The impact of digital economy on consumption and education industry: Taking China as an example

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Abstract. Looking around the world, a new round of scientific and technological revolution and industrial transformation is developing in depth. The digital economy has become an important factor affecting global resource allocation, industrial structure, and the international division of labor. Promoting the development of the digital economy has become an important strategic direction for most countries. The digital economy is shining brightly in daily consumption, education, and other fields. This article uses macro, meso, and micro education to conduct a detailed analysis of the market structure and impact of the digital economy on daily consumption and education and discovers the electrification of digital consumption and digital education. The study found that the pain points of digital consumption include insufficient protection of consumer privacy, uneven quality of digital consumption, and insufficient supervision of digital consumption. The pain points of digital education are the difficulty in acquiring customers, the high cost of acquiring customers, and the need to improve teaching quality and rapidly expand the market. Conflicts and limited online teaching formats lead to low accuracy in performance testing.

1 Introduction

Digital technology has become more and more interwoven into the process of economic and social growth across a range of industries in recent years as innovations have been accelerated by the Internet, big data, cloud computing, artificial intelligence, blockchain, and other technologies. The digital economy in China has essentially progressed through three stages: the gestation of technology, the explosive growth stage, and the integration and coordination stage, which involves deepening application, standardizing development, and promoting inclusive sharing [1]. Digital technology is of great significance to life consumption, tourism, travel, game education, etc., and has greatly changed the development pattern of these fields. Now, this article will take China as an example to make a more detailed analysis of the impact of the digital economy on life consumption and education from macro, meso, and micro perspectives.

2 Daily consumption

2.1 Macroscopic

2.1.1 Policy

Regarding everyday consumption, the Chinese government aggressively advances the role of the digital economy in daily consumption while actively adhering to current trends. According to the State Council's notification on the release of the "14th Five-Year Plan" digital economy development plan, my nation's digital economy will advance to a new stage of inclusive sharing, standardized development, and deepening application during this time.

| Table 1 Main indicators of digital economy development during “the fourteenth five-year plan” |
|-----------------|-------|-------|----------------|
| Index                        | 2020 | 2025 | Property      |
| The proportion of GDP that the digital economy's key industries' added value represents. (%) | 7.8  | 10   | Anticipation  |
| Number of IPv6 active users (100 million households) | 4.6  | 8    | Anticipation  |
| Amount of people using gigabit broadband (10,000 households) | 640  | 6000 | Anticipation  |
| The size of the information technology services and software industry (trillion yuan) | 8.16 | 14   | Anticipation  |

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Anticipation economy has considerably tapped into the healthy growth. It can be seen that the growth of the digital economy has driven up demand for internet services. The rise over 2019. Of these, 24.9% of all retail sales of consumer products were made through the sale of physical items through online channels, with 9.76 trillion yuan in sales. China has 782 million online shoppers as of December 2020, up 72.15 million from March 2020; this represents 79.1% of all Internet users in the country. Online retail stimulates both the urban and rural consumption cycles in terms of the domestic consumption cycle. Cross-border e-commerce contributes to the stabilization of foreign trade in relation to the twin cycles of domestic and international trade. Furthermore, internet live streaming has rapidly developed into a new digital business model based on "online traffic + physical consumption". With 66.2% of live streaming e-commerce users buying live streaming items, live streaming e-commerce has grown in popularity among consumers [3].

According to Table 1, China's outlook for the development of the digital economy during the 14th Five-Year Plan shows that within 5 years, the number of gigabit broadband users will increase nearly 10 times, the user base of the digital economy will continue to expand, and online retail sales and electronic business transactions will also grow. This indicates that in the next few years, the combination of the digital economy and daily consumption will develop rapidly and achieve healthy growth. It can be seen that the Chinese government has a positive and standardized attitude towards digital consumption. China is actively seizing the opportunities of the times and vigorously developing the role of the digital economy in consumption.

**2.1.2 Economics**

Consumption channels: China's e-commerce sales in 2020 amounted to 11.76 trillion yuan, indicating a 10.9% rise over 2019. Of these, 24.9% of all retail sales of consumer products were made through the sale of physical items through online channels, with 9.76 trillion yuan in sales. China has 782 million online shoppers as of December 2020, up 72.15 million from March 2020; this represents 79.1% of all Internet users in the country.

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Table 1 Main indicators of digital economy development during “the fourteenth five-year plan” (continuous)

| Application penetration rate of industrial websites (%) | 14.7 | 45 | Anticipation |
| National online retail sales (trillion yuan) | 11.76 | 17 | Anticipation |
| E-commerce transaction scale (trillion yuan) | 37.21 | 46 | Anticipation |
| Number of real-name users of online government services (billion) | 4 | 8 | Anticipation |

Data source: Ma [2]

Digital consumption can help transform urban space: Many cities have recognized the potential of digital consumption and strongly support the development of related new business formats. Taking Ningbo as an example, during the Information Consumption Experience Day event in October 2021, Ningbo showcased 27 digital consumption experience interactive projects, encompassing consumption scenarios such as communications, medical care, people's livelihood, finance, and entertainment. The city also unveiled the Ningbo Mobile Tianning flagship, which includes 13 municipal-level information consumption experience centers, such as the Ningbo Smart City Science and Technology Museum, to cultivate and guide citizens in digital consumption. According to the head of the Ningbo Municipal Economic and Information Bureau, the establishment of an information consumption experience center will accelerate the advancement of information technology products and services to the upper echelons of the industrial chain in addition to offering rich, new digital life experiences that will foster the growth of digital consumption. People's awareness of knowledge, sense of gain, enjoyment, and security in the sphere of consuming are therefore improved as a result [6].

Digital consumption has also become an essential starting point for leveraging rural consumption upgrades
and aiding rural revitalization. With the development of digital rural construction, the divide between urban and rural regions is closing and digital consumption is rising quickly in rural areas. As an illustration, consider internet purchasing. In China, rural online retail sales were 180 billion yuan in 2014; by 2020, they had grown to 1.79 trillion yuan. More than 130,000 village-level e-commerce service sites and over 2,000 county-level e-commerce public service and logistics distribution facilities have been constructed nationwide. With a 97.6% coverage percentage, express delivery outlets have reached over 30,000 towns and villages across the country. The increasing use of digital consumption in rural regions has improved the shopping experience for villagers by giving them access to a wider variety of higher-quality items [6].

2.1.4 Technology

It is impossible to distinguish the encouragement of information infrastructure development from the advancement and growth of China's digital consumption. China ranks first across the globe in the scope of information infrastructure building, according to the "White Paper on China's Digital Economy Development". More new technology being used means more chances to enhance digital consumption. China has the greatest 4G and optical fiber networks in the world. By the end of 2020, 96% of households have access to fixed broadband. With over 200 million 5G terminal connections and 718,000 5G base stations constructed, the 5G network development is the fastest and largest in the world [6].

2.2. Mesocosm (value chain)

2.2.1 Digital technology

Currently, new digital technologies such as big data, the Internet of Things, artificial intelligence, and blockchain are profoundly reshaping the "people-goods-field" of the retail industry, continuously driving the evolution of business models, operating rules, and competition. Digital consumption is becoming a new growth pole [7].

As the process of digitalization accelerates, on the one hand, the digitalization of production and manufacturing-end infrastructure has significantly improved, and digital technology is aiding in the further opening and sharing of the retail value chain. On the other hand, data accumulated on the sales and consumer side has become an essential production factor, driving supply chain innovation and promoting the empowerment and traction of the retail industry. While promoting the transformation of the industrial structure, digitalization can better meet the personalized needs of consumers, reshape the customized value chain with demand as the core, and bring about ecological changes in the entire retail industry [7].

A relatively representative product of the development of digital technology is the digital renminbi. The director of the Digital Currency Research Institute of the People's Bank of China said, "Digital RMB will coexist with traditional electronic payment tools for a long time." China has always supported the coordinated development of various payment methods. Digital RMB and general electronic payment tools exist in different dimensions and are both complementary and different.

2.2.2 Digital products and services

In recent years, with the development of smart terminals and mobile Internet, upgraded business formats such as social e-commerce and live broadcast e-commerce have been further spawned. With digital empowerment, users' scenario needs are more diverse and integrated, which also calls for the retail supply industry to be more intelligent and precise. Social e-commerce uses social media to drive sales and has become one of the hottest business trends in China. It is also an important disruptive force.

Today, mass Chinese consumers spend more than 7 hours a day on the mobile Internet, which is a fifth more than before the COVID-19 crisis. Of these 7 hours, about 2/3 are spent on social or content applications. More and more users are beginning to seek information from social media, key opinion leaders/key opinion consumers (KOL/KOC), and friends to make purchase decisions [8].

In China, there are a total of five types of social e-commerce prototypes, which are [8]:

- Social traffic-draining platforms - KOL and KOC guide consumers to emerging e-commerce platforms or brand stores.
- Social marketing e-commerce platform - KOL and KOC guide customers to e-commerce brand stores.
- Social bargaining e-commerce - each new customer can enjoy a lower price to encourage social sharing of products.
- Community group buying/S2B2C - Incentivize consumers and small businesses to sell to their circle of friends or social circles through commissions.
- Social DTC - Brands and KOL/KOC interact directly with consumers in the WeChat group operated by the brand and achieve sales through the brand's own platform or WeChat mini program.

2.2.3 Digital marketing (trends)

With the gradual improvement of consumers' status and the increasing communication points with consumers under new retail, the operating model of brands has gradually transformed from traditional product and channel management to a consumer-centered operation model. The wave of digitalization transformation provides new opportunities for brands to deeply tap into consumer assets.

In actual business, people face many challenges in truly implementing "consumer-centeredness." First of all, the number of actual points of contact between brands and end consumers is limited, making it difficult to carry out direct and effective communication in a systematic manner. Therefore, for most brands, "consumer-
"centered" is more of an ideal and goal, with little impact on actual business. Guidance is still relatively limited. In transforming the concept of "consumer-centered" from theory into practice, new retail platforms represented by Tmall have done a relatively good job. Based on the new generation of big data, the Internet of Things, AI, and other technologies, Alibaba has systematically integrated the information of more than 600 million consumers in its ecosystem through Uni-D. It also fully records every touchpoint in the consumer journey, allowing brands to communicate with a large number of consumers in a timely and effective manner and understand the specific needs of each type of consumer. This truly enables brands to carry out various businesses such as product research and development, marketing promotion, and category planning with consumers at the center [9].

2.3. Microscopic

2.3.1 Consumer characteristics

In today's era, with the rapid development of Internet technology, the channels through which people obtain information are becoming increasingly diversified. In this case, consumption concepts tend to be rational, consumption touchpoints are fragmented, and decision-making paths are centralized. Consumption is not downgraded; rather, individuals are making smarter choices. Consumers are becoming more pragmatic and rational, with more people making purchasing decisions based on real needs, comprehensive exploration, and thorough comparison.

It can be seen from Table 2 that people have diverse consumption concepts. About 40% of people pursue brands and products that they need or that are cost-effective. Among the decision-making factors, people first pay attention to the quality of the product, followed by functionality, and finally cost-effectiveness. In the case of price comparison, when faced with different products, consumers will compare prices based on current information channels to obtain the most satisfactory products and prices. There are very few people who do not compare prices, accounting for only 6% of the total. Therefore, while people choose to consume digitally, about one-third of them search for coupons before shopping to get the best price.

Table 2 Influencing factors of consumer consumption

<table>
<thead>
<tr>
<th>Consumption attitudes</th>
<th>Decision factors</th>
<th>Price comparison</th>
<th>Coupon favor</th>
</tr>
</thead>
<tbody>
<tr>
<td>41% I buy everything I really need</td>
<td>In food and beverage, clothing,</td>
<td>&quot;I will carefully compare the prices</td>
<td>&quot;Before I shop, I continually search for discounts.&quot;</td>
</tr>
<tr>
<td></td>
<td>shoes and hats, beauty and</td>
<td>of all products&quot; [maximum]</td>
<td>[maximum]</td>
</tr>
<tr>
<td></td>
<td>cosmetics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36% I am willing to look for brands and</td>
<td>Consumer research on three major</td>
<td>31%</td>
<td>32%</td>
</tr>
<tr>
<td>products with the best value for money</td>
<td>categories of personal care,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>quality is decided by consumers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The top 1 factors and check rates</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>are: 14%, 14%, 12%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.3.2 Environment

In 2022, the per capita disposable income of Chinese residents will be 24,538 yuan, showing a steady increase (please see Fig. 1). China currently has the world's largest and fastest-growing middle-income group, with more than 400 million people in 2017. According to McKinsey's prediction, there will be an additional 71 million middle-class families in the next three years [10]. Although China is the second-largest consumer market and the largest online retail market globally, according to World Bank standards (2020-2021), it is an upper-middle-income country (GNI reached the standard for the first time in 2010 and exceeded the average level for the first time in 2019). However, consumer desires are suppressed, and the residents' consumption rate has long been lower than the average level of the same group [10].
The Ministry of Commerce has designated 2023 as the "Year to Boost Consumption," and restoring and expanding consumption has been prioritized. With continued efforts to expand domestic demand, policies and measures to promote consumption, and the gradual recovery of offline consumption scenes, China's consumer economy will gradually pick up. The epidemic has entered a new stage of prevention and control, and the normalization of production and life is expected to restore consumer confidence.

![Fig. 1. Consumption and income level of Chinese residents](image)

Table 3 Investigation into the reasons for the decline in consumption willingness of Chinese residents

<table>
<thead>
<tr>
<th></th>
<th>Decreased demand for goods due to the impact of the epidemic</th>
<th>The epidemic affects shopping/going out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prime factor</td>
<td>23%</td>
<td>14%</td>
</tr>
<tr>
<td>Top three important factors</td>
<td>58%</td>
<td>43%</td>
</tr>
</tbody>
</table>

As can be seen from Table 3, in the survey on the reasons for the decline in consumption willingness, the impact of the epidemic has been selected as the top reason many times. From the perspective of the epidemic affecting the reduction in demand for goods, the epidemic is the main factor, accounting for 23%, and contributes to 58% of the top three important factors. From the perspective of the epidemic affecting shopping and travel, the epidemic is the main factor, accounting for 14%, ranking among the top three important factors. Overall, important factors accounted for 43%.

2.3.3 Information channels

Figure 2 shows that the channels through which consumers obtain information vary in different regions. Search engines, live broadcast rooms, and public accounts/video accounts all have a high proportion of selections, all above 60%. Secondly, short videos, e-commerce apps, social networking media, shopping mall stores, and official websites have a very high proportion influencing consumer decision-making, all above 10%.
In addition, people should innovate digital consumption supervision methods, smooth the production-circulation-consumption cycle, strengthen data security and privacy protection, and better maintain digital consumption order. This includes building a digital consumption ecology to protect the legitimate rights and interests of consumers.

2.3.4 Pain points

Inadequate protection of buyer privacy: While the rapid growth of the digital marketplace necessitates the acquisition of vast amounts of user data to generate scale impacts, doing so also raises the possibility of personal information leaks.

Three variables contribute to the difficulty in safeguarding privacy. Initially, there is a great deal of knowledge asymmetry between users and data obtaining organizations. The collection of users' privacy and the purposes for which it is utilized are unknown to them. It is nearly impossible to retrieve the compromised privacy, secondly. One cannot retrieve compromise because digital information is widely copied, saved, and shared. Lastly, the extent of the harm resulting from privacy breaches is hard to quantify. Policies defending user privacy are quite hazy since there isn't a consensus regarding the worth of users' personal data. Cross-border data flows have raised the concern of privacy leakage [11].

The quality of digital consumption is uneven and breeds new problems: With the continuous development of new consumption, the industry has not only extended old problems in traditional consumption such as uneven product quality and difficult-to-guarantee after-sales service, but it has also given rise to new problems such as big data maturity, privacy leakage, and data security. The second issue is the abuse of market dominance, with repeated prohibitions on monopoly agreements, data blocking, “expiration,” and refusal to trade. Finally, unfair competition behaviors such as counterfeiting, false propaganda, and fraud still exist [12].

2.4. Suggestions & outlook

At present, the digital economy is booming worldwide, and digital consumption has become an indispensable part of economic development. Regarding the further development direction of digital consumption, this article puts forward the following suggestions:

2.4.1 Improve the online market supervision system

During the development period of the online market, some behavioral activities with negative externalities are prevalent, harming the rights and interests of consumers. In recent years, some monopolistic behaviors, unfair competition, and abuse of market dominance have disrupted the market order. Therefore, it is recommended that the state introduce relevant policies to strengthen the internal ecological governance of platforms and urge platform companies to standardize rule establishment, data processing, algorithm formulation, and other behaviors. This will help standardize the order of online market competition and guide the healthy development of the digital economy.

2.4.2 Formulating a more secure and private digital consumption environment
It is essential to set up and maintain a system of security protection for digital consumption, raise the bar for security technology in digital consumption, apply technologies like face recognition, firewalls, and encrypted transmission, and strengthen user capabilities for data encryption and digital identity authentication. Furthermore, care should be taken to create and strengthen the system for protecting users' privacy when consuming digital content, make clear the rights and responsibilities of each party when consuming digital content, uphold users’ freedom to know and make choices about their privacy, and increase users' awareness of and capacity for protecting their privacy.

2.4.3 Improving the balance of services and experiences in digital consumption

Along with increasing technological innovation in digital consumption, relevant enterprises need to develop new models, formats, and scenarios for digital consumption, enhance the quality of services provided and the overall digital consumption experience, and cater to the various and individual needs of digital consumption.

3 Education

3.1 Macroscopic

3.1.1 Policy

The "14th Five-Year Plan for Digital Economy Development" released by the State Council recently, included the following recommendations in column 8: improve network security protection capabilities, advance smart education, and encourage the orderly and intelligent upgrade of infrastructure. Additionally, it seeks to encourage the development of new educational infrastructure and a top-notch system of education support [2].

Secondly, the report of the 20th National Congress of the Communist Party of China made, for the first time, a "three-in-one" overall arrangement and deployment of education, science and technology, and talents. It included "promoting the digitalization of education" in the report and incorporated "building an educational power" into the goals of my country's development in 2035 as an overall goal [13].

But in July 2021, the General Office of the State Council and the General Office of the Communist Party of China released a statement titled "Opinions on Further Reducing the Homework Burden and Off-Campus Training Burden of Students in Compulsory Education." It suggested "double reduction," or lessening the amount of homework assigned to students enrolled in both off-campus training programs and required schooling. The Ministry of Education’s Party Leadership Group considers it to be the "No. 1 Project."

3.1.2 Economic

The national fiscal education funds in China invested a total of 21.4 trillion yuan between 2018 and 2022, with an average annual growth rate of 7%. The percentage of GDP has consistently maintained over 4%, according to data from the Ministry of Education's Finance Department. In my nation, the number of full-time teachers climbed at an average annual growth rate of 3% from 16.7285 million in 2018 to 18.8036 million in 2022. In the same time frame, national fiscal education expenditures for teacher salaries and benefits rose by an average of 8% annually, making up 61% of the total and increasing by 2.4 percentage points to 63.4% [14]. The nation will spend 513.7 billion yuan, 2.6801 billion yuan, 955.6 billion yuan, and 1.6397 billion yuan on preschool education, compulsory education, high school education, and higher education, respectively, in 2022—an increase of 3%, 6.7%, 8.5%, and 8.5%, correspondingly, across the previous year. Kindergartens, regular elementary schools, regular junior high schools, regular high schools, secondary vocational schools, and regular colleges and universities all saw increases in their overall per-student education costs over the prior year of 7.3%, 5.2%, 3.6%, 2.8%, 1.2%, and 1.3%, in that proper order [15].

The state also attaches great importance to remote and backward areas. From 2018 to 2023, the central government has allocated a total of 85.5 billion yuan to continue supporting the implementation of relevant plans and policies to guide teachers to take root in rural areas and serve the grassroots. There will be further implementation of the special post plan to support a large number of college graduates to teach in rural schools in the central and western regions. Implementation of the "Three Regions" Talent Plan teacher special project and the Silver Age Lecture Plan, encouraging outstanding teachers and retired teachers to teach in poverty-stricken areas, ethnic minority areas, old revolutionary areas, and border areas, to promote schools in the central and western regions and underdeveloped areas to improve the quality of education and teaching [14].

From 2018 to 2023, the central government has allocated a total of 17.6 billion yuan to focus on strengthening the capacity building of teachers and improving education and teaching standards. The government will continue to implement the "National Training Plan" to train more than 1 million principals and teachers every year, significantly improving the level of rural school principals in running schools, running schools, and teacher education and teaching [14].

All things considered, China has consistently placed a high value on education and invests a substantial sum of money annually to support it, with annual spending increasing steadily. The nation will nextly proceed to unwaveringly carry out the decisions and agreements made by the State Council and the Party Central Committee regarding the prioritization of education development and investment, as well as the full realization of the contribution that education investment makes to development, equity, reform, and quality improvement in the building of an educational power. It carries out the strategy for developing education priorities and serves as a policy guiding body.
3.1.3 Social

A high percentage of Internet use promotes the growth of digital education: Based on Figure 3, it is evident that the population of Internet users in my nation is increasing gradually. The number of Internet users is steadily increasing as a result of the nation's accelerating Internet infrastructure building, improved information accessible services, and digital aging. By the end of 2022, there were 1.067 billion Internet users in my nation, up 3.44% from the previous year, with a 75.6% Internet penetration rate.

![Fig. 3. China's Internet penetration rate and user base from 2018 to 2022](Photo credit: Original)

3.1.4 Technology

Infrastructure is becoming increasingly complete: Nowadays, the percentage of schools with Internet connectivity at all levels and types has reached 100%, with more than three-quarters of schools having wireless network coverage, and 99.5% of schools equipped with multimedia classrooms. The new education infrastructure is gradually advancing, and the construction of private education networks is actively deployed to promote the application of network technologies such as 5G and IPv6. Various regions are accelerating the construction of teaching environments such as intelligent interactive classrooms and virtual simulation laboratories, strengthening the connection and integration of physical space and virtual space, and promoting iterative upgrades of educational infrastructure [16].

High-quality resources achieve inclusive sharing: The national smart education public service platform continues to enrich the supply of high-quality resources, actively expand functional applications, and strengthen the supply of important public service products in the field of education. At present, the platform has brought together more than 44,000 primary and secondary school resources, over 1,300 vocational education professional teaching resource libraries, 27,000 high-quality university MOOCs, and online special resources such as “Shuren Classroom” to provide teachers, students, and social learners with a “one-stop” service. It has basically built the world’s largest education and teaching resource library [16].

3.2 Mesocosm

The scope of digital education is very broad. Here, this paper only focuses on the field that accounts for the largest proportion of digital education—online education. The industry chain analysis of online education mainly discusses the value creation and delivery process of digital education from the three links of upstream, midstream, and downstream.
Digital education's fundamental support system is known as the upstream link, and its content is its source of content resources. The creation of teaching aids, the hiring of instructors, and the development and production of online course materials are within the purview of content resource providers. In meantime, e-learning technology support offers systems, platform building, tool development, and online education cloud services for pertinent organizations and businesses, among other services [17].

The core and major part of online education, comprising different platforms, institutions, and businesses that may offer online education, is the central link in the chain of the online education sector. Early childhood education, K–12 subject instruction, higher education, vocational training, language instruction, and other high-quality education are all often covered via online learning in China (see Table 4). The consumers who desire online education are downstream. In China, the demand for online education may be broadly classified into two groups: C-end users, who are mostly individual students, and B-end users, who include businesses, educational institutions, and schools [17].

Schools are important demanders of digital education and need to use digital technologies and platforms to achieve personalized, intelligent, and systematic education. Individuals are the ultimate beneficiaries of digital education and need to use digital technologies and platforms to achieve lifelong learning and self-development.

### 3.3 Microscopic

#### 3.3.1 Competitive landscape of online education

There are various participants in online education in my country. Upstream suppliers of live broadcast technology, intelligent voice, and comprehensive solutions provide technical support. Midstream online education startups continue to emerge and blossom in various subdivisions. To speed up the industrial chain, offline education institutions like New Oriental and TAL are setting up product matrices and hopping on the Internet wave. Online education has advanced significantly in the quality and vocational education sectors, despite a significant decline in demand from downstream consumers in the K12 subject training and education sector as a result of the "double reduction" strategy [18].

When the competitive environment of the online education sector is analyzed using Porter's "Five Forces" model, it is evident that the online education manufacturing sector faces somewhat intense rivalry. One of the "five forces" influencing the Chinese online learning market is [18]:

1. Competition among existing competitors is relatively fierce: Although my country's K12 education sector is experiencing a cold spell, competition in vocational education, quality education, and other sectors has intensified.
2. The upstream bargaining power is strong: Online education is based on cloud computing, video technology, and other software and hardware, and the update speed is fast, so the upstream bargaining power is strong.
3. Robust downstream negotiating power: The online education sector is highly segmented, with numerous players operating in each, leading to a high level of product uniformity.
4. The online education sector has average entrance hurdles and does not necessitate stringent technological constraints, making potential newcomers a danger. Although K12 education is no longer as profitable as it once was, there is still some attraction to the sector overall. Data indicates that a significant amount of cash has been drawn to the online education sector due to its enormous expansion potential. A total of 49 investments and financings totaling 14.34 billion yuan—a 48.29% year-over-year increase—occurred in the online education sector in the first half of 2020 (see Fig. 4).

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**Table 4 Online education industry chain structure**

<table>
<thead>
<tr>
<th>Upstream industry</th>
<th>Midstream industry</th>
<th>Downstream industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource supply</td>
<td>Online education</td>
<td>Demand users</td>
</tr>
<tr>
<td>Course development</td>
<td>Early childhood education</td>
<td>B-side users</td>
</tr>
<tr>
<td>Course production</td>
<td>K12 subject training</td>
<td>Schools</td>
</tr>
<tr>
<td>Production of teaching aid materials</td>
<td>Advanced education</td>
<td>Businesses</td>
</tr>
<tr>
<td>Teacher development</td>
<td>Vocational education</td>
<td>Educational institutions</td>
</tr>
<tr>
<td>Online education technology support</td>
<td>Language education</td>
<td>C-side users</td>
</tr>
<tr>
<td>Cloud services</td>
<td>General quality education</td>
<td>Individual learner</td>
</tr>
<tr>
<td>Platform construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tool development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>System docking</td>
<td></td>
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</tr>
</tbody>
</table>
Fig. 4. The amount and growth rate of online education investment and financing in China from 2016 to 2020 H1

Photocredit: Original

(5) The risk of substitutes is greater: On the one hand, my country promotes after-school services in schools and occupies a considerable part of the extracurricular training market; on the other hand, as the output of free educational content on short video platforms such as Bilibili and Douyin becomes more and more high-quality, it will have a certain impact on online education companies.

3.3.2 Pain point analysis

Difficulty in acquiring customers and high cost of acquiring customers: The cost of acquiring customers in the online education industry is much higher than that of offline institutions, and the customer acquisition cycle is relatively long. Factors that parents need to consider when choosing an institution include reputation, cost-effectiveness, and service effectiveness, etc. These will all play a role to a certain extent, making it more difficult to acquire customers in the online education industry. Compared with the tangible products and services of offline institutions, choosing online education institutions will increase the safety risks of parents to a certain extent. The multifaceted superposition of the above factors has led to the difficulty and high cost of acquiring customers in the online education industry.

Improving teaching quality conflicts with rapid market expansion: In order to maintain market demand, various online courses neglected to consolidate their own educational concepts while maintaining a rapid update speed. This made it difficult to effectively integrate resources. Moreover, the most important indicator in the personnel evaluation system of online education institutions is often the continuation rate, making it difficult for teachers to concentrate on polishing their own standards. The final result is a waste of a lot of resources [19].

There are limitations to the online teaching approach, and test scores are not very accurate: PPT, text, and video instruction continue to dominate modern online learning environments, despite a slow but steady diversification of features. As such, the interplay and cross-referencing of educational materials are crucial. In Q&A portions while studying online, there are typically neither questions nor answers [19].

3.4 Suggestions & outlook

3.4.1 Raise the threshold for online quality education and strengthen supervision

In recent years, the online education industry has witnessed the simultaneous growth of large enterprises and small workshops, leading to endless educational problems. To further promote the development of the entire online quality education, it is necessary to formulate access standards for online quality education institutions and strictly control the teaching conditions and teaching content of online education institutions [19].

3.4.2 Focus on the training and construction of teachers

In order to further promote the development of the industry, the next step of reform should focus on increasing teaching research and teacher training and improving the training mechanism within the enterprise. At the same time, relevant government departments must also establish certain teaching quality standards to standardize the development of teachers’ teaching activities and coordinate multiple platforms to supervise the quality of teachers’ teaching [19].

3.4.3 Innovative teaching methods and methods of digital education

Digital education should be student-centered, focusing on cultivating students’ innovative abilities and comprehensive qualities. It should adopt problem-
oriented, project-based, inquiry-based, and cooperative teaching methods to enhance students' independent learning and cooperative learning abilities. Making full use of digital technology and resources to achieve personalized, intelligent, and scenario-based teaching can improve the effectiveness and interest of education. This approach aims to build an open and shared digital teaching environment.

4 Conclusion

Clearly, digital transformation is the craze of the moment. Concerning digital consumption, upgraded formats like social e-commerce and live streaming e-commerce have significantly improved consumers' spending power in recent years. However, digital consumption faces challenges such as insufficient user privacy protection, uneven product quality, and a lack of market supervision. This article recommends improving the online market supervision system by introducing relevant policies to strengthen the internal ecological governance of platforms. Additionally, it suggests enhancing the security and privacy protection of digital consumption through establishing and improving the security protection system and paying attention to the establishment and improvement of the privacy protection system. Moreover, it advocates for improving the balanced service and experience in digital consumption by increasing technological innovation to enhance the market vitality.

As for digital education, mainly online education, there are still various pain points. Therefore, digital education should improve thresholds for online quality education and strengthen supervision by formulating access standards for online quality education institutions. It should also focus on teacher training and construction, setting up certain teaching quality standards to standardize the development of teacher teaching activities. Lastly, it suggests coordinating multi-platform supervision of teacher teaching quality and advocating for innovative digital education teaching methods, such as a student-centered approach.

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