Chapter 7
Industry Promoting Smart Learning

Abstract This chapter discusses the developmental stage and main features of smart learning industry in China. The analyses are based on the data and facts described in industry reports published by research institutes and Internet companies (e.g. Baidu, Tencent, Alibaba, etc.). In addition, the project team of this book has carried out online questionnaire surveys to collect supplementary data. The analysis of these data shows that the industry of smart learning develops rapidly in China as a result of increasing market demand, the strengthened support from governmental policies, and the encouragement from capital investors. It cultivates three typical business models: the digitization of traditional regular education, development of learner-centered learning platforms, and creating online schools for professional training in subdivided fields. The industry chain that helps to build the flexible lifelong education system has almost reached the point of maturity.

Keywords Industry chain · Market structure · Customer segmentation · Online education · Prospect · Risk

7.1 Introduction

During the last decade (2000–2010) smart learning in China was more of a concept. Smart learning started its industrialization process since around 2010, motivated by both government policies and investment capitals. Online education has greatly impacted the traditional education market (Zhiyan Consulting 2013). With the popularity of the Internet and mobile devices, people are used to search for and obtain information through the web, and there is a rising demand for continuing education and skill training among working people. Companies and investors taking smart learning as a promising industry have used the opportunity to penetrate and occupy the market and the whole industry chain has been formed. Platform-based enterprises play the leading role in the process of industrialization, reshaping the business ecosystem, and squeezed the living space for smaller

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companies. A trend of overheating has appeared as capital flooded into online education market around 2014, statistic data shows that over 60% of the projects invested by capital since 2013 has been shut down by 2015. Above facts show the immaturity of the market and the blindness of the capital, thus besides the self-improvement of the market, the government should enhance the guidance for capital investment in this area.

In order to better understand smart learning in smart cities, the industries that support smart learning should be analyzed. The industries and capitals that support smart learning play an important role in creating of the ecosystem for smart learning in smart cities. The following sections will introduce the development status of smart learning industries, the maps of capital investments for smart learning, and the future trends of smart learning industries.

7.2 Developmental Status of Smart Learning Industry

The development of smart learning industry can be analyzed from three perspectives. Firstly, as the support of high-end services of smart city, as it provides learning tools that are terminal-based and intelligent. Secondly, the industry drives the overall upgrading of learning behavior. The capacity of sustainable development and comprehensive competitiveness of industrial enterprises contribute to industrial optimization. Thirdly, the key to industrial breakthrough is in forming of the smart learning environment in the whole society.

The content of this section is based on the results obtained by the "Questionnaire Inquiry About Online Educational Industry Conditions" (QIAOEIC) utilizing so called "sojump" (an online survey tool widely used in China) and carried out by the project team in May, 2015.

7.2.1 Full Coverage of the Lifelong Learning System

"Establishing flexible and open lifelong education system" is the direct manifestation of smart city development. Such system breaks the boundaries between degree education, non-degree education and community education, and gets through the fence between schools and learners. It makes use of educational resources more enjoyable for learners, and inspires the enterprises and institutions specialized in educational industry to create learning resources covering the whole life cycle.

(1) **The smart learning industry is mainly involved in 7 areas**: preschool education, K-12 education, college and university, vocational school, enterprise, government, and personal ability enhancement.

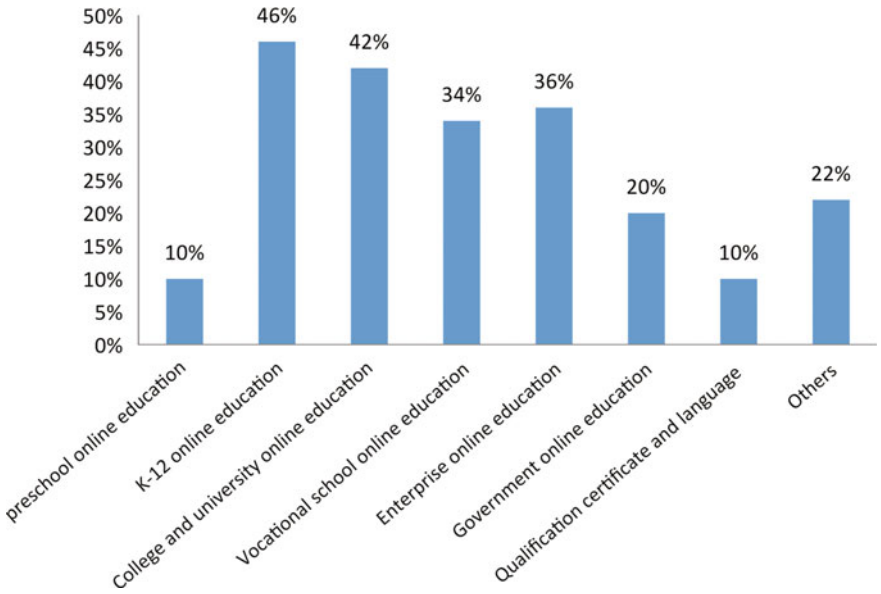


Fig. 7.1 Proportion of smart learning industrial enterprises and institutions in range of services

Among these 7 areas, the K-12 education takes the majority; meanwhile, the online education for the government and for employees of corporate business start to get attention of industries (see Fig. 7.1.[1])

(2) **The traditional education market is impacted by online education**. Each segment of education is impacted by online education to different extents, with higher education and vocational education are impacted deeper. Since the Internet, the PCs and intelligent devices have been playing more important role in people's daily life, they are more open to online education. This trend can be seen in the compound annual growth rate of market scale of online education from 2013 to 2015. (Online Education Market Size in China and Year-on-year Growth Rate in 2013–2015, 2013), as shown in Fig. 7.2.

(3) **All the 7 areas incubate clear market path**. "Preschool education" products occupy an important position in APP store education section. The "K-12 online education" relies on the high-quality school resources and online education brand. "MOOC" model of higher education is further practiced to make higher education more equal. Vocational education has a good development tendency, and it is a new market of education. Some enterprises and institutions with the annual income of more than CNY 100,000,000 has emerged in Enterprises'

[1]Data source: White Paper Project Team of Smart Learning Institute of Beijing Normal University, samples: 50 > middle-high administrative staff from online education industry.

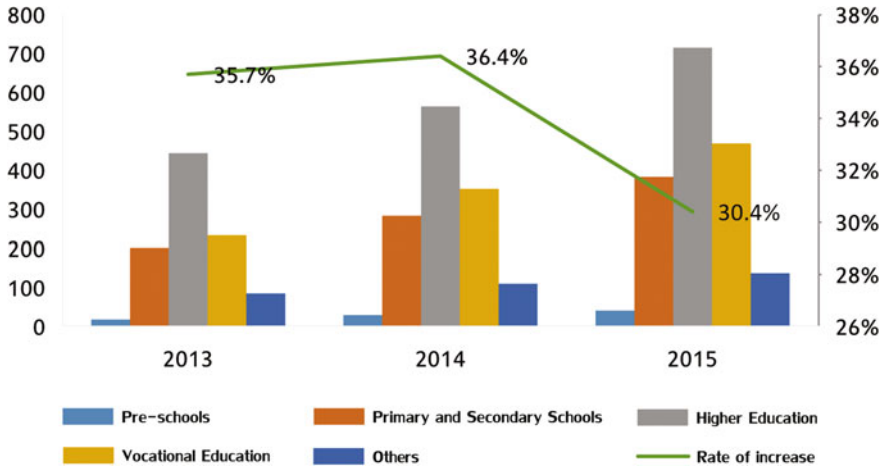


Fig. 7.2 Online education market size in China and year-on-year growth rate in 2013–2015

online education. Government's online education becomes the new emerging form in online educational areas. The enhancement of personal ability by online education covers older learners and social learners, etc.

7.2.2 Increased Diversification of Industry Solutions

Currently, with the platform-based enterprises such as BAT (Baidu, Alibaba and Tencent) invested in smart learning, the types of industry solutions are increasingly diversified in China with the continuous capital inflow and the improvement of user penetration and acceptance.

(1) **The smart learning industry enriches the connotation of smart city industry**. Smart learning industry is the foundation for the sustainable development of smart city. The strategic emerging industry is with intensive knowledge technology, less resource consumption and large growth potential. It contributes to constituting modern industrial system and promotes the overall economic and social development. In the QIAOEIC carried out by the project team, the enterprises and institutions serving the learning environment and supporting the services and learning resources take up a large proportion in all the industrial solutions for smart learning (see Fig. 7.3).

The industrial solution mainly includes the following five types:

- Smart learning environment that is composed of broadband network, smart campus and smart classroom;
- Learning facilities that include the intelligent terminals such as the terminal of mobile learning, mobile storage device and wireless network equipment, etc.;

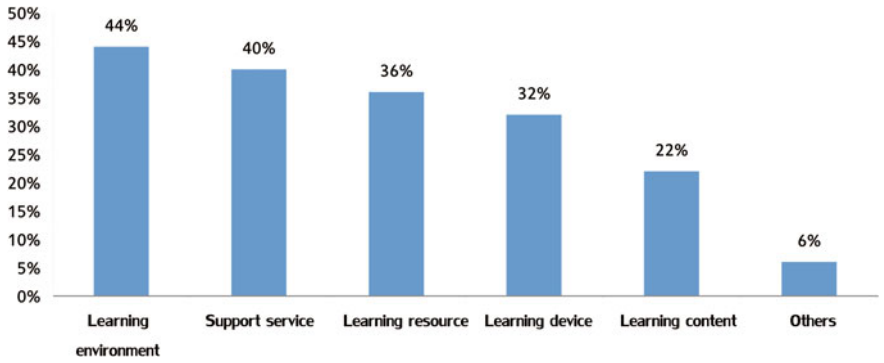


Fig. 7.3 Types of smart learning industrial solutions

- Learning resources that include community education resources, television program, open university, etc.;
- Learning content of video production and the learning content platform;
- Supporting services that include platform-based portal supplier, smart learning consultative agency, etc.

With the aggravated industrial segmentation and expansion of vertical areas, the types of industrial solution will continue to expand.

(2) **The online learning products need further development**. Currently, the research on online education concentrate mainly on 3 aspects: business model and technology, user experience and measurement of learning effects, control and description of learning products, personnel organization, and learning process. It was found that the product forms mainly include B2B2C platform-based form, B2C service-oriented type, tool-oriented type and online class-oriented form (Wang 2014) (see Table 7.1).

Table 7.1 Main product forms of online learning

Product form	Characteristic	Example of typical enterprise and institution
B2B2C platform-based form	Cooperate with institutions. Personal teachers enter. Provide online and network teaching resources	Chuanke.com, Dauber, 51CTO
B2C service-oriented	Produce high-quality contents independently	Kuxuexi.com
Tutorial tool-oriented	Answer the test paper. Design the test paper intelligently. Do exercises by passing through a series of difficult levels	Yuantiku.com, 17zuoye.com
Online school-oriented	Real 1 to 1 teaching-student video guidance	91waijiao.com, New Oriental

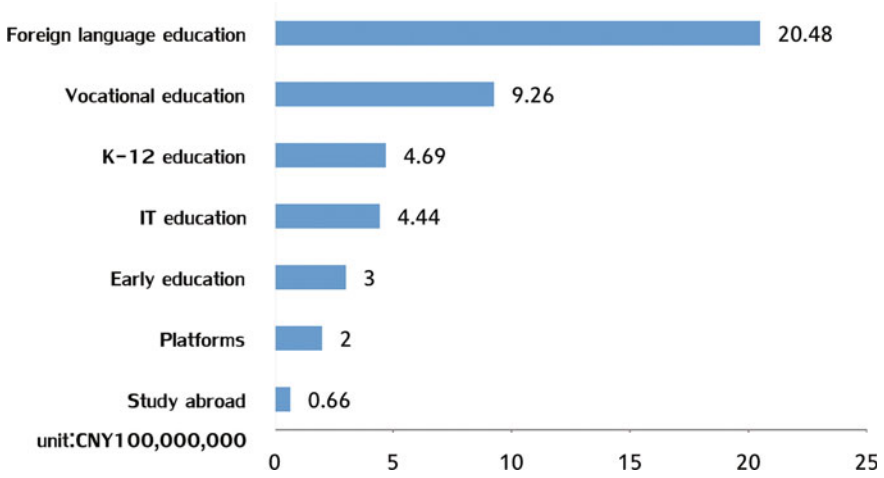


Fig. 7.4 Investment amount in 7 educational enterprises in 2014 (*unit* CNY100,000,000)

(3) **The capital market is more optimistic about vertical online educational products**. The platform layout ability of vertical online educational products is inferior to that of the Internet enterprises. However, the vertical enterprises generally possess core competitiveness: teacher resources, mature teaching charge profit model and user habits. According to the *K12 Educational Market Analysis Report in 2014* published by Tencent Class, the in online education exceeds CNY 4.4 billion, including CNY 2 billion in foreign language, CNY 0.469 billion in K-12 education. Despite the outburst of K12 in 2015, this market is still facing severe challenges such as low maturity of user, competition homogeneity, and non-standardization of service, etc. (see Fig. 7.4).

7.2.3 Promotion of Learning Society by Intelligent Tools

On August 17, 2013 the State Council of China issued the "Broadband China" strategic implementation scheme, which deployed the development goals and path of broadband for the next 8 years. It means the "Broadband Strategy" has been upgraded from a sector's action to a national strategy. Broadband becomes the national strategic public infrastructure for the first time. The "Broadband China" strategy and network infrastructure are deepened, which provide space for the development of various smart devices. From smart phone to Tablet PC and wearable devices, the intelligence and networking of terminal products creates the explosive opportunity of smart learning industry in the new economic environment.

(1) **Learning products should provide a good human-computer interactive experience**. The mobile smart terminal products design needs the full consideration of user experience. The convenience degree of learning products directly influences the experience effect of learners. The convenience of learning product is mainly manifested as to whether the human-computer interface is friendly, whether the operating product is easy to use, and whether the relevant help and support is available. According to the statistics resulting from the QIAOEIC, the very high and high satisfaction for the convenience of learning products of the investigated institution take up 68% (see Fig. 7.5).

(2) **There are three universal evaluation standards for excellent learning products allowing human-computer interaction**. The first standard is priority that learning products should display the most valuable resources to promote user-interface interaction. The second standard is consistency. The interface is easy to be predicted. It shall reduce the cognitive and learning burden of users. The third one is experience. It makes the learners experience the convenience and safety of learning through high-quality learning products.

(3) **The learning products should support personalized learning**. Personalization is the main feature of the future lifelong learning. The personalized learning needs learning products to be adaptable to various differences in demand, and needs to provide different customized learning services for learners. If the personalization degree of the product is higher, learners feel to be more valued and develop stronger learning motivation for learning (see Fig. 7.6).

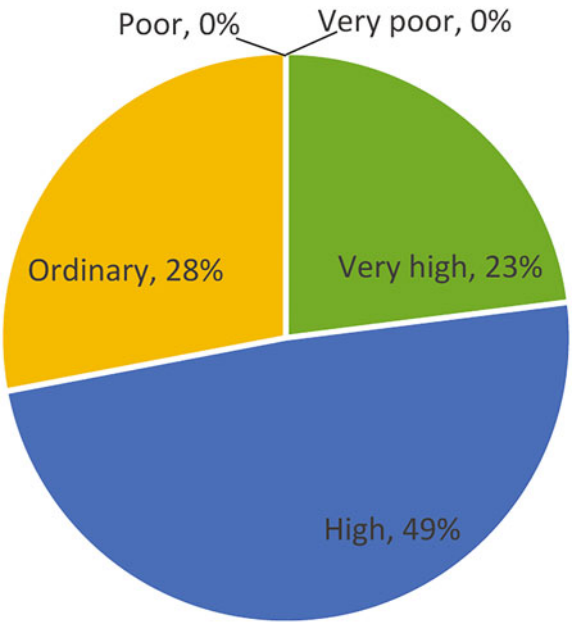


Fig. 7.5 Satisfaction proportion for the convenience of learning products

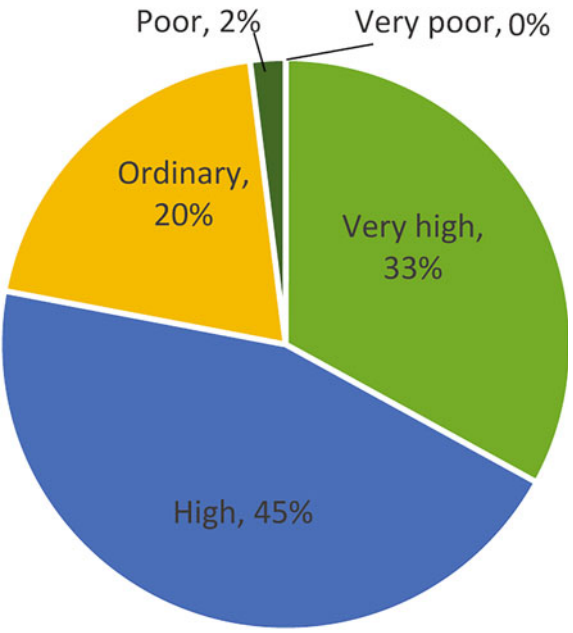


Fig. 7.6 Recognition degree of personalized design of learning product

(4) **The online learning products need sophisticated design**. It is very clear for the learning content, learning objective, learning plan in traditional classroom offline learning, so no complex theory or design skills is needed for such a learning. However, online education needs the comprehensive consideration of various links of learning due to lack of enforcement and discipline, so as to guide the participating enthusiasm of learners. The design of learning products shall also consider cognition, memory, imitation, exercise, understanding and application, etc., to motivate learners to generate learning behavior actively and conscientiously, and achieve learning purpose.

7.2.4 Online Products Should Be Optimized Through User Analysis

The learner analysis is the core element of the smart learning environment. One of the basic characteristic of smart learning environment is providing personalized learning diagnosis, learning recommendation and learning service based on the individual difference of learners and individual records of learning process. Learning analytics improves the application experience of product via data analysis, and solves the difficulties and doubt as well as problems during learning.

(1) **The product-replacement rate is manifested in the research and development ability of online learning enterprises**. It can reflect the research and development ability of innovative enterprises. If the product upgrade speed of an enterprise is high, it will make a favorable impression of on customers, and gain their affirmation and support %. Generally speaking, the upgrade speed is high (see Fig. 7.7). However, according to the research data the products updated within half a year take up 54%, and those updated within 1 year take up 26.

(2) **Product upgrade promotes industry upgrade**. In the last three years, the online education field has been surging forward vigorously, but cannot avoid problems such as conceptual speculation, misinterpretation of online learning and disdain of learning product design. The upgrade of online learning products could promote the improvement of the eco system of learning industry. For example, one online product remodels the traditional video into the "flipped class" model for learners' self-regulated learning by inspecting the learning effect, taking part in live interactive exercises for improvement, and answering questions and providing solutions at any time for 7 × 24 h.

(3) **Learner analysis is the core factor for the growth of smart learning industry**. The trend of online education is to provide personalized and customized learning services for students according to standard algorithm, system model, date mining and knowledge repository. Based on such services, the specific learning behavior and teaching behavior can be analyzed what can improve the teaching techniques used by teachers, and upgrade the learning behavior of learners. According to the data obtained by the QIAOEIC, the

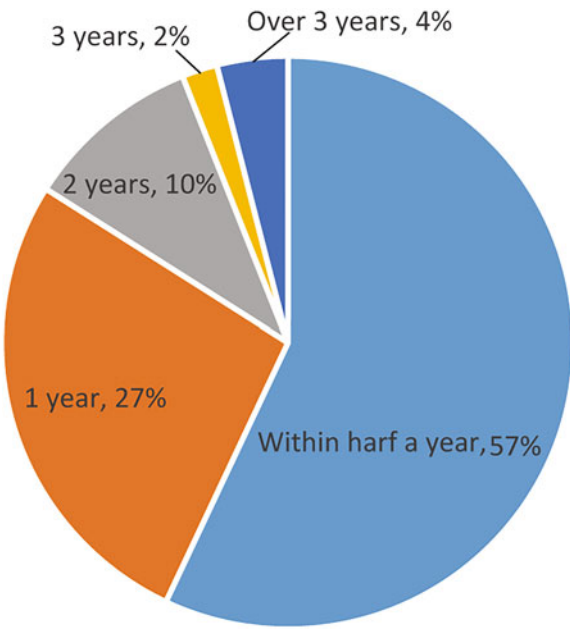


Fig. 7.7 Upgrade speed of learning product

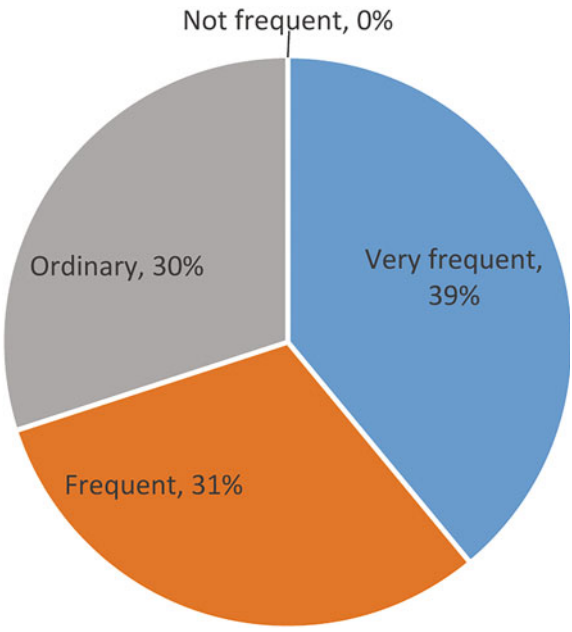


Fig. 7.8 Frequency of learner analysis

proportion of enterprises and institutions that very frequently or frequently conduct learner analysis reaches 70% (see Fig. 7.8). It indicates that in the era of information technology, understanding the user's demands and improving product service through the data mining have become the consensus of most enterprises or institutions.

(4) **Technology for personalized data analysis is in great demand in online education field**. One new opportunity in online education market is the field of technology-driven data analysis. It makes instruction more efficient aiming at learners' short plate through infusing technology into instructional guidance, which is the weakness of traditional offline education and one-to-one tutoring.

[Case] Strategic Partnership of 17zuoye.com and Knewton

17zuoye.com cooperates with Knewton that possesses adaptive learning technology to provide adaptive English learning in China. The personalized demand of each learner is adapted. It applies the personalized data analysis technology to the teaching products through data collection, deduction and suggestion. The cases of importing personalized data analysis technology into online education field are increasing. "100 Education" also imports its self-developed adaptive technology into the vocational education field of global net-school.

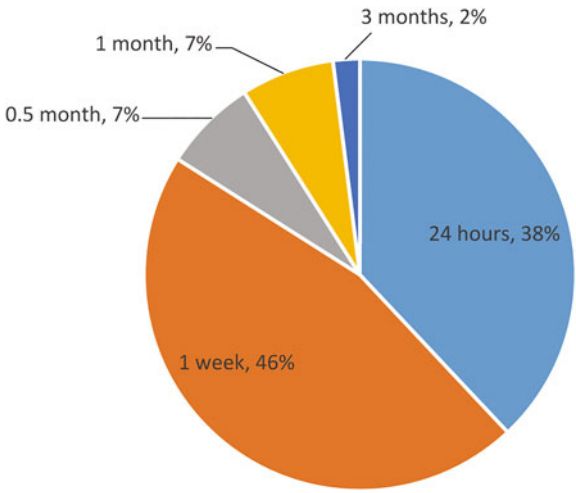


Fig. 7.9 Speed of online education enterprises and institutions to respond to learners' questions

(5) **The speed of solving problems for online education enterprises is becoming important**. Low response speed will reduce the customers satisfaction and decrease their intention to use the service again. The studies on enterprises and institutions offering online education, show that 38% of online education enterprises can respond to learners' questions within 24 h and 46% of them require one week for providing a solution. It indicates that the speed and efficiency of enterprises of learning products to solve learners' questions need to be improved (see Fig. 7.9).

[Case] "Wisdom Teaching Assistant" Robot of Huayu Education

The robot "wisdom teaching assistant" replaces teachers in the classroom, reads textbook content according to curriculum, and solves students' problems at any time. Through its built-in "elite-teacher class" application, students can make remote English learning interaction with foreign teachers in the way of video call through the tablet PC in the robot's head. It solves the problem of "difficulties of innovation teaching, interactive learning and parents' involvement. "Smart learning class" will become the principal model of K-12 classroom teaching in the next 5–10 years.

(6) **The learning system should rapidly respond to the questions and demands of customers**. Online education results in the change of learning behavior: the flipped class gives the initiative to students; answer questions through mobile phone photographing; machines start to infiltrate into the interactive dialogue

summary; hardware is used for educational training, such as understanding the physical world through robot programming; the interaction improves learning efficiency, etc. The learning system relying on technology can respond to customers' demand immediately and provide the required learning resources in the shortest time.

7.2.5 *Bottlenecks and Possible Solutions*

The two ideas of requirement-driven application and application-driven development for digital learning resources proposed in "*National Plan for ICT in Education (2011–2020)*" acted as the guidelines for smart learning market. The Ministry of Education promotes the fusion between information technology and education through "requirement-driven application". It issued a series of documents that provide guidelines for the establishment of online open courses and public service platforms. These applications become the new growth point of the industry.

(1) **The online learning of K-12 Education should apply O2O**. There are several important dimensions to judge the core competitiveness of online education, including concise application, high-quality content, smooth channel and diversified user experience. No matter whether it is K-12, vocational training or studying language before going abroad, more and more students adopt the learning model that includes the Internet products. However, the younger is the age of learners, the lower is their ability for self-regulated learning. Young learners often cannot complete the online courses independently, which directly influences the judgment to online education effect. According to the conclusions of "penguin chi cool" report (Internet cross-border report of second and third class cities in China 2015a) and data from the research of our project team, it can be seen that although online education is flourishing, the satisfaction of users is rather low (see Figs. 7.10 and 7.11).

(2) **Scientific assessment of learning effect contributes should break the bottleneck of industrial development**. There are four levels for the evaluation of learning. The first one is evaluation of reaction, the second one is evaluation of results of learning, the third one is evaluation of behavior, and the fourth one is evaluation of performance. The statistical data obtained by the QIAOEIC way indicate that the key to overcoming bottleneck of industry development is in evaluation of learning effects of online learning courses (see Fig. 7.12).

(3) **Application effect weakens the industry innovations**. In contrast with the flourish of the industry, the popularity at the user level is relatively lag behind. On the one hand online learning industry is still trapped in the lack of interactivity of its products that can not trigger learner's motivation and enthusiasm. On the other hand, the industry is still in the initial stage, and the application level requires further popularity. As for the evolution status of comprehensive

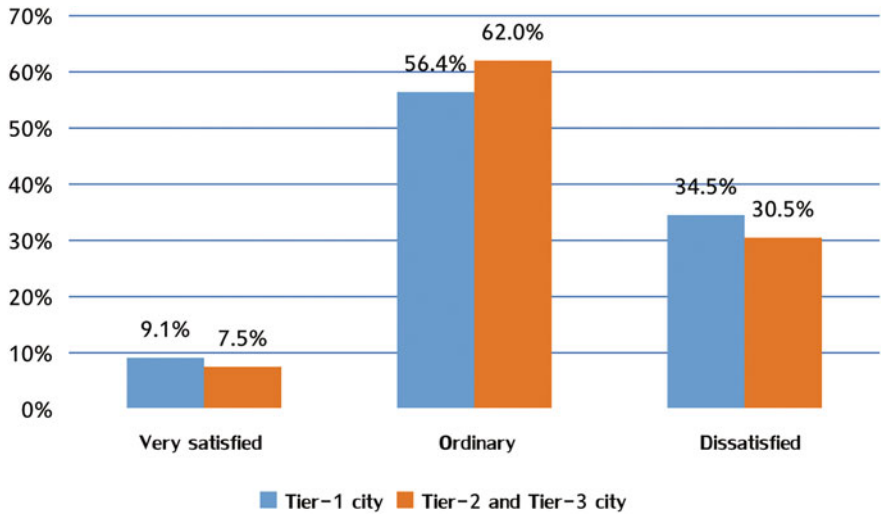
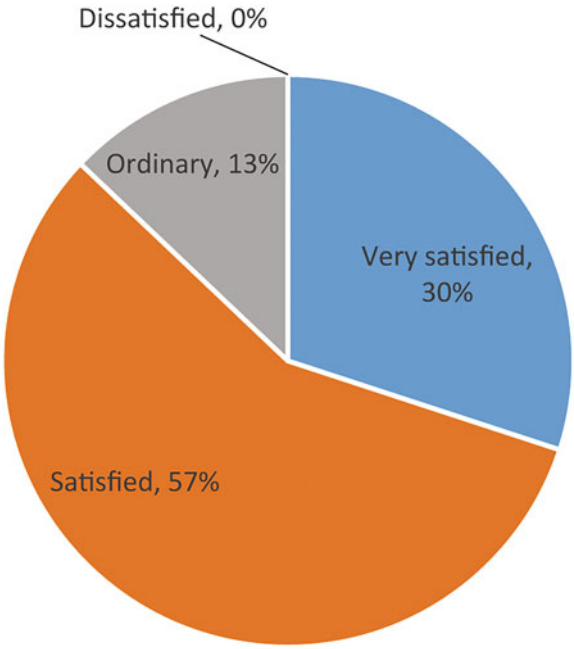


Fig. 7.10 Satisfaction of users in different cities to online education in 2015

Fig. 7.11 Customer satisfaction self-assessment for online learning products



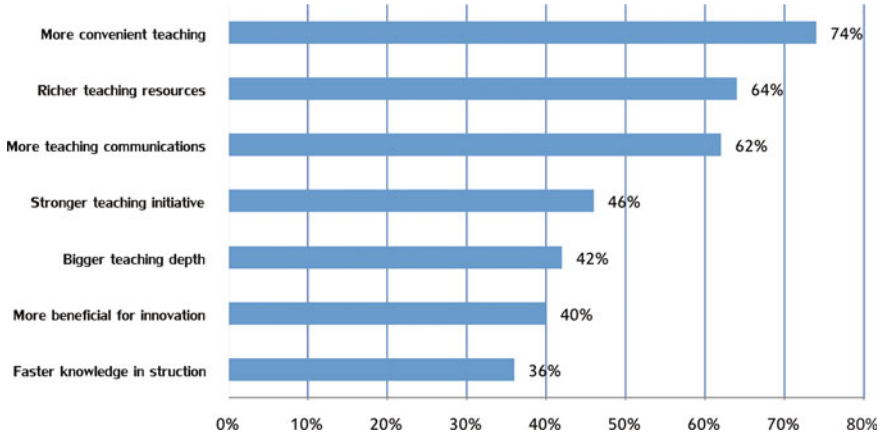


Fig. 7.12 Application effect of online learning product

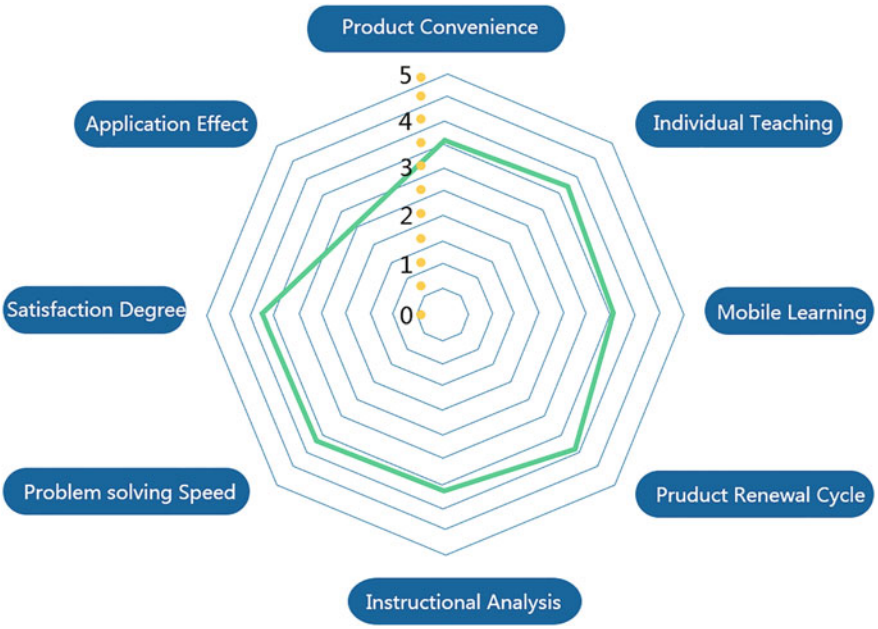


Fig. 7.13 Radar diagram for evolution status of smart learning industry

smart learning industry, the application effect is the weakness of the whole industry. It is a huge challenge to know how to utilize online learning products and improve the expected effect of learners[2] (see Fig. 7.13).

7.3 Map of Capital Investments Supporting the Smart Learning Industrialization

Capitals (investments) have penetrated into every aspect of Chinese education. The statistical data indicate that in the last 10 years there has been a rapid expansion of private education. The educational digitization industry grows at a compound annual rate of 20%. With the popularity of the concept of information society and learning society, capital cooperates with smart learning industry more closely. Therefore, the industrial capital map is formed rapidly.

7.3.1 Open Capitals Getting Involved

One question frequently discussed in the domestic educational circle is what kind of knowledge students need to learn in the Internet era. In the 21st century, the global village constituted by the Internet amplifies the value of learning. Learning has become the foundation for understanding the modern world and adaptation to the society. Learners are moving into the new learning environment, where the industry organizations invested capital to different extents for profits. Smart learning enterprises constantly optimize the learning environment to obtain more market value and business share.

(1) **The industrial chain of online education has been formed** The industrial chain of online education mainly consists of platform suppliers, technology suppliers and content suppliers. One forecast report issued in 2014 by IBIS indicated that the platform, technology and content suppliers account for market shares of 70, 21 and 9% respectively. Though platform gains the upper hand at present, the content will probably play a dominant role in accordance with the future trend (see Fig. 7.14).

The overall netizen scale continues to expand. Online education habit of users is initially formed. The Internet environment is gradually popularized and the mobile Internet is well established. The emerging Internet market with hundreds of billions output has been rendered. Users' demands will directly stimulate the market. Chinese online education market will remain at over 30% growth rate per year in

[2]Data source: White Paper Project Team, comprehensive statistical scores in "Questionnaire Inquiry of Online Education Industry", May 2015.

Fig. 7.14 Online education industrial chain

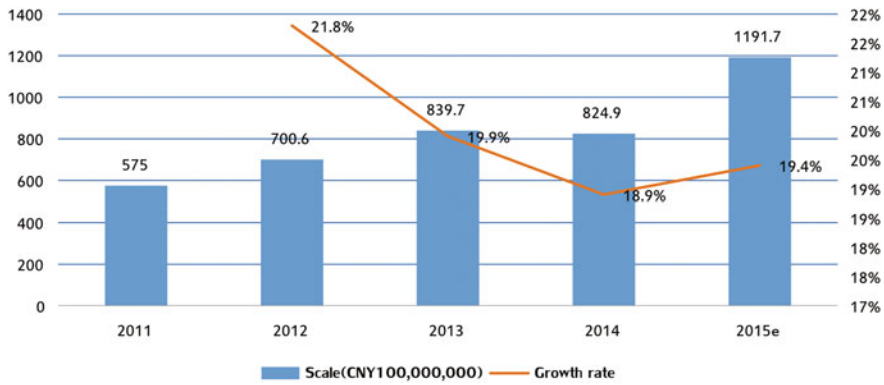


Fig. 7.15 Market scale of Chinese online education

the next few years. The growth rate ranks the second in the world. The market scale is expected to exceed CNY 170 billion in 2017 (see Fig. 7.15).

(2) **Online education has become the new economic growth point**. The financial input into online education in 2014 exceeded CNY 4.4 billion, which resulted

in some obvious changes: the requirement of degree programs decreased, language training courses were getting increasing attention, and the awareness for K-12 education rose steadily. Online education products of language training and K-12 education developed rapidly.

(3) **Online education gains the favor of the capital investment**. The capital's awareness is a key indicator of a certain product or an industry's value. Investment in online education in 2012 presented a trend of compound growth. Online education platforms have become the hot spot of capital market, such as SmartStudy invested by Baidu, VIPABC invested by Alibaba, "Wanmen University" invested by Renren company, and the 91waijiao.com invested by Netease, etc. The intervention of capital market has brought new vitality for this industry. Some investment cases in 2013 and 2014 indicate the attentions of capital to this field (see Fig. 7.16).

(4) **The cross-border trend of smart learning industry is obvious**. BAT (i.e. Baidu, Alibaba, Tencent), as the big three market players firstly seized the business opportunity and entered the field of smart learning, BAT adopted the "self-establishing + investment" way, bringing funds, talents, technology and ideas for the industry. Smart learning industry is a developing sunrise industry with bottleneck and deficiency, which needs the common participation of social forces for solutions. Cross-border enterprises bring new ideas and thoughts, promote resources to flow naturally towards the value low-lying land of learning industry. Four main types are formed: platform-based trans-boundary, central trans-boundary, value-added trans-boundary and integrated trans-boundary (Fig. 7.17).

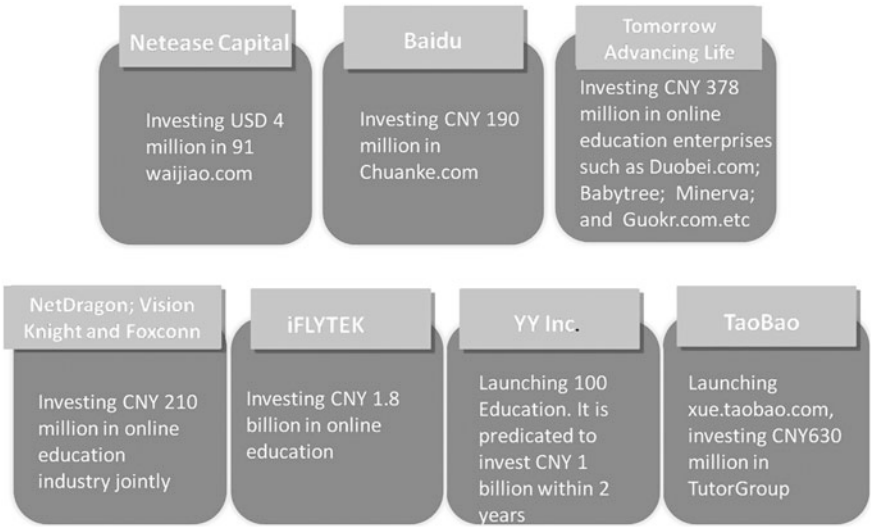


Fig. 7.16 Several investment cases of internet enterprises and education institutions in 2013–2014

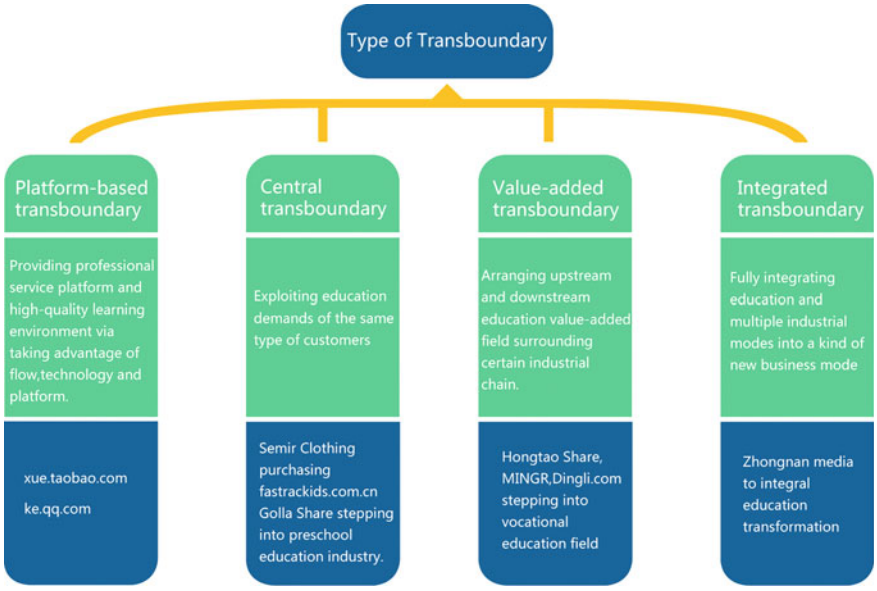


Fig. 7.17 Main cross-border types of online education industry

(5) **The business type of A share market presents 5 echelons**. From the perspective of main enterprises of online education concept stock, enterprises involved in online education in the capital market mainly include: enterprises specialized in traditional home-school interaction field, enterprises participating in information construction of schools, software enterprises based on education, enterprises providing technical support such as audio video tools, and enterprises providing broadband and terminal support. As for the representative enterprises, there are traditional enterprises in non-educational field, and also the Internet enterprises with leading technology, with an obvious cross-border trend (see Table 7.2).

(6) **The diversified cross-border of online education represents two models**. One is light cross-border model. It sets about from users' demands, without store input in short term. It is favored by the investment market and the typical representatives are 91waijiao.com, jikexueyuan.com.; The other is heavy cross-border model, that combines traditional teaching resources, methods, theories with Internet channels and innovative experience. It reconstitutes teaching and learning model through 020 innovation modes. The typical representatives are Xueda Education, New Oriental and Tomorrow Advancing Life.

Table 7.2 Five types of online education concept stock in a share market

Type	Content	Representative Share
Type 1	Traditional enterprises specialized in home-school interaction field possess the channel advantage for in-depth contact with schools and parents. They are expected to cooperate with the content enterprises in the future	Qtone Education, Talkweb
Type 2	Participate in the information construction of the Ministry of Education and schools, and provide the cloud-based platform and relevant technical support	Tianyu Information, Huaping Stock, Central South Media
Type 3	Develop more online education contents based on educational software and positive transformation	Fangzhi Technology, New Southeast Asia, Gehua CATV Network, Sumavision
Type 4	Provide technical support for audio video tools	InterPhonic
Type 5	Provide broadband and terminal support, and establish smart education platform	Dr. Peng

7.3.2 Industrial Shuffle Motivated by the Capital Participation

With the acceleration of the digitization in education industry, the concept of "Internet+" gradually enjoys popular support. Online education attracts capital investments. Meanwhile, the high dispersion status of this market provides good opportunity for capital to cultivate the biggest online education companies. Capital seeks the "quasi-oligarch" that may get the monopoly in certain field. The industrial shuffle is aggravated.

(1) **Online education industry enters the new stage with the coexistence of opportunity and crisis**. When the capital is flooded in, the crisis of smart learning industry starts to emerge. More and more enterprises and investors outside the education field enter the market, thus resulting in waves of failures. There are over 30 failure cases in online education filed in 2014. When users are not fully cultivated, capital inflow promotes enterprise and institutions to follow, and the Matthew Effect of the industry gradually emerges. Enterprises with potential gain multi-round investment, while institutions without profit model or capital background are in difficulties.

Since 2013, 692 projects have constituted the panorama of online education industry in China. 89 online education projects have gained investment with the investment amount over USD 560 million and 57 of these projects have stopped operation (see Fig. 7.18). The Internet severely impacts the offline training organizations. In the context of market, it is predicted that the scale will exceed 10,000

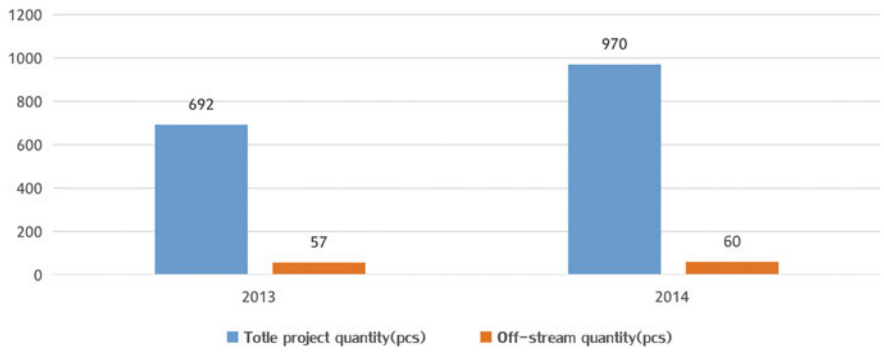


Fig. 7.18 Contrast between total project quantity and off-stream quantity of online education in 2013–2014

in 2015. How the capital injection can improve the education industry will be an ever-existing topic.

(2) **Capital oligarchy effect is initially manifested**. The development of online education is in a subtle transformation period in the information society. The intelligent hardware, Internet of Things (IoT) and big data, etc. have not been truly popularized and applied. However the mobile lifestyle of O2O and APP, etc. and innovation model are becoming things of the past. The smart learning environment taking online education as the main manifestation is one the fields that are not fixed by patterns. With the aggressive cross-border of BAT, the enterprises with educational gene will compete with the enterprises with Internet gene at the levels of operation mode and profit mode, etc. Under the impact of the Internet, industries are divided and demoralized gradually. Capital begins to put its efforts into oligarch cultivation in this field.

[Case] VIPABC where Alibaba as the leading investor gaining the largest financing case of online education

Alibaba, Temasek and Qiming Venture invested USD 100 billion in the Round B financing of VIPABC in the beginning of 2014. VIPABC provides a teaching environment that takes good students as the center. It has provided over 5 million online courses with live teachers and high-quality nature language teaching environment for more than 40 countries. Meanwhile, VIPABC can solve the issue of teachers, narrow the gap between urban and rural education, and satisfy rural learners to obtain good education and provide them with the opportunity to understand the world in a more convenient way.

Alibaba ranks education industry in the first place among the list in the investment plan in the next decade; Tencent is engaged in creating a mature remote

education system; Baidu will complete market segmentation by the capital injection in Chuanke.com. As for the huge market and particularity based on online learning industry, the model dominated by only one strongest oligarch still remains to be seen. However, it cannot be denied that the intervention of capital market will accelerate the maturity of online education market. In addition, the closed-loop ecological construction-oriented enterprises and institutions will appear on the E-business platform that holds the advantages on flow and entrance.

(3) **Industrial shuffle will continue**. When online learning industry expands rapidly, the homogeneous competition is increasingly fierce. Every day 9 online education projects and 2.6 new APPs are released. In the "only the first, no the second" mobile Internet age, the competition in online education field is more cruel than in other fields. In the *Research Report on Chinese Education APP Industry Development and Users' Behavior in 2014* released by Sina Education, the educational APPs for foreign languages and exams are most frequently used (see Fig. 7.19). By the end of 2014, there were more than 70,000 educational APPs, which rank the second among the application types, after game application in the mobile phone application stores.[3]

(4) **The deep perpendicularity accelerates the industry differentiation**. Internet has brought high homogenization of products and services. The homogenization phenomenon is especially obvious in online learning field. Meanwhile, competition forces enterprises and institutions to make constant transformation, subdivide users' demands, and select the direction with large quantities of user groups for intensive efforts. In such process, industrial chain accelerates the differentiation. The division of labor is more and more elaborated in such a way that it forms durable and irreplaceable core competitiveness.

(5) **Industry shall return to the ultimate source of education**. The important mission of the online education is to motivate people for learning, exploration of knowledge and pursuit for happiness. However, the educational behavior derived from the Internet at present puts too much emphasis on teaching as about 99% of enterprises still stay at the teaching level. The learning behavior is highly utilitarian. Online learning shall change the traditional learning concept and learning behavior via advancing the quality-oriented education, to make learning the basic skill of each person.

7.3.3 Capital Is Interested in Profit Model of Online Education

The key issue for online education at present is the lack of clear business and profit models. The profit model is relatively complex. As for the future industry structure,

[3]Data source: Sina, China's Education on Fingertips—Education APP (Application Software) Assessment Report, November 2014.

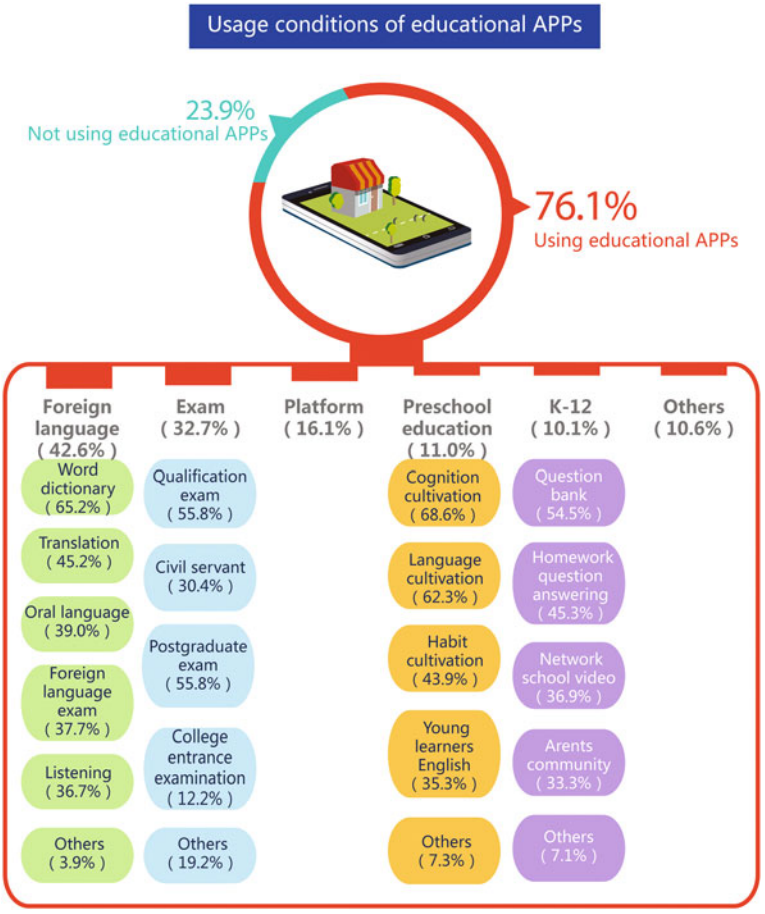


Fig. 7.19 Usage conditions of educational APPs by classification

diversified situation will appear, presenting "platform + vertical industry" dual-wheel-driving state.

(1) **New profit models are created on the basis of traditional charging model**. The profit of domestic online learning industry mainly relies on five charging models: content charges, service charges, software charges, platform commissions and advertisements[4] (see Fig. 7.20). To attract users, learning products launched by many platforms are free of charge. But, free-of-charge has no

[4]Data source: Industry Information Network, Research Report on Network Education Market Investigation and Investment Potential in China in 2012–2013, 2016.

practical significance to the sustainable development of enterprises. With the industry popularity and the formation of users' habit, endow products with payable value based on the original platform to provide quality service will become the profit points.

(2) **The differentiation of profit models originates from the variation of business models**. Mobile terminals are superior to PC terminals in terms of learning progress, voice interaction, interface design, etc. Users possess the awareness to pay for high-quality contents. The main profit points of platform-based enterprises and institutions are proportional to the distribution of income and advertisement. The charges for educational products mainly depend on course contents. Each industrial subject is exploring new profit path on the basis of traditional charging model.

(3) **The main characteristic of industry is long term for profit**. Though it is actively welcomed by capital, the overall profit model of online education is still under exploration. Many new startups generally adopt the path that firstly gains customers and then considers profits. The high cost of obtaining customers has become the core reason. The cost for obtaining customers in online learning generally takes up approximately 30% of total cost, nearly the same with the cost of obtaining customer of the offline traditional learning institutions.

[Case] MOOCS: positively exploring new profit model

MOOC stands for massive open online course, which reflects the core of online education to certain extent: to solve problems via knowledge, and gain cashability via high-quality service. MOOC platform enterprises are still exploring more feasible profit model: Lynda adopts user subscription model; Courser gains profits via course-completion certificate. All its online courses are free of charge. Certain cost shall be paid if the course-completion certificate is needed after all the courses are learned. In addition, the payable counseling on job-hunting, degree awarding and advertisement, etc. are the profit models positively tried by MOOC.

(4) **K12 profit model includes two levels of teaching and learning**. From our analysis via Kirkpatrick Model and product perpendicularity, the products in the current market can be divided into 4 types of point-cuts: teaching assignment, exercise, and tutorial (Power Education 2014) (see Fig. 7.21).

(5) **The Chinese online education industry is still at the stage exploration for the product model**. Product model determines the profit model. The product model of "teaching point-cut" mainly serves teachers. Teachers represent the teaching faculties in school organizations, which mainly manifest B2B (Business to Business) business; "assignment point-cut" serves both teachers and students, which manifests B2B and C2C (Consumer to Consumer) business; "exercise point-cut" mainly serves families and students, which manifests

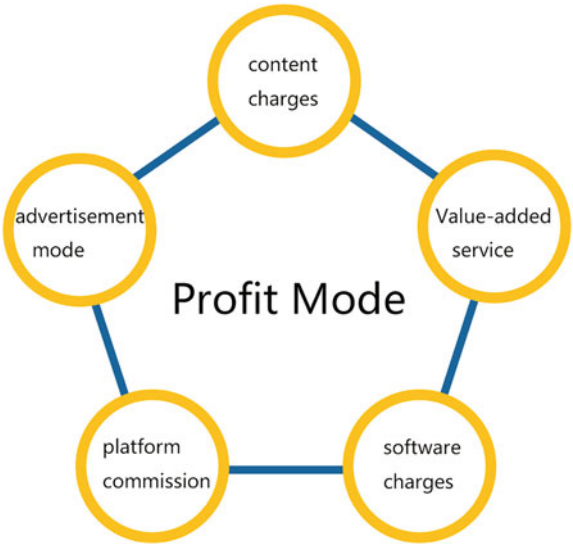


Fig. 7.20 Types of profit models of online learning industry

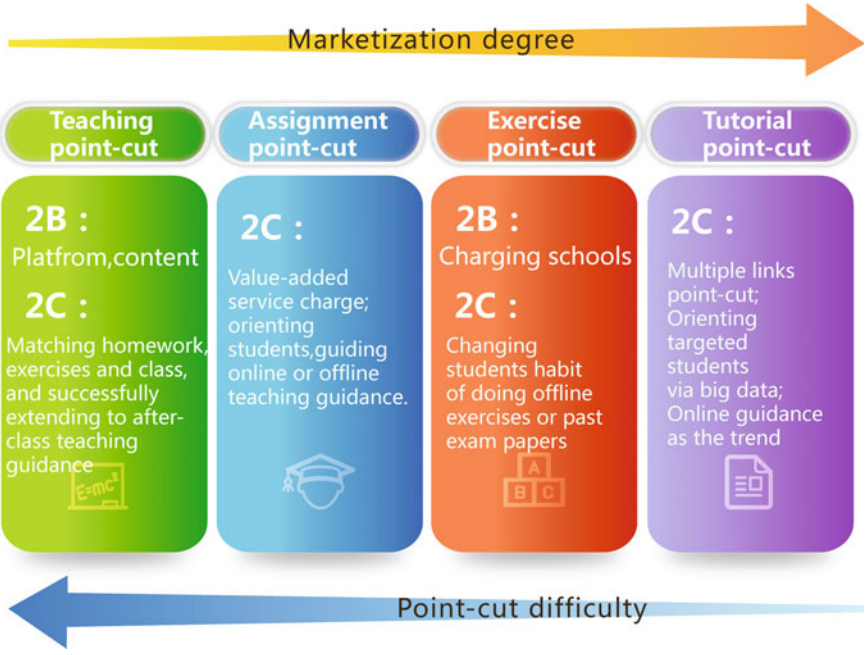


Fig. 7.21 Profit model of point-cut products

C2C business; "tutorial point-cut" gets through online and offline. Online is to position learns' behavior and purpose, and offline is for orientation guidance, assessment and inspection. The industrial chain of the product form that takes school teaching as the point-cut is the longest. No matter which kind of model, there will be steady profit model only after the industrial chain being connected through.

7.4 Growth Analysis of Smart Learning Industry

There are three characteristics of the school learning system: government's overall consideration as the compass; market mechanism as the sally port, multi-participation as the overall context. Meanwhile, the industrialization of smart learning plays main force to accelerate the city development.

7.4.1 Industry Development Is Supported by Relevant Governmental Policies

With the in-depth advancement of the learning society, learning community, and learning city the government, become a powerful factor in promoting lifelong learning. Local governments and functional organization gradually increase their awareness, and establish specific measures and action plans promoting constant upgrade of the industrial layout of smart learning. At the national level, the policy of "Mass entrepreneurship and innovation" promotes the associated index such as knowledge, learning, innovation and happiness to be unified with living index; in the city level, various policies that are suitable for the young to start business, retain high-level intellectual talents and aim at "city and industry integration" are released in succession.

(1) **National policy: "Mass entrepreneurship and innovation" renovates and updates China's economy**. The "commercial registration system" reform carried out by the State Council, the series of policies for the reduction of reserve requirement ratio and interest oriented medium, small and micro-sized enterprises, and the measures that permit undergraduate students to be temporarily absent from school to start business, etc. to aim to lower the threshold of startup and upgrade entrepreneurial vitality. Teaching and learning industry, as the high-end smart industry, becomes one of the main directions for entrepreneurs. The implementation of "Mass entrepreneurship and innovation" results in two obvious changes: firstly, it promotes the renovation and update of economy; secondly, it promotes the expansion of learning and innovation market.

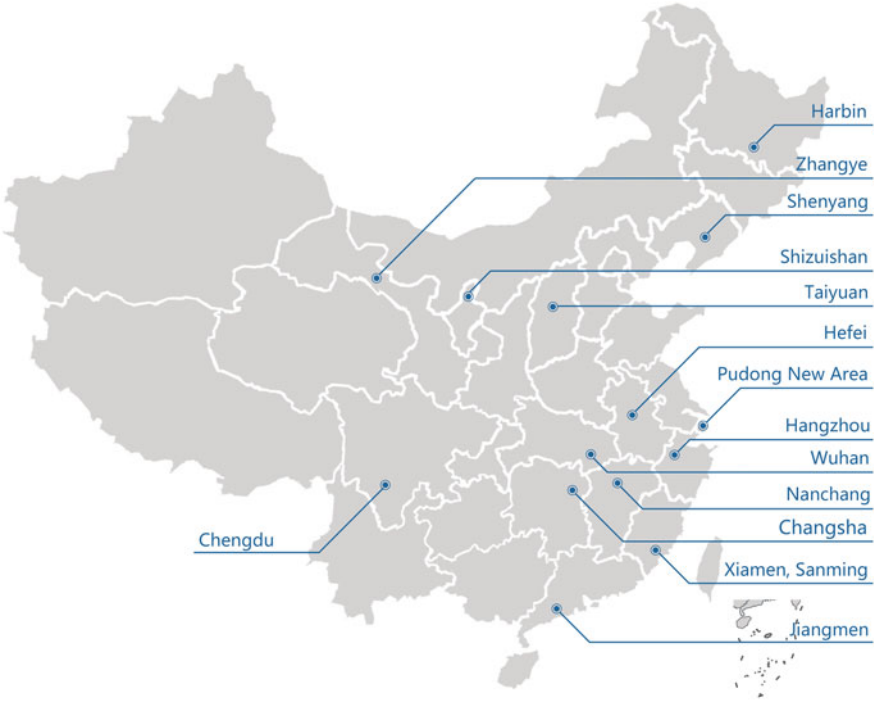


Fig. 7.22 Top 15 cities among the first group of "Mass entrepreneurship and innovation" demonstration

The Ministry of Finance, Ministry of Industry and Information Technology, Ministry of Science and Technology, Ministry of Commerce and State Administration for Industry and Commerce listed the top 15 cities as the first group of "Mass entrepreneurship and innovation demonstration" in June, 2015 (see Fig. 7.22). The "Mass entrepreneurship and innovation" demonstration cities put efforts to solve the outstanding problems of "the last mile". Focusing on the development of small and micro-sized enterprises, it explores how to establish the new mechanism by which the governments could support development of small and micro-sized enterprises.

(2) **Urban policy: the youth is the vital force for urban development**. The cities that are attractive for the youth possess two features. On the one hand, there is a good employment and entrepreneurial environment, which provides working and entrepreneurial opportunity. On the other hand, there is a relevant infrastructure and good social environment that meet the demands of the young for leisure, knowledge and recreation. The vitality of the city and the quantities of the young people living there promote mutually and interact with each other. Vibrant cities can retain the youth, and the young create value for the development of such cities and promote their upgrade.

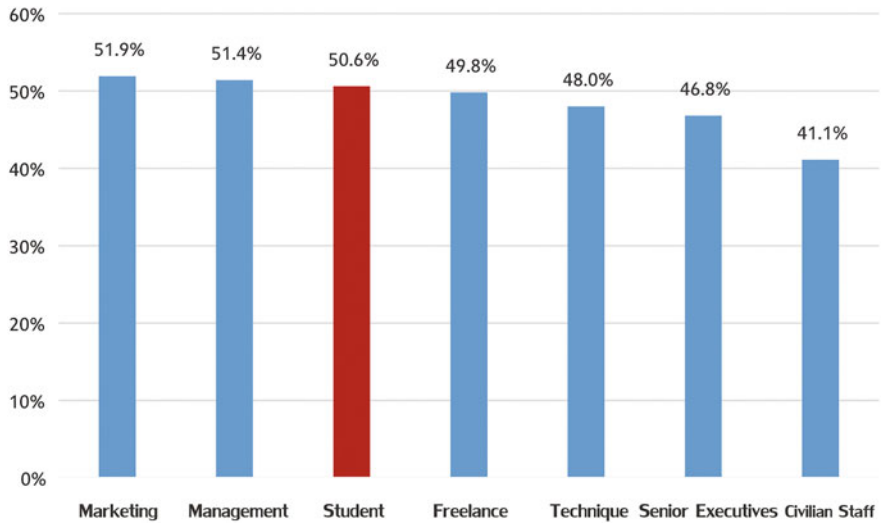


Fig. 7.23 Possibility of entrepreneurial potential of different population in China

Students are becoming the new main force for "dual-startup" of cities. According to *Entrepreneurial Potential Investigation of Population Segment in China*,[5] people aged 21–30 present larger entrepreneurial potential. Students rank the third in terms of entrepreneurial potential. These Internet natives will play a dominant role in forming new living and learning way in cities[6] (see Fig. 7.23).

(3) **Industrial policy: a large quantity of newly-established enterprises emerges**. Among the over 200 best sellers of educational application software in China, the sales of application software for preschool education takes up approximately 60%.

The newly-established enterprises of online education can be divided into: tool platform, flow platform, question bank, online preschool education, online assessment, curriculum schedule and terminal tool. In terms of the main audiences, the white collar employees with strong demands for improving vocational ability, and the students of K12 education, are still the mainstream groups (Sohu Education 2014) (see Fig. 7.24).

[5]Data source: Penguin Intelligence, *Entrepreneurial Potential Investigation of Population Segment in China*, Samples: 57375 pieces, January 2015.

[6]Data source: N = 43604. The ratio calculation: population with more entrepreneurial ideas in this profession/the total investigated number of people in this profession. Other options are excluded.

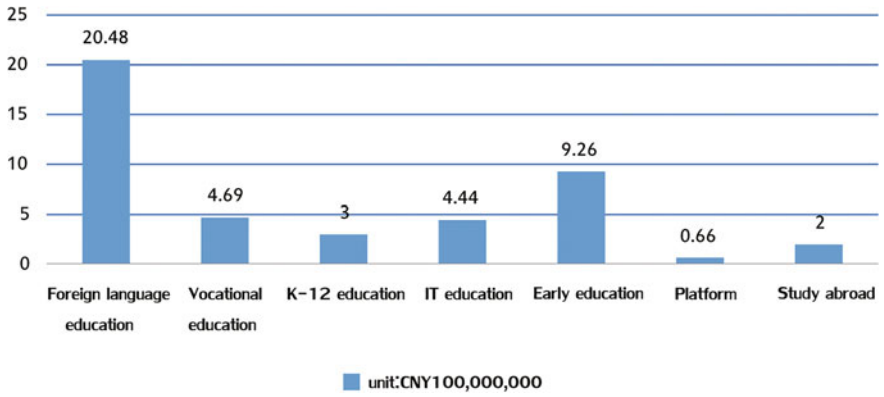


Fig. 7.24 Investment amount for the financing of each field of online education in 2014 (*unit* hundred million RMB)

7.4.2 Smart Learning + Industry as a Key Indicator of a City's Soft Strength

As the tool connecting members of information society, the Internet can effectively link teachers, students, parents and administrators. At the intelligent terminal level, such subjects can enjoy the learning environment at any time, place and in any pace. The structure principle of smart learning in a city includes 4 factors: intensive degree of cities' infrastructure, the asset-light coverage, the modern vocational educational system, and in-depth transformation of smart education and learning environment.

Principle I: Development of urban information infrastructure impacts the merits and demerits of smart learning environment. The input and layout of smart city in public educational facilities manifests the overall consideration of municipal administrators for digital soft power and city comprehensive competitiveness. The convenience, intelligence and efficiency of learning environment can be fully manifested in cities with perfect city infrastructure, including road traffic, residential buildings, environmental landscaping and educational facilities, etc.

Principle II: Light asset industry is a component of city industrial type. The epitome of city industrial value is the irradiation effect of high growth and high value-added industry. The teaching and learning industry belongs to light asset industry, fitting the innovation demand of the Internet. The future integration of urbanization, industrialization and Industry 4.0 will be manifested not only in economy and social security, but also in education and learning.

Smart city industry has reached each link of the industrial chain. Some actions of the state such as the Internet, Internet of Things (IoT), smart city construction, Internet + action and made in China 2025, etc. have been constantly creating new

Fig. 7.25 Asset light industry types of city

types of business. Such new types of business will be overturned, divided and recombined into emerging ones in the general trend of the Internet thinking and cross-border integration. The emerging types of business dominated by asset light industry (National Vocational Classification Collection of the People's Republic of China 2015) are the beneficial supplement of manufacturing industry (see Fig. 7.25).

Principle III: Modern vocational education is the fresh force of city educational system. The rise of vocational education has become the essential trend. Firstly, labor force in city is structurally unbalanced. The ability to fit the professional development shall be enhanced through constant learning. Secondly, there are favorable policies as several draft amendments about educational laws were discussed and passed at the executive meeting of the State Council in January, 2015. The establishment at the level of laws for the commercial private education institutions will further promote the industrialization of education to become the normal status. In terms of the development of private education, various cities have issued encouraging policies in succession. Shenzhen has incorporated the development of private education into the overall planning of urban development (Shenzhen Special Zone Daily 2014).

Vocational education takes up 29.8% market shares in the overall Chinese Internet educational market (Analysys International 2015), what ranks it as a second after higher education. In this market, users have higher learning motivation, and stronger willingness to pay. Specifically, the enterprises of Internet vocational educational market are mainly divided into 6 types (see Fig. 7.26).

Fig. 7.26 Main types of internet vocational educational market

Principle IV: The learning environment of smart city needs in-depth transformation. The design of smart learning environment shall fully support the school education, vocational education, skill training and social cultural education. In the process of the rapid development of smart city, urban development will be impacted and limited to different extent by the lack of learning environment design, the improvement of citizens' moral quality and the overall image of urban brand. In the process of urban integration, the differences in learning environment among cities will in the future widen the competitiveness gap.

[Case] Shanghai: the forerunner of "MOOC" in China

Pudong New District of Shanghai is one of first experimental pilots for smart cities and is also the forerunner of "MOOC" in China. Shanghai deeply transforms the learning environment of urban residents mainly through 3 approaches. The first approach is Shanghai Micro-school, a large-scale smart learning platform for all learners. Each learner possesses a lifelong learning account. Various learning achievements of residents can be accumulated and converted; the second approach is course resource sharing platform of Shanghai colleges and universities, which gathers the power of the government, schools and enterprises. It is also faced with the bottleneck for interaction-interaction solutions; the third approach is educational data center, which offers help for educational scientific decision through the analysis on the learning demands, habit and effect of learners.

7.4.3 Industrialization of Production of Learning Content

(1) **Content is the key point to convert the traditional learning into smart learning**. According to *Online Education prospect and Hot Spot Analysis Report* (2013), the first factor decreasing the usage of online educational platform is "boring course content". To be welcomed by more learners, online education must improve the level of interaction between the user and the platform, what may increase enjoyment of course content and enhance the user's experience (see Fig. 7.27).

(2) **Different groups of people have different demands for the learning contents**. The content is the key to attract learners. Learners of different age have different demands regarding the content. What may appeal to students utilizing smart learning may include: instruction after class, interest and specialty learning, foreign language skill and computer skills. What may appeal to employees are: vocational skill, professional knowledge, various areas of interest and hobby, practical living skill, etc. Learners have imperious demands on superior contents[7] (see Fig. 7.28).

(3) **The development of learning content should consider the cross-platform operation**. It is in the transition period from E-Learning to M-Learning. PC and mobile equipment, as the output terminal of learning, will remain still in parallel state for the next few years. Meanwhile, there are will be new operating systems developed for the mobile terminals. However, when each operating system is developed for once respectively, the development cost will inevitably increase. The additional cost will be finally paid by the learners what will affect their selection preferences Therefore, industrial subjects need to think the "developing for once, using in multi-environment" for course contents.

(4) **The innovative teaching models are important for the development of contents**. Innovative teaching methods can break through the limitations of time and space, promote transformation of teaching models from the isolated ones to an open ones, and promote transformation of learning behavior from the inattentive one to a self-conscious one. There is also a need of transformation from the well-structured classroom teaching, to semi-open blending teaching, and to the fully open socialized teaching, that will change the structure of the relationship between teachers and students. For example, the flipped class constitutes a semi-open teaching and learning system; MOOC's character of networked and socialization manifests in-depth collaboration and open teaching.

[7]Data source: Netease Education and Youdao Dict (2013): Report on Online Education Trend in China in 2013–2014.

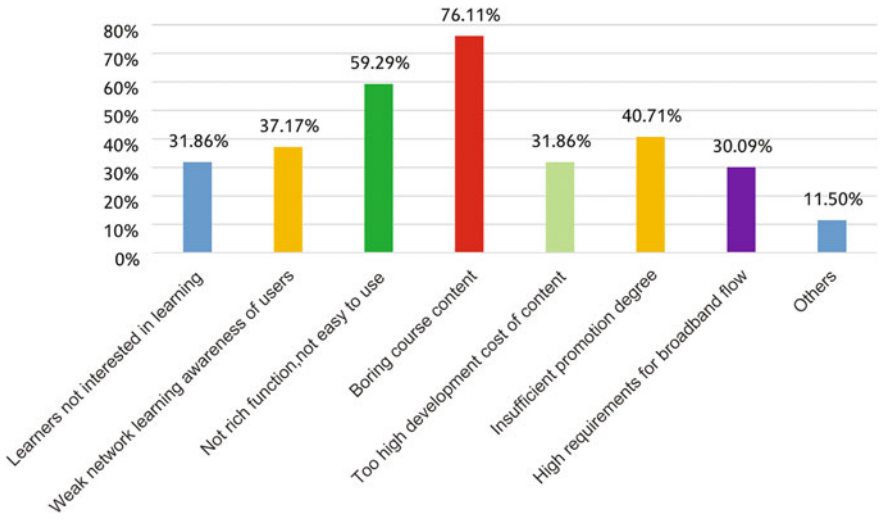


Fig. 7.27 Influence factor on the usage of online educational platform

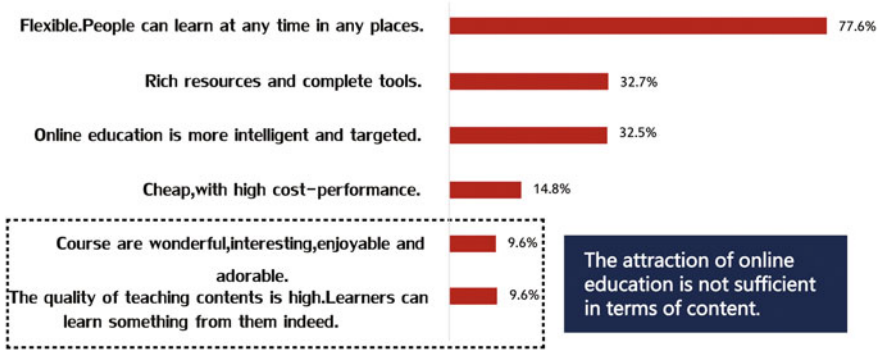


Fig. 7.28 Content insufficiency of online education

(5) **The innovative model of smart learning utilizes superior learning resources**. It equips learners with dynamic self-development ability through use of advanced science and technology. For example, the "smart information factory mode" of Google search engine can solve the problems that cannot be settled by individuals. This allows learning contents be spread more broadly.

7.4.4 Evolution and Reconstruction of the Industry Chain

The layout of the overall smart learning industrial has been already started. It is not only the key industry that the Internet seeks to overturn, but also the mainstream of the new economic entity in the future. **Smart learning industry is involved in the two aspects of traditional education: industrial chain and socialization learning industrial chain**. Their rise will not only impact the traditional education industry, but also result in new industrial models. The current integration period is the stage that various parties scramble for market positions.

(1) **Traditional education industrial chain enriches the connotation of city industry**. Taking "government-school-family" as the subjects, the government-dominated traditional education industrial chain is in an urgent demand for new elements, new concepts and new markets. The B2B2C closed-loop ecology of education industrial chain is formed rapidly, which is manifested in two aspects: firstly, due to the openness of industrial field and industrialization trend, increased number of participants, and market segmentation are obvious. Original resources are fully vitalized. The industrial pattern is formed, taking the industrial capital-upstream-midstream-downstream as the bond; secondly, taking students as the center, the industrial chain expands laterally, with innovative capital, integrated resources, extended channels and rich contents. It covers each level of learning subjects, meets the lifelong learning demands and riches the connotation of city industry (see Table 7.3 Education Industrial Chain).

(2) **Education industrial chain is gradually integrated with the socialized industrial chain**. The city-class education industrial chain is at the key period of exploration, integration, innovation and collaboration. At the capital level, it is mainly manifested by two aspects: capital management and capital cooperation. At the upstream of industry, it promotes the conversion rate of education resource through the integration and creation of resources. It also results in innovative supporting services. At the midstream of industry, it is pivotal to connect the provider and demander of education; At the downstream of industry, the number of demanding learners is constantly increasing, what in the future will promote the upgrade and transformation of the industry.

(3) **The family, society and government jointly upgrade the industrial environment of smart learning**. Industrial environment and industrial pattern promote mutually. Firstly, the government, school and family jointly create an open and comprehensive industrial environment. Secondly, technology, market and enterprise form the joint force to promote the development of industry Thirdly, the self-innovation of industrial environment and the active adaption of industrial pattern promote each other, and jointly purify the smart learning environment (Fig. 7.29).

(4) **Three models reconstitute the industrial pattern of education**. Before the rise of smart education, the attraction and profitability of Chinese education industry decreased as a result of wrong industrial policy and deficiency of

Table 7.3 Education industrial chain

Industrial capital		Industrial upstream		Industrial midstream		Industrial downstream	
Capital governance	Stock, financing, investment, management and withdrawal …	Resource integration and creation	Site equipment, Material items, participants, resources in system, products, clients …	Resource aggregation and utilization	School center, tutorial institution, online platform, Expo procurement …	Institution	Government institution, traditional education, Internet enterprise, vertical platform, research association …
Capital cooperation	PPP Government + school, School + society, Society + society …	Supporting service innovation	Technical platform, content channel, information consultation, added value …	Alignment of upstream and downstream	Investigation planning, consulting evaluation, e-business enterprise, added value …	Individual	Students' parents, workers, specialists and scholars, the senior and children …

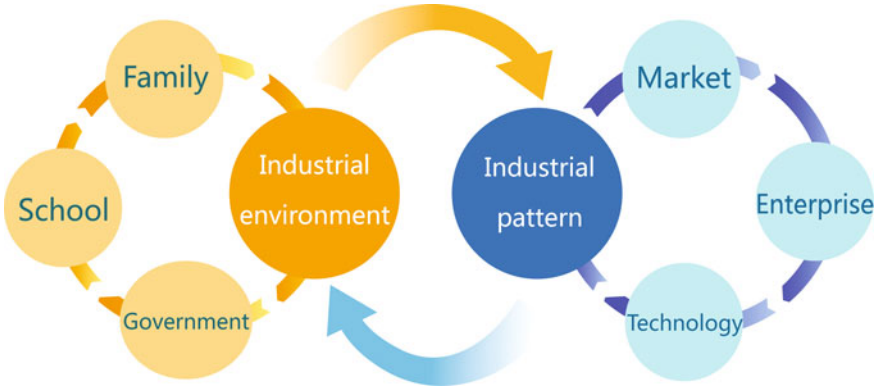


Fig. 7.29 The role of family, society and government in facilitation of smart learning

business model. Since the rise of smart education, the education market has been gradually open. Accordingly, three learner-centered mainstream industrial models emerged: traditional model dominated by ICT in education, Internet model dominated by Internet enterprise cross-border, vertical model dominated by professional cyber-schools. They lay the foundation of market-oriented industrial development pattern (Fig. 7.30).

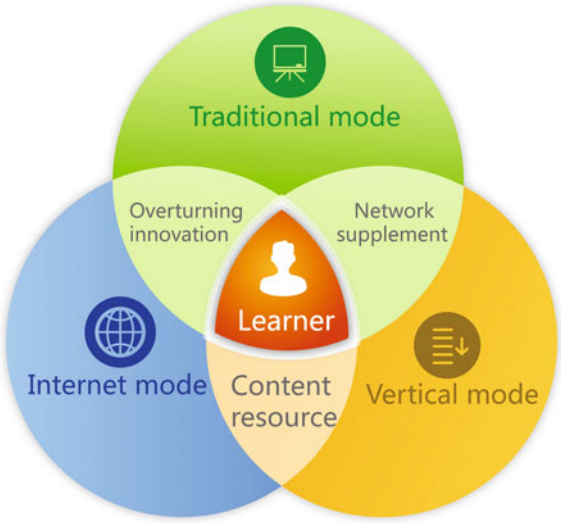


Fig. 7.30 Relationship of the three models

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