Digital Tax Index 2018: Locational Tax Attractiveness for Digital Business Models

Executive Summary

Digital Tax Index 2018

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Preface

The digital transformation of industry (including “Industry 4.0”) is progressing continuously. It revolutionises value creation processes and supply chains, makes production processes smart and promotes employees’ know-how in dealing with innovative technologies. Not least of all, it influences business strategies and corporate culture. More and more digital business models are emerging, spurring on competition and disrupting entire sectors. At the same time, new digital opportunities work as a catalyst on research and development, for instance by stimulating innovation processes and shortening development cycles. None of this would be conceivable without investment in hardware, software, cloud solutions or platforms. Ultimately, they lead to increases in productivity and economic growth.

In this context, the tax factors at the investment location play an ever-more important role. Given a fully connected business world, the decision on the investment location for a digital business unit such as a digital hub or a platform appears much more flexible and less costly than a location decision for conventional physical production plants. Consequently, tax factors for the attractiveness of locations for digital business models become more relevant to decision-makers. This Digital Tax Index 2018 analyses the relevant tax factors for investments in digital business models already for the second time since 2017. In addition to performing a country comparison that analyses individual tax factors, an established investment model is used to calculate effective average tax rates and the cost of capital depending on the business model and the investment location. Although, again, these are not the actual effective tax rates of any single company, or of the sector as a whole. The indicators rather reflect tax incentives for stylized investments in digital business models with regard to the investment location and the investment volume and represent the attractiveness of 33 tax systems compared by country and time. In addition, the study includes special sections to illustrate the impact of the US tax reform and the characteristics of platform-based digital business models.

Our Digital Tax Index provides the following findings:

1. The effective tax burden for investments in digital business models is generally lower than for traditional business models, which is also reflected in a lower cost of capital.
2. Tax incentives for research and development activities and the resulting income have a significant impact on the attractiveness of a location. Furthermore, the taxation heavily depends on whether it is a domestic or a cross-border investment. Another relevant factor is whether the cross-border business models are active in the B2B or in the B2C sector.
3. The attractiveness of the countries considered as locations for digital business models varies to a large extent. Prior to the US tax reform, the three industrialised countries Germany, the US and Japan are at the bottom of the Digital Tax Index. In contrast, the most attractive locations are Italy, Ireland and Hungary.
4. In the stylized model, the US has moved up in the rankings to the 3rd place thanks to a significant tax relief under the latest tax reform, particularly due to the special tax rate on foreign-derived intangible income (FDII). Foreign companies will not benefit to the same extent from the lower statutory tax rate as US companies.
5. Due to their special lean structure, platform-based digital business models particularly benefit from a more favourable tax environment at the investment location.

The high degree of mobility of digital business models and the possibility of serving international markets without a significant physical presence entail that the tax environment becomes decisive for the location choice of digital companies. In extreme cases, under our stylized model, the effective tax burden of digital companies could differ by over 30 percentage points between neighbouring industrialised countries. This study therefore provides new findings for assessing corporate decisions and sets out courses of action for designing tax policy regarding investment activities of companies with digital business models.

We wish you insightful reading.

Dr. Frank Schmidt ***Prof. Dr. Christoph Spengel***

Executive Summary

This updated version of the "Digital Tax Index" compares the tax attractiveness of locations for investments in digital business models in the 28 EU member states, Japan, Canada, Norway, Switzerland and the US for the second time since 2017. The Index analyses effective tax burdens for standardised investments in digital business models in these 33 countries based on the prevailing tax factors as legally applicable on 01.07.2017.

With respect to direct business taxation, Italy, Ireland and Hungary are the most attractive locations for investments in such digital business models. Germany, on the other hand, is the least attractive location for digital business models. The study sets out the locational tax factors and analyses quantitative results for investments in digital business models in detail, compares them with effective tax burdens for traditional business models and with other relevant location factors in the digital economy such as infrastructure, personnel and the degree of technology utilisation. The results serve as an objective measure for policy and entrepreneurial decision-makers with regard to the tax factors in the context of the digitisation of the economy. Based on last year's study *(Steuerlicher Digitalisierungsindex [Digital Tax Index] 2017)*, changes in the relevant tax factors are presented. Furthermore, three separate sections analyse in-depth the R&D tax incentives, which can heavily influence the effective tax burden on digital business models, special characteristics of platform-based business models, and the impact of the US tax reform that took effect on 01.01.2018.

The digitisation of business models drives innovation and growth

The digital transformation of the economy is implemented across all sectors and results in the continuous development of new business models. Investment in digital goods and technologies leads to increases in productivity and economic growth. It also provides the foundation for innovation, improvements in efficiency and greater sales potential. The increased use of (individualised) software presents a significant success factor in the increase in value.

In Germany alone, businesses almost invested € 75 bn. in information technology in 2016. Globally, growth for 2017 is forecast at 3.8% and at a further 6.2% for 2018. Internet-based integration of hardware and software is the basis of new business segments such as platform solutions, artificial intelligence and cloud computing. The aggregation, analysis and targeted use of data act as key prerequisites for innovation. In addition, the horizontal and vertical integration of value-added processes under Industry 4.0 projects, coupled with the targeted use of skilled personnel, allows traditional business models to transform into value chains within digital ecosystems.

Quality of location factors for digital business models varies by international comparison

This study discusses and analyses various location factors for investments in digital business models. The digital infrastructure, capable human capital and the use of new technologies are the most important non-tax location factors. Significant discrepancies arise within the international comparison. Numerous rankings show that the Scandinavian countries as well as Switzerland tend to stand out as attractive locations, while Germany often only ranks at mid-table.

Investment costs are a significant factor in the corporate decision-making process. From a business perspective, this also includes taxes. Several scientific studies have shown that taxes have a significant impact on international investment decisions, the location of key functions and assets and the disclosure of the profitability of individual business units. Although digital business models are highly mobile and the tax environment can be exploited accordingly, previous studies have largely failed to consider taxes as location factors for the digital economy. Drawing on the results from last year, this study analyses factors for direct corporate taxation as additional determining factors for investment costs, and thus for investment decisions with respect to digital business models.

For this study, we researched relevant tax parameters for investments in digital business models for the 28 EU member states as well as Japan, Canada, Norway, Switzerland and the USA. Generally speaking, the same tax law applies for investments in digital business models as for investments in traditional business models – however, due to their structure, particular elements of the tax system assume greater significance for investments in digital business models. Key drivers for the national tax burden at company level are the tax rate and the rules determining the tax base. A qualitative assessment produces a large range of statutory income tax rates from 10% to at least 38%; Germany is now a high-tax country with a rate topping 31%. With regard to the tax base, favourable regulations apply for for the treatment of assets used in digital business models. For software and hardware, generally shortened amortisation periods or higher depreciation rates compared with conventional investment goods are applied. Furthermore, the development costs of intangible assets can often be immediately deducted. Given the high relevance of personnel and ongoing development costs, this favours digital business models from a tax perspective compared with traditional business models. In Germany, more generous regulations also apply for investments in information and communications technologies compared with conventional investment goods. Furthermore, several tax systems provide for tax incentives for research and development (R&D). This reduces investment costs by favourably treating the assessment base or by providing tax credits. What is more, so-called 'Intellectual Property' (IP) box regimes already exist in 13 of the considered countries. These regimes provide for favourable taxation of income derived from intangible assets. As of now, Germany does not offer any tax incentives for R&D.

The tax environment can influence the attractiveness of locations for digital business models

The countries considered are attractive to varying degrees as locations for digital business models. Taxes can influence the attractiveness of a location in that investments in digital business models with identical output parameters (particularly the pre-tax yield) show varying after-tax yields depending on the location. Investment costs in the form of the cost of capital continue to depend on fiscal parameters.

The analysis of tax factors comprises the calculation of effective average tax rates (EATR) and the cost of capital (CoC) for standardised investments in digital business models. The CoC expresses the precise yield that a marginal investment before tax must generate in order to be worthwhile for an investor. Lower CoC indicate a lower minimum yield before tax and thus a more attractive location for expanding the investment volume. The EATR expresses the change in the net present value of a profitable investment caused by taxation. A lower EATR indicates that an investment at the specific location is more worthwhile for investors and that the attractiveness of the location for placing profitable investments therefore increases.

The effective tax measures are calculated for three standardised investment forms in digital business models. We assume that a fiscal nexus will develop under the prevailing rules at the investment location and at the location of international expansion and the relevant local tax factors will be decisive. Hence, we present consequences of taxation for real investment decisions. Legal and organisational structures with the purpose of international tax planning continue to be excluded. In the domestic case, we assume that a corporation invests in hardware, software and other intangible assets. In isolation, this simplified form of the domestic business model reproduces the digital transformation process of a traditional business model. We consider B2C and B2B business models as cross-border cases. In each case, we assume that a company invests in its digital business model at the primary location and serves foreign markets through the use of service (B2C) or distribution companies (B2B).

As a result, effective tax burdens are derived for standardised investments in digital assets based on a single-period investment model, within which capital values are compared before and after tax. The interpretation of these results allows us to assess the tax parameters of an investment location, in other words, the prevailing tax policy. Under no circumstances can actual tax payments of existing companies be deduced from the quantitative results.[1] Lower effective tax rates relative to traditional investments indicate that investments in digital assets in a country are treated in a tax-friendly way. This is due, for example, to the immediate deductibility of ongoing costs (e.g., software development), while investment costs in machinery must be capitalised and written off, and the targeted tax incentives (such as tax credits, special depreciation, lower income tax rates for IP) for R&D and for innovative activities in conjunction with the digitisation of business models.

Digital Tax Index 2018: Italy, Ireland and Hungary top the table; Germany left behind

Table 1 shows the results of the overall index for 2018. The final ranking is based on the EATR in the respective countries taking account the most advantageous tax regulations, in other words, taking account special tax provisions for research, development and innovation. Each of the indicators are derived from the mean values of the three business models considered – a domestic model and cross-border B2C and B2B models. In addition, the computed CoC and the corresponding ranking are given. The tax burden of digital business models is compared with that for traditional business models and with the figures for the previous year.

- Italy leads the Digital Tax Index 2018 with a significantly negative EATR, followed by Ireland and Hungary. The respective negative effective burdens result from the application of R&D incentives and IP-Box regimes, such that investments in digital business models after tax are more profitable than before tax or, in other words, receive a tax subsidy.
- Italy has proven to be highly attractive and has moved up 22 places, compared with its traditional ranking, to the top of the table. The very favourable treatment of digital investment goods (so-called 'hyperdeduction' of 150%), coupled with a generous R&D tax credit and the IP-Box, have led to this sharp reduction in the effective burden for digital business models. Ireland and Hungary can assert their attractiveness as locations that already have traditionally low levels of tax through tax incentives that further reduce the effective burden.
- Germany, the USA (until 31.12.2017) and Japan, however, show high effective tax burdens above 21%. Their low level of attractiveness rootes in the high statutory tax rates and the restricted tax incentives or the lack thereof.

[1] In contrast to how the European Commission interpreted these results (European Commission 2018).

Tab. 1 Main results of the Digital Tax Index 2018

	Effective Average Tax Rate				Cost of Capital			
	Result 2018		Change to 2017		Result 2018		Change to 2017	
Country	Rank	Ø	Δ Rank	Δ in percentage points	Rank	Ø	Δ Rank	Δ in percentage points
Italy	1	–33.18%	→ 0	–18.72	1	–8.87%	→ 0	–4.02
Ireland	2	–3.39%	→ 0	8.17	6	2.17%	↘ –2	1.92
Hungary	3	–0.52%	→ 0	6.33	11	2.99%	↘ –8	3.15
Lithuania	4	–0.05%	→ 1	–0.49	7	2.20%	↗ 3	–0.08
Latvia	5	0.09%	↘ –1	–0.24	8	2.23%	→ 1	–0.03
Croatia	6	4.50%	→ 1	–0.69	10	2.74%	↗ 2	0.25
Romania	7	5.42%	↗ 2	–1.20	14	3.30%	↗ 2	–0.25
Portugal	8	5.48%	↑ 11	–6.16	4	0.81%	↗ 7	–1.66
Spain	9	5.50%	↘ –1	0.08	3	0.23%	↗ 2	–0.14
France	10	6.73%	↑ 10	–4.93	2	–0.30%	→ 0	0.42
Czech Republic	11	7.16%	↘ –1	–0.32	13	3.19%	→ 1	–0.04
United Kingdom	12	7.45%	↗ 5	–2.64	21	3.85%	↗ 2	–0.46
Norway	13	7.89%	↘ –1	–0.12	9	2.44%	↘ –1	0.22
Cyprus	14	8.51%	↘ –3	0.58	26	4.69%	→ 0	0.04
Netherlands	15	8.69%	→ 1	–1.36	16	3.53%	↗ 2	–0.31
Bulgaria	16	9.20%	↘ –1	–0.32	31	5.14%	↘ –1	–0.04
Poland	17	9.49%	↗ 4	–3.14	20	3.79%	↗ 4	–0.74
Luxemburg	18	9.82%	→ 0	–0.94	27	4.81%	→ 0	–0.01
Slovenia	19	9.85%	↘ –5	0.34	22	3.86%	↘ –2	–0.22
Slovakia	20	10.02%	↗ 2	–2.93	17	3.55%	↗ 2	–0.52
Belgium	21	12.57%	↓ –15	11.26	18	3.62%	↓ –12	2.59
Malta	22	12.80%	→ 1	–0.32	5	1.42%	↗ 2	–0.04
Canada (Ontario)	23	12.80%	↗ 4	–3.25	15	3.53%	↗ 7	–0.77
Denmark	24	14.50%	→ 0	–0.32	24	4.54%	→ 1	–0.04
Austria	25	14.84%	→ 0	–0.32	23	4.10%	↘ –2	–0.04
Switzerland (Zurich)	26	15.57%	↓ –13	7.18	29	5.10%	↓ –16	2.01
Estonia	27	15.95%	→ 1	–0.32	32	5.24%	→ 0	–0.04
Finland	28	16.17%	↘ –2	0.31	33	5.29%	↘ –4	0.12
Sweden	29	16.38%	→ 1	–0.55	30	5.11%	→ 1	–0.10
Greece	30	16.41%	↘ –1	–0.32	19	3.72%	↘ –2	–0.04
Japan	31	21.16%	↗ 2	–4.30	25	4.56%	↗ 8	–1.20
USA (California)	32	21.97%	→ 0	–0.84	12	3.09%	↗ 3	–0.23
Germany	33	22.19%	↘ –2	–0.62	28	4.89%	→ 0	–0.25
Average		8.85%		–0.64		3.05%		–0.02

Investments in digital business models bear lower tax burdens than in traditional busi-ness models

As the Index was reviewed, inconsistencies in the simultaneous treatment of R&D credits and IP-Box regimes have been adjusted regarding the calculation of the last Digital Tax Index. The comparison is therefore based on the corrected results for 2017.

- The effective burdens for digital business models lie between –33% and 22%. On average, the EATR is just under 9%, thus confirming the results of the previous year. Compared with the traditional domestic business model, the EATR is over 12 percentage points lower. The higher proportion of non-capitalisable costs in the investment structure (particularly internally-developed software and intangible assets), more advantageous amortisation rules for digital investment goods and the applicability of special tax incentives for research, development and innovation cause the substantial reduction.
- In the upper mid-table, we primarily find traditional low-tax countries such as the Eastern European states, Luxemburg and Cyprus and high-tax countries and industrialised nations such as Portugal, Spain, France, the United Kingdom, Norway and the Netherlands, which improve their attractiveness as locations for digital business models thanks to generous R&D incentives and IP-Box regimes. Portugal, Spain and France have moved well up compared with their traditional ranking. In particular, Portugal and France reduce their effective burden year-on-year.
- Belgium, Ireland, Switzerland and Hungary experience a clear increase in the effective burden compared with the previous year. While Ireland and Hungary can maintain their attractiveness as locations, Belgium and Switzerland fall back most strikingly in the ranking based on the EATR and cost of capital.
- The cost of capital for digital business models are between –9% and just under 5%. On average, this is 3 percentage points lower than for traditional business models. The results suggest that additional investments compared with alternative investments on the capital market (5%) are highly worthwhile in most countries.
- The leading group measured by their cost of capital are Italy, France and Spain. The cost of capital have fallen very sharply for digital business models in these countries. Similar developments emerge in Norway, Malta and the USA. This suggests a higher attractiveness of locations for the expansion of corresponding investments, which is the result of generous rules for determining the tax base such as immediate deductions granted for investments in acquired hardware and software or R&D incentives.
- In Germany, both the effective average tax rate and the cost of capital for digital business models have declined. In the international comparison, however, Germany has fallen back due to the more attractive tax factors in the other considered countries and takes the last place (effective average tax rate), and position 28 of 33 measured by the cost of capital.

Tax attractiveness at the investment location is relevant for cross-border digital business models

The results for cross-border B2C and B2B business models vary compared with the domestic case (digital transformation), given that an additional level of taxation arises in the market state. However, the tax burden continues to depend to a large extent on the regulations in the country in which the parent company resides. The relative attractiveness of the investment locations in the case of a digital B2C business model change very little compared with the domestic business model. The ranking changes for the digital B2B business model, since intra-group royalty payments arise from licences. In countries like France, Malta, Portugal, Switzerland, Spain, Hungary and Cyprus, the existence of royalty income permits the application of IP-Box regimes and therefore results in reduced effective tax burdens in this group of countries.

These findings are illustrated by the effective burdens of an investment in a B2C or B2B business model in Germany, Italy and France that serve the relevant foreign markets.

Cross-border B2C

- For investments in a digital B2C business model in Italy with cross-border sales activities in Germany or France, we continue to see negative effective average tax rates. This underscores the relevance of the location conditions at the company's main site.
- A lower effective burden is achieved for investments in a B2C business model in Germany with activities in Italy, while activities in the market state of France do not result in any change compared with domestic investments.
- If a company invests in a B2C business model in France, we see similar trends as for the example of Germany.

Cross-border B2B

- Also in the B2B model, the investment in Italy represents an extreme case with nega-tive effective average tax rates, which is due to the advantageous provisions for de-termining the tax base, the R&D incentives and the IP-Box regime.
- Similar to the B2C model, investments in a B2B model in Germany face varying effective tax burdens depending on the tax attractiveness of the market state.
- For investments in a B2B model in France, effective burdens ar much lower compared to domestic investments. This is driven by the applicability of the IP-Box for license payments, which does not apply in the domestic case.

Focus topic 1: Tax incentives for research, development and innovation

Table 2 shows the results of the detailed location analysis for the domestic digital business model. The effective average tax rate and the cost of capital are presented, together with the relevant ranking for Germany compared with the key trading partners France and the United Kingdom, as well as in comparison with the frontrunner, Italy. In performing this examination, the effects of the individual factors are isolated by listing the results both with and without the inclusion of tax incentive mechanisms.

- On average, the EATR is 17.5% and the CoC is 5.1%, if the special regimes are not included. The statutory tax rate mainly drives the results.
- The lower tax burdens on digital business models without including the special regulations result from the more generous amortisation provisions for investment goods of digital business models compared with the traditional business model. Combined with tax incentives, the EATR be reduced on average by 9.4%.
- By expanding special discounts for investment goods of digital business models, Italy can significantly improve its attractiveness as a location both measured by the CoC and the EATR (17 and 14 places). France and Germanymove up more than 10 places measured by the CoC, while the relative attractiveness measured by the EATR remains unchanged.

- If tax incentives for R&D are included, both the absolute results and the ranking change significantly. Italy clearly stands out with CoC of almost –10% and a negative EATR given the generous provisions of the tax credit. The R&D tax credits in France and the United Kingdom also lead to a further reduction in the effective burden.
- If one varies the application in the case of an incremental tax credit, the ranking changes substantially, particularly in the case of Italy and Spain. If the incremental tax credit is not applied, Italy falls back to 20th position with an EATR of 9.0%.
- Countries such as Germany without R&D tax incentives are deteriorating in the international comparison. In the current discussion on implementing a tax subsidy for R&D in Germany, the main focus is on small and medium-sized companies. By internation-al comparison, we can that no major improvements can be expected in Germany's relative attractiveness as a location, depending on the desgin of the tax credit.
- When we look at the IP-Box regimes in isolation, the EATR in Italy and the United Kingdom fall by 3 to 4 percentage points, which is attributable to the applicability of the IP-Boxes to all types of income (including sales). The CoC remains largely unchanged.
- With the combined application of the R&D incentives and IP-Box regimes, the complementary design leads to further reductions in the effective tax burden in most countries. Among others, this can be identified for Italy and the United Kingdom as well as for the current tax submission 17 in Switzerland.

Tab. 2 Detailed results for selected countries

		Standard factors				Including R&D incentives			
		EATR		CoC		EATR		CoC	
Country	Index 2018	Rank	Ø	Rank	Ø	Rank	Ø	Rank	Ø
Ireland	1	9	12.9%	1	2.8%	1	–32.8%	1	–9.9%
United Kingdom	8	14	15.7%	28	5.4%	17	9.3%	22	3.8%
Average			17.5%		5.1%		9.4%		2.9%
France	18	30	27.0%	19	5.1%	15	8.7%	2	–0.5%
Germany	33	27	23.7%	15	5.0%	33	23.7%	29	5.0%

		Including IP-Box regimes (excluding R&D-)				Including IP-Box regimes (and R&D-)			
		EATR		CoC		EATR		CoC	
Country	Index 2018	Rank	Ø	Rank	Ø	Rank	Ø	Rank	Ø
Irland	1	5	9.0%	1	2.9%	1	–37.0%	1	–8.9%
United Kingdom	8	10	12.4%	22	5.2%	3	6.02%	3	3.7%
Average			16.4%		5.1%		14.4%		4.5%
France	18	30	27.0%	19	5.1%	30	27.0%	22	5.1%
Germany	33	28	23.7%	14	5.0%	28	23.7%	18	5.0%

Focus topic 2: Platform-based business models benefit from more favourable tax provisions

Digital platform-based business models such as Blablacar, Ebay or Netflix stand out as Internet-based forums and use digital technologies such as software algorithms to act as intermediaries and efficiently connect suppliers and consumers. Disruptive potential is ascribed to them, in other words, they are able to fundamentally change market structures and the competition. The core activity relates to the development of the technological platform and the collection and evaluation of data, with costs predominantly arising in the form of personnel expenses. Digital platform-based business models are characterised by a lean organisational structure and only require a limited physical presence, or no physical presence, in the market state. Accordingly, this type of digital business model also produces a taxable nexus primarily at the investment location, where the software and platform development take place.

These activities are considered as an extreme case within the Digital Tax Index, if a company only invests in the in-house production of software and intangible assets and additionally requires software applications and intangible assets for support. For investments in the activities of digital platform companies, the effective average tax rate is also well below the burden for investments in traditional business models. In most countries, the primary costs, i.e. personnel expenses, can be immediately deducted from the tax base in the year in which they arise.

In the considered countries, the special regimes for R&D expenses comprise all of the development costs for intangible assets as well as software and have a correspondingly strong impact on the effective tax burden, which is further triggered by the application of IP-Box regimes. The EATR therefore stands at 7.4% on average and the rate is on average 14 percentage points lower than for traditional business models. The CoC are also comparatively low due to the inclusion of personnel expenses that can be immediately deducted for tax purposes.

Furthermore, the analysis shows that the treatment of personnel expenses is highly relevant for the tax burden of these investments. Accordingly, above and beyond the effective average tax rate at the level of the company, the consequences of employee taxation need to be considered. The comparison of the location factors for digital business models provides relevant indicators, including the taxation of (high-qualified) human capital.

We also observe that the tax treatment of investment costs in relation to the IT infrastructure (hardware) is relevant to create an attractive investment environment for the entire range of digital business models. If only expenses relating to software development or software as an acquired intangible asset are favoured, the main beneficiary will be digital platform-based business models that are not substantially based on their own infrastructure (data centres, etc.).

Focus topic 3: US tax reform 2018 – potential far-reaching effects, particularly for cross-border digital business models and international tax competition

The US tax reform (Tax Cuts and Jobs Act 2017, TCJA) takes effect as of 01.01.2018 and brings far-reaching changes to corporate tax law and the respective attractiveness for investments in the USA. The reform also improves the attractiveness of the USA as a location for investment in digital business models, particularly against the backdrop of international tax competition. A separate study by the ZEW & University of Mannheim shows that just by reducing the corporation tax rate from 35% to 21% and introducing immediate write-offs for investment goods, the EATR of traditional, domestic business models in the USA is reduced from 36.5% to 23.3% and CoC are reduced from 7.6% to 6.0%.[2]

In the Digital Tax Index, the TCJA reform effects for digital business models are determined based on the assumptions in this study. For domestic business models, both the EATR and CoC fall from 22.6% to 10.4% and from 3.1% to 2.5%, respectively, provided that R&D tax credits are still applicable. In particular, cross-border business models (both B2B and B2C) at this investment location can benefit most from the reform, provided that the special tax rate of 13.125% applies according to the FDII rule for profits generated abroad. This is not unlikely for the business models considered in this study and, in extreme cases, leads to a negative EATR of around –10% and to CoC close to 0%.[3] As an investment location for profitable digital business models that generate profits abroad, this makes the USA far more attractive. Large differences in EATRs and the costs of capital arise between companies with an invest-ment location in the USA and foreign markets (US Outbound) and companies with a foreign investment location and the market state of the USA (US Inbound). Such differences might ultimately impact the competitiveness of these companies.

Due to the stronger weighting of cross-border business models in the overall index (2/3 vs. 1/3 domestic business model), the USA moves up to third place in the Digital Tax Index as-suming that the tax factors remain unchanged in other countries. The results are driven by the significant tax relief under the reform, particularly the FDII rule, with foreign companies ben-efiting less from the lower statutory tax rate now applicable in the USA.

Tab. 3 Tax attractiveness of the USA as a location for digital business models before and after the 2018 reform

Business model	EATR/CoC prior to reform	EATR/CoC after reform	Digital Tax Index ranking prior to reform	Digital Tax Index ranking after reform
Domestic	22.6%/3.1%	10.4%/2.5%	32/14	21/11
B2C	20.7%/3.6%	–8.8%/0.1%	32/14	2/2
B2B	22.6%/2.6%	–10.2%/–0.9%	33/10	2/3
Total	22%/3.1%	–2.9%/2.16%	32/12	3/4

[2] Spengel/Heinemann/Olbert/Pfeiffer/Schwab/Stutzenberger (2018) and Bärsch/Spengel/Olbert (2018), p. 1,815-1,824.

[3] Again, the disclaimer applies that all quantitative results are based on simplified assumptions. In particular, the tax burden is calculated for an investment in a (digital) asset that generates profits in the future (in this case for-eign profits). We are not able to model the complex interactions of the US tax code after the TCJA that might limit the benefits from the FDII regime. The numbers can thus be interpreted as the extreme (most beneficial) case. As explicitly stated, the assumption is that all beneficial rules will apply. Please refer to the full study (in German) for a detailed discussion of the assumptions.

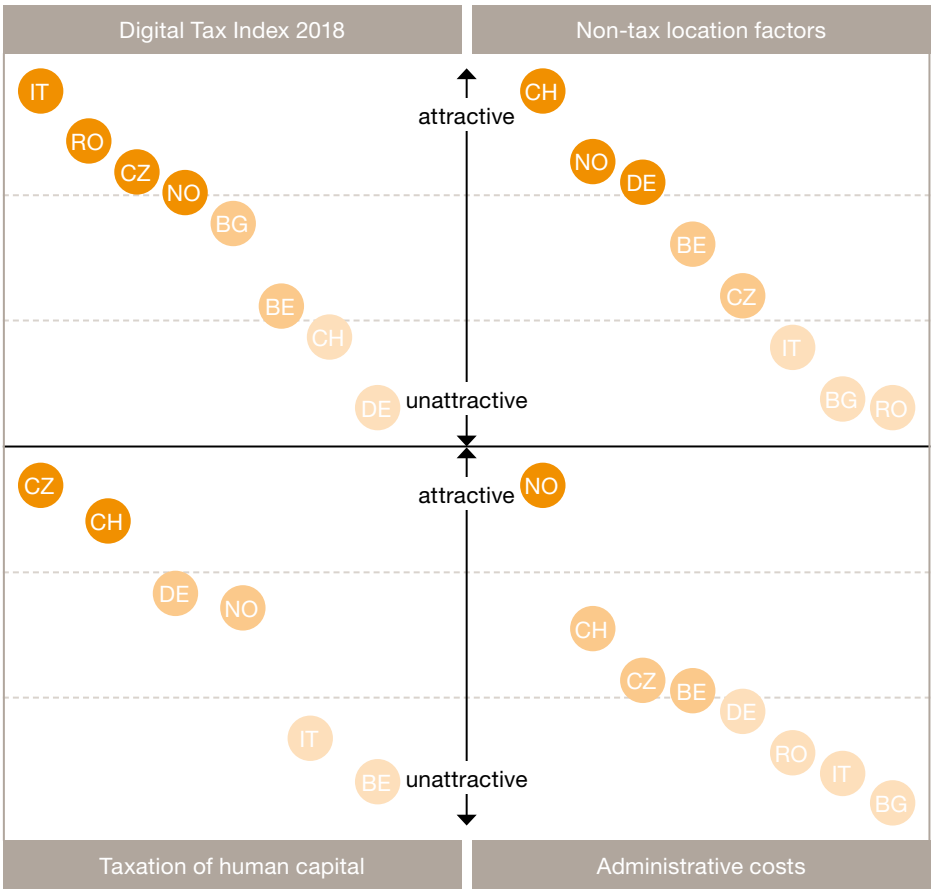
Taxation as an additional location factor for the digitisation of the economy

Many studies consider locational factors for allocating digital business models. Which location factors influence investments in digital business models the most and whether taxes are a relevant decision factor for such investments has not been empirically proven. However, the country comparison of this study illustrates that there are clear differences between the individual factors and locations. The results of this study provide an objective measure for supporting entrepreneurial investment decisions. Direct corporate taxation as a location factor can therefore be compared against other location factors.

The tax attractiveness of the considered countries differs greatly along the factors (Digital Tax Index, human capital, administrative cost). For the selected countries we observe that, with the exception of Italy, there is generally a predominance of good non-tax location conditions for digital business models, while the tax attractiveness of locations varies considerably. Germany shows a low level of tax attractiveness for investments and is characterised by comparatively high administrative costs, although it taxes highly qualified employees at moderate rates in the international comparison. France and Italy are comparatively unattractive locations with regard to the taxation of highly qualified employees. Administrative costs in Italy are also very high and can present a hurdle for smaller companies in particular.

However, this study demonstrates that Italy is the most attractive location for investments in digital business models regarding direct business taxation. With regard to its administrative costs, France is ranked in the upper mid-table and also offers a comparatively high level of tax attractiveness as location for investments. The strongest variation within the various factors can be seen in the United Kingdom. Here, the location tax attractiveness for investments in digital business models is slightly lower than in France and highly qualified employees are relatively heavily taxed. However, with regard to the non-tax location factors and the administrative costs, the United Kingdom continues to emerge the best and positions itself very well in the overall comparison.

Fig. 1 Digital Tax Index and other location factors by comparison



high medium low

The results of the Digital Tax Index refer to the ranking measured by the EATR of the overall Index 2018 (c.f Table 1, column 2). The other three location factors and rankings illustrated here are explained in detail in chapters C 2 regarding non-tax location factors, D 2.5 regarding the taxation of human capital, and D 2.6 regarding the administrative costs. The graphs displays those countries that assume the first and last spot in the respective rankings.

Summary of the major findings

- Existing studies have not considered taxation in assessing the attractiveness of locations in the digital economy. However, the tax burden on companies represents a significant cost factor in the context of investment decisions and, in particular, investments in digital business models.
- Extensive research shows that the relevant tax parameters vary considerably by international comparison. This gives rise to significant differences in the effective tax burden depending on the investment location.
- Overall, this study shows that stylized investments in digital business models are subject to a lower tax burden than traditional business models. This trend has strengthened somewhat in the last year. A decisive factor for the tax attractiveness of a location is the high proportion of current costs, particularly personnel expenses, which can usually be immediately deducted, and favourable rules for the valuation of digital assets. Denmark and Italy stand out, where the generous rules on tax write-offs have a particular impact on the cost of capital.
- Special tax incentives for research, development and innovation also heavily influence the effective tax burden for digital companies. The country-specific provisions for such special regimes and the associated applicability to the activities of digital business models are therefore highly relevant.
- Overall, the tax factors at the parent company's investment location are relevant for international expansion (B2C and B2B). Tax factors in the market countries play a subordinate role and merely moderate the effects.
- Italy appears to be the most tax attractive location due to measures that reduce the tax burden, even though it has a comparatively high statutory tax rate. Countries with traditionally low levels of tax such as Ireland and Hungary, as well as countries with a high level of tax such as Portugal, Spain and France can be seen as the winners in the Digital Tax Index 2018.
- Germany takes the last position among the 33 countries in the Digital Tax Index 2018 and thus shows the least attractive tax environment for digital business models.

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Note
The purpose of this study is to examine and compare relevant tax parameters for standardised investments in digital business models. 33 countries (the current member states of the EU, the USA, Canada, Norway, Switzerland and Japan) are considered in this context, allowing the comparison of various investments in digital business models according to their location.

Calculations are based on a model with simplified assumptions, such that the full complexity of the tax system and the digital business models can only be represented to a limited extent.

The study explicitly does not calculate any effective tax rates according to accounting principles of actual companies, nor does it provide any forecasts of actual tax payments. Instead, it provides isolated indicators such as the cost of capital that measure the attractiveness of particular locations for real investments in asset classes that are typical of digital business models.