DISRUPTION AND INNOVATION IN LATIN AMERICAN RETAIL DISTRIBUTION

gA Center for Digital Business Transformation

Following up with the studies on the holistic digital transformation challenges and opportunities in Latin American economies , the gA Center for Digital Business Transformation is issuing in 2018 our first report on digital transformation in vertical markets. Our focus in this instance is the Latin American retail distribution industry. As is always the case, while using the experience of lead markets tackling digital transformation challenges, our research focus remains heavily anchored in the Latin American geography. For this purpose, this study presents the results of the analysis of national industrial census conducted by governments of the region, and industry surveys. That said, while maintaining a Latin American research focus, we believe that the current transformations permeating the sector in our region need to be analyzed in the context of how disruptive changes in retailing occur over time in developed countries.

## I THE HISTORY OF RETAILING IS PERMEATED WITH CONTINUOUS DISRUPTION

The history of retail distribution shows the constant emergence of new formats displacing old ones . Retail distribution regularly undergoes format changes driven by three factors: changes in socio-demographics, such as the rise of the middle class and industrialization; shifts in spatial geography, such as urbanization and the development of suburbs; and deployment of infrastructure, such as the development of railways and highways (and currently, the Internet). For example, the growth of urbanization and the rise of railways in the industrialized world in the 1850s, especially in North America, led to the emergence of the

modern department store. In the 1940s, mass-produced automobiles and highways led to the emergence of shopping malls lined with specialty retailers in the suburbs, replacing the city-based department stores. The 1960s and 1970s witnessed the spread of discount chains, and the so-called "category killers" like Circuit City and Home Depot. In general terms, business model evolution of retailing proceeds along two dimensions: formats and products (see exhibit 1).

[1] gA Center for Digital Business Transformation. Latin America 4.0. The Digital Transformation in Latin America, 2015, and gA Center for Digital Business Transformation. Innovation and disruption in the value chain. 2017.

[2] A format is a business model that describes a retail operation. Retail formats range from the small, family-owned outlet, to mass discounters such as Walmart and Kmart, shopping malls such as Parque Arauco in Chile, department stores such as Falabella, Cencosud, Lojas Americanas in Brazil, and Palacio de Hierro, in Mexico, and "category killers", such as Frávega in Argentina and Livraria Saraiva in Brazil.

EXHIBIT 1.
COMMON GOODS CHANNEL
FORMAT EVOLUTION
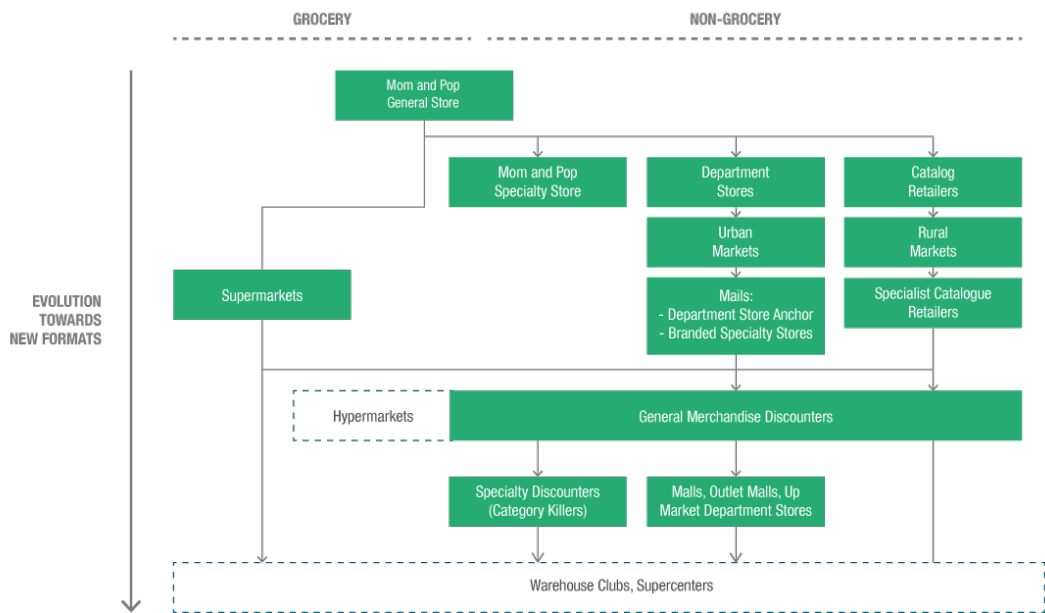
As exhibit 1 indicates, retail format evolution proceeds by involving the distribution of additional goods in "specialized" and/or "generic" channels. The original "mom and pop" or general store gave way to larger scale generic channels (e.g. supermarkets, and department stores) combined with the development of "specialty stores" and catalogue retailers. However, while channel substitution might occur in some cases, the rise and fall of specific formats is not automatic. Format substitution might take over longer periods of time, while multiple redundant channels could be reaching the marketplace simultaneously and even coexist.

The format replacement cycle is remarkably consistent. Initially, when a new format enters the market and gets established it does not necessarily eliminate prior generations but raises new competitive imperatives. The new format redefines consumer expectations in terms price, service needs and experience. In this context, the prior retail channels need to adapt in order to survive. If they do not, they disappear, if they adapt, they continue to thrive.

Consider e-commerce as a new format that initially emerged in the industrialized world. Triggered primarily by the growth of the Internet (as an infrastructure change), the first wave of e-commerce developed in the 1990s. With few exceptions, such as, notably, Amazon, the original Internet retailers did not survive. Irrationally exuberant predictions, coupled with poorly defined business models and interfaces led to their demise. Nevertheless, the "brick and mortar" retailers reacted to the original disruption wave by creating separate online channels. Their first foray was not successful either. The newly created online organizations targeted different customer segments, inhibited

internal collaboration, and created friction between the online and physical channels. As a result, the new online units were, in most cases, dismantled or de-emphasized when predictions again proved overtly optimistic.

However, with the recovery following the 2001 dot.com demise, e-commerce returned with a vengeance. In industrialized countries, the development of e-Commerce, led by Internet retailer "pure plays" and the response from "brick and mortar" distributors, was triggered by companies that had learned from the mistakes of the first wave. Therefore, despite the original mistakes, a new format was established prompting the pre-existing retailers to adapt in order to survive. Those that did not (such as, prominently, Borders, Virgin Records, and Radio Shack), disappeared.

If something has been learnt from the history of retail format evolution in developed markets is that, once a new format proves its viability, its proliferation accelerates, undermining the prior format economics, triggering a wave of failures and exits among the companies that have not been able to adapt. Witness the list of 18 bankrupt retail chains that have taken place in the United States just in 2017[3] (see exhibit 2).

EXHIBIT 2.
UNITED STATE: RETAILERS THAT DECLARED BANKRUPTCY IN 2017

RETAILER	STORE CLOSURES
Vitamin World	51
Toys R Us	NA
AeroGroup International	"significant reduction"
Perfumania Holdings	64
True Religion Brand Jeans	27
Papaya Clothing	NA
The GYmnboree Corp.	350
Rue21	400
Payless ShoeSource	808
Gender Mountain	32
Gordmans Stores inc	48
Hhgregg Appliances	220
Radio Shack	1,000
BCBG Max Azria Group	120
The Wet Seal LLC	171
Eastern Outfitters LLC	48
Marbles Holdings LLC	37
The Limited	250
Total	**3,626**

Source: Internet Retailer

In other words, format transitions create enormous economic value for successful innovators, resulting in successful new entrants, rapid retaliating firms and failures. In the industrialized world, with a few notable exceptions, traditional retailers have been

[3]Some of them, such as The Limited, have re-emerged from bankruptcy proceedings as web-based channels.

lagging in their embrace of digital transformation. Some of them were badly burned by the failed first e-commerce wave or past breakthrough innovations, such as RFID. Others lacked the technology skills, or remained not adept to the test and learn approaches that characterize digital innovation.

Furthermore, there are other structural barriers at work within traditional retailers. First and foremost, digital distribution threatens existing store economics, measurement systems and incentives. Analogue metrics, such as same-store sales, in-store sales per labor hour, and sales driven compensation, do not favor the launch of holistic digital channels. Consequently, these metrics fall apart once online sales reach 15% of revenues. In light of this, traditional retailers continue focus on the wrong financial metrics, such as profit margins, instead of looking at return on invested capital.

Has Latin America retailing undergone a similar process? How big is the gap separating the continent's retail industry from the realities of industrialized nations? Is Latin America retailing undergoing the same level of disruption?

II THE TRANFORMATION OF LATIN AMERICAN RETAILING

The same process of format evolution observed in the developed world has, to a large degree, taken place in Latin America, albeit driven by different factors and over a more compressed period of time. Shopping malls emerged in our region in the 1970s as a result of the sprawling development of urbanization. In addition, the growth of the middle class that took place in the latter part of the twentieth century led to the expansion of multinational and local discount chains, as well as department stores. Furthermore, the development of the Internet triggered the emergence of the new e-commerce format over a very short period of time.

The Development Of E-Commerce In Latin America

Simultaneously with the advance of the second wave of Internet retailing in the developed world, e-commerce began its advance in Latin America as a result of the three drivers of retail format change. The first and foremost driver was the emergence of the middle class. This demographic change, resulting from the commodity boom and income distribution policies that took place at the end of the twentieth century, was the primary drive in retail format change. As of today, the middle class represents 55% of the Brazilian population, 53% in Colombia, 47% in Chile, and 24% in Peru. Triggered in part by this trend, the rate of urbanization that took place since the 1950s accelerated as well. As of now, 80% of the Latin American population resides in cities. It should be emphasized, however, that the rise of the middle class and the increase in urbanization are two processes that are highly correlated (see exhibit 3).
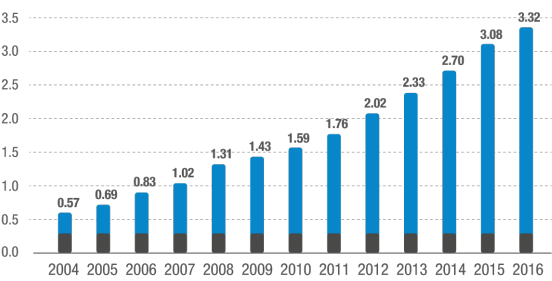
EXHIBIT 3.
URBANIZATION AND GDP PER CAPITA
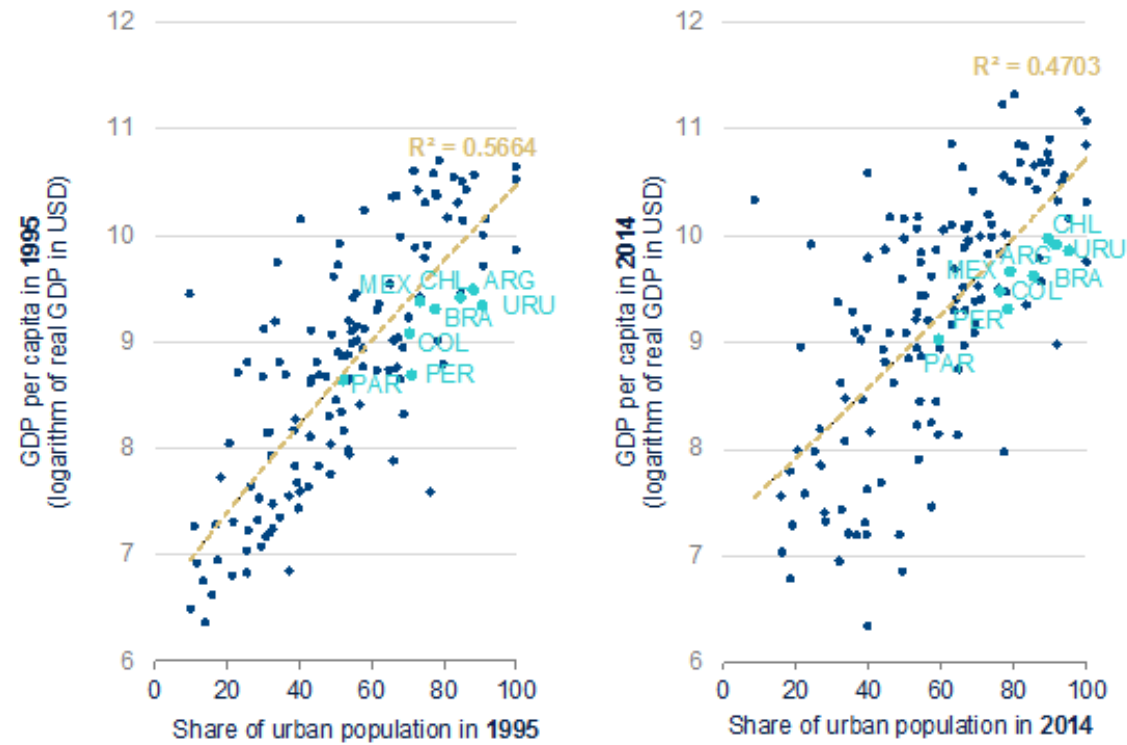
Source: BBVA

Finally, as an infrastructure enabler, the development of broadband Internet reached critical mass in the region. Fixed broadband connectivity rose from 4.37% of household penetration in 2004 to 40.57 % by the end of 2015. In some countries, fixed broadband penetration exceeded 50% of households. Such is the case in Argentina (58.69%), Chile (57.51%), Mexico (52.54%), and Uruguay (65.66%),

The combination of the three trends – demographic, geographic and infrastructure -resulted in an increase in e-commerce flows. In 2004, Internet retailing represented on average 0.57 % of total retail flows. By 2016, this percentage had grown to 3.32 % (see exhibit 4).

These statistics show, on the one hand, the growth trend but at the same time indicate the hurdles experienced by this new format in the region. Under-bankarization, and less efficient fulfillment and logistics infrastructure have proven to be significant development barriers. A comparison between the largest Latin American Internet commerce markets and the world leaders indicate how much our region still needs to develop (see exhibit 5).

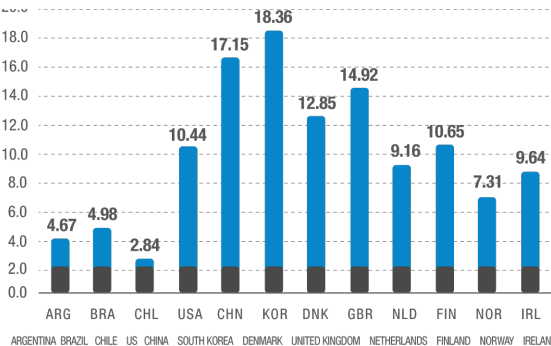Source: Euromonitor; analysis Telecom Advisory Services

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Source: Euromonitor; analysis Telecom Advisory Services

As exhibit 5 indicates, even the largest e-commerce countries in the region (Argentina, Brazil, and Chile) represent a small share of retail flows relative to the developed world and China.

Total e-commerce sales in Latin America by domestic Internet "pure play" retailers and "brick and mortar" players amount to US$ 24.59 billion. The year on year growth rate has slowed

down to 14.9% from an average 21% since 2012, driven not by retrenching demand but by enhanced competition from global players, such as Amazon, Ali Baba, and Walmart. It is important to emphasize that, despite this apparently large numbers, they represent, as mentioned above, only 3.32% of total retail flows. In Brazil, recognized as the largest e-commerce market, only 4.98% of total retail trade is conducted

through e-commerce. To put matters further in perspective, as of 2015, 25% of the population above 15 years old was e-shoppers, while the comparable statistic for the United States is 76% and the United Kingdom is 81%.

That being said, all metrics point to the fact that the waves of change triggering an acceleration of format disruption in the region are quite active. For starters, the development of social media (Facebook, Twitter, YouTube) is resulting in the ability to establish bi-directional communication with customers. By the end of 2015, Facebook penetration in Latin America had reached 48%, with some countries exceeding 60% (Argentina: 62%, Chile: 61%, Uruguay: 64%). Simultaneously, the growth of mobile broadband around 3G and especially 4G has resulted in a second wave of e-commerce, enabled by smartphones, mobile sites, and apps. The combination of social media and mobile Internet access has resulted in the integration of shop front-end channels into Facebook, linking product and service offerings with customer likes and interests.

Competitive Dynamics in Latin American Retailing Accelerate with E-Commerce

Having explored the demand side trends of e-commerce, let's now look at the supply side. How have traditional brick and mortar retailers reacted to the entry of "pure plays" Internet retailers? What is the rate of expansion of global players, such as Amazon and Alibaba, in Latin America? Are they threatening to displace the well endowed local web retailers, such as

Mercado Libre and B2W? Is format disruption having an impact on the retail value chain? How are the specific features of Latin American digitization impacting the e-commerce business?

In Latin America, the disruption of retail distribution associated to the development of the Internet is a bit more complex, comprising several dynamics working simultaneously:

• **Emergence of local pure play Internet retailers:** Of the total US$ 24.59 billion web sales registered in Latin America[4] , US$ 11.60 billion (or 47% are generated by pure play internet retailers, such as B2W (US$ 3.579 billion), Nova Pontocom (US$ 2.07 billion), and Mercado Libre (while the company does not sell merchandise on its own behalf, total sales is over US$ 8 billion).

• Response of local "brick and mortar" players: Latin American store-based retailers have entered e-commerce in a very aggressive fashion, deploying electronic distribution channels in parallel with their physical network (witness Falabella and Cencosud in Chile, for example). Retail chains that combine digital and "brick and mortar" channels account for US$ 10.18 billion in web sales (therefore representing 41% of total web sales). For example, Magazine Luiza in Brazil, which operates 800 stores, reported that e-commerce accounted for 24% of total sales

[4]Internet Retailer. Latin America 2017

in 2016, and an even higher 26% during the fourth quarter when consumers were buying holiday gifts. Similarly, the department store operator Liverpool of Mexico reported 61% growth in online sales in 2016. Furthermore, the entry of "brick and mortar" chains in e-commerce does not entail only developing a parallel retail channel. These players also mimic Internet retailers by deploying platform-based marketplaces. Such is the case of Magazine Luisa, which added a marketplace to its web portal.

• **Expansion of global Internet retailers:** in the last two years, Amazon, Alibaba, and Walmart have significantly expanded their presence in the region. Amazon entered Mexico in 2015 and launched Amazon Prime in March 2017. In 2016, Amazon announced its arrival in Chile and the construction of a distribution center to handle logistics for its e-commerce business, with the objective of offering Amazon Prime Now services, which is a system that delivers in a timespan of hours. This player has also announced its entry in Argentina. Similarly, Walmart has expanded its logistics capability in Mexico to better support its "brick and mortar" and e-commerce channels. Alibaba is already a notable presence in Brazil by means of its AliExpress service.

This trend is forcing local "pure plays" and "brick and mortar" players to improve their performance to face this new challenge. For example, in response to Amazon's offer of free shipping, Mercado Libre introduced the same feature in Mexico and Brazil.

• **Fragmentation and reintegration of the value chain:** as analyzed in our book "Digital ecosystems: Latin America"[5] , one of the

disruptive effects of digital transformation is that of facilitating disintermediation in production chains. The concept of disintermediation in a value chain refers to the elimination of certain functions or stages. Digitization allows companies operating in production chains of traditional industries to eliminate stages, virtualizing them and facilitating their vertical integration. However, another modification of an industry traditional value chain can be the emergence of "specialists" who, because of economies of scale or learning curve can fulfill one of the stages of the chain more productively than vertically integrated players. Witness the emergence of Axado, a Brazilian fulfillment technology firm that provides services to some 2,500 retailers. Recognizing the fulfillment barrier existing in the region, "fulfillment specialists" have emerged to solve this challenge. However, the fragmentation of the value chain is not permanent. If "specialists" become too valuable, they might be acquired by players seeking to vertically integrate in the value chain. As a case in point, Mercado Libre acquired Axado in June 2016.

• **Mobile e-commerce is becoming a dominant access mode:** while this is still an emerging trend, with smartphones being adopted by close to 60% of mobile users, it is expected to develop further. For example, NetShoes, the Brazilian footwear and apparel e-retailer reports that 46.0% of visits and 32.2% of sales in 2016 were already coming from consumers using mobile devices .

[5] gA Center fpr Digital Business Transformation. Digital Ecosystems: Latin America 2017.

That being said, it is important to reemphasize that e-commerce still represents a minor format in relation to the physical "brick and mortar" channel. Even some modern formats such as supermarkets still remain a small channel within the whole retail landscape . The "Brick and mortar" arms of large retailers still remain viable, especially in combination with e-commerce subsidiaries (see, for example, Lojas Americanas, Via Varejo in Brazil, and Falabella in Chile, Mexico and Colombia), as will be shown below.

The convergence challenge

As it was reviewed in the history of retail format changes and illustrated through the Latin American evolution, the emergence of new business models does not result in the disappearance of prior ones. The future of retailing embodies a convergence between physical and digital channels, where customers want the advantages of digital (broad selection, rich product information, customer reviews and tips) and physical stores (personal service, ability to touch products, shopping as an event). In this context of convergence, traditional retailers will try to integrate channels, while digital retailers attempt to digitally replicate the advantages of physical shopping (see exhibit 6).

[6] Internet Retailer. Latin America 2016 Edition., p. 8.
[7] With the exception of Mexico and Chile, supermarkets exhibit a low penetration: 26% in Peru, 40% in Colombia, and 53% in Brazil (source: J.P. Morgan.)

EXHIBIT 6.
ADVANTAGES OF DIGITAL VERSUS DIGITAL CHANNELS

ADVANTAGES OF DIGITAL	ADVANTAGES OF PHYSICAL
Rich product information	Edited assortment
Customer reviews and tips	Shopping as an event and an experience
Editorial content and advice	Ability to test, try on or experience products
Social engagement and two-way dialogue	Personal help from caring associates
Broadest selection	Convenient returns
Convenient and fast check-out	Instant access to products
Price comparison and special deals	Help with initial setup or ongoing repairs
Convenience of anything, anytime, anywhere access	Instant gratification of all senses

Source: gA Center for Digital Business Transformation

Again, the Chilean retail industry provides an anticipating picture of what the future of Latin American retailing looks like. With emphasis on omni-channel strategies, department stores (32%) and category killers (44%) exhibit the largest share of web sales . However, retailers in other countries appear to be slower to adopt omni-channel approaches.

In this context, the lessons learned in developed economies are useful in terms of predicting of the sector's future evolution. The disruption prevalent at the tip of the iceberg will continue permeating down, resulting in a number of exits of those companies that will not be able to adapt to the new business models. This wave, enabled by the low level of sector formalization,

will result in more consolidations. In that sense, Chile, where in the three major retail segments (food, department stores/apparel, and home improvement/construction) the top three players enjoy over 70% market share , provides a picture of future market evolution in other Latin American countries. For comparison purposes, in other Latin American countries, the family-owned store format still controls around 40%-50% market share.

Notwithstanding these Latin American trends which, to some degree, follow what is ongoing in developed markets, retail distribution in the region still experiences some critical challenges grounded on the reality of emerging markets. For example, as discussed in two earlier reports from the gA Center for Digital Business Transformation, the payoff related to technology adoption is directly linked to the capacity of companies to accumulate intangible capital, defined as the difference between the acquisition price of information technologies and the economic value created once they have been assimilated in business processes . In this context, it is useful to understand where is the retail industry as a whole in the region when it comes to digital transformation.

III THE STATE OF DIGITAL TRANSFORMATION IN LATIN AMERICAN RETAILING

The understanding of the state of digital transformation of retailing requires first defining the term. The same way earlier processes[10] of technological change, such as the steam engine, railroads, telegraph and automobiles have transformed society, technological innovation linked to digital transformation of production proceeds along "waves" (see exhibit 7).
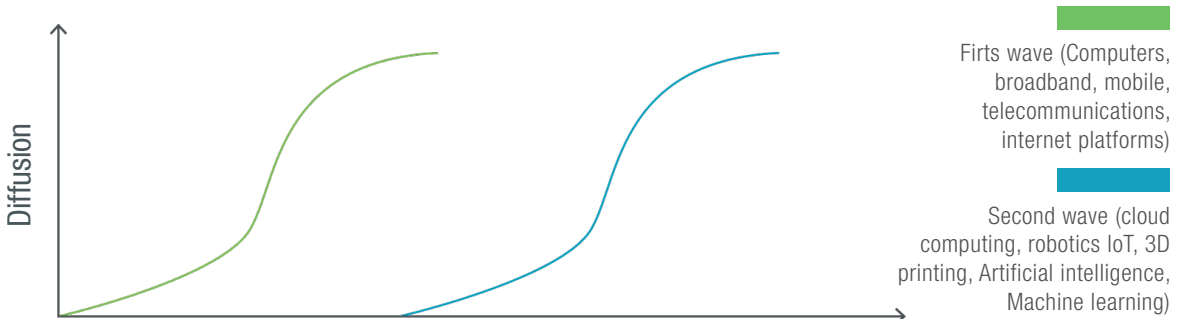
[8] Source: CNC as quoted in JP Morgan. Andean Retail 101. April 24, 2017.
[9] JP Morgan. Andean Retail 101. April 24, 2017.
[10] See gA Center for Digital Business Transformation. Digital Ecosystems: Latin America 4.0. 2017; and Katz, R. La inversion en capital intangible en espacios económicos integrados. Presentación a la III Asamblea y Jornada de Reflexión del Consejo Iberoamericano de la Productividad y la Competitividad. Sao Paulo, 2 de octubre, 2017.

EXHIBIT 7.
DIGITAL TRANSFORMATION WAVES

Source: gA Center for Digital Business Transformation

Diffusion

Firts wave (Computers, broadband, mobile, telecommunications, internet platforms)

Second wave (cloud computing, robotics IoT, 3D printing, Artificial intelligence, Machine learning)

The first wave of digital transformation is associated with the introduction and adoption of what today are considered "mature" technologies, such as management information systems aimed at automating data processing and applied to monitoring and reporting of business performance, telecommunications technologies such as broadband (fixed and mobile), voice and data telecommunications (fixed and mobile) which allow the remote access of information, and Internet platforms. This first wave took almost fifty years to reach high levels of adoption. Computers were introduced in business environments in the 1960s and reached 92.61% penetration among businesses in OECD countries only in 2014[11]. Mobile telephony was launched in 1985 and achieved 99% worldwide penetration by 2015. Personal computers, introduced in 1982, were adopted by 80.29% of OECD households in 2015[12]. Similarly, fixed broadband was introduced approximately in 1995 and reached 80.07% adoption within the same universe in the same year, while mobile broadband networks (3G and above) reached 84% of the global population in 2016. Finally, the Internet and its corresponding platforms (search engines, marketplaces), which enable the networking of enterprises to consumers and enterprises among themselves for purchasing of supplies, and distribution of output, fulfilled interconnection of all first wave technologies. Despite its early development in the late 1960s through 1980s, the popular introduction of the Internet can be situated in 1995[13]. By 2015, 77.2% of the OECD population accesses the Internet in a regular fashion, while 45% of the emerging world population has reached the same level.

It should be noted that, even within the first wave of digital transformation, diffusion cycles have become faster with each generation. For example, while Facebook, the dominant worldwide social network, was launched in 2005, by 2015, 48.05% of the OECD population accesses it in each country on a regular basis. In emerging countries, Facebook penetration has reached even higher levels (Argentina: 62.19%, Malaysia: 59.35%, United Arab Emirates: 68.80%).[14]

The second wave of digital transformation, whose diffusion start point can be somewhat arbitrarily placed around 2010, entails the adoption of a range of technologies aimed at enhancing information processing and the quality of decision making, while further automating routine tasks within business enterprises and governments. They comprise big data/analytics[15], Internet of Things[16], Robotics[17], 3D printing[18], and artificial intelligence/machine learning.[19]

[11] Source: UNCTAD (2016).
[12] Source: http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2016.pdf
[13] Having started as a research project of the Advanced Research Projects Administration (ARPA) of the US Department of Defense, its management was transferred to the National Science Foundation in the mid-1980s and limited to academic locations. In 1995, NSFNET was shut down and only for-profit organizations were left running the commercial backbone. At this point, the diffusion process was driven exclusively by market forces (Greenstein and Prince, 2006).
[14] Source: Owloo.
[15] Big data/analytics is defined as the capability of processing extremely large data sets to identify patterns of relationships (correlation, causality) among data to be used in detecting market trends, consumer behavior and preferences.

These technologies are not typically adopted in a stand-alone fashion. In order to be incorporated within an industrial digital transformation context, they are integrated with mature technologies characteristic of the first wave. Along those lines, industry 4.0 represents the assembly of mature and advanced technologies to respond to new requirements in the configuration of value chains in order to yield higher efficiencies and new capabilities in product development and delivery (which naturally leads to an increase in consumers' willingness to pay). As an example of changes in business operations:

• Collaborative development of products and services among different firms;

• Optimization of production chains in order to reduce transactions costs between functions;

• Reduction in production sizes and decrease in response time to allow for higher product personalization;

• Optimization of logistics chains to reduce supply intervals;

• End to end multidimensional traceability in order to increase monitoring and management of the production chain;

• Flexibilization and efficiency in the management of production means; and

• Transformation of distribution in order to optimize market reach (better signalling, better prices, improved segment coverage).

Where is the Latin American retail industry in terms of these two waves of digital transformation?

[16] Internet of things entails platforms that link multiple sensors and data devices in order to generate a complete vision of the behavior of an organization, a system, a business operation, or a phenomenon. The adoption of Internet of Things is directly linked to vertical applications, and while these platforms are different from machine to machine applications, they are based on common components. Machine to machine applications are generally conceived as point solutions that link similar devices, such as thermostats, connected via a cellular network, a flow sensor in a refinery, a vehicle location system for fleet management, or home appliances monitoring. On the other hand, an Internet of Things system is a platform that interconnects a variety of discrete devices (including Machine to Machine sensors) to provide a holistic vision of certain phenomena. In that sense, M2M devices are a component of an Internet of Things network.

[17] Robotics entails the application of digital technology to the performance of repetitive manual tasks, such as those required in car assembly, agricultural harvesting, and exploration in dangerous environments.
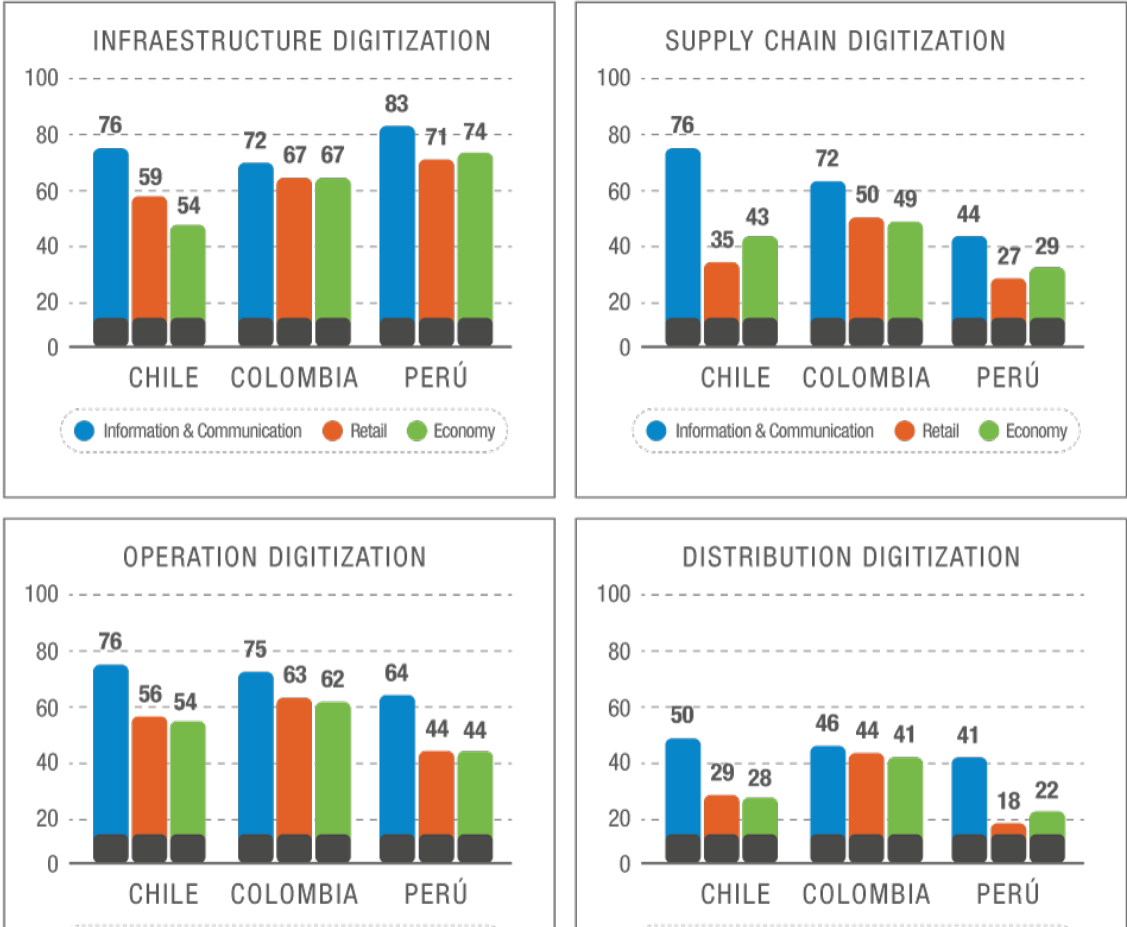
[18] 3D printing is a technology that allows the creation of objects by means of successive printing of adhesive materials such as polymers.

[19] Artificial intelligence/machine learning: these two technologies are not equivalent, although they share some common concepts. Machine learning is an artificial intelligence application consisting in the development of programs that allow a computer to learn routines without being necessarily pre-programmed. In that sense, the machine learning program transforms itself once it starts processing information. The most common machine learning applications are self-driving cars, product recommendations, Internet platforms like Amazon and Netflix, fraud detection in credit card usage, and calculation of consumer credit profile.

[20] See detailed review of methodology in Katz, R. Industrialización inclusiva y sostenible. Santiago, Chile: CEPAL, 2017.

The first wave of digital transformation

INFRAESTRUCTURE DIGITIZATION

Chile — Information & Communication: 76, Retail: 59, Economy: 54
Colombia — Information & Communication: 72, Retail: 67, Economy: 67
Perú — Information & Communication: 83, Retail: 71, Economy: 74

SUPPLY CHAIN DIGITIZATION

Chile — Information & Communication: 76, Retail: 35, Economy: 43
Colombia — Information & Communication: 72, Retail: 50, Economy: 49
Perú — Information & Communication: 44, Retail: 27, Economy: 29

OPERATION DIGITIZATION

Chile — 76, 56, 54
Colombia — 75, 63, 62
Perú — 64, 44, 44

DISTRIBUTION DIGITIZATION

Chile — 50, 29, 28
Colombia — 46, 44, 41
Perú — 41, 18, 22

The aggregate level of development of the first wave of digital transformation of the retail industry in Latin America is relatively low when compared to other sectors. By relying on a digitization composite index calculated on the basis of metrics such as internet use, computer adoption, broadband use, and access to online data, as reported in national industrial surveys, it is possible to determine not only what the aggregate digitization of a given industry is, but also estimating the level of digital transformation at each value chain stage (i.e. supply chain, in-house operations such as order processing, packing, and warehouse management in retail trade, and sales/customer care) .

Exhibit 8 displays the digitization index in the four value chain stages (infrastructure, supply chain, operations, and distribution) of the retail sector, the whole economy, and the information and communication industry (which is one of the leaders in regional digitization) of three Latin American countries.

Data in exhibit 8 is useful to draw some fundamental observations regarding the stage of the first wave of digital transformation of the retail sector in three Latin American countries:

• The retail sector always depicts a somewhat lower or similar level of infrastructure digitization than the whole economy and significantly less than the leading industry (Information and Communications). In Chile, 67 (on a scale of 0 to 100) for the whole economy versus 59 for retail, and 76 for Information and Communications. In Colombia, 67 for the whole economy and retail, and 72 for information and communications. In Peru, 74 for the whole economy versus 71 for retail, and 83 for information and communications. This means that even in the case of mature
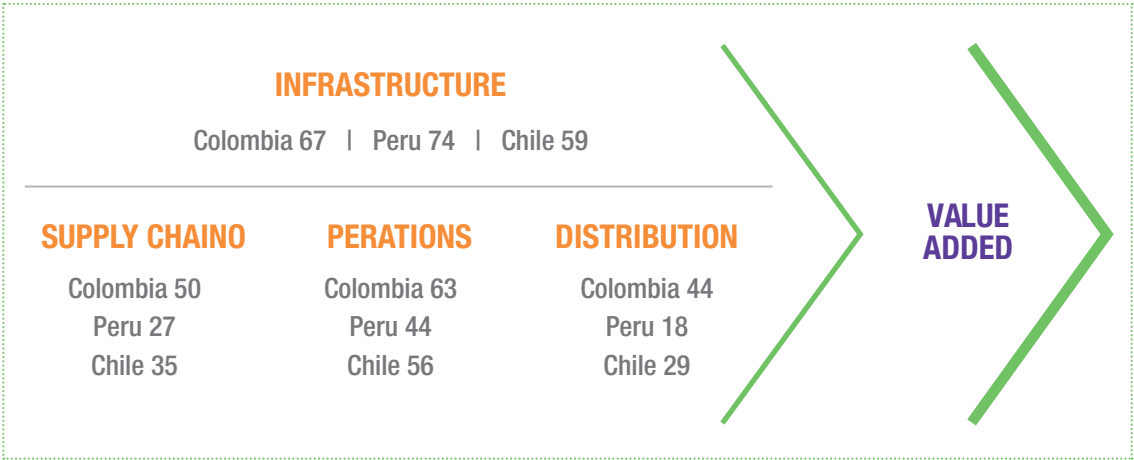
technologies associated with the first wave of digital transformation (broadband, computer applications, wireless telephony, and the Internet) the retail sector appears to lag the rest of industries. This is partly explained by the large universe of Micro, Small and Medium Enterprises (SME) that characterizes the retail sector. As has widely analyzed elsewhere, micro-enterprises and SMEs are less adept at even acquiring and deploying information technology.

• With the exception of Colombia, the retail sector depicts a lower level of first wave supply chain digitization than the whole economy. In Chile, the level of digital transformation of the supply chain in retail is 23% lower than in the rest of the economy, while in Peru it is only 7% less, and in Colombia it is at parity. In all three countries, retail lags Information and Communication.

• In the case of distribution digital transformation, the Chilean retail sector is at parity with the whole of economy, is higher in Colombia (13%) but lags Peru (19%). Since distribution is one of the primary value chain stages in retail, it is expected to register a small or no gap in terms of digital transformation in relation to the rest of the economy.

• Finally, consistently with our conclusion in prior research cited above, and indicating the limited accumulation of intangible capital, the retail sector exhibits always a higher level of adoption of infrastructure combined with lower index of digital transformation at each vertical stage of the value chain (see exhibit 9).

INFRASTRUCTURE

Colombia 67 | Peru 74 | Chile 59

SUPPLY CHAINO	PERATIONS	DISTRIBUTION
Colombia 50	Colombia 63	Colombia 44
Peru 27	Peru 44	Peru 18
Chile 35	Chile 56	Chile 29

VALUE ADDED

Source: gA Center for Digital Business Transformation

To conclude, an aggregate view of the first wave of digital transformation (based on the adoption of mature digital technologies) of the retail sector in Latin America depicts a sector still under development with high adoption of infrastructure but lower digitization of production processes.

This view, which includes small and medium retailers, is different from a perspective of the "top of the iceberg" of retail sector analyzed in the prior section (depicting internet retailers both domestic and global, "brick and mortar" players that have actively deployed web channels). The first perspective, based on national statistics (which is the portion of the iceberg under water) reveals an industry changing at a slow pace lagging other sectors of the economy, not only in terms of accumulation of intangible capital but also when it comes to adoption of information technology. The second view, based on case study evidence provides a view of intense disruption and competition, fraught with value chain re-composition and new entrants.

The second wave of digital transformation

The analysis of the first wave of digital transformation concluded outlining a dichotomy between big retailers engaged in an active process of incorporating digital technologies at all stages of the value chain and a large universe of SMEs lagging even the first wave digital transformation of the general economy. This perspective should actually be similar to the second wave. In this case, we examined the level of second wave across three industry segments in a single Latin American country: Colombia[21]. As in the case of the first wave, the analysis was conducted on the basis of the adoption of advanced digital technologies along the value chain (see exhibit 10)

[21]These statistics have been generated in 2017 and are based on 206 face-to-face interviews with retailers throughout Colombia with a margin of error of +/- 75% (see Ministerio TIC. Observatorio de la Economia Digital de Colombia (2018).

EXHIBIT 10.
INDEX OF SECOND WAVE
OF DIGITAL TRANSFORMATION

ADVANTAGES OF DIGITAL	ADVANTAGES OF PHYSICAL
INFRASTRUCTURE	Enterprises having adopted cyber-security systems Enterprises planning to adopt cyber-security systems Enterprises having adopted cloud computing Enterprises planning to adopt cloud computing
OPERATIONS	Enterprises having adopted sensors/M2M/IoT Enterprises planning to adopt sensors/M2M/IoT Enterprises having adopting robotic systems Enterprises planning to adopt robotic systems Enterprises having adopted 3D printers Enterprises planning to adopt 3D printers Enterprises having adopted virtual reality platforms Enterprises planning to adopt virtual reality platforms
DISTRIBUTION	Enterprises using big data/analytics Enterprises planning to adopt big data/analytics Enterprises having adopted Artificial Intelligence/Machine Learning Enterprises planning to adopt Artificial Intelligence/Machine Learning Enterprises having adopted block chain Enterprises planning to adopt block chain Enterprises having adopted Artificial Intelligence/Machine Learning Enterprises planning to adopt Artificial Intelligence/Machine Learning Enterprises having adopted block chain Enterprises planning to adopt block chain

Considering these technologies to be fairly advanced, one would expect the index of the second wave to be lower than the index of the first wave. This is the case as seen in exhibit 11.

EXHIBIT 11.
INDEX OF SECOND WAVE
OF DIGITAL TRANSFORMATION

Sources: Observatorio de la Economía Digital de Colombia; analysis by gA Center for Digital Business Transformation
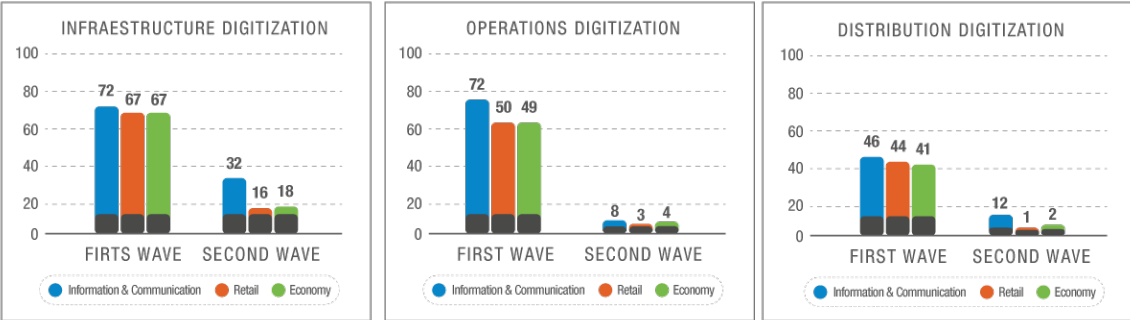
As expected, the gap between the retail sector and the Information and Communication Sector remains still within the second wave of digital transformation. Digging further in terms of adoption specific advanced technologies, the retail sector lags not only the sector leader but also the whole economy (see exhibit 12).

Value chain stage	Technology	Retail	All sectors	Information and Communication
Infrastructure	Cyber-security systems	25.2 %	28.1 %	41.9 %
	Cloud computing	12.2 %	17.3 %	51.5 %
	Sensors/M2M/IoT	5.5 %	8.6 %	12.9 %
Operations	Robotic systems	1.4 %	1.2 %	3.4 %
	3D printers	1.2 %	2.0 %	4.1 %
	Virtual reality platforms	0.0 %	0.8 %	14.8 %
Distribution	Big data/analytics	0.9 %	2.5 %	17.0 %
	AI/ machine learning	0.4 %	1.5 %	12.5 %
	Block chain	1.0 %	1.3 %	2.3 %

In every technology, with the exception of robotic systems (where the difference is only of 0.2 percentage points), the retail sector lags the average of all sectors as well as the Information and Communications industry. However, when the plans to adopt second wave technologies are factored in, the relative position of retail changes somewhat (see exhibit 13).

Value chain stage	Technology	Retail	All sectors	Information and Communication
Infrastructure	Cyber-security systems	36.6 %	40.2 %	55.4 %
	Cloud computing	24.5 %	27.5 %	55.9 %
	Sensors/M2M/IoT	11.6 %	15.0 %	20.5 %
Operations	Robotic systems	5.6 %	4.5 %	6.7 %
	3D printers	7.5 %	7.3 %	8.3 %
	Virtual reality platforms	4.2 %	5.3 %	20.2 %
Distribution	Big data/analytics	4.5 %	7.6 %	30.0 %
	AI/ machine learning	3.3 %	4.1 %	24.8 %
	Block chain	4.6 %	4.7 %	4.3 %

Exhibit 13 is quite enlightening in relation to the second wave of digital transformation in the retail sector. There are some technologies where retail is going to be exceeding the adoption in the general economy and approaching the Information and Communication sector: robotics (5.6% adoption vs. 4.5% in all sectors and 6.7% in the Information and Communications sector); 3D printers (7.5% adoption vs. 7.3% in all sectors and 8.3% in the Information and Communication sector) and block chain (4.6% in retail vs. 4.7% in all sectors and 4.3% in Information and Communication).

The future adoption of robotic systems indicates that the Colombian retail sector is recognizing the value of this technology in areas such as warehouse automation. For example, Amazon's fulfillment center robotic technology automates shelf management, stacking and picking[22]. The robots are controlled by a centralized computer using a secured Wi-Fi network for communications[23]. The operational efficiency of this technology is driven by:

• Productivity increases: reduction of manual effort, including searching for goods in the picking process, which increases overall workforce productivity; reduction of the training cycle time;
• Faster response times: in high-velocity omni-channel context, warehouse robotics can reduce the pick, pack, and ship times;
• Improved warehouse efficiency: warehouse robotics helps reduce operating costs, space utilization, and energy efficiency;
• Improved security and inventory accuracy;
• Improved safety.

Its economic benefit[24] has been estimated in three key areas: increase in on-time shipments from 85.6% to 92.10%, increase in order accuracy of 7.50%, and increase in inventory

accuracy: 7.50%. Future diffusion of this technology is predicated upon adoption in warehouses that were not originally designed for its deployment.

On the other hand, some technologies were one would be expecting higher adoption intentions in the retail sector (big data/analytics, Artificial Intelligence/Machine learning), current and future adoption remains lower than the whole economy and the sector leader.

So far, the statistics reviewed cover the whole retail sector. How do they look if they were to be segmented by large, medium and small retailers? Would they confirm the dichotomy highlighted above between innovative large retailers and the rest? In fact, second wave technology adoption follows the same pattern identified for the first wave of digital transformation (see exhibit 14).

[22] Knight, W. (2015). "Inside Amazon's warehouse, human-robot symbiosis", Technology Review, 7/7.
[23] Valerio, P. (2015). "Amazon Robotics: IoT in the warehouse". Information Week, September 28.
[24] Datalogic (2014). Benefits from warehouse automation: a comparative report.

EXHIBIT 14.

COLOMBIA RETAIL: SECOND WAVE OF
DIGITAL TRANSFORMATION INDEX (SCALE:
0-100)
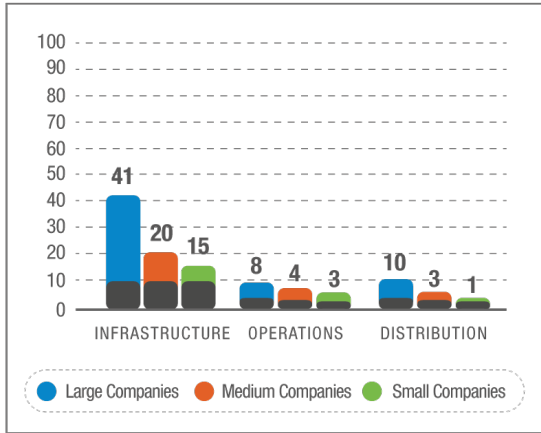
Sources: Observatorio de la Economía Digital
de Colombia; analysis by gA Center for Digital
Business Transformation.

The second wave digital transformation index
among retailers confirms what has been already
reviewed in our prior research: large companies
lead the rest of the economy in terms of
technology purchasing, but the whole sector
indicates still limited assimilation of advanced
digital technologies in production processes.

How are Latin American retailers managing the second wave of digital transformation?

Can we relate the gap in technology assimilation
reviewed above to organizational and human
capital barriers? This will require examining how
Colombian retailers are managing the second
wave of digital transformation. As in the case of
adoption, the management of the second wave
of digital transformation was analyzed on the
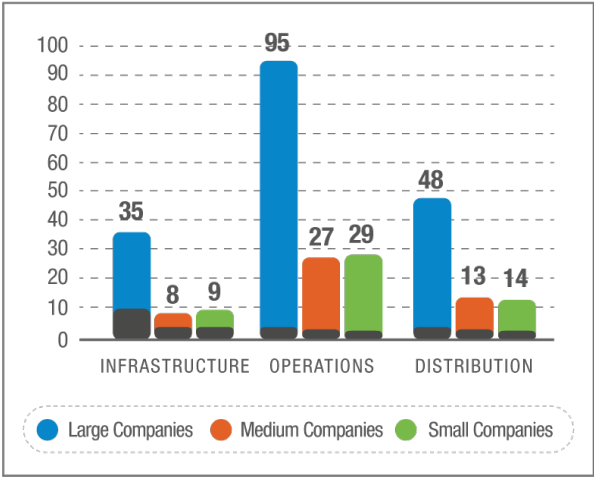basis of an index comprised of three pillars (see
exhibit 15).

EXHIBIT 15.

INDEX OF MANAGEMENT OF THE SECOND
WAVE OF DIGITAL TRANSFORMATION

PILLARS	INDICATORS
Infrastructure	Enterprises with a digital strategy Enterprises envisioning the implementation of a digital transformation strategy Enterprises that have already implemented a digital transformation strategy Enterprises that are in the processes of implementing a digital transformation strategy Enterprises that are measuring the impact of a digital transformation strategy Enterprises that have defined digital transformation KPIs
Operations	Executive leading a digital transformation strategy Executive responsible of defining the vision guiding the digital transformation
Distribution	Enterprises with human resources prepared to implement a digital transformation strategy Enterprises with sufficient human resources to develop/implement a digital transformation strategy

The index was calculated for each of the three types of retailers (see exhibit 16).

According to exhibit 16, large retailers appear to have a substantial advantage over the rest of sector companies in terms of a digital transformation strategy, high level governance, and availability of human capital capable of driving this process.

EXHIBIT 17.
COLOMBIA RETAIL: MANAGEMENT OF SECOND WAVE OF DIGITAL TRANSFORMATION

PILLARS	INDICATORS	LARGE COMPANIES	MEDIUM SIZE COMPANIES	SMALL COMPANIES
Strategy	Enterprises with a digital transformation strategy	37.3 %	7.4 %	10.8 %
	Enterprises envisioning the implementation of a digital transformation strategy	51.2 %	20.4 %	17.9 %
	Enterprises that have implemented a digital transformation strategy	0.0 %	7.5 %	4.1 %
	Enterprises that are in the processes of implementing a digital transformation strategy	74.6 %	10.0 %	4.9 %
	Enterprises that measure the impact of a digital transformation strategy	37.3 %	7.7 %	12.8 %
Governance	Enterprises that have defined digital transformation KPIs	37.3 %	0.0 %	3.1 %
	CEO and board leading a digital transformation strategy	100 %	25 %	29 %
	CEO and C-suite responsible of defining the vision guiding the digital transformation	95 %	27 %	29 %
Human Capital	Enterprises with human resources prepared to implement a digital transformation strategy	32.6 %	9.5 %	9.3 %
	Enterprises with sufficient human resources to develop/ implement a digital transformation strategy	62.7 %	18.9 %	16.2 %

The statistics in exhibit 17 are quite helpful in understanding some of the limitations for implementing a second wave digital transformation facing the retail sector in Colombia (and by extension in Latin America):

• Overall, few retailers consider that they have already implemented a second wave digital transformation strategy (0% for large companies, 7.5% of medium-sized and 4.1% of small companies)

• While most large retailers are considering the development of a second wave digital transformation strategy or are in the process of definition (74.6%), no one considers that strategy to be fully implemented;

• In the case of large retailers, the CEO and the Board appear to be driving the development and implementation of a second wave digital transformation strategy;

• Only 32.6% of large retailers consider that they have sufficient human resources trained to implement a digital transformation strategy; the figure drops to 9.5% in the case of medium and small companies;

• Measurement of the economic impact of digital transformation remains a critical barrier for all companies, especially, but not only medium and small.

In sum, considering the two waves of digital transformation (first, comprised of adoption of computers, broadband, mobile telecommunications, and the Internet, and second (entailing cloud computing, robotics, IoT, and Artificial Intelligence), the Latin American retail sector depicts a relatively low level of performance in the first wave, and highly embryonic advance for the second wave.

In general terms, the retail sector presents a somewhat lower or similar level of first wave infrastructure adoption, lagging considerably some of the more advanced industries such as Information and Communications. This means that, even in the case of mature technologies associated with the first wave of digital transformation (broadband, computer applications, wireless telephony, and the Internet), the retail sector appears to lag the rest of industries. More specifically, the retail sector registers a lower first level digital transformation of the supply chain and operations. The only area where the retail sector appears to be somewhat ahead of other sectors of the economy is distribution, which is not surprising since this is one of the primary value chain stages in retail. Finally, consistently with our conclusion in prior research cited above, and indicating the limited accumulation of intangible capital, the retail sector exhibits always a higher level of adoption of infrastructure combined with a lower index of digital transformation at each vertical stage of the value chain. This conclusion derived from national industrial statistics is not consistent with case study data indicating high level of activity of internet retailers both domestic and global, as well as large "brick and mortar" players that have actively deployed web channels, within omni-channel configurations.

Moving to the second wave of digital transformation, the Latin American retail sector (at least from the evidence of Colombia) presents a lower level of technology adoption (as is the case with the rest of the economy); additionally, it also lags other more dynamic sectors (such as Information and Communication). In fact, in every technology, with the exception of robotic systems (where the difference is only of 0.2 percentage points), the retail sector lags the average of all sectors as well as the Information and Communications industry.

While the sector recognizes the high potential of robotics in warehouse automation, it still lags even in its intention to incorporate big/data and artificial intelligence. The second wave digital transformation index among retailers confirms what has been already reviewed in our prior research: large companies lead the rest of the economy in terms of technology purchasing, but the whole sector indicates still limited assimilation in production processes.

The advantage of large retailers is the result of larger resource endowment to acquire advanced technologies, but also a management awareness of the digital transformation imperative. Most large retailers are considering the development of a second wave digital transformation strategy or are in the process of definition (74.6%). In most large companies, the CEO appears to be primary executive driving the digital transformation effort. At least, 32.6% of large retailers consider that they have sufficient human resources trained to implement a digital transformation strategy, while this figure drops to 9.5% in the case of medium and small companies.

A view of the future

What do these findings mean for the future of Latin American retailing? How would the Latin American retail sector evolve in terms of formats in light of the second wave of digital transformation? Is the U.S. format disruption pre-announcing a similar trend in Latin America?

Four macro-trends appear to be at play in Latin American retail:

• With a year on year 13.8% growth, Latin American E-commerce pure plays continue to gain market share;[25]
• However, their growth appears to be limited by multinational giants making inroads in the region;
• Large retail chain operators continue diversifying in e-commerce channels and they represent the largest web sales year-on-year growth (19.4%) followed by direct marketers (17.2%); and
• Following their web expansion, large retailers are tackling the challenges of the second wave digital transformation (warehouse robotics automation, data analytics, and artificial intelligence).

The lessons learned in developed economies are useful in terms of predicting the sector's future evolution. The disruption prevalent at the "tip of the iceberg" will continue permeating down, resulting in a number of exits of those companies that will not be able to adapt to the new business models. This wave, enabled by the low level of sector formalization, will result in more consolidations and exits.

Can medium and small retailers survive? Is format coexistence a potential scenario? Only if they adapt to the competitive challenge and are supported by "specialists" in key areas such as fulfillment, warehouse automation, and use of advanced digital technologies.

[25] Internet Retailer. 2017 Latin America 500 report.