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Digital Transformation and Vertical (Dis-)Integration: The Role of Technological Change and the Importance of the Institutional Context

Danilo Pesce 

Abstract—The evolution of industries through vertical disintegration has long been the focus of attention and concern of management scholars and managers. However, most existing studies are based on transaction cost economics and address vertical disintegration choices as firm-level decisions. By integrating transaction costs economics with the resource-based view of the firm and moving from static analysis of individual transactions to dynamic analysis of the causes of change within an industry, the article develops an integrative framework that explains where and how vertical disintegration occurs. Drawing on the cultural heritage industry, the results show that vertical disintegration choices reflect differences in the way the institutional context favors (or prevents) the creation and capture of value enabled by technological change. On the one hand, firms with low strategic autonomy and limited flexibility in acquiring resources and competencies tend to evolve toward vertical disintegration decisions when digital platforms enter the industry—Google in our case. On the other hand, organizations with a high degree of strategic autonomy and high flexibility in acquiring resources and competencies opt for vertical integration strategies. In practical terms, the framework provides a tool for managers to understand whether their industry is prone to vertical disintegration.

Index Terms—Digital transformation, google arts and culture, institutional context, museums, vertical disintegration, vertical integration.

I. INTRODUCTION

THE vertical disintegration of industrial sectors is a central aspect of industrial evolution theories and has long been the focus of attention and concern of management scholars and managers. Since the beginning of industrialization, the predominant strategy has been to “own the value chain” and have a high degree of vertical integration [1]. However, this vertical integration strategy became unfashionable in the late 1990s, when companies realized that concentrating on core competencies and the outsourcing of noncore activities offered

such advantages that “vertical disintegration” strategies became the prevailing management paradigm [2]. Vertical disintegration is defined as “the emergence of new intermediate markets that divide a previously integrated production process between two sets of specialized firms in the same industry” ([3], p. 465). The renewed interest of management scholars and managers in vertical disintegration strategies is due to the pervasiveness and ubiquity of new digital technologies. Such technologies, by fostering complementarity between previously unrelated activities and blurring the boundaries of existing industries, have led to the emergence of new intermediary markets through digital platforms, such as Uber, Deliveroo, Meta, Google, or Amazon. The disintegration brought about by these platforms has radically transformed the nature of industries, their very definition, and their competitive dynamics, even for those players who have chosen to remain integrated by keeping all production processes in-house. To use a biological analogy, vertical disintegration allows a new cospecialized ecosystem to compete and cooperate with legacy integrated structures, altering the institutional and social landscape for all involved [4]. But how and why does the disintegration occur? What is the role of the institutional context? How do vertical integration and disintegration strategies coexist at the industry level, and which of these strategic options allows companies to capture more economic value? Surprisingly, little research has been devoted to explaining how and why disintegration occurs, focusing on the underlying factors that determine it [5].

The main reason for this relative scarcity of knowledge is that the literature, in particular, transaction cost economics (TCE) [6], [7], [8], has largely focused on the integration choices of individual firms by failing to consider at the industry level how markets emerge to create vertical disintegration. Only recently has it been recognized that the vertical structure of an industry evolves and must be studied in its own right [4]. To this end, it is necessary to go beyond the choices of individual firms and examine the causes of change within an industry. This article attempts to fill this gap by examining not the vertical disintegration itself, but the process that leads to it, focusing on the level of the value chain structure. Drawing on the cultural heritage industry and integrating transaction costs economics [6] and the resource-based view of the firm (RBV) [9], [10] to investigate a firm’s integration choices [11], the article shows that differences in institutional forms constitute a relevant variable in the evolution of an industry’s architecture and should be

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included in theoretical contributions to the vertical disintegration of industries.

The cultural heritage industry is a current example of a growing trend toward integrated solutions enabled by digital transformation [12]. While it is not claimed that this is a universal and generalizable trend, it is an understudied and empirically relevant phenomenon and its analysis can help us better understand how the sector's structure, competitive dynamics, governance arrangements, and institutional context evolve. The cultural heritage industry has recently been characterized by a profound digital transformation that has changed the way art and culture is disseminated; therefore, it can be considered a "revealing context" in which a phenomenon of interest can be "transparently observed" ([13], p. 40). The opportunities offered by digitalization have led technological players specialized in digital imaging and content indexing (e.g., Google) to enter the market, weakening the appropriability regime of museums and forcing them to develop new revenue creation mechanisms. Furthermore, the institutional context where museums operate varies across countries (in terms of resource endowment, fundraising capabilities, emphasis on creating shared social value, intellectual property protection of artworks, and managerial attitude), playing a key role in explaining technological change and vertical integration choices. The article looks at the evolution of the cultural heritage industry over the last decade through a case study methodology. A total of 74 industry experts (directors, curators, digital specialists, and marketing managers) were interviewed in Europe and the USA to understand 1) what new value creation mechanisms they adopted; 2) the transaction costs that are emerging from the specialization of the industry; and 3) the advantage of museums trading with technology vendors.

The results break new ground, by showing how new competitors emerge, why "unwritten" institutional rules are often updated, how new "roles" in industries appear and develop, and what drives specific industries to change their vertical structure and transform their institutional and social environment. In practical terms, an integrative framework that explains where and how vertical disintegration occurs and provides a tool for managers to understand whether their industry is prone to vertical disintegration has been developed. In terms of research, the article contributes to the vertical integration literature by shifting from the static analysis of the efficiency of vertical integration and individual transactions [7] to the dynamic analysis of how transaction costs, capabilities, technological change, and the institutional context in which firms operate and shape the division of labor through vertical disintegration choices. These issues are of utmost importance considering the changes in social, economic, and industrial structures that external shocks, such as the coronavirus pandemic, can bring to previously developed routines inherent in institutional context and vertical scope.

The structure of this article is organized as follows: Section II provides an overview of the underlying literature underpinning the investigation. Section III describes the research methodology. The results of the analysis are presented in Section IV and discussed in Section V through an inductive theoretical framework that theorizes the role of the institutional context in explaining technological change and vertical integration choices.

The article concludes with a summary of the main findings, limitations, and research opportunities.

II. THEORETICAL BACKGROUND

The choices of vertical integration—"the combination, under a single ownership, of two or more stages of production or distribution (or both) that are usually separate" ([14], p. 93)—and vertical disintegration—"the emergence of new intermediate markets that divide a previously integrated production process between two sets of specialized firms in the same industry" ([3], p. 465)—have always been the subject of extensive debate in the literature of management, microeconomics, and international political economy. However, although the theory on how firms adopt vertical integration is well established, studies that explain the conditions that lead to vertical disintegration are relatively new and need to be enriched with empirical documentation and theoretical contributions [5], [15].

The theoretical framework underlying vertical integration is undoubtedly TCE [6], [7], [8]. TCE elaborates and operationalizes the concept of transaction costs, initially formulated by Coase [16], by examining the conditions under which firms choose to abandon markets in favor of vertical integration. TCE researchers argue that the potential for opportunistic behavior is the main determinant of vertical integration [4]. As Williamson [6] noted, the main case for TCE is that vertically integrated firms "perform" activities that require asset specificity and entail high coordination costs due to product complexity, and whose disintegration would make them highly dependent on a supplier. Transaction costs associated with the use of the market arise both from information asymmetry problems [17] and from risks in specific investments whose value can be expropriated ex post by an opportunistic party [7]. Thus, vertical integration occurs whenever a market transaction requires specific investments or efforts that are difficult to obtain or measure. The Internet and digital platforms nowadays play a crucial role in vertical integration choices. Reducing transaction costs through increased market transparency (lower search costs) and lower coordination costs are leading to the emergence of new intermediary markets and a global unbundling of jobs (e.g., Amazon Mechanical Turk).

Independently of this, another stream of literature has started to have a decisive impact on strategy as a field: the RBV. This approach, which has its roots in Penrose [9] and Barney [10], emphasizes the importance of resources in driving corporate action and the management of a company's portfolio of resources and capabilities as a central concern of strategy. According to RBV, vertical integration is mainly influenced by an organization's competitive advantage at a specific stage of the value chain as its resources and capabilities dominate the market [18]. This competitive advantage is the result of a company's predominant resources and capabilities, which are not only valuable, rare, difficult to imitate, and nonsubstitutable [10], but also derive from a unique and path-dependent learning process [4].

In recent years, a convergence between these two theories has begun, creating a more satisfactory account of what drives vertical scope [11], [19]. For instance, Jacobides and Winter [4]

TABLE I
 ADVANTAGES (DISADVANTAGES) AND DISADVANTAGES (ADVANTAGES) OF VERTICAL INTEGRATION (DISINTEGRATION) CHOICES FROM THE LITERATURE REVIEW

Advantages of vertical integration <i>(disadvantages of vertical disintegration)</i>	Disadvantages of vertical integration <i>(advantages of vertical disintegration)</i>
Lower transaction costs	Lower flexibility
Higher coordination	Lower market exit barriers
Higher customer satisfaction	Higher fixed costs
Higher trustworthiness and credibility	Higher capital requirements
Higher market power	Higher operative costs
Higher supply assurance	Higher agency costs
Higher quality standards	Higher coordination costs
Higher protection of proprietary products	Higher risks of focusing on non-core operations
Higher protection of proprietary process	
Higher protection of proprietary technology	

demonstrated that TCE and RBV are fundamentally interconnected in the determination of vertical reach and identified the key mechanisms of their coevolution. Jacobides [3] analyzed vertical disintegration in the mortgage banking industry and showed that it occurs in conjunction with the creation of new markets and an increase in the heterogeneity of knowledge bases and management styles in an industry. Baldwin and Clark [20] highlighted how new intermediate markets must converge to create their own institutional and contractual infrastructure. Cacciatori and Jacobides [21], drawing on the British construction industry, explored both the inertial forces that sustain and institutionalize vertical specialization and the forces that lead to the transition from specialization to reintegration.

A systematic analysis of studies combining TCE and RBV allowed us to summarize the advantages (disadvantages) and disadvantages (advantages) of vertical integration (disintegration) choices in Table I.

As shown in Table I, the advantages of a higher degree of vertical integration on the financial performance of a firm are usually explained by lower transaction costs and less dependence on external suppliers [1], higher quality standards [22], greater operational efficiency and better coordination between different stages of production [1], protection of products, processes and technologies underpinning competitive advantage [23], higher customer satisfaction and credibility for new products [1], and higher barriers to entry [24]. A second group of arguments concerns the disadvantages—intended as additional costs—associated with vertical integration. These are usually explained by higher coordination costs [22], higher fixed costs and higher capital requirements [23], higher risks of concentrating on non-core activities due to information asymmetries [25], reduced strategic and organizational flexibility [23], and progressively lower barriers to exit [14].

Recent progress notwithstanding, important gaps remain in our understanding of how TCE and RBV combine to determine vertical scope. The main reason for the relative paucity of knowledge is that the literature—with notable exceptions such as those mentioned above—has largely focused on firms’ “make or buy”

decisions in certain transactions. Many of the existing studies are in fact conducted at the level of individual companies and do not examine entire industries by studying, for example, how markets emerge to create vertical disintegration. The second reason is that global differences in the institutional structures of industries and changes in the “rules and roles” within them may be relevant in explaining how firms respond to the emergence of new islands of specialization and what advantages are gained by trading with a new entrant with a different institutional background [26]. Scott [26] stated that institutions “are social structures that have attained a high degree of resilience. They are composed of cultural-cognitive, normative, and regulative elements that, together with the associated activities and resources, provide stability and meaning to social life” ([26], p. 33). Indeed, the emergence of new markets at the industry level requires sociocognitive and legitimation structures [27] and relies on social [28] and institutional [29] modes of interaction, which allow new specialized vendors to interact through a market interface [30]. The institutional context in which firms operate is therefore of fundamental importance in understanding how new intermediate markets establish their conventions [31]. The third reason is that new digital technologies, by fostering complementarities between previously unrelated activities and blurring the boundaries of industries, have led to the emergence of intermediate markets dominated by digital platforms, such as Uber, Deliveroo, Meta, Google, or Amazon, that are radically transforming the nature of industries, their very definition, and their competitive dynamics.

To address these phenomena, this article focuses on key phenomena at the industry level, the structure of the value chain, and the participants—incumbents and new entrants—operating within it. In particular, the article looks at how the value chain structure influences the participants and how they, in turn, reshape the value chain structure according to the institutional context in which they operate. Furthermore, the elements that drive integration and disintegration strategies were analyzed, focusing on how a given technology can be used for different reasons, depending on who is in control of the new digital artifact: in our case, a museum with an innovative mindset

that demonstrates “institutional entrepreneurship” or a digital platform, such as Google, that specializes in digitizing and indexing museum content.

III. RESEARCH METHOD

To address the phenomena that motivated this article, a longitudinal in-depth study of the evolution of the cultural heritage industry over the last decade was conducted. In order to study a “revealing context” in which the phenomena of interest could be “transparently observed” ([13], p. 40), the analysis focuses on the 2010–2018 period, as it coincided with the entry of new digital platforms, such as Google Arts & Culture, into the sector, the rise of new regulatory frameworks (in Italy, France, and The Netherlands) and the strategic repositioning of some innovative museums [e.g., the Rijksmuseum in The Netherlands and the Museum of Modern Art (MoMA) in the USA]. In the following, the research setting (Section III-A), the data collection (Section III-B), and data analysis (Section III-C) are described.

A. Research Setting

In the 2010s, the cultural heritage industry underwent a profound technological change that has sustained the long-term evolution of its social and economic mission. Digital technologies have offered museums new opportunities to globally disseminate art and culture in a more effective and accessible way [32]. As Cameron [33] stated, this process has accelerated the evolution of museums from learning and culture “temples” to “forums” for experimentation, innovation, and a more open approach to the public.

The digital distribution of artworks on the Internet has increased the capital intensity level of the industry, paved the way for a new tier of intermediation controlled by Google and social media companies, and increased the competition between museums to attract Internet traffic to their collections and convert digital visitors into real visitors. Overall, the capabilities of the industry needed to be reformed and integrated with new digital specialization [34], [35], and state-owned museums in Europe have adopted vertical disintegration due to the decreasing public funding of museums since the 1980s [36].

The Internet distribution of artworks has also made the cultural heritage industry change its institutional structure in many countries. In Italy, the government has pressured museums into expanding their cultural participation (with Law 83/2014) by giving them more autonomy in funding and recruitment of their senior management teams and digital-specialized figures [37]. In countries, such as The Netherlands, the regime regulating intellectual property protection has been loosened to allow museums to distribute digitized artwork and the related content through open data mechanisms. Museums around the world have thus been searching for new business models and new managerial approaches oriented toward finding new revenue streams. Private museums—although maintaining a nonprofit scheme—have built more capabilities to embrace digital innovation and Internet distribution, due to their greater flexibility on the labor market and resource attraction.

This empirical setting is thus interesting to understand how and why some museums chose vertical disintegration, while others increased their vertical integration in the new industry value chain, which exhibited more complexity and new specialization patterns.

B. Data Collection

The article has relied on multiple data sources [13] to document the new regulatory frameworks when data were not available from the primary sources (see Table II). Archival research helped us prepare semi-structured interviews to collect detailed information on five of the world’s largest and most admired museums. The sample was defined considering heterogeneous polar cases that differ in terms of governance structure, institutional context, size, digital strategy, and capacity to create and capture social and economic value.

A targeted (theoretical) sampling strategy to increase the generalizability of the results was pursued [38]. According to Yin [13], this approach improves the external validity of the results by using a logic of replication (literal replication), whereby the studied phenomena can be generalized into a theory of vertical (dis-)integration. Thus, “ideal” types of organizations were included in the sample of replicated “examples.” These cases were “representative of a presumably large class of cases that fits the requirements of the theory or theories to be tested” ([39], p. 24). Variation in the characteristics of the selected organizations was maximized to minimize any potential bias in the study. The **Uffizi Gallery** (public organization with special autonomy since 2015 in Italy), the **Museo Egizio** (private foundation that includes the local government in Italy), the **Rijksmuseum** (public organization in The Netherlands), the **Van Gogh Museum** (private foundation that includes the local government in Netherlands), and the **MoMA** (private nonprofit organization in the USA) were selected. An embedded design was used, focusing for each museum on three different levels: management, strategic decision, and functional curation, digital, marketing, and IT officer domains.

The sampled organizations have different institutional forms, geographical scopes, and sizes (please refer to Table IV). This form of sampling allowed to achieve two crucial goals [38]: to gain new information about the constructs of interest and to increase confidence in measuring the constructs through constant triangulation. It was therefore possible to systematically use all the strategies outlined by Patton [38] to improve construct validity and opportunistic sampling. The possibility of including Google Arts & Culture in the analysis emerged during the research. A total of 18 semi-structured interviews were conducted with the management team of Google Arts & Culture to establish their role in the creation of new digital cultural artifacts and their collaboration with museums.

In total, 74 interviews were conducted. They lasted between 60 and 90 min and they were all taped and transcribed. Table III describes the informants indicating position, year in which the interview took place, and distinguishing single interviews—almost all of them—from those conducted in groups of up to three informants.

TABLE II
DATA SOURCES

Source of Data	Type of Data	Use in Analysis
Semistructured interviews (74)	56 interviews with museums including: <ul style="list-style-type: none"> • 12 interviews with the Uffizi Gallery • 15 interviews with the Museo Egizio • 6 interviews with the Rijksmuseum • 15 interviews with the Van Gogh Museum • 8 interviews with the Museum of Modern Art (MoMA) 	Trace the processes and dynamics of vertical disintegration and their impact on museums. All interviews were conducted in museums with the aim of enriching our understanding of the context in which the changes were taking place and to gather information on specific areas of the organization. For each museum, key figures were interviewed: director, head of digital communication, head of marketing, curators, IT managers.
	18 interviews with Google Arts & Culture	Some of the interviews with Google Arts & Culture were conducted face-to-face while others were conducted online. The interviews involved programme managers, external relations managers, public policy managers, and heads of global programs and operations with the aim of understanding the role of Google Arts & Culture in the creation of new digital cultural artifacts and the level of collaboration with museums.
Annual reports	Global versions of annual reports, 2010–2018	Fine-grained tracking of historical events, actions, and performance. Triangulation of informants’ statements and recollections.
Industry press	Articles on the museums under analysis and on political, economic, social, and technological changes in the cultural heritage industry.	Integration of information on museums and the institutional context. Tracking external responses to museum actions.
Other publications	Books, book chapters, and articles in academic journals	Triangulation of informants’ claims.

C. Data Analysis

The adopted data analysis followed the common prescriptions for case studies [13]. The analysis began with a detailed reconstruction of the history of the museums and of the period covering the entrance of Google Arts & Culture to highlight patterns and critical points. I then moved to in-vivo codes generated directly from the interview material [40]. This was followed by multiple rounds of data coding to search for changes in the vertical integration choices. The reliability of the emergent coding was verified through a collective check-coding of the previously coded texts to ensure internal consistency [41]. This involved multiple iterations, as the emerging framework (see Fig. 2) was constantly updated and revised with evidence from the subsequent interviews. The full data table has not been included for reasons of space, but the most representative quotes are reported in the results section. After several iterations of the data and existing literature, the insights gained from the inductive analysis were refined by formally and informally discussing evidence with experts at various specialised conferences and workshops. Furthermore, the emerging results were double checked with museum directors and institutional figures responsible for cultural heritage management at national and international level to ensure the credibility of the interpretations [42].

Finally, drawing on Locke [40], alternative conceptual frameworks were tested until a general conceptual framework was reached. The conceptual framework was also discussed with colleagues and key informants as a further check on the validity of the emerging interpretations [43].

IV. FINDINGS

A. Digital Technologies and the New Mechanisms of Value Creation for Museums

Since the 2010s, digital technologies have offered different mechanisms to create economic value for museums, depending on the level of complexity of the institutional and technological changes required by museums to implement these technologies. Some of these technologies offer opportunities for incremental innovations, as the degree of novelty of their technological possibilities is limited. Examples of these opportunities are e-commerce features used to sell tickets or online merchandizing (e.g., mugs, posters, and T-shirts), social media, near field communication, and sensors (iBeacon) used to develop new models of interaction between museums and their visitors. These features do not revolutionize the service architecture of a museum visit, although they may add new and valuable experiential

TABLE III
INFORMANTS

	Position ^a	Uffizi Gallery	Museo Egizio	Rijksmuseum	Van Gogh Museum	MoMA	Google Arts & Culture	Total
Museums	Director	1 (2016)	1 (2015) 1 (2016) 1 (2017) 2 (2018)		1 (2017)			7
	Curatorial	1 (2016) 1 (2017)	1 (2015) 1 ^b (2017) 1 (2018)	1 (2017)	1 (2017)			7
	Collection management	1 (2017)	1 (2018)	1 (2017)	1 ^c (2017)	1 (2017)		5
	Education			1 (2017)	1 ^c (2017)			2
	Exhibitions		1 (2018)		1 ^c (2017)			2
	Digital	1 (2016) 1 (2017)	1 ^b (2017) 1 (2018)	1 (2017)	1 (2016) 2 (2017) 2 (2018)	2 (2016) 3 (2017)		15
	Marketing	1 (2016) 1 (2017)	1 (2017)	1 (2017)	1 (2017)	1 (2017)		6
	Finance	1 (2017)	1 (2018)	1 (2017)	1 (2017)	1 (2017)		5
	Philanthropy	1 (2016) 1 (2017)	1 (2018)		1 (2017)			4
	Retail	1 (2017)			2 (2017)			3
Digital platforms	Program Manager						1 (2015) 3 (2016) 2 (2017) 2 ^d (2018)	8
	Public Policy						1 (2015) 3 (2016) 2 (2017)	6
	Country Coordinator						2 (2017) 2 (2018)	4
Total		12	15	6	15	8	18	74

^aAs of the time of a first interview.

^{b, c, d} Interviews conducted in groups.

experiences, or may eliminate elements of inefficiency, such as long queues to enter museums and galleries. In other words, the competencies needed to bring technology-based practices, such as e-commerce, iBeacon, and social media interaction, into museums can be easily acquired through transactions with local service providers (e.g., social media experts and e-commerce specialists) and do not require significant institutional changes in working practices, competencies, or roles available in museum staff.

A second group of technologies includes machine learning, high-resolution digital imaging, and three-dimensional scanning of artworks. These technologies can be applied to the way

artworks can be disseminated online according to new principles compared to those guiding art exhibitions in physical galleries. These technologies introduce new islands of specialization in the field and thus oblige museums to start collaborating with specialized organizations that are new to the field. Thus, this set of new enabling technologies may offer new technological possibilities, paving the way for a discontinuous change in the available opportunities through which museums can build visitor engagement and provide memorable visitor experiences. The discontinuities for museums are related to the fact that these technologies put museums at risk of developing new relational dependencies with a small number of very specialized

companies (e.g., Google), which requires a profound change in their competence base and systems of values, beliefs, and professional norms. In the same way, in many countries, the national laws that regulate the copyrights of artworks and their related images also need to be changed.

1) *Entry of Google in the Cultural Heritage Industry:* In February 2011, the Google Cultural Institute—a nonprofit branch of Google—launched the Google Art Project as a cooperative research initiative with 17 museums in the USA and Europe. Google then launched its digital artwork platform—“Google Arts & Culture,” which offers museums a unique global distribution platform for disseminating the digitized copies of their artworks. As Google Arts & Culture is a nonprofit initiative, Google assumed the digitization costs. Museums maintained copyrights to the uploaded content, but gave Google a nonexclusive, royalty-free, worldwide license to use, reproduce, and distribute such content.

Museums were thus able to deploy Google’s Street View technology to navigate their interior spaces, but also to use Google’s gigapixel technology to develop ultrahigh-resolution digitized images of paintings and sculptures. Online visitors were able to zoom in on individual elements of the digitized works, reaching levels of detail invisible to the naked eye. In 2011, digitizing artworks at a gigapixel resolution was a complex technical challenge. Museums could not compete with Google concerning the resolution performance of digitized artworks. As the Director of the Uffizi Gallery stated:

Digitising even a handful of objects at an ultra-high resolution would have been a challenge for the museum’s equipment. The Uffizi Gallery has more than 600 objects on Google Arts & Culture. Some of them were taken by the Google Art Camera (e.g., Sandro Botticelli’s “The Birth of Venus”). When I compared these high-resolution images with the traditional ones, the disparity between the two optical technologies immediately became clear.

Google reinforced its specialization advantage over museums by combining its digital imaging and indexing competencies with emerging artificial intelligence, machine learning, and virtual reality technologies, thereby ensuring access to hard-to-reach places. The entry of Google into this industry was consistent with its strategy to deliver more content and “organise the world’s information” to keep their users on its platform for longer and be more attractive to advertisers and other customers intermediated by the Google platform. Google proposed various economic value creation drivers for artwork digitization. However, the radical novelty for visitors was the gigapixel technology, which reveals, through high-resolution imaging, elements of paintings, or sculptures that are not easily visible in a real museum visit.

2) *Vertical Disintegration Drivers:* The entry of Google into the cultural heritage industry favored the rise of a new specialization pattern in the value chain. Although Google was able to apply digital multimedia technologies to disseminate artwork, thereby supporting museums in their evolution from “temples” to “forums” [33], museums had to specialize in content and storytelling. However, many small and state-owned museums did not have the necessary digital competencies or resources to

take advantage of Google to distribute their content, for two main reasons. First, the strategic posture of many museums just after 2011 was to not develop relational dependencies on Google. This was the consequence of 1) a prolonged institutional vacuum which led to the lack of an institutional framework that regulated how content could be distributed by third parties, and 2) the lack of strategic autonomy that would allow small and state museums to seize the new opportunities offered by digital technologies. Moreover, the common belief of many museums was that the digital distribution of their content would undermine the enjoyment of art and encourage excessive “popularization” and “banalization.” The second reason was that museums had traditionally outsourced the dissemination of artworks to specialised book and poster publishers.

This seemed to indicate that curators were reluctant to transfer their research results to the Internet. However, as the Director of the Uffizi Gallery reported, *the digital transformation could not be avoided, and this also applies to art and culture.* Lacking the resources and expertise to deal with the digitization of physical objects and engage visitors with an effective online presence, these museums opted for vertical disintegration. Museums with limited flexibility in acquiring resources and expertise and few resources and contents in the upstream part of the value chain thus opted to outsource the digitization process.

The rationale behind the agreement between museums and platform was to locate transactions at the “thin crossing points” [44] between legacy (museums) and digital (Google) resources and expertise to support the division of knowledge between cultural organizations and the digital platform and, consequently, lower transaction costs [see Fig. 1(a)].

3) *Vertical Integration Drivers:* When digital dissemination became a real opportunity, the largest private museums in the world did not choose vertical disintegration. Although state-owned museums had severe budget constraints and could only hire new employees through public competition procedures, most of the private museums could count on higher flexibility on the job market to attract digital specialists and had more financial resources to build their direct digital marketing channels. Moreover, before the rise of the “digital heritage,” many large museums worked with research institutions, whose mission was to transfer the outcomes of their research on art to society. Therefore, they had more content to disseminate through digital assets and started creating new roles specialized in digital communication by hiring external experts. Private museums thus applied learning-by-hiring to manage the conversion of the competencies needed for the online dissemination of their artworks. This is reflected in what a digital media expert at the MoMA in New York stated:

I am lucky. I work in a large, well-funded and well-resourced museum. All organisations need to embrace digital technologies. However, you are less likely to encounter digital specialists in a small state-owned organisation. You are more likely to meet generalists who need to work over a wide range of different disciplines. A digital team made up of just one person, for example, might need to do a bit of coding, a bit of design, a bit of content development, a bit of social media,

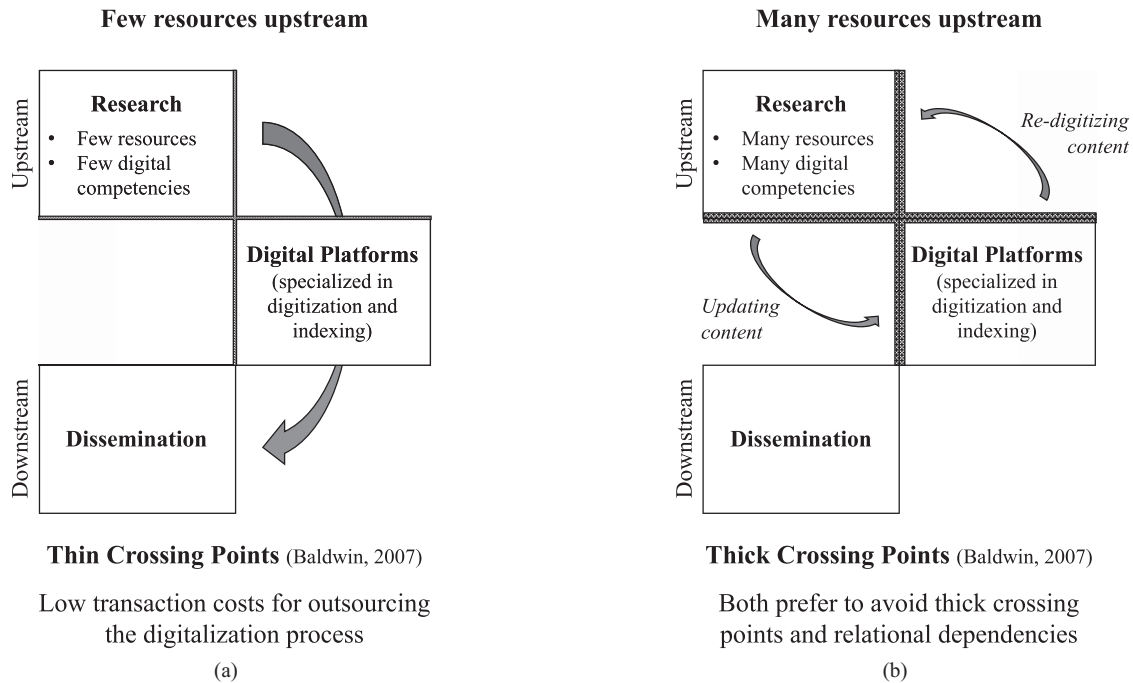


Fig. 1. (a) Vertical disintegration drivers. (b) Vertical integration drivers.

a bit of email marketing ... We have many job vacancies for digital specialists here at MoMA, including data scientists!

Learning-by-hiring thus allowed private museums to maintain their vertical integration, although a new specialization island had emerged [see Fig. 1(b)]. These museums decided to keep control of the content generated by their new digital communication specialists, by not transferring it to Google, but using it as a relevant lever to attract visitors to the museum.

Museums with high flexibility in acquiring resources and competencies, even in the upstream part of the value chain, may choose to vertically integrate, and face the challenges of digital transformation without developing relational dependencies on new digital entrants [11]. Therefore, the decision of museums to adopt vertical integration strategies is linked to the presence of “thick crossing points” [44], where both museums and digital platforms (Google) prefer to avoid higher task interdependencies [Fig. 1(b)]. At “thick crossing points” (as opposed to thin ones), transfers are complex, numerous, and interdependent. Information flows are consequently uncertain and iterative, and interdependencies give rise to the specificity of activities. Therefore, “thick crossing points” are necessarily places with high transaction costs [44]. As Baldwin [44] asked “can two companies with interdependent projects really expect to define and count all the necessary transfers of project information?” The answer to this question emerged from what the head of the digital communication department at the Van Gogh Museum in Amsterdam said:

We have more paintings digitised on our website than on the Google Arts & Culture platform. Transferring all the research content that we create each month around an artwork onto the Google platform requires a lot of work; it is not easy and requires time. For example,

suppose our researchers discover a new piece of knowledge about the “Sunflowers”. In that case, we can easily add it to our content management system and immediately update the information published on our website. We do not have to think about reconciling all the different types of information available on different channels. Updating such information on the Google platform would require redundant work.

Several research-based museums decided not to define an Internet competition around the high resolution of their images and not to contend Google’s competitive advantage in this field. Instead, they concentrated on the possibility of bundling the storytelling content with their digitized artwork collection. It was found that museums provided richer content and information on their websites than they did on Google’s platform.

Large and research-based museums—thanks to their more favorable institutional context and higher endowment of resources—chose a vertical integration toward new stages of the industry value chain, such as gamification strategies, on their social media channels or the e-commerce of merchandizing on their own channel. One of the prime examples of success in this direction is the collaboration of the Van Gogh Museum with the American Vans brand. This partnership generated an exclusive collection of shoes, clothes, and backpacks featuring images of some of Van Gogh’s masterpieces and some lesser-known works. In other words, their higher vertical integration upstream in the value chain (i.e., research) led these museums to take greater control of their digital distribution, which was managed directly on their website, as this was the channel where content created through research could be transferred without incurring transaction costs or relational dependencies.

4) *New Institutions Needed to Create and Capture Value:* The institutional changes needed to unleash the value creation

opportunities described above have matured over the years and had, in fact, already started before Google entered the industry. In the early 2000s, museums had matured a conservative attitude toward digitizing their heritage on the web, as they feared that the web could have popularized art to an excessive extent. Museums feared that art could have become a commodity on Google and social media, with museums losing their control of the quality of the related art content.

Such inhibitors are still related to the necessity of rooting a new system of values, norms, incentives, and specialized roles among museum management teams and curators. Informants repeatedly stated that curators and researchers do not have the digital competencies or the time to “tweet art” and adapt content to their online communications or engage with visitors. New curricula and new careers have been set up through the creation of liaison roles, to translate the “scientific” knowledge provided by curators into a nonspecialist language for the various digital channels that digital media specialists upload online to increase a museum’s visibility. As reported by the curator of the Museo Egizio:

The content resulting from our research activities cannot simply be transposed to the digital world. Content needs to be translated to be disseminated through digital technologies. Now, curators are too academic to do this effectively. We tried; it did not work. Similarly, this translation process cannot be left to the museum’s digital specialists. We tried; it did not work. The solution? Create new liaison roles that see curators and digital specialists working together to develop new digital content that provides visitors with a new lens and breaks down their set of beliefs.

The institutional changes have also embraced regulations and norms. For example, in 2014, to impede the country from losing momentum in the dissemination of its unique cultural heritage, the Italian government approved a reform that established greater autonomy in funding and hiring top managers for 18 large public museums and allowed smaller museums to be grouped into regional clusters to sustain their adoption of innovation and the sharing of knowledge, resources, and best practices. The other significant change in the institutional context regarded the copyright protection of high-resolution artwork images hosted in museums. Until the 2010s, museums had been highly protective of any good-quality digital versions of their artworks, making them available only upon request to the press, art historians, and scholars, with restrictions on how they could be used, to maintain control over potentially lucrative museum revenues from posters or souvenirs and prevent thieves or forgers from making convincing copies. Today, cultural institutions are encouraged to adopt policies and strategies to make digital content available with limited economic, technological, and legal barriers to its widespread use. One of the most path-breaking positions is the approach undertaken by the Rijksmuseum in Amsterdam in 2013. The museum provides online tools to manipulate, change, or clip images to copy and transform the digitized artwork images into stationery, T-shirts, tattoos, plates, etc. As the Director of collections at the Rijksmuseum stated in an interview with the New York Times:

With the Internet, it is so difficult to control your copyrights or the use of images that we decided we would rather people used an excellent

high-resolution image of the “Milkmaid” from the Rijksmuseum rather than using an awful reproduction [...]. If they want to have a Vermeer on their toilet paper, I would rather have a very high-quality image of Vermeer on toilet paper than a very bad reproduction.

In short, museums where the local institutional context allowed them to apply more resources and competencies upstream in the value chain (i.e., research) had the opportunity to develop higher resources downstream. These museums exploited such capabilities by releasing more content online. As their website was the channel through which content was given free, these museums increased their ticket prices to subsidize the investments made online and consolidate their revenue stream. The increase in ticket prices was used to capture—in the “physical” channel—the economic value created in the “digital” channel (where the price was zero). However, this path of exploiting digital competencies was not taken by certain museums (such as the Uffizi Gallery), which completely deintegrated their Internet presence with the Google Arts & Culture platform.


Table IV shows this difference in the institutional, organizational, and strategic structure of the sampled museums and the consequent effect on vertical integration choices and ticket prices.

5) How Museums Maintain Their “Least Replaceable” Player Role: The analysis has identified the specialization of museums and new entrants into the new industry architecture, as well as the complementarities that emerged between their core assets and capabilities. However, the fundamental question of how museums maintained their centrality role in value creation and value capture in response to the entry of new actors is still open. The role of the least replaceable player in the value chain is essentially derived from two value creation mechanisms. First, attracting visitors from the digital world to physical galleries where digital technologies create a realm of memorable experiences. Second, using their proprietary digital channels to develop an ongoing relationship with visitors by delivering unique and valuable information.

These two value creation mechanisms imply that the competition with Google is based on the quality and richness of the narrative content that can be developed about artworks and the visibility of their content through search engines and social media. The release of artwork content through open data ensures the visibility of artworks. Museums can thus defend their role of “guardians of quality” in the cultural heritage value chain. Their goal is to control the whole process through which online visitors mature their intention of going or returning to the physical museum by ensuring that the content available online is the official one released by the museum or qualified experts. Thus, ensuring free access and the reuse of high-resolution images of collections counteracts the proliferation of “untrusted” content that may be uploaded on Wikipedia, art blogs, and nonauthorised websites by any third party.

The capability of developing more qualified content ensures online visibility and promotes trustworthiness. This can be capitalized on through a higher museum attendance and higher ticket prices. The higher ticket prices in some of the analyzed museums are consistent with the goal of making galleries a realm of valuable customer experience (see Table IV). Many large

TABLE IV
INSTITUTIONAL CONTEXT, TECHNOLOGY ADOPTION, AND LEVEL OF VERTICAL INTEGRATION

	MoMA	Van Gogh Museum	Rijksmuseum	Museo Egizio	Uffizi Gallery
Institutional form	Private non-profit organization	Private foundation that includes the local government	Public organization	Private foundation that includes the local government	Public organization with special autonomy since 2015
Attendance 2018	3 000 000	2 165 000	2 300 000	849 163	2.230.914
Employees 2018	2 100	341	614	44	345
Revenue 2018	€ 206 149 481	€ 64 777 943	€ 63 225 000	€ 8 586 455	€ 34 090 512
Revenue 2018 per employee	€ 98 166	€ 189 955	€ 102 972	€ 195 147	€ 98 813
Level of vertical integration (downstream)	High	High	Medium	Medium	Low
					
	Digital dissemination Digital installations e-Commerce	Digital dissemination Digital education e-Commerce	Digital dissemination e-Commerce	Digital dissemination	Website launched in September 2017
Price of ticket 2018	€ 23.23	€ 19	€ 20	€ 15	€ 20
Ticket income per visitor 2010 vs. 2018	2010: € 9.37 2018: € 9.63	2010: € 10.80 2018: € 14.13	2010: € 7.24 2018: € 11.40	2010: € 4.20 2018: € 8.23	2010: € 4.21 2018: € 7.09
New roles	Digital content and strategy department	Digital communication department	Digital communication and online gallery department	Liaison role between research and communication departments	Liaison role between research and communication departments
Digital vision	Scalability of the digital collections	Synchronization of the digital and legacy practices	Open collections	Digital tools for research	No digital presence strategy yet

museums have in fact witnessed a decrease in their revenues from copyright concessions of their image bank. These concessions were deemed necessary to attract more visitors and obtain more revenues from ticket sales, but have not produced a drop in revenues. When the Rijksmuseum made its high-resolution image bank accessible, upon payment of a fee, this type of revenue accounted for 0.2% of the total revenues. The Rijksmuseum, thanks to its increased visibility on the web, experienced a

growth in its annual attendance between 2010 and 2018, from 1 to 2.3 million visits, and a growth in the number of online visitors from 1 to more than 8 million.

Private museums, being positioned in institutional contexts that provide more hiring flexibility, are better positioned to hire digital specialists from cultural and creative sectors; for example, the MoMA employs about 30 digital specialists with at least a 10-year tenure. On the other hand, public museums, especially

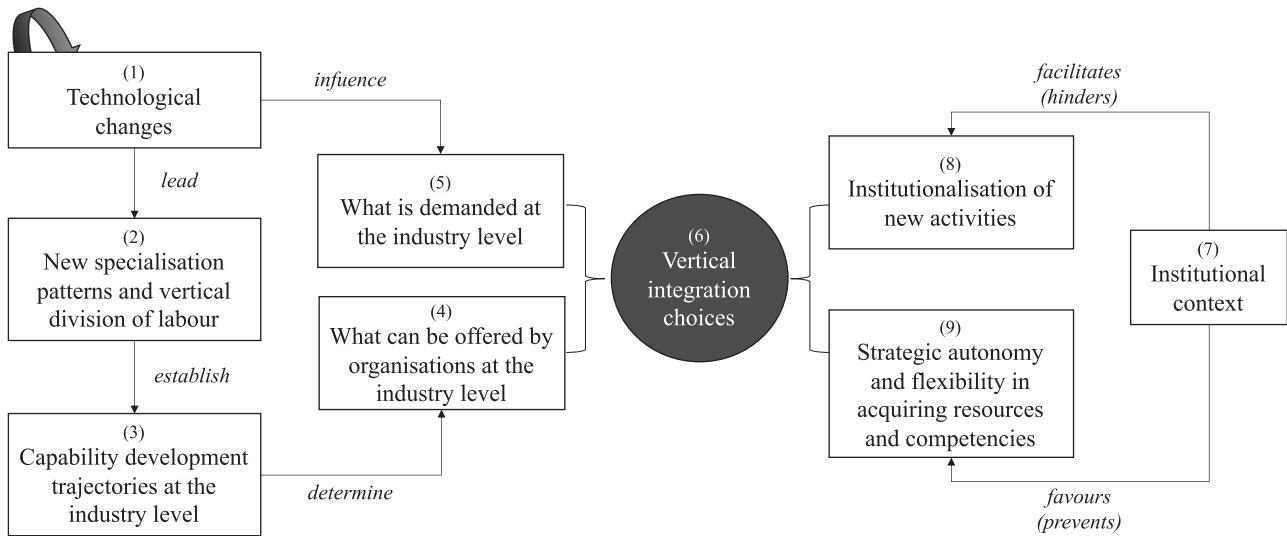


Fig. 2. Integrative framework of vertical integration choices.

those in institutional contexts with a lack of resources [37], must develop new competencies by converting existing employees into digital dissemination experts. This hampers their capacity-building model, as the Director of the Uffizi Gallery reported:

The recent autonomy granted by the Italian Ministry of Culture to some large museums, such as the Uffizi Gallery, has given us the freedom to start a change in our organisational structure. However, the reform has not given us the freedom to hire new employees with the required digital media skills. To do so, it would be necessary to start a national competition, but it is not possible now due to the lack of public funds available for new human resources. The main constraint on the “buying” of competencies through collaborations is the threshold of service expenses set by the national budget rules.

V. DISCUSSION

This article theoretically establishes and empirically investigates the relationship between vertical integration, technological change, and the institutional context. Empirical evidence shows that the institutional context—seen as the interplay of laws, social norms, managerial beliefs, knowledge bases, and access to finance—can explain why some firms opted for vertical integration and others for vertical disintegration in response to technological change that brought new islands of specialization to the cultural heritage industry. In particular, the article shows that vertical integration choices reflect differences in the way an institutional context operating at the national level favors (or prevents) value creation and capture enabled by technological change—hence, the dependence on the country-specific path in the division of labor. Fig. 2 schematically illustrates this point.

The results show that technological changes 1) enable new creating and capturing value opportunities within the industry, and new specialization patterns and a vertical division of labour 2). The new specialization patterns and vertical division of labor break down the industry value chain into a hierarchy of different segments (in our case research and production of new content upstream in the value chain and onsite and online dissemination

of content downstream in the value chain). This compartmentalization influences the knowledge base of each segment and establishes trajectories for the development of capabilities at the industry level 3). This set of capabilities dynamically influences an industry’s evolution and determines a company’s supply at the industry level 4). If these capabilities are not sufficient to jointly meet existing and emerging market demands 5)—in turn influenced by technological changes—and new specialized players enter the industry (e.g., digital platforms, such as Google Arts & Culture), vertical disintegration occurs 6). However, if the capabilities are sufficient to satisfy existing and emerging demands, firms may adopt vertical integration strategies. The institutional context 7) plays an important role in the strategic decision of firms by facilitating (or hindering) the institutionalization of new activities 8) and by favoring (or preventing) strategic autonomy and flexibility in the acquisition of resources and competencies 9).

Although this process appears linear, it represents a set of recursive relationships—exemplified by the self-reinforcing cycle started by technological change 1)—that intersect the organization’s ability to cope with the digital transformation process and the institutional context in which the organization operates.

A. Theoretical Implications

Several arguments can explain the complexity of the set of relationships that emerged in this article. First, by examining the entire value chain and its participants over time, this article provides a dynamic and empirically grounded picture that vertical integration is a complex, costly, and difficult strategy to reverse. This, seen together with the analysis of Jacobides [3], helps to explain industry-wide changes in the value chain structure and vertical industry architecture.

Second, the article confirms that market transaction costs are a relevant variable in this process [7]. In this sense, the analysis enriches the long-running debate on the disintegration of industry

boundaries by showing that the value chain disintegration trends described by Hagel and Singer [45] do not necessarily follow clear-cut patterns and that transaction and coordination costs may still persist, even in a context of highly digitized information flow.

Third, this article also shows that the institutional context and industry-level policies are important in shaping the structure of an industry. Specifically, by examining the strategic choices of vertical integration as a function of the institutional context, the analysis shows that the vertical scope of an industry is a “contested terrain” that creates winners and losers. Institutional contexts that have fostered strategic autonomy and flexibility in acquiring resources and expertise have allowed museums to adopt vertical integration to avoid the higher costs of coordinating with new entrants (e.g., Google). However, organizations must be able to afford these intensive benefits in terms of operational costs [46], bureaucratic costs, and increased capacity requirements [23]. Consequently, resource-poor organizations may reduce the opportunity costs—related to activities that can only materialize if outsourced (e.g., the dissemination of online content by museums that have neither the expertise nor the resources to do so)—and the risks arising from these challenges by reducing their degree of vertical integration or opting for vertical disintegration strategies. This result extends Barney and Clark’s [47] study by pointing out that opportunity costs may sometimes even exceed transaction costs and should therefore be evaluated in the analysis of vertical disintegration.

Fourth, the article shows that vertical integration offers several potential benefits that improve coordination, increase the opportunity of creating product differentiation [1], build higher market entry barriers for new entrants [23], and help develop a market for young industries [48]. However, the results do not fully support Christensen et al.’s [49] thesis that vertical integration is always superior. In fact, this article shows that the potential benefits of vertical integration over disintegration depend on the balance of capabilities, the institutional environment in which firms operate, and the demand imposed by the market.

A fifth argument concerns the uncertainty that companies face when they vertically integrate or disintegrate. Uncertainty, in this context, refers to the measurement of costs related to the vertical integration choice, the identification of core and peripheral competencies, and the difficulties in predicting performance outcomes resulting from vertical integration. The evidence suggests that less integrated organizations are likely to become less profitable when facing increased competitive pressure and be forced to further reduce their level of vertical integration [cf. 50]. This result contradicts the resource partitioning view [51] that suggests that specialized new entrants should fight against industry firms and corroborates Jacobides’ [3] findings in the mortgage industry.

Finally, this article provides a dynamic integration of TCE and RBV that shows how the vertical division of labor shapes the process of capability development based on the institutional context in which firms operate and how capabilities influence efforts to change the vertical structure of an industry over time [cf. 4]. In this sense, the article contributes to broadening our understanding of industrial dynamics.

B. Managerial Implications

The combination of these theoretical implications leads to a number of important managerial implications. First, the strategic choice of the integration level is not simple. Managers should realize that vertical disintegration is not a simple or convenient strategy, but rather “a serious interference in business processes” ([5], p. 25) that is difficult to reverse and has long-term effects on a company’s competitive advantage. On the one hand, vertical integration choices are mainly influenced by the competitive advantage a company has at a particular stage of the value chain with respect to the market. This competitive advantage is the result of the firm’s predominant resources and capabilities, which result from a unique and path-dependent learning process [4]. Therefore, to achieve a sustainable competitive advantage, managers should outsource their noncore activities and focus on core competencies. On the other hand, vertical integration choices influence the ability to develop intangible assets that, in turn, affect a firm’s competitive advantage [52]. For example, vertical integration creates credibility for new products and provides protection for proprietary products or process technology and managers should take this into account to build long-term forms of competitive advantage.

Second, integrating the wrong activities or neglecting the appropriate ones can have serious consequences. Kaiser and Obermaier [5] highlighted the presence of possible bandwagon effects in vertical integration choices that could lead managers to make wrong strategic choices. This article suggests that if the “management fad” tells managers that vertical disintegration is favorable, there is a probability that they may choose the wrong direction if they do not consider the institutional context in which the organization operates. In fact, not considering the institutional context may lead managers to only consider variable costs rather than a combination of transaction costs and the prospect of the competencies needed for the transformation process.

Third, this article shows that transaction costs and competencies operate in conjunction depending on how well current competencies match the specificity of technology assets. It is therefore recommended that managers constantly map and identify the legacy and digital skills they possess (or can acquire in the short term) and assess which activities they are able to perform in-house, and which require specialization.

Fourth, the article confirms the role of managers in trying to change the competitive environment to suit their advantages [cf. 9] by expanding existing trajectories or—if these are not sustainable—by trying to change the institutional environment in which they operate (e.g., the Uffizi Gallery).

Finally, in practical terms, the framework developed in this article suggests not to take the vertical structure of an industry for granted and thus provides a tool for managers to understand whether their industry is subject to vertical disintegration phenomena.

C. Limitations and Extensions

This article has several limitations. First, this is a study on a specific field and therefore should not be hastily generalized to

other contexts. Like other process research [cf. 3], in developing the conceptual framework, the focus was on understanding context-specific causal dynamics, rather than providing information on the generalizability of results to other contexts. Future article could test whether the framework developed in this article applies to the evolution of other industries where—as in the case of museums—the product or service is a digitally native artifact whose economic value depends on the information it contains [53]. Second, the individual parts of the framework would benefit from more in-depth analysis to further develop the link between vertical integration choices, technological change, and the institutional context. Future article could investigate the specific microprocesses of how organizational structures should be designed to capture the value creation enabled by digital technologies. Third, the hierarchical nature of the relationships that govern institutional contexts and determine firm and industry boundaries has not been directly explored. Future article might consider how status and power influence the vertical structure of industries and the functioning of transactional mechanisms within them. Fourth, the article did not focus in depth on how firms seek to change the institutional environment to their own advantage in the long run. Further article is needed to understand when this happens and what factors mediate this process.

Finally, it is hoped that the results of this article will encourage more qualitative studies on the ability of legacy organizations to maintain their role as the “least replaceable player,” despite the advent of digital innovation. By sketching some of the differences between the newspaper industry and the cultural industry, this article offers some preliminary insights into the roles that causal ambiguity and knowledge stickiness play in creating the dynamic capabilities needed to combine legacy assets and skills with digital ones. However, there is still a lack of theories and empirical studies aimed at defining the value capture mechanisms that intervene between incumbents and new entrants in the new industrial architectures originating from the digital transformation. How will the value capture mechanisms of such nonprofit initiatives as Google Arts and Culture evolve? Will we continue to talk about the democratization of culture or the training of machine learning and artificial intelligence algorithms? What will the role of nonfungible tokens be? How will the role of museums (and other organizations) evolve in the not-too-distant future regarding the new metaverse logic? What will the role of institutions be, and how will the institutional context embrace these new logics? These and other questions will be the subject of future studies, and it is hoped that this article will contribute to providing answers to these questions.

VI. CONCLUSION

The article shows that the institutional context can explain how some firms have adopted vertical integration and others vertical disintegration in response to a technological change that has introduced new islands of specialization to the cultural heritage industry. Vertical integration requires expertise, time, and money, but also offers advantages to create and capture economic value. Organizations with a high degree of strategic

autonomy, high flexibility in acquiring financial resources and expertise, and many resources and contents in the upstream part of the value chain, can afford this strategy and face the challenges of a high degree of vertical integration. Conversely, firms with low strategic autonomy, limited flexibility in acquiring resources and expertise, and few resources and contents in the upstream part of the value chain tend to evolve toward vertical disintegration decisions when digital platforms or specialised firms (e.g., Google) enter the industry.

In practical terms, the framework developed in this article explains where and how vertical disintegration occurs and provides a tool for managers to understand whether their industry is prone to vertical disintegration. In terms of research, this article contributes to the vertical integration literature by shifting from the static analysis of the efficiency of vertical integration and individual transactions to the dynamic analysis of what causes changes within an industry. By looking at the evolution of the value chain and the types of actors within it, the article identified both the evolution and change mechanisms, thus contributing through a more detailed analysis of the institutional forces that shape the nature and structure of vertical segments of an industry. Taken together, the results suggest a more sophisticated evaluation of vertical disintegration strategies than those offered by TCE or RBV taken in isolation and emphasise how the ability to “make” or “buy” should not be taken for granted.

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