes once the organization is ready to adopt what Mode 2 has cultivated.

The resulting IT transformation eventually enables the IT function to support the business more effectively in its digital transformation. However, a transformation of only the IT function is not enough to effectively embed digital business capabilities in the organization. For digital transformation to be successful, the organization as a whole must adopt a culture that allows joint business-IT digitization initiatives to flourish.

## 6. Conclusion

This study finds that bimodal IT is a three-pronged approach, which enables the IT function to transform into an entity, which effectively supports the business undergoing digital transformation. The results also indicate that in the longer term, the IT function reverts to a unimodal design after it has adopted the learnings from the governance principles, working methods, and cultural aspects developed in Mode 2 throughout the IT function.

This has implications for practitioners who are tasked with designing the organizational structures to effectively support digitization. This paper provides practitioners with a pathway for IT function transformation, from understanding the purpose of bimodal IT and the different archetypes to clearly

identifying that the bimodal IT design is not a destination but an interim stage in a larger transition. The study provides impetus for business and IT leaders to benchmark their firm's IT function and its ability to support digitization initiatives and discuss the study's findings with peers through communities of practice.

This paper sets the foundation on which further research can built. However, there are several limitations due to the methodology used. Specifically, limitations relate to the study's nature being subjective and exploratory, which constrains generalizability. Future research should seek to further investigate and empirically validate the study's findings. Future research can also assist in developing a framework, which provides greater clarity into the conditions that facilitate the success or failure of implementing each of the three archetypes and give recommendations to overcome any challenges identified.

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