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Market ranking of successful digital business models

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Abstract

The transition from industrial to service economy resulted in a wider adoption of asset-light strategies and technology-enabled business models. In the last ten years, digital companies have ascended to the top of the most valuable firms lists. Various aspects of digital business models have been exhaustively discussed in management literature, but their economic dimension remains under-researched.

We analyze how strategy and business model add value and propose using historical volatility of valuation multiples for ranking companies by the degree of investors' understanding of a firm's strategy and business model in addition to ratings of companies by market capitalization. This ranking, in our view, is particularly helpful in analyzing business models of digital companies where most of the value is in intangible assets and economic goodwill. We also propose a way of expanding this research topic in the future.

Keywords: business model, digitalization, innovation, strategy, market capitalization

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Оценка рынком успешных цифровых бизнес-моделей

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Аннотация

Переход от индустриальной экономики к экономике услуг привел к росту популярности стратегий, построенных на нематериальных активах, и бизнес-моделей, основанных на цифровых технологиях. За последние 10 лет цифровые компании возглавили рейтинги самых дорогостоящих фирм. Различные аспекты цифровых бизнес-моделей подробно рассматриваются в научных публикациях, посвященных вопросам менеджмента, однако экономическое измерение бизнес-моделей остается недостаточно изученным.

Мы анализируем роль стратегий и бизнес-моделей в создании стоимости и предлагаем в дополнение к рейтингам компаний по рыночной капитализации использовать историческую волатильность оценочных мультипликаторов. По мнению авторов, такое ранжирование отражает степень «понимания» инвесторами стратегии и бизнес-моделей компании и особенно полезно при анализе бизнес-моделей цифровых компаний, где большая часть стоимости приходится на нематериальные активы и деловую репутацию. Также предлагаются возможные направления будущих исследований.

Ключевые слова: бизнес-модель, цифровизация, инновации, стратегия, рыночная капитализация

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Introduction

The ascent of the digital economy conjures binary thinking, i.e., companies either go digital or go bust. The increasing interconnectedness of the modern economy makes it a global phenomenon. The table 1 below shows the evolution of the global top-10 companies by market capitalizations. It reflects the expected growth potential of the new economy and its leaders. Paraphrasing Tolstoi, today all successful companies are most digital, but not all digital companies are most successful[1] [Denisova, Lopatnikov, 2023].

The industry composition of the top-10 most valuable companies in 2023 brings memories of the Dot-com bubble of the late 1990s. This time, tech companies that provide cloud-based infrastructure and AI capabilities took over from telecom companies that built the Internet backbone.

Over the past 50 years, public companies' market value has been increasingly associated with intangible assets. The share of the intangible assets in balance sheets of firms varies by industry and country, yet the pattern persists. According to Ocean Tomo Intangible Assets Market Value Study, between 1995 and 2020, the share of intangible assets in the market value (IAMV) of S&P500 increased from 68% to 90%[2]. This trend holds for the S&P Europe 350 index as well, albeit to a lesser extent, with an increase from 71% in 2005 to 74% in 2020.

They also found that during Covid-19, the rate of increase of the share of intangible assets in the market value of S&P500 and S&P 350 Europe accelerated. At the same time in China, Japan, and South Korea, Covid-19 has resulted in a decline in the IAMV share in the Shanghai Shenzhen CSI 300, the Nikkei 225, and KOSDAQ Composite Index, respectively. Analyses of IAMV by S&P 500, S&P Europe 350, Shanghai Shenzhen CSI 300, and Nikkei 225 indices are shown in fig. 1–4 below.

The composition of assets in an industry is derivative of companies' strategies and business models.

Companies are legal arrangements for implementing the ideas and visions of their founders. The ideas may or may not be formalized in a strategy statement, but they are the blueprints, DNA that define future successes and failures.

[1] Leo Tolstoy. Anna Karenina. (p. 1). Available at: https://www.litres.ru/book/lev-tolstoy/anna-karenina-23301522/chitat-onlayn/ (accessed 05.05.2023).

[2] Ocean Tomo. Intangible Asset Market Value Study. Available at: https://oceantomo.com/intangible-asset-market-value-study/ (accessed 05.05.2023).

Table 1

Dynamics of development of global companies by market capitalization

Rank	Company	MCAP 01.01.2000	Company	MCAP 01.01.2003	Company	MCAP 01.01.2013	Company	MCAP 01.08.2023
1	Microsoft	606	Microsoft	274	Apple	486	Apple	2.728
2	General Electric	508	General Electric	244	ExxonMobil	396	Microsoft	2.351
3	NTT Docomo	367	Exxon Mobile	235	PetroChina	263	Saudi Aramco	2.261
4	Cisco	352	Walmart	224	Alphabet	237	Alphabet	1.614
5	Walmart	302	Pfizer	189	ICBC	236	Amazon	1.375
6	Intel	280	Citi	178	Walmart	231	Nvidia	1.071
7	Nippon Telegraph	271	Johnson & Johnson	161	China Mobile	231	Berkshire Hathaway	769
8	Nokia	219	BP	152	Microsoft	227	Meta Platforms	729

End of table 1

Rank	Company	MCAP 01.01.2000	Company	MCAP 01.01.2003	Company	MCAP 01.01.2013	Company	MCAP 01.08.2023
9	Pfizer	206	AIG	150	Berkshire Hathaway	227	Tesla	682
10	Deutsche Telekom	197	IBM	132	General Electric	223	Eli Lilly and Company	491

Note: MCAP – market capitalization

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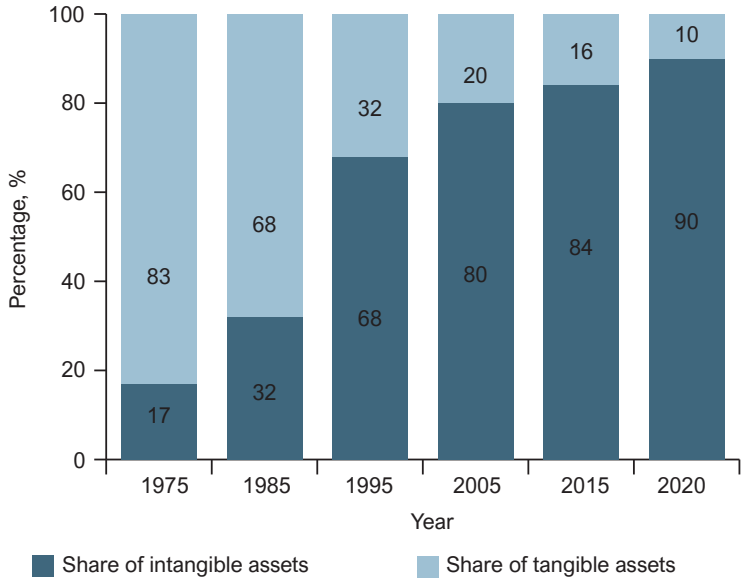
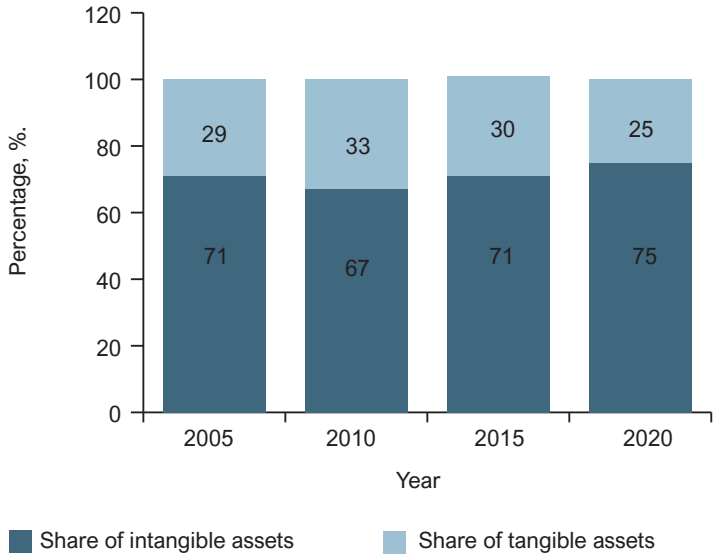


Source[3]

Fig. 1. Components of S&P 500 market value

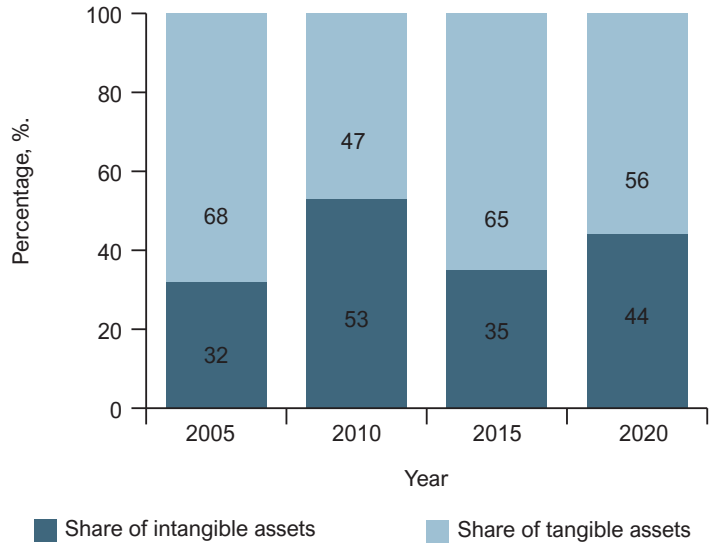


Source[4]

Fig. 2. Components of S&P Europe 350 market value

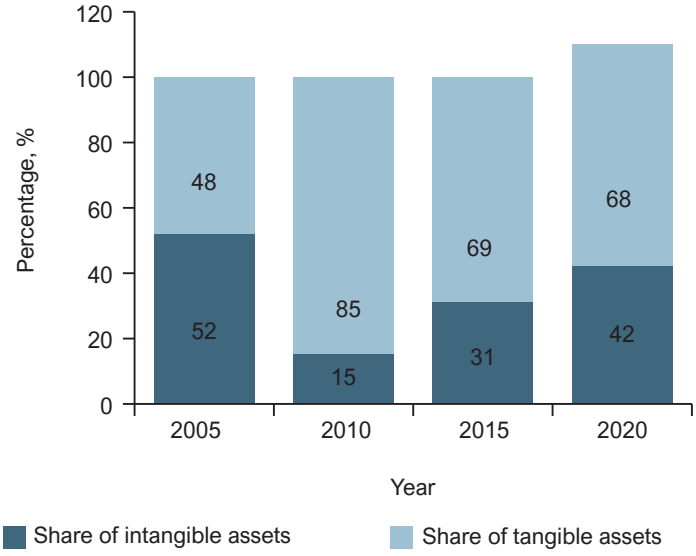
[3] Ibid.

[4] Ibid.



Source[5]

Fig. 3. Components of Shanghai Shenzhen CSI 300 market value



Source[6]

Fig. 4. Components of Nikkei 225 market value

Firms are often viewed as portfolios of jointly operated assets and the term "company DNA" is sometimes used as a shorthand for an organization's culture and strategy – a metaphor for what makes it unique[7] [Moore, 1992]. It also helps to understand what a company can and can't do, and how to fit a changing world. Evolution occurs as DNA modifies itself. The changes in genetic code create new physical attributes that are then tested against the external environment[8]. Some of the new attributes help the host, leading to increased chances of its survival. Some environments are more conducive to growth and consolidate position in the market for firms. Industries are born and mature or become extinct. Firms that cannot adapt fail or get acquired by competitors. Technologies not only enhance existing business models but also give rise to totally new ones – such as search engine-based advertising and many other digitally enabled models [Schiavi, Behr, 2018].

[5] Ibid.

[6] Ibid.

[7] Mark Bonchek (12 December 2016). Harvard Business Review. How to discover your company's DNA. Available at: https://hbr.org/2016/12/how-to-discover-your-companys-dna (accessed 05.05.2023).

[8] Richard Warley (1 June 2016). Forbes. The rise and rise of corporate DNA. Available at: https://www.forbes.com/sites/centurylink/2016/06/01/the-rise-and-rise-of-corporate-dna/?sh=63eee385782b (accessed 07.05.2023).

The rate of change of economic environment accelerates. The average lifespan of the USA S&P 500 company has fallen by 80% in the last 80 years (from 67 to 15 years), and 76% of the UK FTSE 100 companies have disappeared in the last 30 years[9]. BCG estimated that in the past 50 years, the average business model lifespan has fallen from about 15 years to less than 5[10]. That makes business model innovation an essential capability for firms, a way to defend against industry disruption or decline.

Business models have a finite life and companies invest time and effort in business models' innovation, why then we do not see them on companies' balance sheet? There are valuable intangible assets and elements of economic goodwill that were developed with insignificant cost but evolved to have extremely high value. Proverbial examples of economic importance of visionary revelations range from the idea for Southwest Airlines, the world's most successful budget airline, to the sketch of Uber business model and counting[11].

At the beginning, a startup, even one that will later become a trillion-dollar company, is a strategy, a business model and an insatiable energy of the founders. Yet the company's balance sheet will not have accounting entries for them. By the time a company's business gains ground, strategy and business model will have become a part of other assets of the firm, such as a brand, or its economic goodwill. We give an illustration in fig. 5. As a result, at no point markets can see or measure them, while recognizing their importance.

Market capitalization is considered the best measure of the value strategies and business models created for shareholders. Tech industry dominates the top-10 of most valuable companies in 2023, with an ecosystem as a core strategy and platform as the business model of choice. The recent phenomenon is the emergence of trillion-dollar companies, all of which except Saudi Aramco are digital.

[9] Alex Hill, Liz Mellon, Jules Goddard (27 September 2018). Harvard business review. How winning organizations last 100 years. Available at: https://hbr.org/2018/09/how-winning-organizations-last-100-years (accessed 07.05.2023).

[10] Boston Consulting Group. Business model innovation. Available at: https://www.bcg.com/capabilities/innovation-strategy-delivery/business-model-innovation (accessed 07.05.2023).

[11] The Guardian. The big ideas that started on a napkin – from Reaganomics to Shark Week. Available at: https://www.theguardian.com/us-news/shortcuts/2017/apr/10/napkin-ideas-mri-reaganomics-shark-week (accessed 08.05.2023).

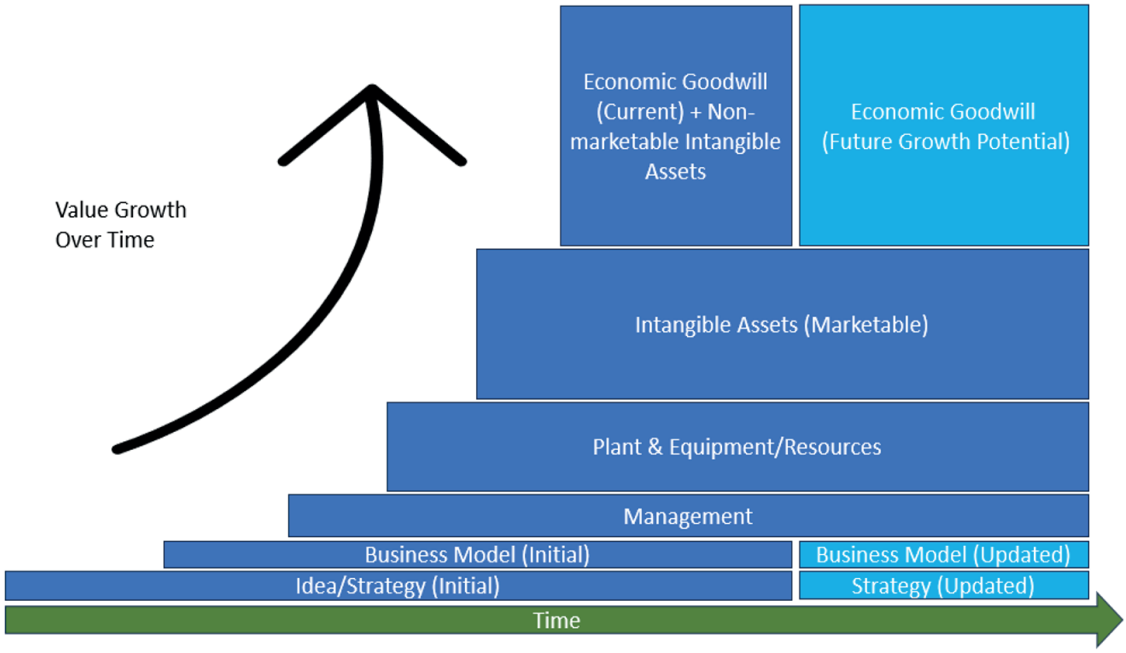


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Fig. 5. The concept of a business model in the company's ecosystem.

The market capitalization of the top-3 companies (Exxon Mobil, PetroChina and Walmart) ranged USD 200–300 billion in 2009, the valuation of the top-3 tech companies of 2023 (Apple, Microsoft, and Google) is an order of magnitude higher, or USD 1.000–3.000 billion.

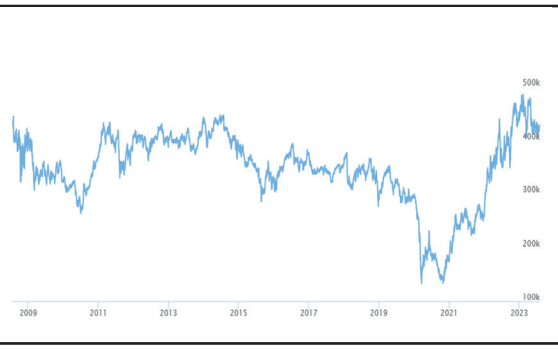
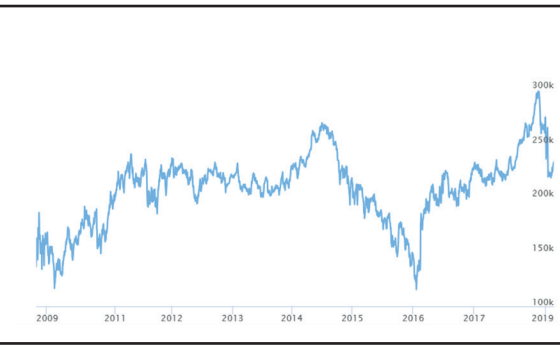
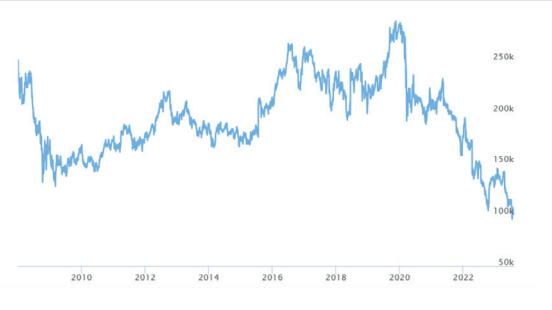
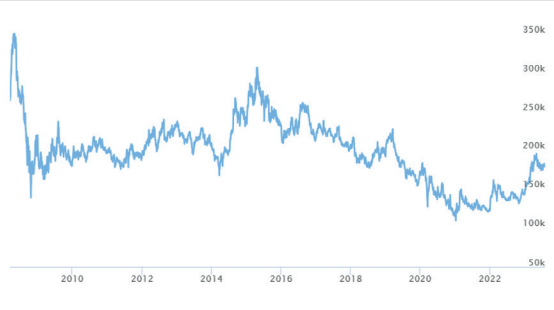
All top-10 companies operate globally. Exuberant expectations about the unlimited demand in China of the early 2000s, that underpinned high valuations of China Mobile or ICBC, subsided as China's Gross Domestic Product (GPD) growth rates first reached the plateau and then began declining.

The market leaders that dominated the most valuable companies lists ten years ago continue doing well in 2023, all gained in market capitalization, except for AT&T and China Mobile. However, the growth rates of their market valuations varied significantly among companies and industries, as can be seen from the charts in table 2.

Despite the declining market valuation China Mobile remains the largest telecommunication company in the world in 2023, same as it was in 2009, and AT&T remains the biggest telecom company in the USA. Many years leader in an industry would be expected to have a good strategy and an efficient business model. The fact the industries mature with time makes it impossible for even the best companies to grow faster than the industry in the longer run.

Table 2

The growth rate of the market valuation in the most valuable companies

Field of activity	Company name	
	The Procter & Gamble Company (PG)	Johnson & Johnson (JNJ)
Diversified consumer services		
	Exxon Mobil Corporation (XOM)	Royal Dutch Shell plc (OLN9)
Oil and gas extraction		
	AT&T Inc. (T)	China Mobile Limited (941)
Telecom		

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To overcome the limits to growth of a traditional telecom industry, AT&T entered new sectors, not typical for a telecommunication company of the 20th century. After its USD 85 billion acquisition of Time Warner, its portfolio of business models includes media. However, markets were less enthusiastic; some commentators calling it "...strategic miscalculation unrivaled in recent corporate history"[12].

Energy companies like Exxon Mobil and Shell also have limits to growth in their traditional niches. They increased the levels of digitalization of their operations and logistics, but that did not change the business models they used for decades. The growth opportunities for energy or mining companies are limited by the resources they can control. A more recent limiting factor is markets' reassessment of the climate agenda. Resource companies struggle to redesign their strategies and business models while markets are no longer sure about their longer-term prospects.

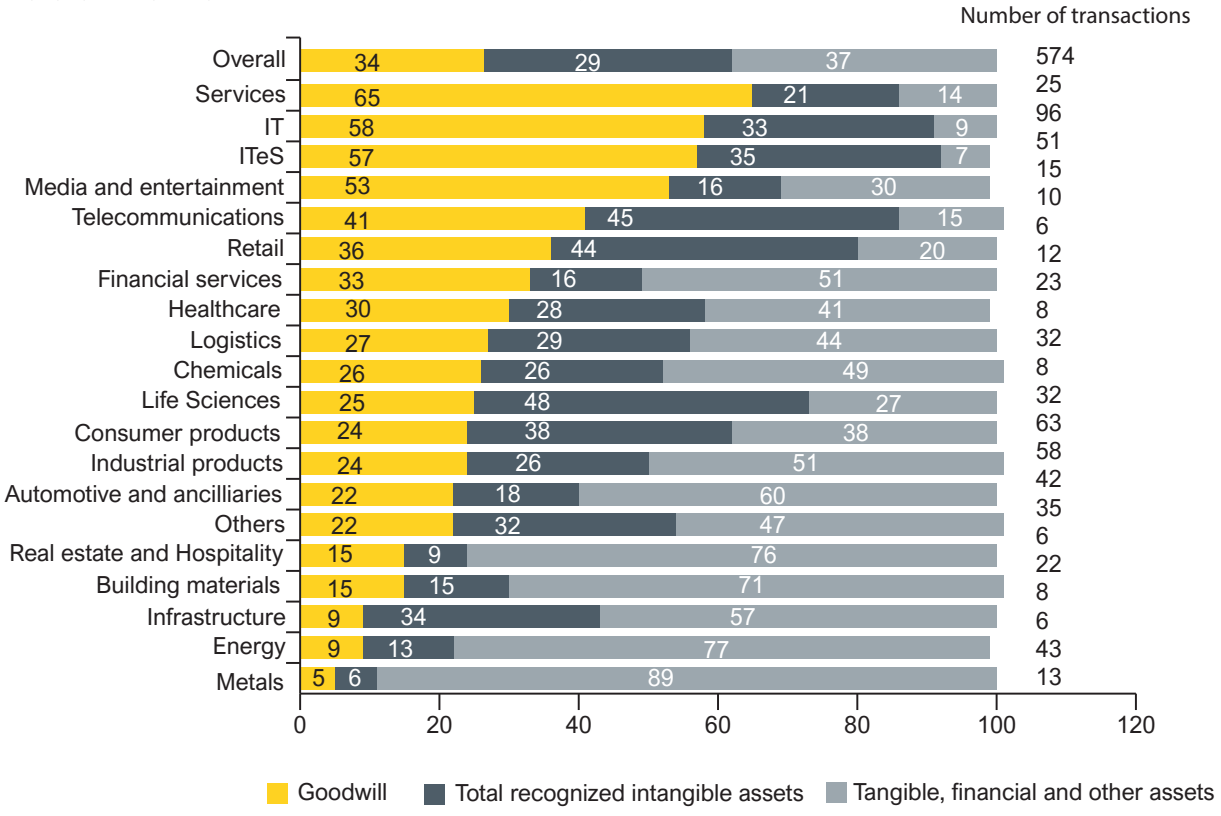
Accounting treatment of strategies and business models

Sectors where companies are built around intangible assets have higher market valuations. Statistics of purchase price allocations reported by Ernst&Young Global Limited (EY) show that over half, or about 58% of the purchase price in recent IT transactions and 57% in Information Technology Enabled Services (ITeS) transactions were attributed to goodwill[13]. In this case it is accounting goodwill that may have included overpayment and buyer-specific synergies. Identifiable intangible assets accounted for 33% and 35% of the total purchase price, respectively (fig. 6).

[12] James Stewart (19 November 2022). The New York Times. Was this $100 billion deal the worst merger ever? Available at: https://www.nytimes.com/2022/11/19/business/media/att-time-warner-deal.html (accessed 10.05.2023).

[13] Ernst&Young Global Limited. EY purchase price allocation study: can recognizing intangibles add value? Available at: https://www.ey.com/en_in/strategy-transactions/ey-purchase-price-allocation-study-how-recognizing-the-intangibles-can-add-value (accessed 10.05.2023).

[14] Ibid.



*Tangible, financial, and other assets for financial services are higher due to higher composition of financial assets (i.e. loans and advances)
Note 1: the above numbers are average and should not be considered as a benchmark for the sector, as allocation of assets and goodwill may vary significantly based on transaction-specific facts
Note 2: sectors with less than five transactions are categorized under "Others"
Note 3: average goodwill is after considering adjustment for capital reserves

Source[14]

Fig. 6. The ratio of business reputation and assets by industry structure of the economy.

Customer-related intangibles were concluded to be the acquisition driver in IT and ITeS sectors. However, the above allocations do not mention any strategy or business model assets.

Textbooks define asset is a durable good that can only be partially consumed or used as a factor of production and still retain value in the next period. Because it represents a stock of future benefits, an asset can be regarded as a store of value. The International Accounting Standards Board (the IASB) defines an asset as: "A present economic resource controlled by the entity as a result of past events"[15].

Accounting standards do not recognize strategy or business models as intangible assets because they do not meet the identifiability criteria[16]. This is not different from the way workforce asset is treated under International Financial Reporting Standards (the IFRS) or other generally accepted accounting principles (GAAP) where it is considered part of goodwill. The relevance of the business model for analyzing the performance of a firm is recognized in GAAP[17].

According to Vijay Govindarajan et al, "the building blocks for a modern company are investments in research and development (R&D), branding, customer relationships, computerized data and software, and human capital. The economic purpose of these intangible investments is no different from that of an industrial company's factories and buildings. Yet these intangible investments are treated as expenses in calculation of profits, and not as assets"[18]. To address it tech firms often present non-GAAP numbers by adding back intangible expenses. Examples include Vonage metric of "pre-marketing operating income" and Groupon's "adjusted consolidated segment operating income" that excluded marketing costs, considering them investments, not expenses[19,20].

Protecting business models by patenting

Could strategy and business model assets meet identifiability criteria if legally protected by patent laws? In 2018 the UK Financial Reporting Council published an update on its research initiative to improve corporate reporting practices. Their goal was to propose a comprehensive strategic report which seek to explore the areas of most interest to investors and consider where companies face challenges in deciding what disclosures to make and how best to present them. Their "Business model reporting" project (October 2017) showed that business model disclosures were a key starting point for investors when trying to understand how a company gains money and why that is sustainable over the longer-term. Investors desire information that is sufficiently broad to give them a good understanding of the overall business and in enough detail that it begins to provide evidence of the performance and position of the company in the context of its business model.

On the other hand, companies constantly monitor market trends and benchmark the performance of competitors. To the extent possible and practical, they are looking to protect valuable assets and know-how. In an information economy entire business models can be embedded in digital code, intensifying attempts to use patents as competitive weapons[21]. However, the practice of patenting business models is diverse, often mixing business models and business methods. According to the United States Patent and Trademark Office (USPTO), a business model is a general vision or strategy, whereas a business method is a specific way of doing business. Despite confusing explanatory language used by USPTO (that combines business models and business methods) apparently only business methods are potentially patentable at present. Among famous examples, Amazon's one click shopping method patented in 1999 that expired in 2017[22]. The patent helped Amazon to roll out the

[15] IFRS. IAS 38 Intangible assets. Available at: https://www.researchgate.net/profile/Paul-Louangrath/post/How-can-Cost-Driver-be-identified-beside-brain-storming-methodology/attachment/59d63904c49f478072ea5c1a/AS%3A273708906680354%401442268696960/download/IAS38-English.pdf#:~:text=An%20asset%20is%20identifiable%20if,from%20other%20rights%20and%20obligations (accessed 12.05.2023).

[16] Ibid.

[17] ACCA. Using the business model of a company to help analyse its performance. Available at: https://www.accaglobal.com/gb/en/student/exam-support-resources/professional-exams-study-resources/strategic-business-reporting/technical-articles/business-model.html (accessed 12.05.2023).

[18] Vijay Govindarajan et al. (4 May 2021). Mind the GAAP. Available at: https://hbr.org/2021/05/mind-the-gaap (accessed 12.05.2023).

[19] Vonage. Press release issued by Vonage holdings corp. on February 25, 2010. Available at: https://www.sec.gov/Archives/edgar/data/1272830/000119312510039779/dex991.htm (accessed 14.05.2023).

[20] The New York Times. Michael J. de la Merced (2 June 2011). The Groupon I.P.O.: What is adjusted CSOI? Available at: https://archive.nytimes.com/dealbook.nytimes.com/2011/06/02/the-groupon-i-p-o-what-is-adjusted-csoi/ (accessed 14.05.2023).

[21] Andrea Ovans (July-August 2000). Can You Patent Your Business Model? Available at: https://hbr.org/2000/07/can-you-patent-your-business-model (accessed 16.05.2023).

[22] Knowledge at Wharton. Why Amazon's "1-Click" Ordering Was a Game changer. Available at: https://knowledge.wharton.upenn.edu/podcast/knowledge-at-wharton-podcast/amazons-1-click-goes-off-patent/ (accessed 16.05.2023).

marketplace business model and allowed Amazon to create a strong and advantageous position in the market.

Netflix has been filing patent applications from its initial years of DVD renting. In 2003 Netflix has received a U.S. patent covering the methods it uses to log customer requests and track checked-out movies[23,24]. The patent covers Netflix's entire process of renting out movies and extends to music, video games, and books. It gave Netflix intellectual property protection over the technology at the core of its business, including the way that a customer sets up his or her rental list and the way the company sends the DVDs. Netflix patent portfolio has been steadily growing ever since. The structure and number of patents obtained are shown in fig. 7.

Patenting practices vary in different countries. It is very rare to get patent protection for a business method in the UK, Europe. According to the Indian Patent laws, a mathematical or business method or a computer program per se or algorithms are not inventions, hence not patentable[26]. The US is one of the few nations where a business method can be patented based on criteria similar to conditions of any other patent application. A U.S. patent provides a range of possibilities, not only for business methods, but also for software which is also largely excluded for patent protection in the UK and Europe[27]. In order to qualify for patentability, a method must be novel, useful, and perform a particular practical function. An abstract concept, for example, a theory, cannot be patented. The concept must be industrially applicable, and the patent specification must detail at least one way of reducing the invention to a practical working model. The invention must also be "non-obvious" – it cannot be a simple and straightforward step-up, improvement or enhancement of an idea, method which already exists. It must be "inventive".

At the peak of dot.com bubble USPTO reported a rush to patent business methods after the court opinion on State Street Bank Corporation versus Signature Financial, which definitively stated that software that governs business methods can be patented as long as it produces some concrete, useful, and tangible result. That ruling made companies much more aware that they could patent software-based business methods. At the same time, there's been a general rise in software patents of all types, fueled in part by the burst of innovation generated by the Internet. That said, USPTO issued about 161.000 patents in 1999, including only 600 software-related business methods.

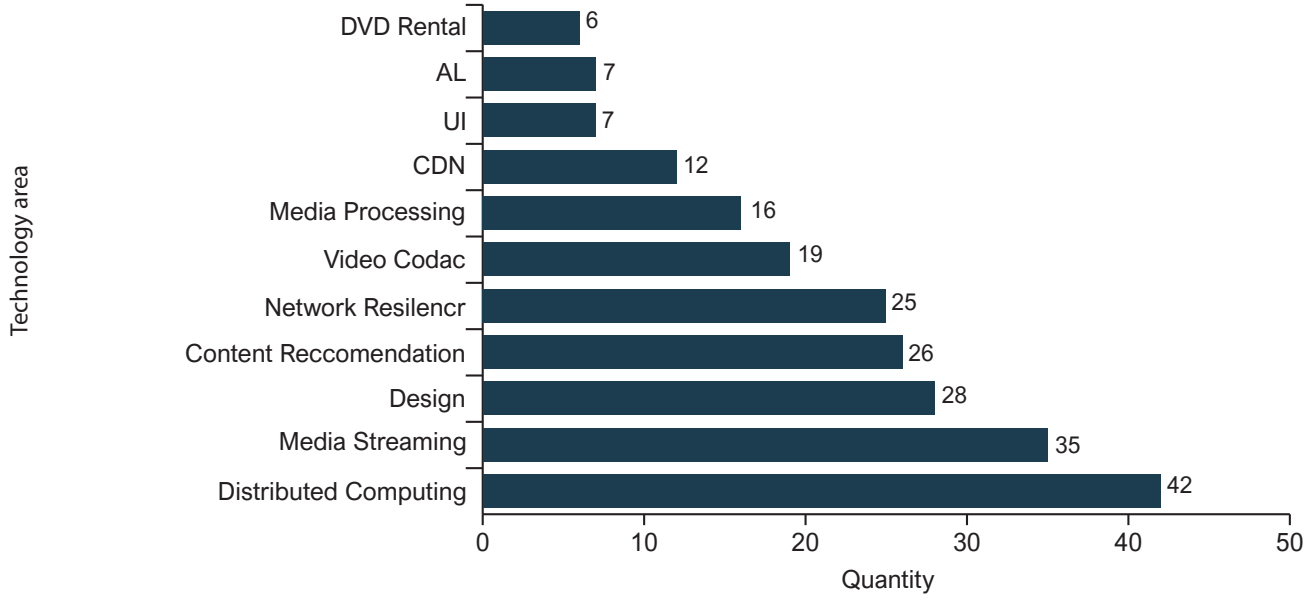
[23] Los Angeles Times. Netflix Wins Patent for Online DVD Rentals. Available at: https://www.latimes.com/archives/la-xpm-2003-jun-25-fi-netflix25-story.html (accessed 18.05.2023).

[24] Insights by Oreyb. What is inside Netflix's Patents? Available at: https://insights.greyb.com/netflix-patents-portfolio/ (accessed 14.05.2023).

[25] Ibid.

[26] India Filings. Patent for Business Idea in India. Available at: https://www.indiafilings.com/learn/patent-for-business-idea-in-india/#:~:text=As%20per%20the%20Indian%20Patent%20laws%2C%20a%20mathematical,in%20any%20form%20are%20not%20patentable%20subject%20matter (accessed 20.05.2023).

[27] Adrian Hocking (29 August 2013). Albright IP. Patenting a business method. Available at: https://www.albright-ip.co.uk/2013/08/patenting-a-business-method/ (accessed 21.05.2023).



Source[25]

Fig. 7. Netflix's patents by technology

The most common class for business model applications is financial data processing. Under this class, only computer-related processes involving finance, business practices, management or price determination are eligible. However, there are other classifications for business model patent applications which can qualify, including education, gaming, and agriculture.

The difficulty of legally protecting business models makes them similar to know-hows with first-mover advantage as a critically important competitive tool for digital companies. In many situation technology patents can offer opportunities for developing new business models[28]. At the same time, it is important to remember about the risks that new technology-based business models may not be well understood and appreciated by the wider market.

A framework for analyzing investor preferences in relation to business models

Whatever the attribution on a balance sheet, the future economic benefits of a successful strategy and accompanying business model are valuable to the party that controls it. Institutional investors own 60–85% of the leading IT and ITeS companies, which means their plans and performance are extensively and thoroughly studied by thousands of analysts.

Companies disclose and explain their strategies and their business models to their partners and investors; however, the descriptions they provide are typically sketchy and leave room for interpretation. Similar to know-hows they leave some important elements hidden. Learning the basic mechanics of how Amazon or Google work does not guarantee one truly understands their business models let alone can replicate their success.

Approaches to analyzing strategies and business models have been extensively discussed in management literature from Porter to Osterwalder. However, they are mostly descriptive, focused primarily on taxonomies of business models and definitions of components of business models. At the same time such approaches do not address the issue of how well markets understand strategies and business models. A comprehensive framework for analyzing business models was developed by Weill et al. [Weill et al., 2006]. They proposed 14 detailed archetypes of business models (table 3).

The framework was used to classify the business models of all 10,970 publicly traded firms in the USA from 1998 through 2002. Using Compustat data, the authors documented the distribution of business models in the USA economy and analyzed the firms' financial performance in three categories: market value, profitability, and operating efficiency. They found that some business models are much more common than others and the most common business model for large U.S. firms involves making and selling ownership of physical assets (i.e., manufacturers). While no one model was found to outperform others in all dimensions, some models have better financial performance than others.

Specifically, Physical Creators (Manufacturers in author's taxonomy) and Physical Landlords have greater cash flow on assets, and Intellectual Landlords have poorer Tobin's q, than Physical Distributors (Wholesaler/Retailers). Peter Weill et al. demonstrated that the stock market consistently values certain types of business models more highly than others[29]. Investors prefer business models based on innovation and intellectual property, including models based on licensing intellectual property (such as Walt Disney's business model) and highly innovative manufacturing (such as Apple's).

[28] Murgitroyd. Using patents to establish alternative business models, built around licensing. Available at: https://www.murgitroyd.com/blog/using-patents-to-establish-alternative-business-models-built-around-licensing/ (accessed 21.05.2023).

[29] Peter Weill, Thomas W. Malone, Thomas G. Apel (22 June 2011). The Business Models Investors Prefer. Available at: https://sloanreview.mit.edu/article/the-business-models-investors-prefer/ (accessed 23.05.2023).

Table 3

A framework for analyzing business models

Basic business model archetype	Type of asset			
	Financial	Physical	Intangible	Human
Creator	Entrepreneur	Manufacturer	Inventor	–
Distributor	Financial Trader	Wholesaler/ Retailer	Intellectual property trader	–
Landlord	Financial Landlord	Physical Landlord	Intellectual Landlord	Contractor
Broker	Financial Broker	Physical Broker	Intellectual property broker	Human Resources Broker

Source: [Weill et al., 2006]

Ranking of business models

Expanding the research or Weill et al., we propose a way of ranking digital companies using volatility of their value multiples as a measure of the level of the market understanding of their strategies and business models. We did not include Apple because its book value and market valuations have been impacted by particularly large-scale share buyback programs in previous years[30].

We considered three multiples most often used for market analysis for digital companies, i.e. P/S (with little or sometimes negative net debt on the balance sheets of digital companies P/S is less noisy than EV/IC multiple), EV/EBITDA and Price/Book multiples.

Even though the consensus view is that Price/Book is not of relevance for the digital industry, we added it because the multiple has a more intuitive and straightforward decomposition into main drivers and key ingredients of a successful strategy, i.e. excess returns, or capital efficiency (RoE), growth (g) and risk (CoE). The financial indicator P/B is calculated according to the following formula (1):

$$\frac{P}{B} = \frac{(RoE - g)}{(CoE - g)} \quad (1)$$

[30] Apple Insider. Malcom Owen (4 May 2023). Apple extends share buybacks by another $90 billion. Available at: https://appleinsider.com/articles/23/05/04/apple-extends-share-buybacks-by-another-90b (accessed 23.05.2023).

The table 4 shows the valuation multiples for 2013 and 2023.

Our analysis did not include consideration of the valuation dynamics of the selected tech companies. We however noted that average multiples doubled for the period and that coefficient of variation of the revenue and book value multiples widened in 2023, whereas it narrowed marginally for EBITDA multiple. This was in part a result of the increase in market valuations of Nvidia, Microsoft and Adobe. Paypal was the only company for which both revenue and EBITDA multiples decreased significantly over the period.

The level of market understanding of the strategies and business models was deemed reflective of the volatility of these multiples. With consideration of the typical lifetime of a strategy or business model of 5–10 years, we looked at the variability of the multiples over the period 2013–2023. The total score used to rank companies was the average of the rankings for individual multiples (table 5).

Being driven by the same factors (i.e. share price, volatility of stock price), the multiples are correlated. Considering the most often used definition of a business model as a description of how business is gaining money, we believe the revenue-based multiple could have higher relevance of ranking. However, this inference needs to be tested using representative sets of data. For now, we used the average of the three ranks, indicated by respective multiples.

Table 4

Comparison of large digital companies' valuation multiples in 2013–2023

Company name	Valuation multiples for 2013				Valuation multiples for 2023			
	P/S	EV/EBITDA	P/B	P/E	P/S	EV/EBITDA	P/B	P/E
Google	5.22	14.11	3.65	24.47	5.57	16.98	6.12	27.44
Intel	2.02	4.5	2.12	10.25	2.54	18.69	1.36	-141.88
IBM	2.27	9.68	12.64	14.84	2.14	13.44	5.87	60.55
Amazon	1.98	40.44	14.77	-2.961.00	2.55	24.25	8.47	109.45
Cisco	2.41	6.21	2.13	13.65	3.94	11.93	5.05	17.93
Netflix	2.94	107.71	14.13	642.74	5.61	32.79	8.18	44.85
Microsoft	3.29	6.43	3.3	15.72	11.10	23.43	11.75	33.68
Adobe	4.54	12.19	2.96	23.99	12.57	33.58	15.62	48.47
PayPal	4.40*	18.35	2.97	35.04	2.28	12.46	3.45	17.16
Nvidia	1.88	5.24	1.64	15.5	41.38	180.85	45.05	233.14

Note: * the earliest data for Paypal is 2015

Complied by the authors on the materials of the study

Table 5

Ranking of digital companies by multipliers' indicators in the period 2013-2023

Company	Rank	Score (average rank of the 3 multiples)	Valuation multiples for the period 2013-2023 (quarterly)					
			EV/EBITDA		P/B		P/S	
			CV	Rank	CV	Rank	CV	Rank
Google	1	1.33	0.16	2	0.22	1	0.16	1
IBM	2	2.33	0.10	1	0.30	3	0.13	3
Intel	3	3.33	0.36	6	0.25	2	0.19	2
Amazon	4	3.67	0.24	3	0.31	4	0.30	4
Cisco	5	4.67	0.26	4	0.39	5	0.21	5
Adobe	6	6.33	0.27	5	0.49	7	0.34	7
Netflix	7	6.67	0.50	8	0.41	6	0.36	6
Microsoft	8	7.67	0.37	7	0.44	8	0.42	8
PayPal	9	9.00	0.79	9	0.58	9	0.79	9
Nvidia	10	10.00	0.92	10	0.75	10	0.78	10

Note: CV – coefficient of variation

Complied by the authors on the materials of the study

Discussion of results

The rankings can be analyzed with consideration of segment reporting of the companies. It helps understand the relative importance of the business models they use. Large companies, like the ones selected for the test, usually have more than one line of business, hence more than one business model and marketing strategy. As the competitive landscape of the digital industries is rapidly changing alongside the changes in the disruptive technologies, strategies and business models of the leading firms also change. Examples of the business models' expansions by following companies should be considered in detail[31].

1. Amazon began as an online consumer (B2C) store and extended its solution focus to consumer goods (Echo Dot, Fire Tablet) and new web services (Prime Video) to consumers while broadening its services and reach to businesses such as amazonbusiness.com, Amazon Web Services (AWS) and Amazon Advertising. With its 2016 Whole Foods acquisition and more recent Amazon Go retail concept, Amazon stepped well out of its web-centric worldview.

2. Google leveraged search into content (news, videos) and has entered new markets like smart speaker (Home), laptops (Pixelbook), smartphones (Pixel), interactive whiteboards (Jambox) and virtual reality (Stadia) among others. Like Amazon and Microsoft, Google developed and grew a business-productivity suite (G Suite) and a cloud platform (Google Cloud) business.

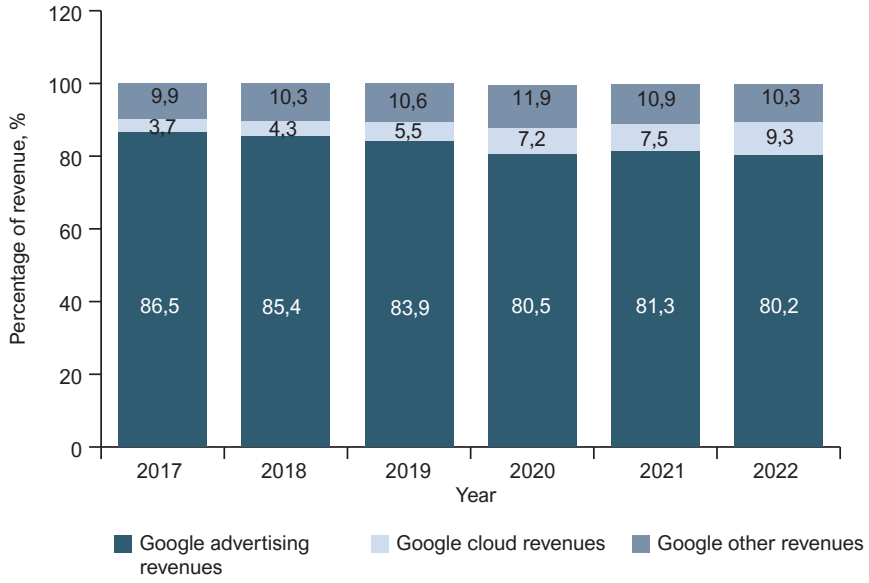
3. Microsoft transitioned from selling software stored on physical media (CD-ROMs, floppy disks) to delivering software via the web (SaaS, PaaS and IaaS). The company extended and grew its cloud capabilities with Azure (cloud platform), LinkedIn (SaaS), Bing Search, and introduced gaming (Xbox) and computer devices (Surface), growing both its business and consumer franchises.

Despite the changes, some companies still earn most revenue using their core business models, which market became used and which they understand better. The breakthrough in AI technologies did not change the fact that Google is still predominately an advertising business backed by its market leading search engine with 93.12% global market share[32]. Intel remains a dominant player

[31] Michael Gurau (20 April 2020). Forbes. How three of the biggest tech companies moved out of their conventional lanes. Available at: https://www.forbes.com/sites/forbestechcouncil/2020/04/20/how-three-of-the-biggest-tech-companies-moved-out-of-their-conventional-lanes/?sh=377fb4ed8f9d (accessed 25.05.2023).

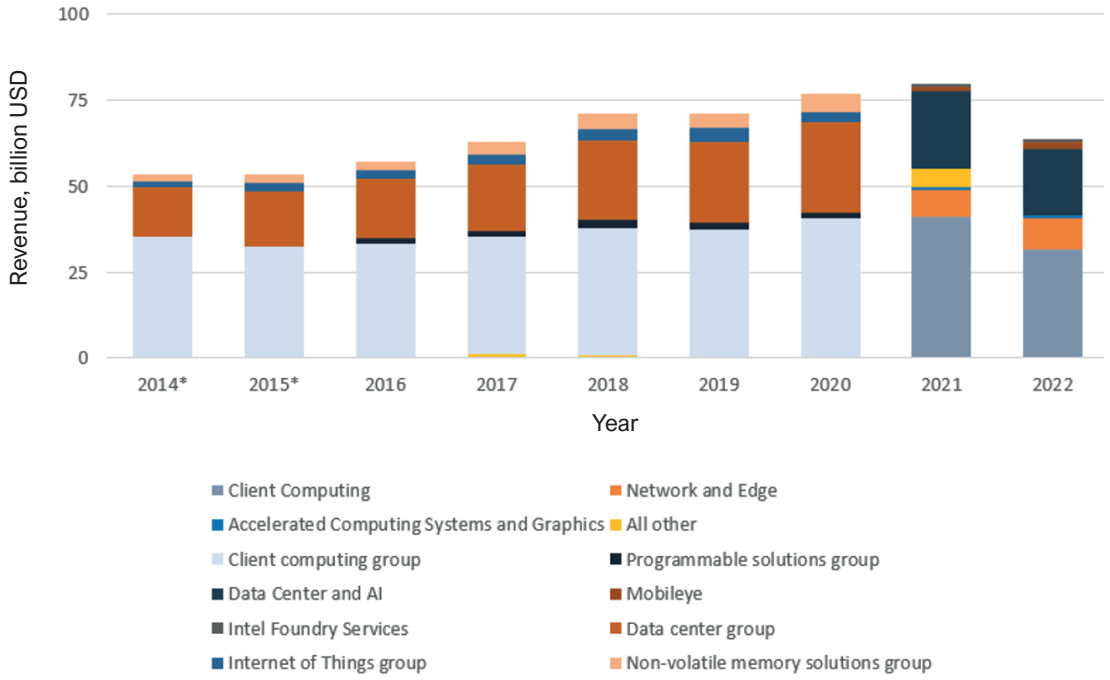
[32] Oberlo. Search engine market share in 2023. Available at: https://www.oberlo.com/statistics/search-engine-market-share#:~:text=Handling%20over%2090%25%20of%20all,done%20through%20the%20internet%20giant. (accessed 25.05.2023).

in x86 computer processors with 62.7% market share. In order to illustrate the relative importance of different business models used by companies, we presented a comparative analysis of six large technology companies based on their segment reporting. The data is shown in fig. 8–13.



Compiled by the authors on market data from Statista[33]

Fig.8. Distribution of Google segment revenues from 2017 to 2022

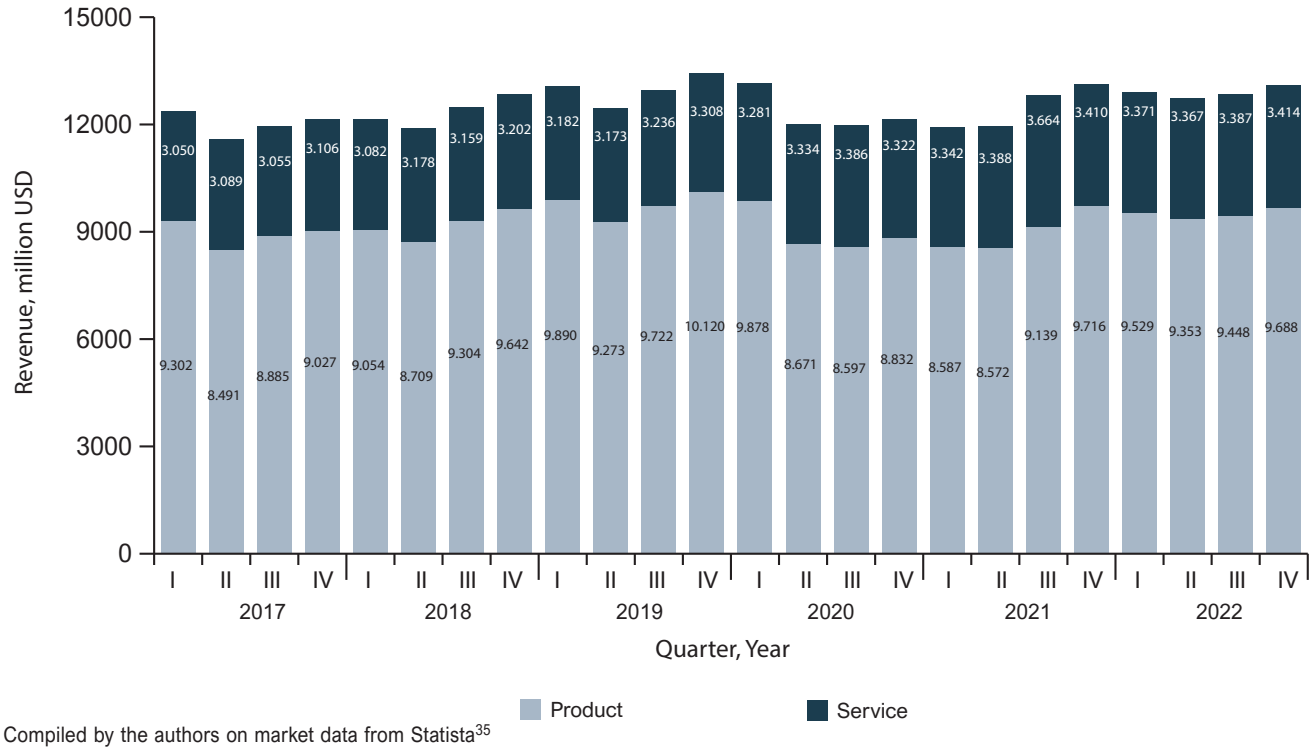


Compiled by the authors on market data from Statista[34]

Fig.9. Intel revenue from 2014 to 2022 by segment

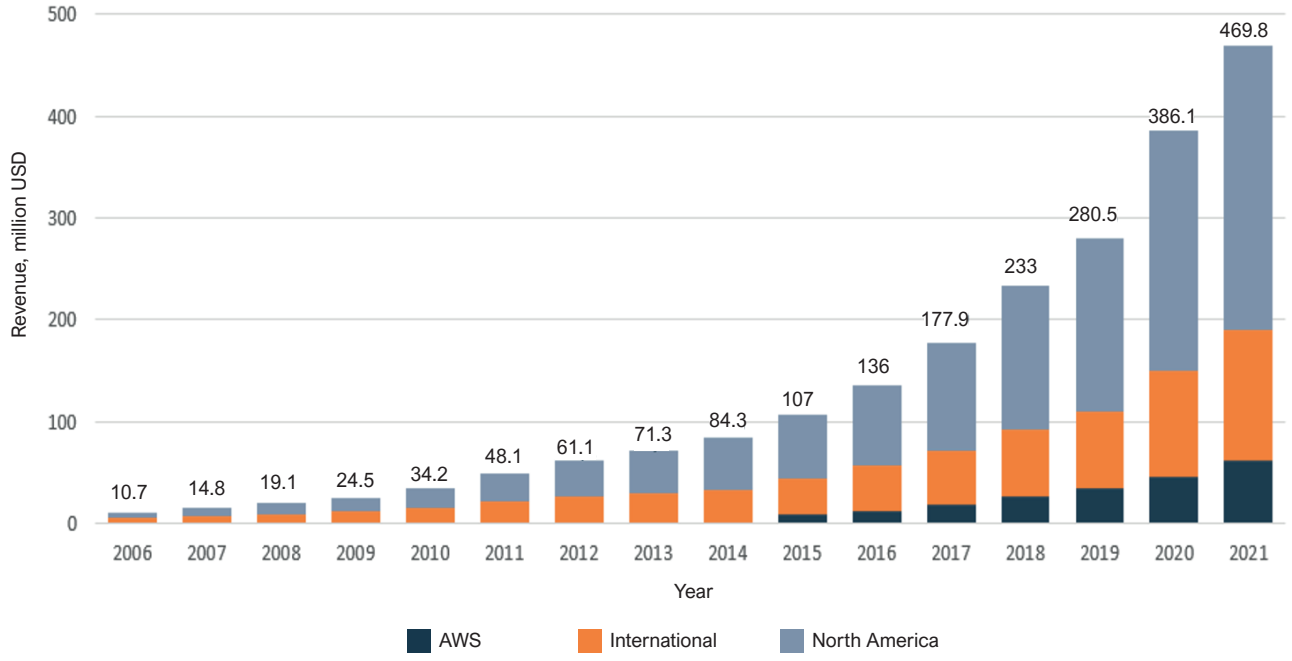
[33] Statista. Distribution of Google segment revenues from 2017 to 2022. Available at: https://www.statista.com/statistics/1093781/distribution-of-googles-revenues-by-segment/ (accessed 25.05.2023).

[34] Statista. Intel revenue from 2014 to 2022 by segment. Available at: https://www.statista.com/statistics/495928/net-revenue-of-intel-by-segment/ (accessed 25.05.2023).



Compiled by the authors on market data from Statista[35]

Fig.10. Cisco's quarterly revenue by segment



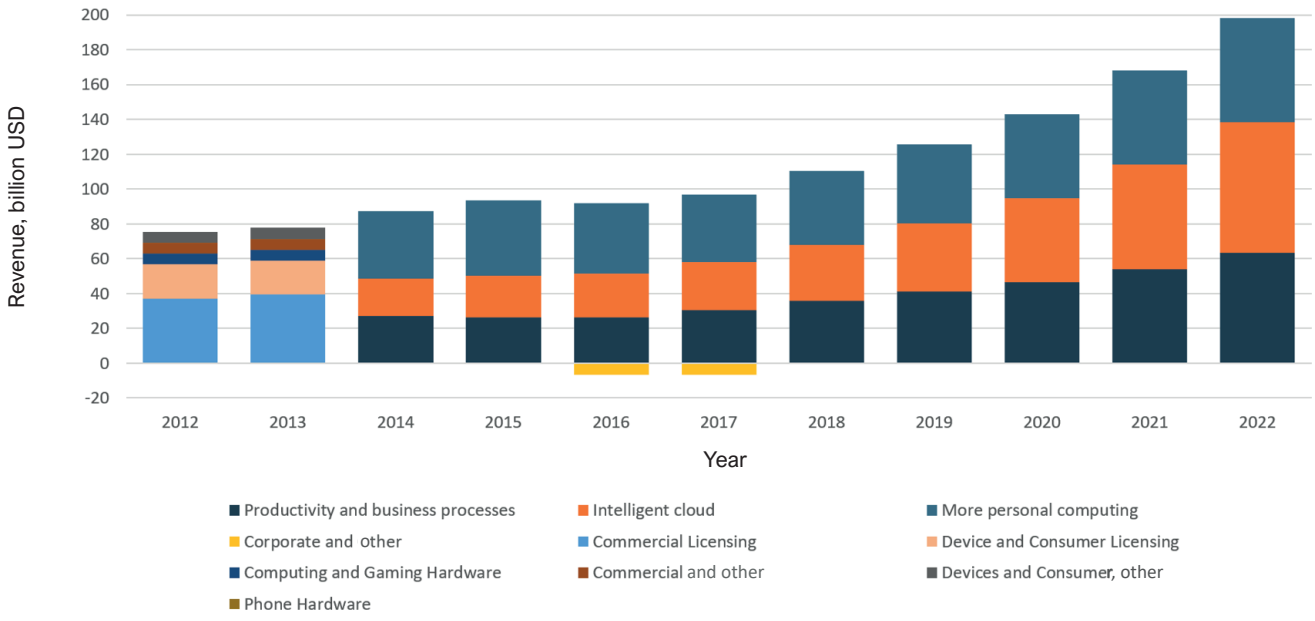
Note: AWS – Amazon Web Services

Compiled by the authors on market data from Statista[36]

Fig.11. Amazon annual revenue by segment (by fiscal year)

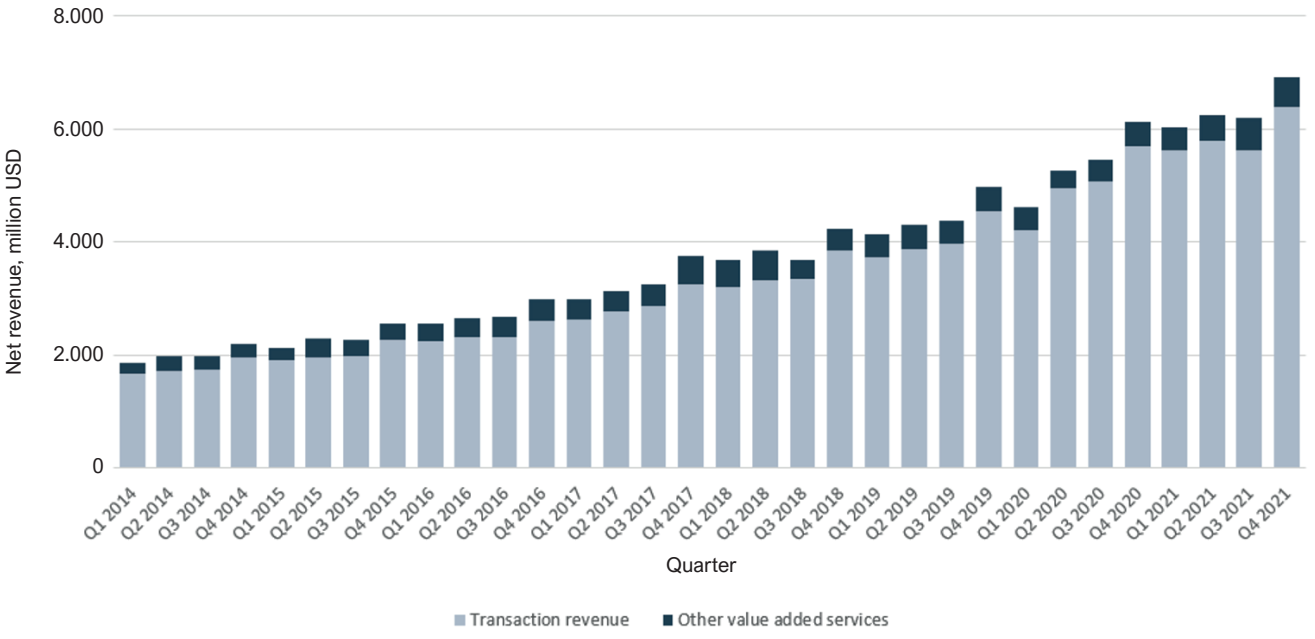
[35] Statista. Cisco's Quarterly Revenue. Available at: https://www.statista.com/search/?q=Cisco%27s+Quarterly+Revenue+&p=1 (accessed 27.05.2023).

[36] Statista. Amazon Annual Revenue. Available at: https://www.statista.com/search/?q=Amazon+Annual+Revenue+&p=2&sortMethod=idrelevance&interval=2%2C2021 (accessed 26.05.2023).



Compiled by the authors on market data from Statista[37]

Fig.12. Microsoft's revenue from 2012 to 2022 financial years by segment



Compiled by the authors on market data from Statista[38]

Fig.13. PayPal's net revenue from 1st quarter 2014 to 4th quarter 2021 by segment

[37] Statista. Microsoft's revenue from 2012 to 2022. Available at: https://www.statista.com/search/?q=Microsoft%27s+revenue+from+2012+to+2022+&p=1&sortMethod=idrelevance&interval=2%2C2022&tabGroup=statistic (accessed 27.05.2023).

[38] Statista. PayPal's net revenue from 1st quarter 2014 to 4th quarter 2021 by segment. Available at: https://www.statista.com/statistics/422014/paypals-net-revenue-per-quarter-channel/ (accessed 27.05.2023).

Table 6

Amazon revenue in the second quarter of 2023 by product and service categories

Amazon's segments						
Online Stores	**3P Services***	**AWS**	**Advertising**	**Subscriptions**	**Physical Stores**	**Other**
USD 53.0 billion	USD 32.3 billion	USD 22.1 billion	USD 10.7 billion	USD 9.9 billion	USD 5.0 billion	USD 1.3 billion

Note: *including commissions and related shipping and fulfillment fees as well as other third-party seller services

Source[39]

The successful development of Amazon Web Services (AWS) supported the valuation of Amazon, but it also made the assessment of its strategy and business models more difficult for investors, who got used to see it primarily as a platform-based e-commerce company that has built a global ecosystem. Amazon net sales in Q2 2023 by segment well illustrate it (table 6).

The lower ranking of Microsoft can be attributed to its more complex revenue mix and the significant contribution of the cloud computing segment to revenue. We noted that segment reporting of Microsoft has been simplified significantly after the company adopted a new strategy in 2013. At the same time the recent attempts to buy Activision Blizzard in a USD 75 billion acquisition show that it has not achieved dominance in at least two of its three key revenue segments. The lower ranking may also reflect the impact of significant share buybacks on the company's valuations.

A relatively higher ranking of International Business Machines (IBM) reflects its legacy as the oldest computing company and a blue-chip stock with the lowest beta of 0.85 of the ten leading companies. As markets become more familiar with a firm, its strategy and stable business mix (in 2022 segment revenues included software – 41% of total revenue, consulting – 32%, and infrastructure – 25%), they recalibrate their view on the risk of the company. Chincarini et al. documented a robust pattern of beta declining over the age of a firm [Chincarini et al, 2020].

It may be argued that markets see the 80 years old IBM a tech version of an industrial company, and do not challenge its strategy enough even after its 40 years-long stock buybacks programs that became a proverbial failure[40].

Despite Nvidia has recently joined the trillion-dollar market capitalization club, its lower rank does not look unreasonable. It may be the belated acknowledgment by the markets of Nvidia's strategy and business model, and the long-term impact of AI technologies. It may also reflect investors' concerns that Nvidia may become another Cisco. At its peak, Cisco had market capitalization of USD 546 billion surpassing Microsoft as the world's most valuable company and inspiring estimates that it could exceed a USD 1 trillion valuation[41] (fig.14).

As an additional check we compared our rankings with the ranking of the leading technology brands by Brand Finance, Interbrand and Kantar BrandZ. Assuming that strategy and business model are important elements of a successful and recognized brand we would expect to see similarities in the rankings. We provide the results of the comparison in the table 7. The brand rankings for the selected companies are simplified ordered ranks, not the actual ranks as reported by respective sources in the top 100 lists.

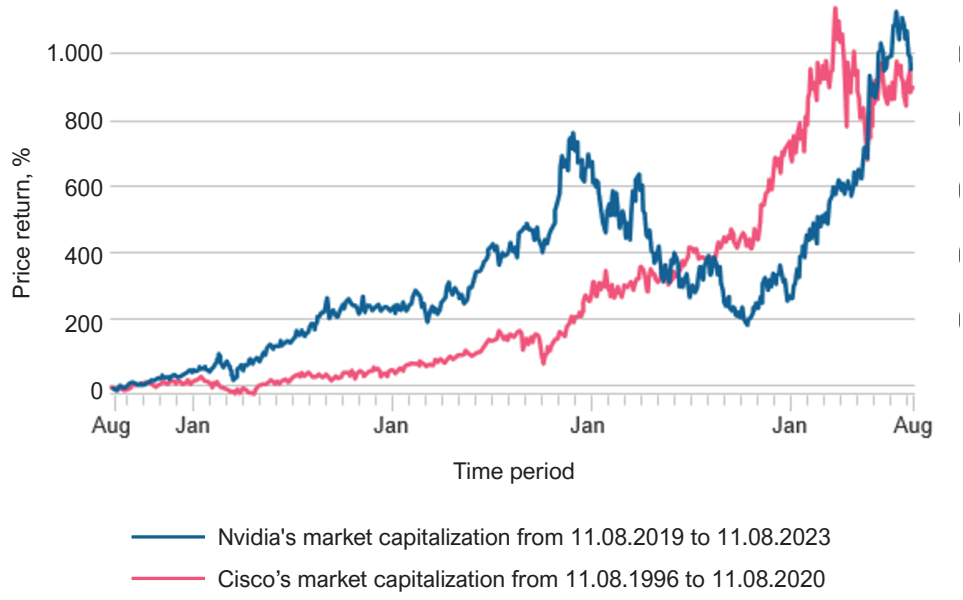
We did not find a similarity between the rankings. The logic of the brand rankings of digital companies is not transparent and may be largely driven by their market capitalization. The rankings effectively divide the ten companies into two baskets, i.e. the best (Amazon, Google and Microsoft) and the rest. Apart from the top three by market capitalization, which have similar rankings, the rankings assigned to the same company by different providers differ significantly.

We believe that the simplified ranking based on the historical volatility of valuation metrics provides insight into the degree of understanding of companies' strategies and business models. A wider sampling of tech companies over different time periods would be a logical next step. Replicating the research of Weill et al. to reflect the dramatic changes in the IT and ITeS companies' valuations in the last ten years would also be important.

[39] Amazon. Official website. Available at: https://www.amazon.com/ref=nav_logo (accessed: 26.05.2023).

[40] Peter Greulich (18 April 2022). An IBM Case Study: Do Share Buybacks Work? Available at: https://seekingalpha.com/article/4501564-an-ibm-case-study-do-share-buybacks-work (accessed 28.05.2023).

[41] Keith Noonan (23 September 2016). Cisco stock history: what investors need to know. Available at: https://www.fool.com/investing/2016/09/23/cisco-stock-history-what-investors-need-to-know.aspx#:~:text=At%20its%20peak%20in%202000%2C%20Cisco%20stock%20traded,that%20it%20could%20surpass%20a%20%241%20trillion%20valuation (accessed: 28.05.2023).



Source[42]

Fig.14. Nvidia's market capitalization in 2023 compared to Cisco's in 2020.

Table 7

Comparative analysis of technology brands rankings

Multiples volatility ranking	Rank	Brand Rankings			Average
		Brand Finance	Interbrand	Kantar BrandZ	
Google	1	2	3	1	1*
IBM	2	7	5	4	5
Intel	3	10	6	9	10
Amazon	4	1	2	3	1*
Cisco	5	9	4	8	7
Adobe	6	6	7	6	6
Netflix	7	8	9	7	9
Microsoft	8	3	1	2	1*
PayPal	9	4	8	10	8
Nvidia	10	5	–	5	4

Note: * Google, Amazon and Microsoft have the same average rank

Complied by the authors on the materials of the study

[42] Financial Times. Nvidia circa 2023, Cisco circa 2000. Available at: https://www.ft.com/content/bdf843ed-6a6d-4f23-ae76-ebb618b495bd (accessed: 28.05.2023).

Conclusion

Market leadership of IT and ITeS companies built on intangible assets and economic goodwill requires a better understanding of their strategies and business models. Various aspects of digital business models have been exhaustively discussed in management literature, but their economic dimension remains under-researched.

We analyze how strategy and business model add value and propose using historical volatility of valuation multiples for ranking companies by the degree of investors' understanding of a firm's strategy and business model in addition to ratings of companies by market capitalization. This ranking, in our view, is particularly helpful in analyzing business models of digital companies where most of the value is in intangible assets and economic goodwill. We also propose a way of expanding this research topic in the future.

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