

The evolution of digital MNEs: an empirical note*

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Abstract

UNCTAD first published a list of the top 100 digital multinationals in the *World Investment Report 2017*. This research note builds on the analysis and conceptual framework on digitalization and foreign direct investment set out in that report. It provides an updated list, allowing for an analysis of trends over the five-year period including the COVID-19 pandemic and adds new features to the data set that will be exploited in forthcoming UNCTAD work. The note describes the methodology to create the new and extended data set and points at possible avenues for further work. The purpose of the research note is to provide academic scholars with the basic elements needed to pursue further research in this field.

Keywords: digital economy; technology multinationals; FDI lightness index, base erosion and profit shifting (BEPS)

JEL classification codes: C43, F23, H25, L86

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1. Introduction

In 2017 UNCTAD first analysed and provided a ranking of the top 100 digital companies, in the *World Investment Report 2017 (WIR17)* (UNCTAD, 2017), and investigated the effect of digital MNEs on global investment patterns. Casella and Formenti (2018) shed light on the methodology underpinning the analysis in *WIR17* to ensure full replicability and provided impetus for future research. Subsequently, both the new taxonomy and resulting data were taken up in the academic community through various angles of analysis – from trends and impact on business models to development implications (e.g. Jones et al., 2020; Srinivasan and Eden, 2021; Stephenson et al., 2021).

The novel analysis in *WIR17* explained the diverse international footprint of digital companies. Not needing a physical presence in foreign markets to reach consumers, these companies have a very light foreign-asset presence. Digital companies are a very dynamic group that, on the basis of firm-specific advantages in intangible and digital assets, as well as network effects, are able to reach scale in a short time and expand abroad seamlessly. These new asset-light business models are disrupting modes of operation and cross-border processes, affecting the development strategies of host economies in important policy areas such as taxation and employment creation.

This paper updates the work first published in *WIR17* and provides new insights on the landscape of the world's top digital MNEs. The update is very timely because (a) a five-year timespan is sufficient to look at evolutionary trends; (b) the five years include the COVID-19 pandemic period, which has provided a huge boost to digital activities; and (c) the recent progress in international tax reforms – from the Base Erosion and Profit Shifting (BEPS) Project's Pillar One on taxing rights and the latest development in the Digital Services Act of the European Union, which contain specific rule changes addressing the digital economy – make it interesting to assess which firms and activities will be most affected.

The research note is structured as follows. The next section presents in detail the methodology for the selection and classification of the top 100 firms, and the collection of the relevant indicators of international activity at the firm level. Section 3 presents the new ranking of the top 100 digital MNEs, analyses the main differences from the ranking published in *WIR17*, and evaluates the impact of the pandemic. Section 4 concludes.

2. The new top 100 digital MNEs

2.1. Selecting the new top 100 digital MNEs

The compilation of data for the new ranking started from the original one, updating the underlying statistics – operating revenues, sales and assets – of this group of companies. Additional companies were selected among the largest listed companies from the Refinitiv SA data set, on the basis of revenues (total revenues greater than \$1 billion).

As in UNCTAD (2017) we focus on relevant sectors and on publicly listed companies. We include the so-called technology companies as well as more general companies belonging to the list of industries that OECD (2020) defines as consumer facing (B2C), which have a significant digital offering (for goods companies) or product (mostly services companies that could digitalize). These industries comprise businesses that potentially can have significant and sustained interactions with customers and users beyond having a local physical presence because of the broader digitalization of the economy (OECD, 2020). The focus on publicly listed companies is motivated by the fact that unlisted companies usually do not disclose the information on financials and international activity necessary for this kind of analysis. Also, we focus on parent companies and do not consider subsidiaries (typically not listed), which might not release independent financial statistics.

Across technology and B2C companies we select digital firms according to their business description. Because statistical classifications usually describe the product offered (see Ietto-Gilles and Trentini, 2021), for many mixed-mode companies this selection entails an accurate screening according to their reliance on digital technologies for their core or principal product. In many cases, especially for firms that are going digital, this involves analysis of the company's business segment report to identify the core product (a more detailed description of the selection procedure by subcategories appears in annex B).

For companies operating in multiple industries, we consider their core activity. In addition to providing information and communication technology (ICT) infrastructure (hardware and software), all big United States tech companies (Alphabet, Amazon, Apple, Meta and Microsoft) have a dominant market share in several digital industries such as streaming, delivery, ride-hailing and social network platforms. However, we consider only Alphabet, Amazon and Meta as digital companies, as they have a digital product in their core business line.

The last filter was the transnationality condition, as the focus of this line of studies is on the international footprint of digital firms. We consider companies with foreign

sales and/or foreign assets greater than 10 per cent or with a significant number of projects or subsidiaries outside their country of headquarters and exclude companies that do not report any information on foreign sales or foreign assets. From this group of companies (approximately 300) we selected the 100 largest in terms of operating revenues.

The process outlined here follows the same methodology set out in the annex to UNCTAD (2017) and in Casella and Formenti (2018). We cross-checked the resulting list with known lists and reports on the digital economy – such as Forbes' Top 100 Digital, UNCTAD's 2021 Digital Economy Report, Thomson Reuters' top 100 technology leaders and the ILO's (2021) list of digital labour platforms – to make sure no relevant digital company was missed. Even considering only dedicated lists – those that focus on digital or tech firms – the selection of companies usually differ: these other lists, especially if they rank firms by size or market capitalization (e.g. Forbes or Thomson Reuters), typically include more ICT and hardware companies. In other cases, they are specific to some smaller markets such as the ILO's labour platforms. In addition, none of the other published lists considers the transnationality dimension of the companies. For example, many Chinese digital giants (for example JD.com and Meituan) have limited foreign operations and are therefore excluded from our ranking. Others do not reach the operating revenue cut-off. The cut-off for fiscal year revenue of the bottom company in our ranking was \$2.4 billion (Deliveroo (United Kingdom)), a 140 per cent increase vis-à-vis the bottom company of the previous ranking (ServiceNow (United States)), which explains the absence of some of the youngest and smallest companies. Some examples of companies that did not make it into the ranking, despite being relevant players in the digital economy and having a relevant international footprint, are Dropbox (United States), the fully digital bank Nu Holdings (Brazil) and Wish (United States).

Moreover, the digital MNEs were matched to the data on mergers and acquisitions (M&As) and greenfield investments from Refinitiv and fDi Markets, with the aim of providing a deeper assessment of digital FDI (detailed analysis and data are forthcoming in the *World Investment Report 2022*). Project data provide information on the geography and industry of investments, allowing examination of the motivations behind the internationalization process of these companies.

2.2 Updating the UNCTAD framework for digital MNEs

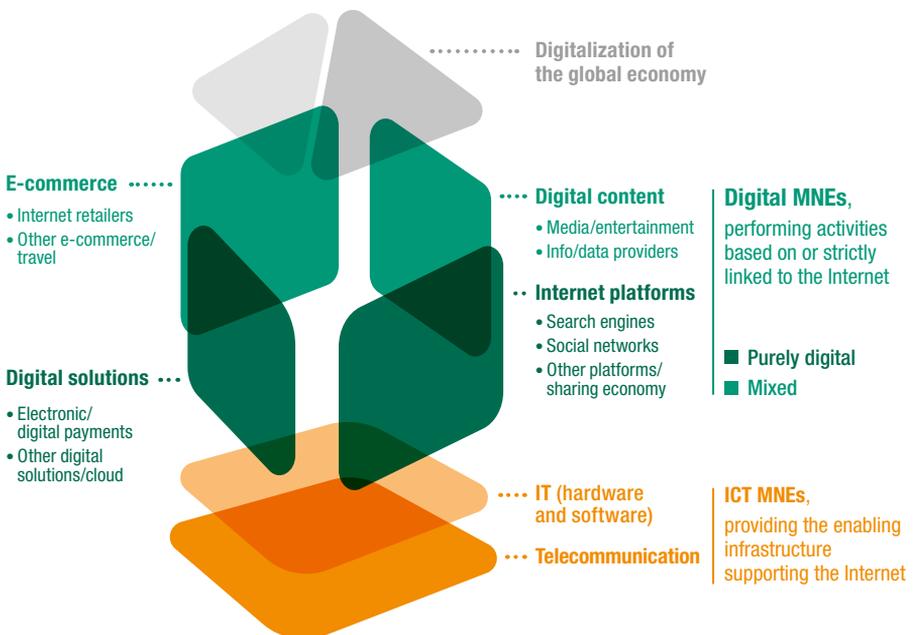
As many traditional industries further digitalize, it becomes more challenging to define digital MNEs. In this paper we refer to the conceptual framework and taxonomy proposed in *WIR17* (reproduced in figure 1 for ease of reference), coupled with further distinctions regarding consumer-facing and business origin characteristics in light of the new developments and the quick digitalization

of the economy in the past five years. The framework is composed of three building blocks: the foundations are given by ICT companies, which provide the infrastructure and tools that make the Internet accessible to individuals and businesses. Its core is represented by digital firms, characterized by the central role of the Internet in their operating and delivery model. Finally, the broad economy rests on digital infrastructure and digital content in the process of digitalization of traditional activities (UNCTAD, 2017).

Digital MNEs include two types:

- *Purely digital MNEs* that operate almost entirely in a virtual environment (Internet platforms, search engines and digital solutions services); both their product and the delivery of their services are fully digital
- *Digital MNEs with mixed modes* that combine offline products and services with digitally enabled business models, such as Amazon (e-commerce) or Uber (ride-hailing)

Figure 1. Digital economy structure



As in UNCTAD (2017), digital MNEs are further classified into four main types:

- a. *Internet platforms*: businesses born digital, operated and delivered through the Internet, such as search engines, social networks and other platforms and shared-economy companies (e.g. ride-hailing companies Didi Global (China) and Uber (United States), and shared accommodation platform Airbnb (United States)).
- b. *Digital solutions*: other Internet-based players and digital enablers. This category is expanded to include providers of software as a service (SaaS), and fintech in addition to e-payment solutions. Fintech has a broader range of services: brokers, banking and finance.
- c. *e-Commerce*: online platforms that enable commercial transactions. This category includes e-commerce and other e-retailers and the new *delivery* group (mostly food delivery and mobile apps) which gained significant relevance during the pandemic.
- d. *Digital content*: producers and distributors of goods and services in digital-format media, including games as well as data and analytics.

Table 1. Top digital MNEs: key elements and descriptive statistics, 2017 and 2022
(Number of firms, billions of dollars and per cent)

		Number of MNEs			Average sales per company (\$ billion)		
		2017	2022	Change	2017	2022	Change (%)
Internet platforms	Search engine	3	4	+1	27.6	71.9	160.6
	Social network	5	7	+2	5.5	19.9	261.0
	Other platforms – shared economy	3	4	+1	4.6	13.9	202.1
	Total	11	15	+4	11.3	32.2	184.6
Digital solutions	Electronic payments	5	4	-1	6.2	11.2	45.8
	Fintech	-	2	+2	-	15.1	..
	Software provider	-	2	+2	-	3.6	..
	Other digital solutions	21	26	+5	3.7	6.0	61.0
Total	26	34	+8	4.2	7.0	66.0	
E-commerce	Delivery	-	3	+3	-	3.5	..
	Internet retailer	13	13	-	11.9	50.9	327.7
	Other e-commerce	5	5	-	4.8	7.8	63.4
	Total	18	21	+3	9.9	33.9	242.2

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Table 1. Top digital MNEs: key elements and descriptive statistics, 2017 and 2022
(Number of firms, billions of dollars and per cent) (Concluded)

		Number of MNEs			Average sales per company (\$ billion)		
		2017	2022	Change	2017	2022	Change (%)
Digital content	Digital media	22	9	-13	11.9	16.1	35.1
	Games	7	9	+2	4.5	11.9	165.1
	Information and data	16	12	-4	3.7	4.8	29.1
	Total	45	30	-15	7.8	10.3	32.2
Total		100	100	-	7.6	17.4	129.0

Source: UNCTAD.

Notes: Years correspond to when the rankings were elaborated. The data on sales correspond to fiscal years 2015 and 2021, respectively.

Digital MNEs with mixed modes is the most noteworthy group, as it is set to represent the majority of the economy as companies gradually digitalize, first their distribution, then their production process and eventually their business model. Although services will be the first to digitalize, even manufacturing companies can now offer hardware as a service (HaaS) – both as a physical product and as a flexible consumption service model (Srinivasan and Eden, 2021). At the same time, companies born as pure digital platforms – such as Airbnb and Uber (both United States) – might start moving in the other direction of internalizing part or some of the production process of the services they are offering, in particular with regard to the labour force and some assets (drivers, vehicles or properties). It is thus the most interesting group of companies to analyse, to understand how digitalization affects FDI patterns and eventually international production. For this reason, two further categories are added. These categories outline possible divergence in investment behaviours driven by their respective business models:

- *Born digital companies*, whose core value proposition is enabled by digital infrastructure, versus *Gone or going digital* companies, which are all the traditional enterprises that successfully transitioned to the digital economy. There is a fine distinction between born digital companies and pure digital companies as defined above. The former include also mixed-mode MNEs that offer offline products and services traded through digitally enabled business models such as Amazon, eBay or shared-economy firms such as Uber; the distinguishing feature is that they can create value only because of digitalization (Shaheer, 2020; Monaghan et al., 2020). Gone digitals are traditional firms that have come to be among the most important players in certain markets; for instance Walt Disney in the streaming and entertainment industry or Walmart in the retail industry.

- Businesses directly facing end consumers (B2C) – whose goods and services do not contribute directly to the factors of production for other goods or services – and those mostly providing goods and services to support other businesses (B2B), for example because of outsourcing and offshoring. Typical B2C platforms need direct access to the customer and their data to rapidly scale their business leveraging network effects. In this case, consumer relationships, interactions with users and consumers, and broader consumer-facing intangibles drive value for these businesses (OECD, 2020). B2B companies in the ranking are mostly enterprise software providers (SaaS) or consultancies that can digitalize and automate their offering on the cloud platform.¹

3. The new top 100 digital MNEs: what changed in the last five years

Digital MNEs are enjoying exceptional growth momentum. Figure 2 describes the recent evolution of assets, sales and profits (net income) for the companies in the new ranking. Total assets and total sales presented a compound annual growth rate of 21 per cent in the period from 2016 to 2021.² Net income increased by 23 per cent, with a significant hike of 60 per cent between 2020 and 2021. This compares with an essentially flat trend for the traditional top 100 MNEs (excluding tech and digital MNEs).

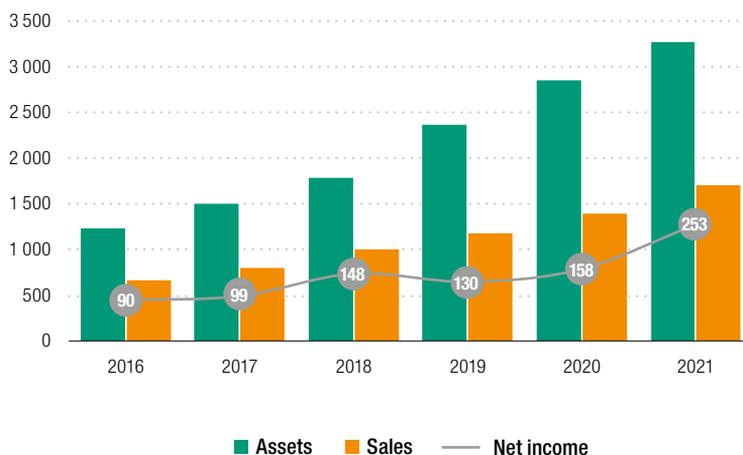
The COVID-19 pandemic sped up the process of digitalization of many companies, driving them to develop home-based work solutions and to shrink their offices (UNCTAD, 2021b). Together with higher demand for delivery and digital solutions services, this can explain the rising performance of top digital companies.

The elevated inherent dynamism of digital companies coupled with the pandemic-imposed acceleration in the adoption of digital solutions results in a high share of new companies in the top 100 digital MNEs. In 2020 and 2021 abundant cash reserves, low interest rates and soaring equity markets fuelled M&A activity and initial public offerings (IPOs). Tech start-ups made popular by the pandemic digitalization tapped equity markets to scale up and expand their businesses (UNCTAD, 2021a). Half of the new entrants in the ranking had their IPOs in the last five years.

¹ ILO (2021) classifies online web-based platforms and location-based platforms. Whereas companies in the former classification can execute all tasks related to their services remotely, the companies in the latter still depend on labour in the locations, e.g. delivery or ride-hailing services. Unfortunately, mayor players for this category of companies, such as Upwork, did not reach either the operating revenue or the transnational threshold level. We thus do not classify companies according to these categories.

² At the time of the elaboration of this study, Delivery Hero (Germany) had yet to publish its 2021 results.

Figure 2. Evolution of assets, sales and net income for the new top digital MNEs, 2016–2021 (Billions of dollars)



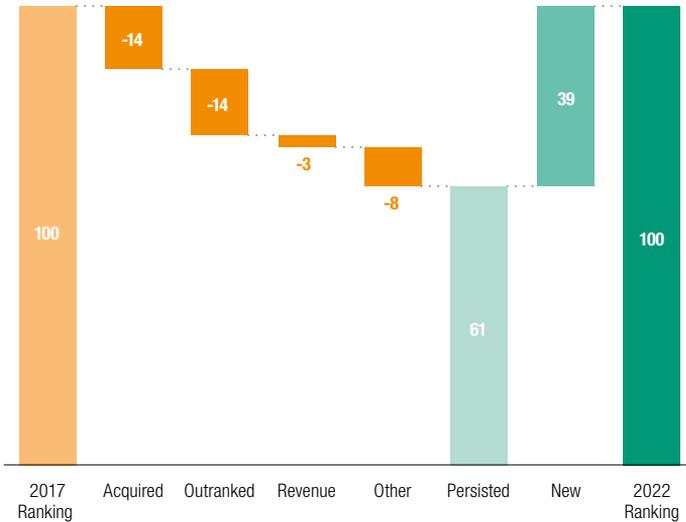
Source: UNCTAD.

In the United States in particular, IPO volumes almost doubled compared with what had already been a very positive 2020, with the debut of companies such as the dating app Bumble, Nubank, the Brazilian financial technology group and the ride-hailing company Grab (Singapore). Many of these companies will still need time before they can jump-start the powerful network effects that will make them profitable and let them expand abroad; thus, at the time being they are excluded from this ranking.

The segments that saw the highest relative number of new entrants was Internet platforms (9 out of 15) and e-commerce (9 out of 21), with the IPO of relevant digital economies that were private during the compilation of the first top digital ranking, such as Airbnb (United States), Didi Global (China), Uber (United States) and WeWork (United States). In both segments new entrants represent almost half of the companies in the group. In absolute terms the digital solution category had the highest number of new entrants (14).

With respect to the companies that fell off the ranking, almost a third of them (14) were acquired by others. This is the case of LinkedIn (acquired by Microsoft), Priceline (Booking Holdings (United States)), Viacom (National Amusement (United States)), Sky (Comcast (United States)), and others. Another third of the companies (14) were outranked by other companies, e.g. Mediaset (Italy), Konami (Japan) and Factset (United States).

Figure 3. Change in ranking composition, 2017 and 2022
(Number of companies)



Source: UNCTAD.

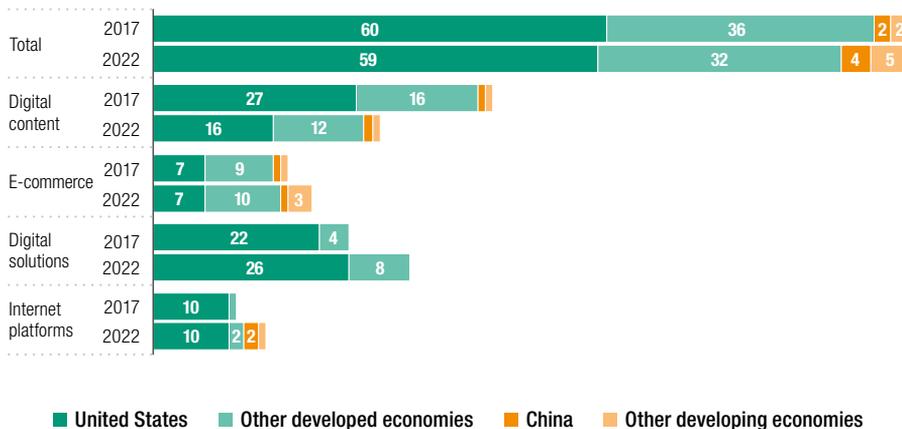
Note: Years correspond to when the rankings were elaborated.

Digital solutions is the segment with the most companies (34) followed by digital content; however, they accounted for only 31 per cent of the ranking's total revenue in the last fiscal year. E-commerce is the segment with the highest representation in the total ranking by revenue, given the presence of big companies like Amazon (United States) and Alibaba (China).³ Without these two, Internet platforms would become the most relevant portion in terms of revenue and e-commerce would become the smallest segment.

The digital top 100 remains highly concentrated geographically. The ranking is still dominated by companies from developed economies, most of them being from the United States and Europe – 59 and 22, respectively – however, companies from South-East Asia and Latin America are gaining global relevance, e.g. Mercado Libre from Argentina, and Joyy and SEA from Singapore (see the full list of companies in annex A).

³ These two companies together correspond to 34 per cent of the ranking by total revenue and 17 per cent of the total assets.

Figure 4. Geographic breakdown, top digital MNEs, 2017 and 2022 (Number)



Source: UNCTAD.

Note: Years correspond to when the rankings were elaborated.

3.1 The investment footprint of the new digital MNEs ranking

The rapid growth of the digital economy has implications for international production and FDI. Digital MNEs can penetrate foreign markets without investing in physical assets; thus, their international investment footprint is very asset light. To assess the potential impact of digitalization on international production and the evolution of digital MNEs in the last five years, we analyse the FDI lightness index, defined as the ratio between the share of sales generated by foreign affiliates and the corresponding share of foreign assets. This indicator was developed in *WIR17* for the analysis of the international footprint of digital MNEs. It reveals the extent to which a company is able to generate sales abroad given its stock of foreign assets. A very light investment footprint is typical of digital and tech companies and indicates that the operational nexus between foreign sales and foreign assets is weakening, undermining taxing rights in host economies. For this reason, this index can help to assess the scope of BEPS Pillar One action agreed internationally only recently (Trentini, 2021).⁴

⁴ Because taxing rights usually refer to the physical presence of a company in the host economy, digitalization is challenging the fiscal policies of many jurisdictions. The recent international "Agreement on a Two-Pillar Solution to Address the Tax Challenges Arising from the Digitalisation of the Economy" (OECD/G20, 2021) aims to ensure a fairer distribution of profits and taxing rights among countries with respect to the largest digital MNEs (Pillar One) and puts a floor on tax competition on corporate income tax through the introduction of a global minimum corporate tax (BEPS Pillar Two).

In terms of their international investment footprint, Internet platforms are the companies with the smallest ratio of foreign sales to foreign assets, given that their business model is easily scalable to an international level without much physical capital investment up front. This allows them to keep most of their assets (e.g. headquarters, data centres) in the country of origin and have commercial representatives in other countries. By contrast, e-commerce companies have been relying on distribution centres across the world, given that the increased demand for fast handling of parcels is driving up their foreign-asset share.

An important share of digital content companies are mostly traditional ones (gone digital) that transitioned to a digital offering but that still need to engage in the physical production of their content. Also in this case, local market knowledge and content are often required, as is evident from their high foreign-asset share.

In general, across mixed-mode categories, companies born digital are asset lighter, especially in the digital solutions and e-commerce categories, highlighting their different business model even for very digital types of services. Similarly, MNEs that directly interact with customers and thus can use their data to leverage network effects are typically lighter than their B2B counterparts; for digital platforms B2C MNEs are 40 per cent lighter.

Table 2. FDI lightness index by category and type, 2021 (Ratio)

	Born digital versus gone digital		B2B versus B2C	
	Born	Gone	B2B	B2C
Internet platforms	2.32	-	1.98	2.76
Digital solutions	2.98	1.83	2.20	2.28
E-commerce	1.19	0.68	0.93	1.08
Digital content	1.07	1.24	1.07	1.21
Total	1.58	1.43	1.45	1.61

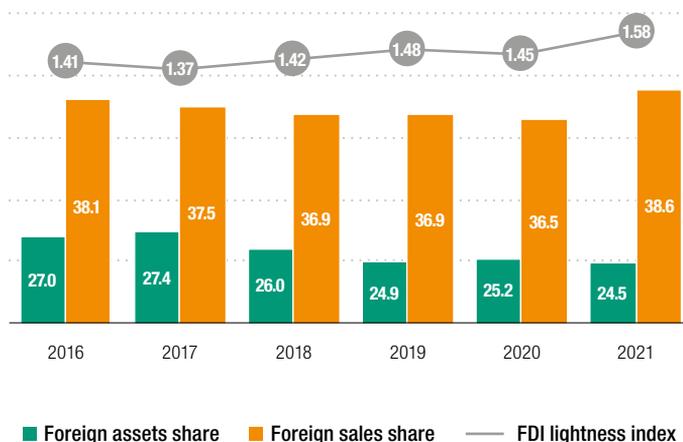
Source: UNCTAD.

Note: FDI lightness is the ratio of the share of foreign sales to the share of foreign assets.

The foreign-asset footprint of the companies in the updated ranking has decreased since 2016 (figure 5). The ratio between foreign sales and foreign assets increased by 11.6 per cent, with most of the increase taking place in 2021 (+8.9 per cent) pushed by the pandemic.⁵ Notably, MNEs in the digital solutions category benefited from increased global sales to teleworking customers.

⁵ Note that this figure tracks the FDI lightness index over time of the new ranking (the same companies over time).

Figure 5. Evolution of foreign assets and foreign sales shares and FDI lightness index, top digital MNEs, 2016–2021 (Per cent and ratio)



Source: UNCTAD.

Note: FDI lightness is the ratio of the share of foreign sales to the share of foreign assets.

Table 3 compares the FDI lightness index of the two rankings. The new companies in the ranking were on average 30 per cent lighter than the companies that persisted in the ranking, with the highlight being digital solution entrants, which were two times lighter than the companies that were carried over from the previous list. The overall lightness increased by 5.8 per cent in the past five years; however, the increase has not been homogeneous across categories: the digital solutions segment had a higher relative increment in FDI lightness vis-à-vis the 2017 ranking (+16.2 per cent) sustained by the lighter new MNEs and their foreign sales expansion, whereas the Internet platform segment contributed negatively to the ranking lightness (-11.7 per cent).

This is explained mostly by the vertical integration of major platforms and their expansion of business segments.⁶ For example, Alphabet (United States) decreased its FDI lightness from 2.2 to 2 over the last five years. A preliminary analysis of the investment projects of top digital companies confirms this trend, as bigger players buy up smaller competitors or innovative start-ups in neighbouring industries (for more information, see the forthcoming *World Investment Report 2022*).

⁶ UNCTAD (2021c) shows that major platform companies are investing in all parts of the data value chain, including submarine cables.

Table 3. Change in FDI lightness, 2017 and 2022

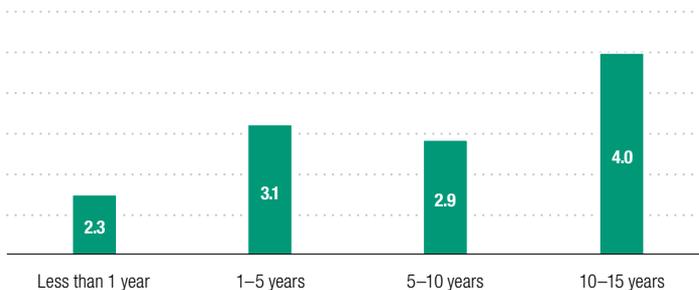
	Share of foreign sales (%)			Share of foreign assets (%)			FDI lightness		
	2017	2022	Change (percentage point)	2017	2022	Change (percentage point)	2017	2022	Change (%)
Internet platforms	50	48	-2	19	21	2	2.63	2.32	-12
Digital solutions	32	37	5	17	17	-	1.90	2.21	16
E-commerce	42	36	-6	38	30	-8	1.11	1.21	9
Digital content	36	33	-3	32	30	-2	1.14	1.12	-2
Top digital	40	39	-1	27	25	-2	1.49	1.58	6

Source: UNCTAD.

Note: Years correspond to when the rankings were elaborated. FDI lightness is the ratio of the share of foreign sales to the share of foreign assets.

In fact, companies born digital increase their number of business segments immediately in the first years after their IPOs (figure 6). The new companies are bundling a number of services into their applications: e-commerce and e-payments typically are offered by the same app, to which – in an effort to leverage network effects – new digital companies often offer much more (ride-hailing, social networking, streaming).

The remaining categories – e-commerce and digital content – increased their FDI lightness index minimally over the past five years, suggesting that these MNEs still need physical support for their sales.

Figure 6. Business lines by age since IPO, born digital MNEs (Number)

Source: UNCTAD.

This outcome suggests that while the economy is transitioning towards a lighter equilibrium, not all industries will adopt digital technologies and business models at the same pace and to the same extent. As a consequence, the application of BEPS Pillar One will most likely be limited to a restricted number of digital MNEs that will comprise the most globally successful digital platforms and some selected B2C mixed-modes MNEs.

4. Conclusion and way forward

Digital MNEs, such as Internet platforms and e-commerce and digital content firms, have expanded at a dramatically faster rate than other MNEs in the last five years, partly pushed by the pandemic. The *WIR17* provided the first list of its kind, comprising the top 100 digital MNEs and their global footprint, showing that some digital MNEs reached massive scale in only a few years. This empirical note provides an update of the original analysis in *WIR17* and extends the conceptual categories of digital MNEs to elicit some new research angles. In particular it looks closer at MNEs that were born digital and businesses facing consumers as the “asset-lighter” groups of companies that represent the main objectives of BEPS Pillar One measures. The data set is further enriched with information on investment projects to prepare the ground for a rigorous analysis of digital FDI (in the forthcoming *World Investment Report 2022*).

Digital MNEs are a very dynamic group of companies which, on the basis of firm-specific advantages in intangibles, network effects and digital assets can reach scale in a very short time and expand abroad seamlessly. These new asset-light business models have a number of implications for investment and international production networks as well as for development strategies, employment and fiscal outcomes in host economies. Pure digital MNEs – which operate entirely in a digital environment – are leading the 4th Industrial Revolution and pushing traditional firms into adopting digital technologies in response to the increased competition (Bolwijn et al., 2019; UNCTAD, 2017). The rapid digitalization of the economy and the spread of digital business models across traditional industries elicit the question of how the internationalization strategies of MNEs are affected, not only of pure digital companies but also – and more importantly – the rest of transitioned or mixed business models companies.

The analysis of the new ranking shows that as the economy is transitioning towards a lighter equilibrium not all industries will adopt digital technologies and business models at the same pace and to the same extent. The different adoption speeds across digital sectors and the different FDI profiles and international asset footprints that will result have important implications for investment and development strategies. It is hoped that the updated data set will provide researchers with ample ammunition to explore likely future trajectories and implications for policymakers.

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Appendix A

Annex A. Top 100 digital MNEs, by sales or operating revenues, 2021 (Millions of dollars and per cent)

Classification first level	Company name	Headquarters	Classification second level	Total sales (\$ million)	Total assets (\$ million)	Share of foreign sales (%)	Share of foreign assets (%)
1	Alphabet	United States	Search engine	257 637	359 268	54.2	27.5
2	Meta Platforms	United States	Social network	117 929	165 987	56.3	20.7
3	DiDi Global	China	Other platforms – shared economy	21 722	22 569	7.5	..
4	Baidu	China	Search engine	19 599	59 828	..	8.2
5	Uber Technologies	United States	Other platforms – shared economy	17 455	38 774	45.4	7.9
6	eBay	United States	Other platforms – shared economy	10 420	26 626	59.6	15.4
7	Airbnb	United States	Other platforms – shared economy	5 992	13 708	51.2	18.2
8	Naver	Republic of Korea	Search engine	5 739	28 360	3.1	25.1
9	Twitter	United States	Social network	5 077	14 060	44.1	2.3
10	Yandex	Netherlands	Search engine	4 777	6 914	6.5	4.6
11	Snap	United States	Social network	4 117	7 536	30.3	13.7
12	IAC/Interactivecorp	United States	Social network	3 700	12 300	19.6	4.3
13	Match Group	United States	Social network	2 983	5 063	53.1	15.0
14	JOYY	Singapore	Social network	2 619	9 120	81.1	38.7
15	Pinterest	United States	Social network	2 578	3 537	22.3	11.9
Total				482 344	773 652	48.5	20.9
Internet platforms, median – unweighted							
16	Amazon.com	United States	Internet retailer	469 822	420 549	40.4	43.7
17	Alibaba Group	China	Internet retailer	109 480	257 978	6.8	..
18	Rakuten Group	Japan	Internet retailer	14 614	146 257	17.6	24.0
19	Qurate Retail	United States	Other e-commerce	14 044	16 249	21.6	31.3
20	Wayfair	United States	Internet retailer	13 708	4 570	15.9	18.6

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Annex A. Top 100 digital MNEs, by sales or operating revenues, 2021 (Millions of dollars and per cent) (Continued)

Classification first level	Company name	Headquarters	Classification second level	Total sales (\$ million)	Total assets (\$ million)	Share of foreign sales (%)	Share of foreign assets (%)	
E-commerce	Zalando	Germany	Internet retailer	11 770	7 841	45.6	..	
	Booking Holdings	United States	Other e-commerce	10 958	23 641	88.5	82.3	
	Sea	Singapore	Internet retailer	9 955	18 756	36.2	22.8	
	Expedia Group	United States	Other e-commerce	8 598	21 548	23.6	5.7	
	Mercadolibre	Argentina	Internet retailer	7 069	10 101	75.3	87.3	
	Bechtle	Germany	Internet retailer	6 031	3 433	37.1	47.1	
	Naspers	South Africa	Internet retailer	5 934	53 817	85.8	..	
	ASOS	United Kingdom	Internet retailer	5 379	3 967	57.8	..	
	Just Eat Takeaway.com	Netherlands	Delivery	5 110	20 208	91.5	99.8	
	Amadeus IT Group	Spain	Other e-commerce	3 035	12 712	97.4	87.1	
	Delivery Hero	Germany	Delivery	3 019	7 043	99.8	80.8	
	Copart	United States	Internet retailer	2 693	4 562	18.5	17.0	
	iMarketKorea	Republic of Korea	Internet retailer	2 637	943	14.2	..	
	Interpark	Republic of Korea	Internet retailer	2 623	1 393	13.0	..	
	WeWork	United States	Other e-commerce	2 570	21 756	87.7	88.1	
	Deliveroo	United Kingdom	Delivery	2 468	2 124	49.7	15.9	
	Total				711 517	1 059 446	36.1	30.0
	E-commerce, median – unweighted							
		Salesforce.com	United States	Other digital solutions	26 492	95 209	30.7	..
	Digital solutions	PayPal	United States	Electronic payments	25 371	75 803	46.0	20.2
		Fiserv	United States	Fintech	16 226	76 249	13.0	..
		Automatic Data Processing	United States	Other digital solutions	15 005	48 773	12.8	13.6
							40.4	37.5

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Annex A. Top 100 digital MNEs, by sales or operating revenues, 2021 (Millions of dollars and per cent) (Continued)

Classification first level	Company name	Headquarters	Classification second level	Total sales (\$ million)	Total assets (\$ million)	Share of foreign sales (%)	Share of foreign assets (%)
41	FIS	United States	Fintech	13 877	82 931	23.9	..
42	VMware	United States	Other digital solutions	12 851	28 676	50.0	21.8
43	Insight Enterprises	United States	Other digital solutions	9 436	4 689	20.7	..
44	Global Payments	United States	Electronic payments	8 524	45 280	16.0	34.9
45	Adyen	Netherlands	Electronic payments	6 816	6 566	55.3	..
46	Equinix	United States	Other digital solutions	6 636	27 919	54.9	55.7
47	ServiceNow	United States	Other digital solutions	5 896	10 798	36.4	36.8
48	Nasdaq	United States	Other digital solutions	5 886	20 115	17.1	34.5
49	Roper Technologies	United States	Other digital solutions	5 778	23 714	15.6	14.3
50	NetApp	United States	Other digital solutions	5 744	9 360	46.1	35.2
51	Workday	United States	Other digital solutions	5 139	10 499	24.8	15.6
52	Broadridge Financial Solutions	United States	Other digital solutions	4 994	8 120	12.5	39.8
53	Shopify	Canada	Other digital solutions	4 612	13 340	93.4	18.3
54	Autodesk	United States	Other digital solutions	4 386	8 607	66.2	30.5
55	Amdocs	United States	Other digital solutions	4 289	6 512	34.9	86.5
56	Palo Alto Networks	United States	Other digital solutions	4 256	10 242	35.4	20.7
57	Worldline	France	Electronic payments	4 194	24 021	78.4	..
58	GoDaddy	United States	Other digital solutions	3 816	7 417	33.3	12.4
59	Epam Systems	United States	Software provider	3 758	3 523	12.5	47.1
60	Akamai Technologies	United States	Other digital solutions	3 461	8 139	44.4	..
61	Open Text	Canada	Software provider	3 386	9 609	95.1	67.9
62	Fortinet	United States	Other digital solutions	3 342	5 919	68.7	33.9

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Annex A. Top 100 digital MNEs, by sales or operating revenues, 2021 (Millions of dollars and per cent) (Continued)

Classification first level	Company name	Headquarters	Classification second level	Total sales (\$ million)	Total assets (\$ million)	Share of foreign sales (%)	Share of foreign assets (%)	
Digital solutions	Citrix Systems	United States	Other digital solutions	3 217	6 976	45.4	23.0	
	Transcosmos	Japan	Other digital solutions	3 039	1 589	18.2	29.1	
	Rackspace Technology	United States	Other digital solutions	3 010	6 329	72.0	77.4	
	Alight	United States	Other digital solutions	2 915	10 988	13.7	10.4	
	Exclusive Networks	France	Other digital solutions	2 823	3 267	87.7	..	
	Applwin	United States	Other digital solutions	2 793	6 164	38.3	2.3	
	Cimpress	Ireland	Other digital solutions	2 593	2 182	53.7	20.0	
	Sage Group	United Kingdom	Other digital solutions	2 487	4 485	79.5	80.5	
	Total			237 046	714 008	36.6	16.6	
	Digital solutions, median – unweighted							
Digital content	Tencent Holdings	China	Games	86 832	253 831	7.0	30.7	
	Walt Disney	United States	Digital media	67 418	203 609	19.7	12.3	
	Netflix	United States	Digital media	29 698	44 585	55.7	24.9	
	Discovery	United States	Digital media	12 191	34 427	36.6	37.6	
	Spotify Technology	Luxembourg	Digital media	10 991	8 151	99.9	81.7	
	Activision Blizzard	United States	Games	8 803	25 056	45.2	40.4	
	S&P Global	United States	Information and data	8 297	15 026	39.6	11.1	
	RTL Group	Luxembourg	Digital media	7 545	11 923	67.5	67.5	
	Thomson Reuters	Canada	Information and data	6 348	22 149	97.1	91.4	
	Moody's	United States	Information and data	6 218	14 680	45.0	69.3	
	Electronic Arts	United States	Games	5 629	13 288	56.0	19.1	
	Wolters Kluwer	Netherlands	Information and data	5 424	10 263	95.8	88.7	
	Total			237 046	714 008	36.6	16.6	
	Digital solutions, median – unweighted							
	71	Tencent Holdings	China	Games	86 832	253 831	7.0	30.7
	72	Walt Disney	United States	Digital media	67 418	203 609	19.7	12.3
	73	Netflix	United States	Digital media	29 698	44 585	55.7	24.9
	74	Discovery	United States	Digital media	12 191	34 427	36.6	37.6
75	Spotify Technology	Luxembourg	Digital media	10 991	8 151	99.9	81.7	
76	Activision Blizzard	United States	Games	8 803	25 056	45.2	40.4	
77	S&P Global	United States	Information and data	8 297	15 026	39.6	11.1	
78	RTL Group	Luxembourg	Digital media	7 545	11 923	67.5	67.5	
79	Thomson Reuters	Canada	Information and data	6 348	22 149	97.1	91.4	
80	Moody's	United States	Information and data	6 218	14 680	45.0	69.3	
81	Electronic Arts	United States	Games	5 629	13 288	56.0	19.1	
82	Wolters Kluwer	Netherlands	Information and data	5 424	10 263	95.8	88.7	

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Annex A. Top 100 digital MNEs, by sales or operating revenues, 2021 (Millions of dollars and per cent) (Concluded)

Classification first level	Company name	Headquarters	Classification second level	Total sales (\$ million)	Total assets (\$ million)	Share of foreign sales (%)	Share of foreign assets (%)
83	Experian	Ireland	Information and data	5 372	10 071	34.3	48.6
84	Entain	Isle of Man	Games	5 182	9 811	53.0	45.1
85	Prosiebensat 1 Media	Germany	Digital media	5 109	7 488	22.0	18.7
86	Grupo Televisa	Mexico	Digital media	5 053	14 297	13.0	2.1
87	Equifax	United States	Information and data	4 924	11 041	22.1	43.8
88	Gartner	United States	Information and data	4 734	7 416	35.7	..
89	Alliance Data Systems	United States	Information and data	3 655	21 746	16.7	35.6
90	Nielsen Holdings	United States	Information and data	3 500	10 820	41.5	11.3
91	Axel Springer	Germany	Digital media	3 489	7 681	45.5	68.6
92	Take-Two Interactive Software	United States	Games	3 373	6 028	40.2	31.8
93	Graham Holdings	United States	Digital media	3 186	7 426	22.0	..
94	Versk Analytics	United States	Information and data	2 999	7 808	23.4	47.9
95	TransUnion	United States	Information and data	2 960	12 635	39.5	45.1
96	Micro Focus International	United Kingdom	Information and data	2 900	10 347	96.5	34.4
97	Zynga	United States	Games	2 801	6 359	38.6	40.5
98	Ubisoft Entertainment	France	Games	2 608	5 729	93.0	..
99	Playtika Holding	Israel	Games	2 583	2 803	85.7	..
100	Sega Sammy Holdings	Japan	Games	2 509	3 808	31.4	14.5
Total				322 328	820 301	33.2	28.7
Digital content, median – unweighted							
Top digital MNEs				1 753 235	3 367 407	39.1	25.0
Top digital MNEs, median – unweighted							

Source: UNCTAD.

Note: Sales and assets correspond to fiscal year 2021.

Appendix B – Top 100 digital creation methodology

- (1) The initial sample corresponds to all the public companies with \$1 billion or more in net revenue. It was extracted using the Refinitiv database and considers data for the last fiscal year available for the companies. By the time of elaboration of this study, most of the companies had already reported their 2021 results. Since only public companies are included, a few companies that were present in the previous list fell out of this new ranking as they were bought and/or delisted; e.g. LinkedIn and Red Hat.
- (2) The sample was then narrowed down by activity using both NACE codes and the Refinitiv Business Classification at industry and activity levels. The output is a broad sample of possible digitally exposed activities, allowing the exclusion of sectors that would not be the primary target of this study.
- (3) A more detailed screening was done manually by analysing companies' business descriptions. This was done to ensure the exclusion of tech companies that would be assimilated more in the ICT list than in the digital list, e.g., cloud and telecommunication companies.
- (4) For companies operating in several industries, we considered their core activity. In addition to providing core ICT infrastructure (hardware and software), all big tech companies (Alphabet, Amazon, Apple, Meta and Microsoft), have a dominant market share in several digital industries such as streaming, delivery, ride-hailing and social networking platforms; however, we consider only Alphabet, Amazon and Meta as digital companies.
- (5) Companies that are not straightforward digital companies were considered for the following reasoning:
 - a. **Retail:** Retail companies are included only if the majority of their business is e-commerce oriented, which helps to rule out big retail companies such as Walmart. Amazon and other digital companies that operate as digital marketplaces are included, since most of the time their activity is to provide the marketplace itself and not the final product. In this case, the sector of the product is not taken into consideration, which means that the sector can range from clothing to electronic e-commerce (e.g. Kabum in Brazil).
 - b. **Media and broadcast:** Broadcast companies are considered only if they have a considerable number of on-demand online services. Discovery, Netflix and Spotify are some examples.

- c. Software:** Software companies are included only if their products are not considered core ICT,⁷ meaning they do not provide the infrastructure for the digital economy. Servers, cloud and hosting platforms, and the Internet of Things, for instance, are core to the digital economy and are thus in the ICT category ICT, whereas cybersecurity, digital creation, SaaS and logistics software are considered in the digital category. This is one of the hardest industries to screen as many of the software providers that were classified as ICT in 2017 on the grounds of their provision of digital infrastructure are now increasingly providing SaaS or some form of automated intelligence or analytical service. We remained consistent with the 2017 classification; thus, those software companies classified as core to the digital economy such as the giant Microsoft remained in the ICT category and thus excluded from this ranking. The logic behind this choice is that we did not want to compare two rankings that had different selection criteria.
- d. Other e-commerce/services:** Hotels and travel sites, although deriving a significant part of their revenue through sales online are in general ruled out (for example, Marriott) as they provide only a digital offering but rely on a traditional business model and product. Airbnb and Expedia, by contrast, are examples of companies that provide a digital service similar to a marketplace, justifying their inclusion in the ranking. Airbnb does not own any properties but links hosts with travellers, and Expedia is an online travel agency.
- e. Financial services:** Physical payment methods are filtered out (VISA, Mastercard), but digital financial solutions are considered (e.g. PayPal). Banks born 100 per cent digital are included as well.
- (6)** Transnationality is then measured using the shares of foreign assets and foreign sales. We consider companies that have foreign assets and/or foreign sales higher than 10 per cent or that have a considerable amount of foreign subsidiaries, excluding any company that does not provide enough information for the computation of either ratio used in the analysis in this report.
- (7)** The top digital companies were then selected, ranking the first 100 digital MNEs by total sales classified according to their segments in the ranking.

⁷ New infrastructure industries could include business automation, speech recognition and edge computing.

- (8)** We validated the current ranking with the previous ranking and also with other publicly available rankings. More than 60 per cent of the companies in the current ranking appear at least once in either the 2017 top digital ranking, or the Forbes ranking or other international organizations' rankings that look at the digital economy on a global scale.

