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RESEARCH PAPER

# How Do Market Standards Inhibit the Enactment of Digital Capabilities?

## A Case Study of Airline Pricing

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**Abstract** Digital capabilities can improve organizations' performance by supporting complex decision-making processes. However, when market standards constrain their enactment, the potential benefits promised by digital capabilities do not realize. The paper explores this tension by means of the critical case of a European airline, which had difficulty to enact a novel pricing approach and finds that market standards are entrenched in the airline's pricing and distribution ecosystem. This causes the organization to focus on local improvements and IT-based workarounds instead of enacting a dramatically new and potentially improved digital pricing capability.

**Keywords** Digital capabilities · Market standards · Path dependence · Pricing · Air transport

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## 1 Introduction and Motivation

*Digital capabilities* draw on emergent technologies to support innovative decision making (Wheeler 2002). Here, we define such capabilities as the technological and organizational ability to implement decision making through advanced algorithms. Examples include producing data-driven market insights into customer experience, controlling sales via online channels, or managing fulfillment processes. For example, Amazon's ability to excel in e-commerce relies partly on advanced customer relationship management and recommender algorithms (Kantor and Streitfeld 2015). Netflix' ability to disrupt the television industry relies partly on its collaborative filtering algorithms (Kirn 2010). Uber's disruption of the taxi market builds on algorithmic matching practices (Scheiber 2017).

Digital capabilities pose new challenges for practitioners and researchers of strategy, organization, and information systems (Orlikowski and Scott 2015), including the ways in which they produce and rely on interdependencies in larger ecosystems. In the transport industry, airlines are at the forefront of enacting digital capabilities to implement sophisticated pricing strategies. Following Bitran and Caldentey (2003), we define pricing as deciding what price to offer, to which customer, and at what time in the booking horizon, given a particular distribution channel. Furthermore, we define a digital pricing capability as combining organizational expertise and technological resources to support this decision through advanced pricing and revenue management algorithms.

The distinct challenges of building and enacting digital capabilities remain understudied. A number of authors point out this research gap (Leonardi and Barley 2008; Yoo et al. 2012; Introna et al. 2016). In particular, we do not

fully understand the long-term interplay between evolving digital capabilities and market standards. Thus, we ask:

*How Do Market Standards Inhibit the Enactment of Digital Capabilities?*

Following the call for research stated in Hinterhuber and Liozu (2017), we strive to highlight organizational factors in the persistence of certain pricing practices. In considering this question by means of a critical case, we respond to a call by Introna et al. (2016) to examine the long-term implications of digital technology properties for techno-organizational phenomena. Here, we assume such properties to describe the nature of digital pricing capabilities, whereas techno-organizational phenomena denote the ability to enact new digital capabilities.

Our research draws on a *longitudinal inductive case study* (Langley 1999). Specifically, we consider a European airline's digital pricing capability from 2003 to 2015. In the sense of Flyvbjerg (2006), this is a "critical case," as it features a best-in-class airline which is well-known for its top-notch pricing practices and helps to gain insights from the perplexing rigidity of enacted capabilities. We document the enactment of the airline's pricing capability as adhering to a particular market standard, the booking class. Finally, we examine IT-based workarounds intended to compensate for the perceived rigidity.

We aim to refine theory by showing that market-based restrictions can motivate local improvements and IT-based workarounds rather than far-reaching changes in the enacted digital capabilities. Short-term improvements circumvent limitations without fully resolving them. As our primary practical contribution, we examine the conflicts and tensions that hinder enacting a digital capability, such as pricing, even given existing algorithms and technology.

## 2 Background and Methodology

### 2.1 Pricing as a Digital Capability

The term capability stems from strategic management and refers to *reliable resource allocation and configuration patterns embedded in organizations*. As Schreyögg and Kliesch-Eberl (2007) emphasize, a capability implies the repeated ability to succeed in a specific application area.

*Digital capabilities* use emergent technologies for business innovation to create customer value (Wheeler 2002). When it comes to pricing, the aspect of customer value may not be obvious at first sight. However, differentiated pricing is a premise for the economical extension of the firm's product portfolio. For instance, the introduction of airline revenue management enabled airlines to deliberately offer drastically reduced fares, making air travel accessible to a much larger proportion of the population. Firms realize value through digital capabilities by repeatedly going through a series of steps. These are, firstly, selecting emergent technologies; secondly, matching technologies with economic opportunities; thirdly, implementing business innovations for growth; and fourthly, assessing customer value.

A pricing capability requires identifying competitor prices, setting a pricing strategy, and translating the pricing strategy to a price (Dutta et al. 2003). This requires technical and organizational knowledge about products as well as sales force expertise. Pricing also needs strategic, financial, and economic competencies, and requires analytic and conflict resolution skills. This is rarely available from a single source. Custom systems and databases may exist for prices, products, as well as foresight and optimization. Multiple people, systems, and activities make to enactment of and value realization from capabilities a socially and technically complex process for organizations (Orlikowski 2002).

Eisenhardt and Martin (2000), interested in the emergence of capabilities, propose that while capabilities are organization-specific, they often build on market standards and best practices. Firms absorb knowledge and skills to incorporate this information in their own practices (Cohen and Levinthal 1990). However, tension rises as firms can only build distinct capabilities by deviating from market practices. Adding a dynamic perspective, Burgelman (2002) observes that a firm's capabilities and their market often co-evolve. In short, firm and market are in a subtle and dynamic relationship; capabilities build on what is already there, but must also deviate from it.

The digital capability airline pricing exemplifies this. Given increasingly competitive markets, airline pricing systems have become "one of the most arcane and complex information systems on the planet" (McAfee and te Velde 2006: 527). Emergent technologies based on reservation systems have played a major role in this process (Copeland and McKenney 1988; Littlewood 2005). Isler and D'Souza (2009) describe how airlines advanced their pricing algorithms over many decades. The results enable them to adjust the offered prices continuously to maximize revenue. The textbook example of revenue management sorts customers into business or leisure categories to anticipate their "willingness-to-pay."

Airline pricing also illustrates how digital capabilities require both evolving expert skills and algorithms. Airline pricing algorithms have undergone several such phases of improvement from simple overbooking, fictitious booking classes, virtual nesting, to bid pricing (Lehrer 2000). Such incremental changes to digital capabilities are the dominant path to learning, as several factors hinder enacting novel digital capabilities completely.

Firstly, organizations can encounter *market-based restrictions* when tying themselves to the wrong vendor, technology, or standard. For example, conversion costs and technological interrelatedness created a lock-in in the case of the QWERTY keyboard layout (David 1985).

Secondly, once a certain (technological) path has been chosen by an organization, further decisions and actions can reinforce it (Schreyögg and Kliesch-Eberl 2007; Sydow et al. 2009; Schreyögg and Sydow 2011). This includes, among other things, investments in complementary assets, resources, and capabilities, learning effects, or coordination effects (Sydow et al. 2009). As pointed out by Burger and Sydow (2014), developing and enacting new capabilities requires collective action by multiple actors, who are partially *unaware* of the dominant action pattern, or *unwilling* or *unable* to change it.

However, there is little research on the evolution of digital capabilities with respect to how market standards affect their enactment. The cautionary tale from the airline industry considered here explores this further.

### 2.2 Research Context: Airline Pricing

Airline pricing has become part of an increasingly global and collaborative distribution process. Airlines rely on global standards established during the industry's initial digitization (Copeland and McKenney 1988). These are both useful and daunting. On the one hand, they enable global alliances, which can extend networks via code share flights. On the other hand, and with increasingly transparent and competitive markets, many full-service airlines felt restricted in enacting the full potential of their pricing capabilities (Isler and D'Souza 2009).

A significant standard underlying airline pricing are booking classes. These define product conditions *and* price levels. When the airline offers tickets in one booking class, the corresponding price is available at the booking class' conditions. When disk space was limited in the 1950s and 60s, programmers designated booking classes by a single letter. Today, many industry experts point out that the standard's discrete nature hinders fully individualized services (Isler and D'Souza 2009; Pölt 2011; Westermann 2013). Nevertheless, booking classes are still crucial to handle aspects such as bonus miles or codeshare contracts.

In accordance with Bitran and Caldentey (2003), we portray three interdependent pricing practices: "price setting," "revenue management," and "distribution."

*Price setting* defines the combinations of prices and conditions offered per booking class. Exemplary conditions include flexible refunds or the necessity for a weekend-stay. The results are published in global distribution systems (GDS). GDS combine information from hundreds of airlines in large-scale information infrastructures. Three major GDS providers, SABRE, Amadeus, and Galileo/Apollo, dominate the global market.

*Revenue management* determines the set of booking classes to offer at any time of the sales horizon. This decision first requires forecasting demand as dependent on time and the set of offers. Subsequently, an optimization algorithm calculates the sets to offer in order to maximize expected revenue from sales. Human analysts can amend the results to account for additional information and objectives, such as competitor's offers or marketing events. The results control the airline's inventory.

*Distribution* communicates offers to customers via *indirect channels*, such as travel agents or intermediary websites, and *direct channels,* such as the airline's website or sales offices. In the traditional model, all channels access the GDS.

*Dynamic pricing* represents an alternative to the processes of price setting and revenue management described above. Instead of relying on booking classes, this concept can accommodate continuous prices and unlimited combinations of prices and conditions (Elmaghraby and Keskinocak 2003). Dynamic pricing relies on discriminating customer characteristics to set an individual price per request. Potentially, this enables incremental gains in both revenue and flexibility for further business objectives, such as customer relationship management. However, dynamic pricing requires a sales channel that can differentiate individual customers. This is not feasible when distribution relies on offering the same set of booking classes to all customers that send a request at the same time.

## 3 Case Study

As a *critical case*, we purposefully selected a European airline and dubbed it "Phoenix". Phoenix is a traditional network airline, primarily targets business customers, and functions partially independently within a holding group. We chose Phoenix for three reasons. First, Phoenix is renowned for its sophisticated pricing. Second, Phoenix has developed an advanced pricing capability and has repeatedly but unsuccessfully attempted to transform it. Third, the firm operates an intercontinental route network, which creates additional dependencies.

### 3.1 Data Collection and Analysis

Our case data cover a period of 12 years (2003–2015); we collected most of the primary data over 3 years (2011–2014). Table 1 lists the data sources, involving interviews, direct observations, and archival materials. The data provides a rich account of how Phoenix' pricing capability evolved and how the firm enacted it.

**Table 1** Qualitative data sources

| | Revenue management and pricing | Management | GDS and distribution ecosystem |
|---|---|---|---|
| *Interviews and public speeches* | | | |
| Firm | Head of Revenue Management (1× interview, 2× public streams[a]) | CEO[a] (3×) | COO[a] |
| | Head of Innovation Lab (4×) | | Head of Marketing[a] |
| | Revenue Management Analyst (2×) | | |
| Group network | Former Head of Revenue Management of largest group airline | Member of Board | Head of e-/mobile commerce largest group firm |
| | Head of Revenue Management of another group airline | Group CEO[a] (2×) | VP Online Retail and Distribution at Group Co[a] |
| Market | Head of Pricing of major competitor | CIO of major competitor | Manager Technology at largest European GDS (2×) |
| | Head of Revenue Management of major competitor | | Manager Frequent Flyer Program at major competitor |
| | | | Aviation/distribution expert-1 |
| | | | Aviation/distribution expert-2 |
| *Observations* | | | |
| | Consortium workshop with experts from four partnering airlines and universities (1d) | | |
| | User training for revenue management analysts (2d) | | |
| | Expert workshops with revenue management analysts (2× 2d) | | |
| *Archival Documents* | | | |
| | Internal documents and memos written (#12), press releases (#2), reports (#1), web pages and blogs (#3), practitioner journal articles (#10) | Press releases (#4), web pages and blogs (#13) | Internal documents and memos written (#9), press releases (#4), web pages and blogs (#12) |

[a]Analysis based on publically available video stream

*Interviews and video analysis* Interviews encompassed the level of (1) the *firm* (Phoenix), (2) the *group network* (i.e., airlines within the group holding and strategic alliances), and (3) the *market*. These interviews were conducted by the first author in person or via telephone and targeted (a) revenue management and pricing experts, (b) managers (mostly CEOs and CIOs), and (c) GDS and distribution ecosystem experts. They varied in length between 0.5 and 2.5 h and were tape-recorded and transcribed. The interviewee selection followed a snowballing strategy starting from one key informant at each level (firm, group, and market). Interviews were semi-structured and focused on the barriers to introducing alternative pricing approaches. We also analyzed video material from public speeches to complement the data (Le Baron et al. 2018).

*Direct observations* The first author participated in a 2-day revenue management training in 2012 and all authors took part in a revenue management strategy meeting in 2013. At the latter, several collaborating airlines, including Phoenix, discussed pricing topics.

*Archival material* To avoid "retrospective bias," which potentially occurs when managers rephrase decisions to make them more acceptable (Golden 1992), and to complement data collection, we triangulated the findings by cross-checking them against 70 archival documents (both from internal and external sources). For instance, Phoenix provided access to their revenue management strategy and system specifications. We also considered ten articles from the *Journal of Revenue & Pricing Management* to examine Phoenix's pricing capabilities in the context of industry best practices. Finally, we challenged all insights against the backdrop of two of the authors' long-term industry experience.

The data analysis followed a processual strategy (Langley 1999), focusing on key events and changes with respect to the enactment of Phoenix' pricing capability. First, we prepared a timeline of key events and critical junctures. Second, we further examined the collected case material through a process of reading, tagging, and coding. Tags/-codes emerged from theoretical and practical sources and were adapted according to new insights. At the same time, we prepared images and diagrams of our emerging insights, which we discussed with key informants. This led to adaptations and further data collections. In particular, we conducted two additional workshops with Phoenix's revenue management experts to look into the relevant obstacles and how they impede the move from the present to the desired state. We enriched the data by further video material and re-examined the progress and developments within the case.

### 3.2 Alternative Digital Pricing Capabilities

Before attempting to introduce dynamic pricing, Phoenix had implemented a common system with fares filed for booking classes. Figure 1 compares this system (A) to the system of dynamic pricing, which Phoenix aimed to implement (B).

The left part of Fig. 1 shows the traditional separation of pricing and revenue management: Phoenix first set fares and subsequently filed them to the GDS. Given these fares, the revenue management process predicted demand for booking classes and optimized the availability of these classes. In a fifth step, fares were also quoted from the GDS. Fare quotation coupled price-setting and distribution via direct or indirect channels. This system was constrained by the distribution systems requiring *discrete* booking classes. As multiple fares could be filed per booking class, but the revenue management process assumed one representative fare per booking class, revenue management and pricing practices were somewhat mismatched to start with. In the figure, a white lightning bolt indicates this mismatch.

The right part of Fig. 1 illustrates the pricing system Phoenix aimed for at the time of our analysis. Via dynamic pricing, Phoenix intended to optimize prices per booking request. This system would also rely on a demand forecast, which would support product bundling and the dynamic pricing of the resulting bundles. A manager described the envisioned scenario: "One step is to begin to allow any arbitrary discount. And not only the 26 or 52 or whatever number per booking class that I have published previously… the freedom to answer with any arbitrary number" (Senior RM expert I, #1). The stated goal was to rely on booking classes solely to delineate compartment segmentations and the set of conditions per fare family.

The new pricing system would fully integrate revenue optimization into the pricing process. While most practices would fit well to each other in this scenario, fare filing was expected to stay based on booking classes; replacing existing legacy systems and processes were seen as more time-consuming. In the figure, a black lightning bolt indicates this mismatch.

As a compensation for not being able to implement the system of dynamic pricing, Phoenix cooperated with a software vendor to develop another practice termed "pseudo dynamic pricing" (not shown in Fig. 1). This workaround let Phoenix adjust the availability of booking classes to the individual customers requesting flights. Phoenix' management expected the workaround to provide a substantial competitive edge. In contrast to true dynamic pricing, the approach still relied on controlling the offered set of booking classes.

### 3.3 Tensions as Sources of Inertia and Conflict

Through our analysis, we could identify three main tensions leading to rigidity in the enactment of the new system of dynamic pricing. These concerned (1) *the control over distribution channels*, (2) *conflicts and mismatches between internal sales and revenue management units*, and (3) *conflicts between the group network and the firm level* (see also Appendix 1; available online via http://springerlink.com).

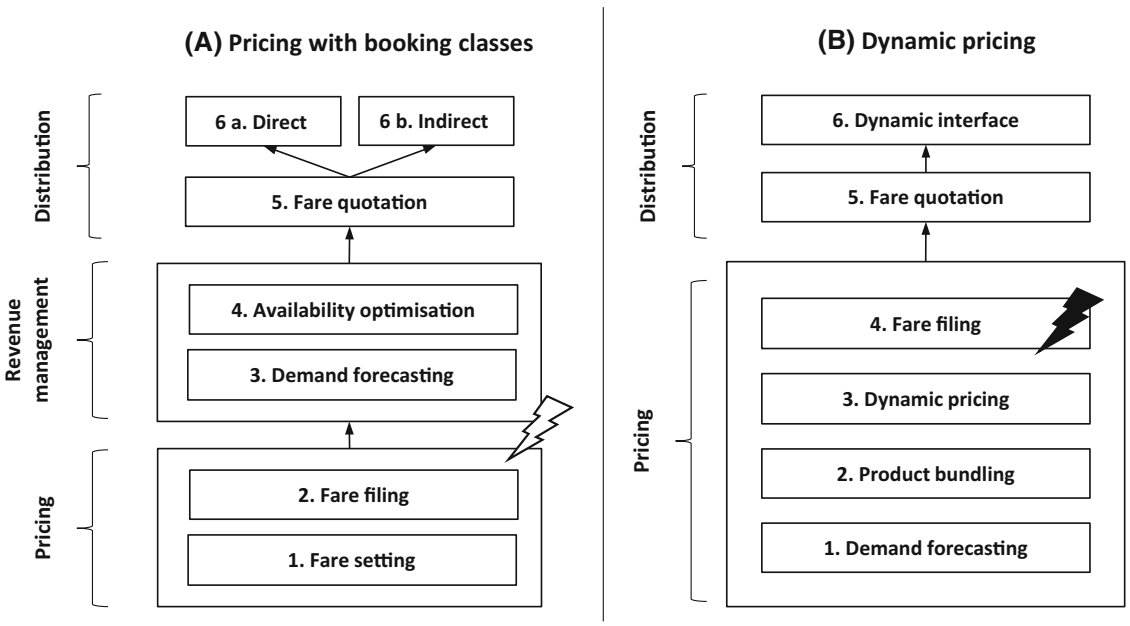


**Fig. 1** Pricing at Phoenix: present (**A**) and future (**B**)

*Control over distribution channels (1)* The main source of conflict which prevented Phoenix from implementing the new system of dynamic pricing turned out to be the indirect distribution channels, which exclusively relied on GDS. At the time of our analysis, indirect sales collected via GDS accounted for more than 70% of Phoenix's revenues and were "indispensable" (Senior RM expert III, #4). However, GDS distribution and the new system of dynamic pricing opposed each other. Most importantly, fare filing, the uploading of price lists via files to GDS, was a tedious, slow, offline process. Moving to more flexible (dynamic) interfaces necessary for the new system of dynamic pricing required fundamentally new processes and technologies. Phoenix tried to reduce the share of bookings collected via GDS, e.g., by charging travel agents for the higher costs of service, but this had shown little effect at the time of our analysis.

A revenue management expert commented:

> You constantly fall back on the GDS standards, because this is the only thing that all airlines or all distribution channels really know. (Senior RM expert II, #2)

Similarly, an interviewee noted:

> There are further dependencies. There is data exchange among airlines, and eventually also within GDS. Moreover, this has always been based on IATA formats, there are entire lexicons, bibles so to speak, that have come into being as telex formats and that have remained gold standard until today. (Manager Technology, #8)

This tension affected the process of fare quotation. Quoting the cheapest applicable fares for itineraries in a large network of flights is inherently complex. Many fares and combinations exist. For this, Phoenix became dependent on GDS knowledge. As a manager explained:

> We have 1.5 million public fares … that everybody can look up, … and an additional 5 million private fares with specific discounts for companies … that's a lot, and it's not easy to know the cheapest applicable fare for an … itinerary. The rules are tremendously complex and only inscribed in this 30, 40 year-old … fare-publishing system. (Senior RM expert I, #1)

*Internal conflicts between sales and revenue management units (2)* The example of fare quotation also illustrated another tension, namely between internal sales and revenue management units. While the sales units had earlier left fare quotation and the necessary machinery to the GDS, the revenue management unit considered it critical. Differences in culture existed. One manager noted the tension between revenue management and sales units (e.g., corporate contracts). In his view, some sales employees held on to the booking class standard "like drowning people" (Senior RM expert I, #1). While the revenue management unit focused on analytically discerning customer segments and demand, sales focused on market definition, fare rule refinement, and marketing. To increase its control over the fares, the revenue management later attempted to establish fare quotation know-how internally and re-build this process completely in-house through a Connection Builder.

Revenue management and sales were not only in opposition organizationally, but also technically, targeting different levels of aggregation. Price setting as a sales practice assigned multiple prices per booking class, whereas the revenue optimization assumed that each class earns a specific revenue. The mismatched aggregation levels necessitated multiple IT-based workarounds, extending the set of necessary pricing and revenue management systems. One expert stated: "With some tweaks, you can maybe have 26 or 26*2 fares, as a magnitude, which is an absolute nightmare when it comes to analysis. You do not see clearly which is really applicable" (Senior RM expert I, #1). In other words: "You can always only somehow approximate. But you never really know whether all of this is correct" (Board member, #6).

*Group network versus firm level (3)* The third tension resulted from coordinating pricing in the group network and strategic alliances (Gerlach et al. 2013). Phoenix was part of an airline holding group which restricted dynamic pricing in the envisioned sense and made it follow suit to the holding's requests. As a manager explained:

> Matching booking classes was the first thing that was done after Phoenix was acquired by the group. This caused some effort but was still feasible. (Senior RM expert I, #1)

Coordination-related tensions also became apparent when Phoenix entered a transatlantic codeshare joint venture in 2011. To do so, it had to abandon advanced pricing practices and return to a more conventional fare structure. A responsible project manager explained:

> On intercontinental routes, we had to replace certain pricing methods because we had joined a transatlantic joint venture. When other alliance members do not even have an 'origin-and-destination' system, how can you harmonize pricing? You can't simply adopt advanced fare structures without having the subsequent machinery in place (Senior RM expert II, #2).

All these tensions represent sources of inertia and conflict that feed the continued reliance on the booking class

standard. Implicitly, by requiring discrete fares, this standard has prevented the system of dynamic pricing and thereby obstructed optimal price discrimination. Competitors implementing a purely direct distribution havenot been restricted when implementing the system of dynamic pricing and have been able to gain a crucial advantage, the revenue management experts observed. Furthermore, Phoenix wanted to pursue a strategy of individualized offers targeting specific customers. By only enabling a limited number of offer sets to cater for a limited number of demand segments, the booking class standard has largely prevented such individualized offers.

### 3.4 The Constrained Enactment of Digital Capabilities over Two Phases

Our research reveals that reliance on market standards enabled the creation of an advanced digital pricing capability based on booking classes in cooperation with the GDS in a first phase. Later, in a second phase, market standards emphasized the tensions listed in the previous section and obstructed the enactment of the new system of dynamic pricing (Fig. 2).

The practice of revenue management is enacted through forecasting demand and setting optimized inventory controls. In a first step, a reservation system supporting fixed fare products and static availability rules based on booking classes enabled this practice. After 2003, Phoenix implemented emergent revenue management technology allowing "pseudo dynamic pricing" in a network optimization context. This enabled Phoenix to switch selected price points on and off, but it excluded the possibility to tailor prices to individual customers. Later, the constraints of such systems were relaxed by introducing simplified fares, which makes pricing more flexible.

From 2008 onward, drawbacks of the booking class standard became visible. Sales agents could trick the pseudo dynamic pricing system to achieve lower prices. Moreover, Phoenix could not maintain the newly introduced simplified price structures, as it had to coordinate pricing with the group holding and its strategic alliances. In turn, it introduced further workarounds building on a seamless availability of request responses and extensions of the pseudo dynamic pricing engine. Fare families made it possible to group and re-bundle fares. To regain more control over the distribution process, fare quotation know-how was gradually rebuilt internally, for example by implementing a Connection Builder.

Within the second phase, several evolutionary steps overcame certain obstacles, but each further extended the systems and algorithms based on the booking class standard. Thus, the evolution intensified the dependency of the firm's pricing capability on this market standard: for example, pseudo dynamic pricing represents an evolution of the pricing capability but does not move Phoenix closer to the goal of dynamic pricing in the intended sense. In short, Phoenix was surprisingly successful in working around limitations *despite* existing constraints. It used technological advances such as exporting data in the booking class format in order to build advanced practices such as pseudo dynamic pricing and fare family optimization, building on an increasingly differentiated set of complementary practices. Nevertheless, Phoenix's capability building relied on optimizing the set of offered booking classes as *the* core pattern. Most practices successfully co-evolved around it. In consequence, the

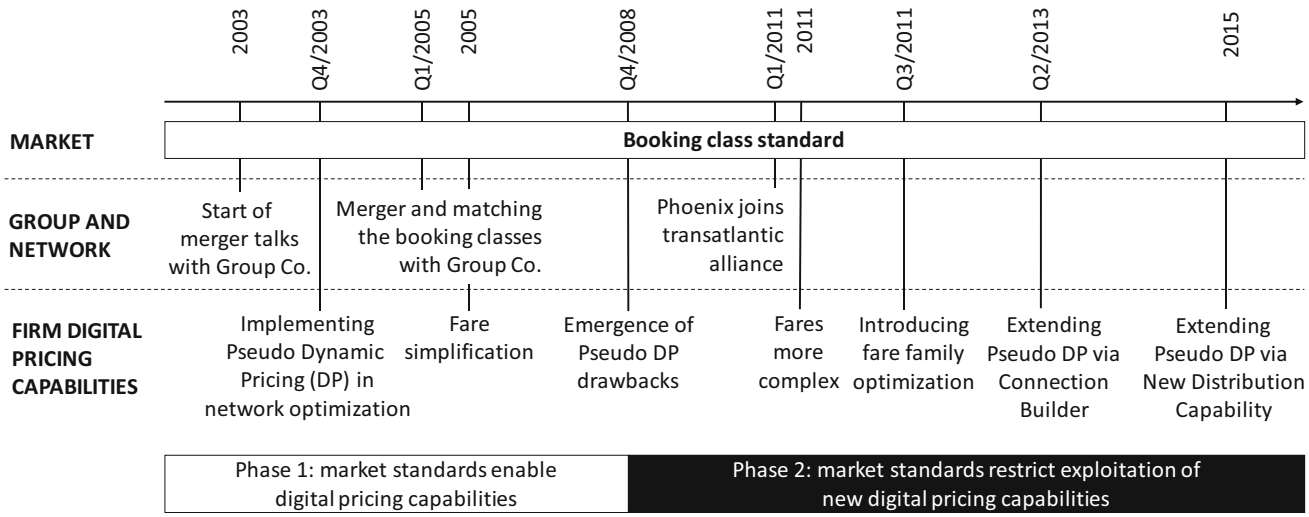


**Fig. 2** Major phases of digital pricing capability development and enactment

booking class standard became further entrenched in the organization.

Adaptations to the digital pricing capability based on booking classes introduced increasingly complex IT-based workarounds. As one expert summarized, "the real drive isn't there. It's like this often in life, the more workarounds you get, the harder it becomes" (Board member, #6).

When Phoenix's management recognized the maladaptation, it reflected on its own scope of action. This motivated Phoenix in 2015 to join an IATA initiative to pilot a new distribution capability, NDC (O'Neil-Dunne 2014). New affordances (i.e., GDS shopping interfaces and service lists) allowed Phoenix to demonstrate "more dynamic" pricing in a travel agency context with large transaction volumes. This was seen as a step toward dynamic pricing in a multi-channel context. However, managers voiced mixed feelings about the potential to break away from the existing path and to overcome the booking class standard. As one manager stated: "The tragedy is that we must soon unlimitedly support the old and the new world" (Senior RM expert I, #1). At the end of our investigation, a leading manager (#2) renewed his complaints about the fixation on booking classes, indicating the (ongoing) restriction.

## 4 Summary and Outlook

This contribution aimed to advance understanding of how market standards restrict the enactment of digital capabilities by analyzing the case of a European airline. Unlike traditional capabilities, digital capabilities, which use emergent technologies to create customer value, provide new affordances (Yoo et al. 2012). These enabled Phoenix, on the one hand, to cope with a rigid market standard. On the other hand, the resulting IT-based workarounds embedded the standard even further in Phoenix's pricing practices and information systems; resource-based, normative, and cognitive constraints hindered change.

### 4.1 Theoretical Implications

Our contribution shows how the enactment of digital (pricing) capabilities including advanced (pricing) algorithms can conform to core patterns (optimizing booking class availability) restricted by market standards (here, the booking class standard). Previous authors have assumed that capability core patterns are inherently social and local (Sydow et al. 2009). However, this may not entirely fit digital capabilities, where advanced algorithms are entrenched in several information systems. Extending the work of Wheeler (2002), we find that the interplay of enacted digital capabilities and market standards can reduce the available set of strategies to a small subset, as illustrated by pseudo dynamic pricing. Phoenix combined and re-used existing technological elements to leap from one restriction to the next. However, these constant changes did not necessarily lead to a global optimum; on the contrary, they unintentionally further reinforced an existing path of optimizing booking class availability.

Furthermore, our analysis suggests that the understanding of pricing capability in Dutta et al. (2003) is partial; it does not consider the amount and intensity of interaction with an ecosystem of distribution partners on multiple levels. From this interaction, the three tensions described in Sect. 3.3 arise: The control over distribution channels was limited via the interaction with infrastructure providers, the innovation within the organization was limited via the interaction of interfacing departments, and the innovation of pricing structures suffered from inertia due to the interaction within the group and strategic alliance. Thus, while a view of pricing as a process with clear boundaries may be useful for limited situations, it should be extended for other settings by looking at the interdependencies on operational, tactical, and strategic levels.

### 4.2 Practical Implications

From a practitioner perspective, we consider the case to be a cautionary tale about the practice of pricing systems and algorithms. It highlights that an excellent body of theoretical research and the knowledge of technological requirements do not necessarily suffice to transform the current ways of handling complex decisions. Building on the idea of the "reflective practitioner" (Schön 1991; Johns 2017), responsible managers should constantly monitor the evolution and enactment of the firm's digital capabilities and the interplay with market standards. Doing so encourages those in charge of implementing desired changes to critically consider affordances and workarounds, assessing whether these buy short-term flexibility at the cost of increasing the risk of a long-term lock-in.

In the case considered here, three practices proved important when the organization's internal efforts did not bring the desired change. First, *spearheading* describes the relentless efforts by individuals (most importantly, the head of Revenue Management Strategy) to raise awareness of the problem through speeches at industry events, practitioner publications, and press releases. Second, *interface management* describes the practice of opening up to outside innovation and working with a capable vendor. In this way, the firm could integrate new and innovative ideas into the existing ways of working. Third, *piloting* describes the organization joining forces with other industry actors in order to finally achieve the desired change. The prerequisite for all these practices was a strong internal knowledge

base, which recognized the opportunities that arose and could relate them to the weaknesses and opportunities of their own systems and practices.

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