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The Long Tail Thesis: Conceptualizing China's Entrepreneurial Practices in Fintech and Electric Vehicles

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Abstract

Purpose- This paper explores the functionality of long tail markets (LTM), where the consumers cannot be reached or are ignored by the traditional mainstream businesses, in new products and business development.

Design/methodology/approach – First, we review two Chinese entrepreneurial practices in the Fintech sector and low-speed electric vehicles (LSEV), and describe their stylized facts; second, we explore a possible theoretical LTM framework to underscore these practices; third, we make a connection between LTM and existing business models, and analyze its significance and practical implications in business, in particular, in developing economies.

Findings – The LTM business approach has helped Chinese companies in the Fintech sector and LSEVs gain global attention. The success factors of LTM for businesses are identifying a specific customer base, being aware of localization products, and playing skilfully with regulations; the LTM approach has several overlaps with existing studies on niche products and BOP market.

Originality/value – Based on some emerging and attractive business practices in China, this paper offers a valuable attempt to theorize them as long tail phenomenon. The LTM thesis provides a potential framework to reference for similar methods elsewhere and may illuminate entrepreneurship to be explored in similar markets.

Keywords Long tail markets, Fintech, Low-speed electric vehicles

Paper type Research paper

1. Introduction

This paper explores the functionality of long tail markets (LTM, hereinafter) in new products and business development through two Chinese cases: the Fintech sector and low-speed electric vehicles (LSEV, hereinafter). LTM are characterized by a constellation where consumers featuring lower purchasing power cannot be reached or are ignored by traditional mainstream businesses. There exists a rather short history of academic studies concerning themselves with long tail market sales of niche products

(Anderson, 2004; Brynjolfsson, Hu, & Simester, 2011), and the significance of niche customers at the base of the pyramid (BOP, hereinafter) in technological innovation (Gebauer et al. 2017; Hart & Christensen 2002; Kolk, Rivera-santos, & Rufín, 2014; Prahalad 2004). In this contribution, the above-mentioned business models are analysed in their capacity to engage niche customers and leverage them for the marketization of emerging technologies and new business models. By focussing on niche customers these firms open new markets out of reach for incumbents and their firmly established business models.

In this study customers are divided in two groups according to their average market values (AMV): head customers and long tail customers. The core incumbents usually only pay attention to the head customers with high AMV and high-powered purchasing behaviour. In comparison, long tail customers feature only low AMV and demonstrate only restricted purchasing patterns. See Figure 1.

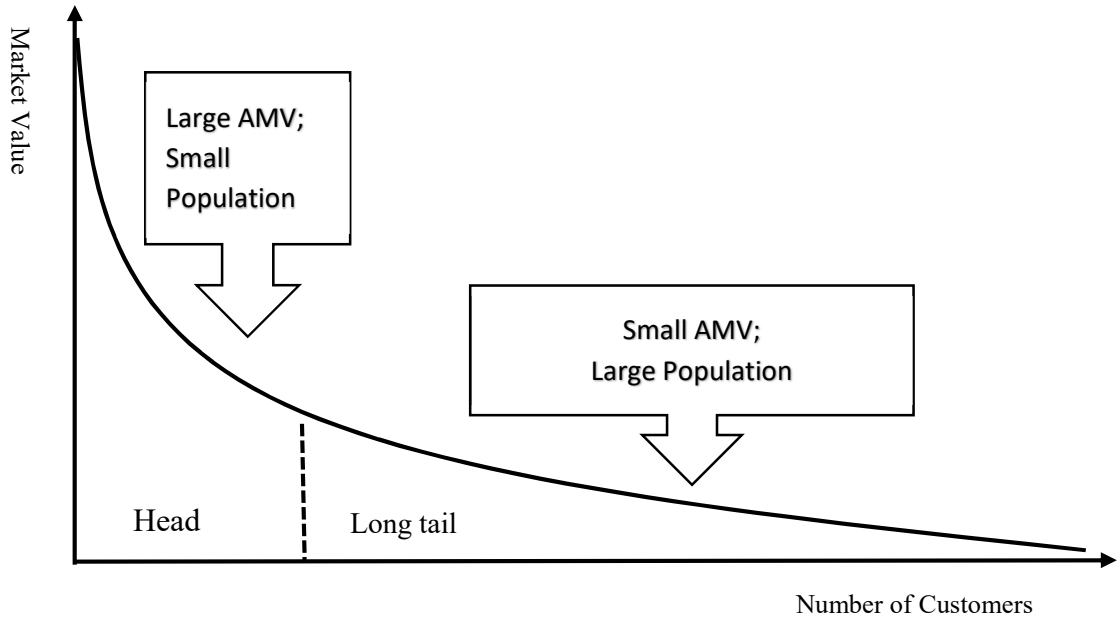


Figure 1 Illustration of long tail market

In terms of absolute market population, customers in LTM may have a share of up to 80%; however, mainstream market companies may not be willing to engage with LTM consumers. For them, marginal returns of LTM are too small to outweigh the higher marketing expenses per customer and the high risks arising from heterogeneous customers for product design, marketing campaigns, etc. Nevertheless, this contribution argues that firms should pay more attention to LTM "grass roots" customers not only because these have been under-served in the past, but because they may facilitate new forms of business success. Proper (niche) products and services may create a market where the total market value may be almost the same as in the head market, even though individual market values are much lower.

The concept of LTM overlaps significantly with BOP markets, yet reflects more considerable business insights and coverage. BOP mainly refers to the most deprived socio-economic group who lives on less than 2.5 US dollar per day. LTM does consist of an income dimension, but are not necessarily limited to the weakest income group.

LTM also embrace customers that have no access to head markets due to discriminatory regulation, cultural obstacles, and other institutional arrangements raising the transaction costs of their participation in head markets. For example, Serrano-Cinca and Gutiérrez-Nieto (2014) examine the long tail functions of microfinance but pay more attention to its mission of helping the BOP. As such customers in our LTM are much more diverse than those in BOP markets and may include, for example: young people, full-day workers, housewives, small firms, etc., with restricted financial means.

With regard to products at offer, BOP markets specify goods and services in affordable micro designs to fulfill the needs of the poor. For instance, microcredit is a service in both BOP and LTM markets, but the BOP model provides small or tiny amounts of money to poor people and helps them in both living and business. The LTM model instead not only covers those poor individuals but also focuses on individuals or firms that lack access to commercial bank loans such as supply-chain financing that helps firms to reduce operational risk triggered by triangle debt. Hence, there exist distinct business models catering for BOP respectively LTM customers.

A further difference exists in so far as LTM businesses, in principle, have the goal of converting, connecting or implementing their LTM business strategy with the head market. In contrast, supplies in the BOP model are tightly linked to specific demand structures and, in most cases, do not extend the same products to the top of the pyramid (TOP). For instance, GE Healthcare's electrocardiogram machine for rural India, where there are no electricity facilities and no trained doctors, may not have too much market potential in the United States. Although the machine could be profitable, GE would risk to cannibalize the profitability of its well-established Western market models. Hence, the LTM model provides a dynamic perspective for market development strategies that target specific customer groups, which is not present the BOP approach.

The long tail issue discussed here is not the same as, but shares similarities with, the "long-tail" phenomenon identified in, for example, Elberse (2008) and Brynjolfsson, Hu, & Simester (2011). They find that, in the Internet economy, niche products that are usually not significantly visible on markets can grow to take a large collective share of total sales. This phenomenon fits the classical "long-tail" pattern. This finding shifts the centre of focus from best-selling products to niche products when comparing total product sales. Although we traditionally believe that best-selling products dominate the market, internet technology enhances the availability of niche products and enables consumers to access the information of niche products with a lower search cost; otherwise, these niche products might be easily overshadowed by marketing strategies that have a strong bias toward best-selling products or promote specific products to be the best selling. Hence, Brynjolfsson, Hu, & Simester (2011) demonstrate a business strategy to induce consumers to discover (and purchase) products which online platforms wish to promote. Through technological decentralization, consumers' choices can be diversified and their welfare enriched (Brynjolfsson, Hu and Smith, 2003), but from a developmental perspective, it may not have a significant impact on the consumers who cannot grasp and access basic internet services. That is to say, such a "long-tail" phenomenon cannot help the consumers who are in the "tail" of the market demand and are not deliberately cared for by the businesses that pay more attention to the "head" of the market. Figure 2 demonstrates the difference of our LTM thesis from the other research fields we have discussed above. Comparing to the long tail phenomena in others, our LTM thesis focuses on the niche customers; the essential

features of LTM lie in its strategic application of the niche customers to achieve innovation in mainstream products in the long run, although sometimes with transitional products between the mainstream and the niche.

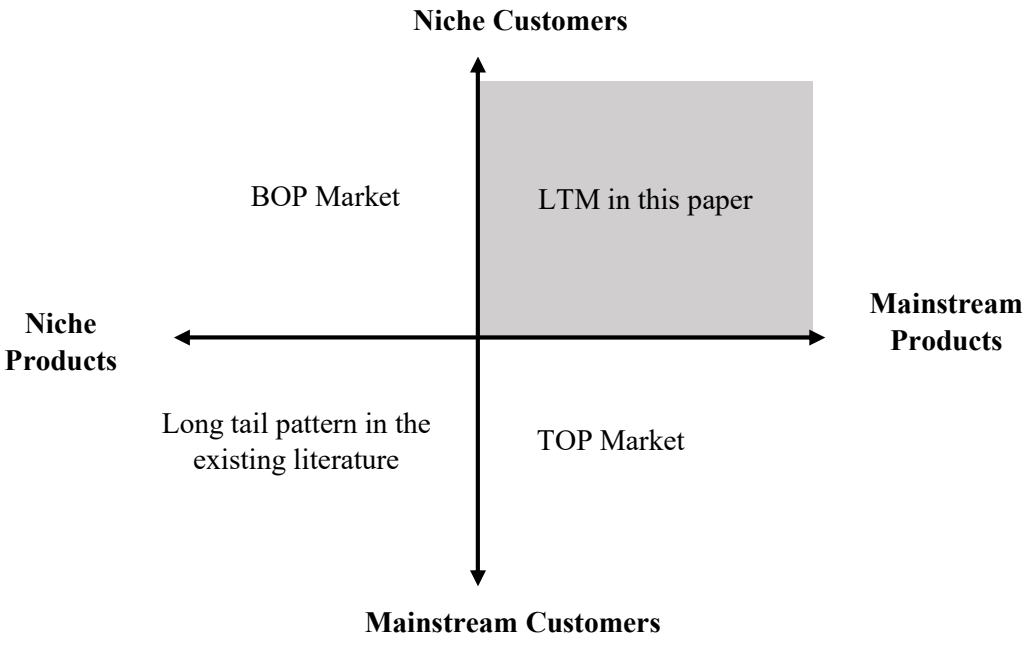


Figure 2 Positioning LTM in the General Market Landscape

The argumentation presented in this paper is based on case studies of two recent entrepreneurial business practices. The first, the Fintech sector, has attracted global attention because of its remarkable total transaction volume, investment levels and innovative business models (McKinsey & Company, 2016). The Chinese representative firms, such as Ant Financial Services Group (Ant Financial, hereinafter) and JD Finance, entered the financial sector by gaining customers through their e-commerce businesses, not conventional banking and investment channels. By doing so, they provided first time access to financial products for many Chinese who had (and still have) no access to the established financial industry. The second, the LSEVs sector, is a non-registered subset of the electric vehicles sector (EVs, hereinafter) which applies non-cutting-edge technologies to develop quasi-EVs—a reduced version of conventional EVs—as to create rural and small city markets. Although the LSEVs sector has not been legitimized in China yet, its impacts on both demand and policymaking are substantial. This product development process fits well into the "long tail argument" in Fujimoto (2014), in which he suggests an evolutionary approach with focuses of customers' functional requirements, environmental-technical constraints, and their changes to explain how nonradical innovations shape automotive product architectures. We argue that the alternative approach of leveraging LTM for new business models and technologies instead of competing the head with powerful incumbents in the head markets promotes the introduction of new techologies and business modells and furthermore enhances the market environment by increasing competition dynamics.

The rest of this paper is organized as follows. Section 2 outlines the development of China's Fintech industry and LSEVs sector, and highlights the specific role of LTM for both of them. On this foundation, section 3 establishes the theoretical rational of these phenomena in a discussion of the reasons why incumbents abstain from LTM as well as the potential significance of LTM for those who engage. In conclusion the chapter discusses business strategies designed to explore LTM. Section 4 concludes by highlightig the specific logic of LTM driven business development.

2. Chinese Entrepreneurial Practices

2.1 The Fintech Sector

The Fintech sector provides a prime example of how a well-established traditional market featuring a long tail of customers not reached and catered for by the incumbent players, is transformed by new entrepreneurial thinking targeting exactly these long tail customers.

For decades formal financial constraints have been a severe obstacle for development of the financial sector and the full mobilization of its potential to drive economic development in China (Poncet et al. 2010; Duschl & Peng 2015). China's traditional banking sector remains deeply embedded in China's state-capitalist structures. Government agencies at all levels try to direct credit allocation, intervene in favour of "their" state-owned enterprises and have created a non-level playing field for financial products. As a result, China's formal banking sector has not been hard pressed to establish sound risk assessment capabilities or borrower information systems. The (state-owned) borrowers could rely on government agencies to intervene on their behalf in case of need. As a result, a specific form of "lazy" banking evolved where banks focussed on large, state-owned enterprises in their lending business (Gordon & Li, 2012; Cull, Li, Sun, & Colin, 2015).

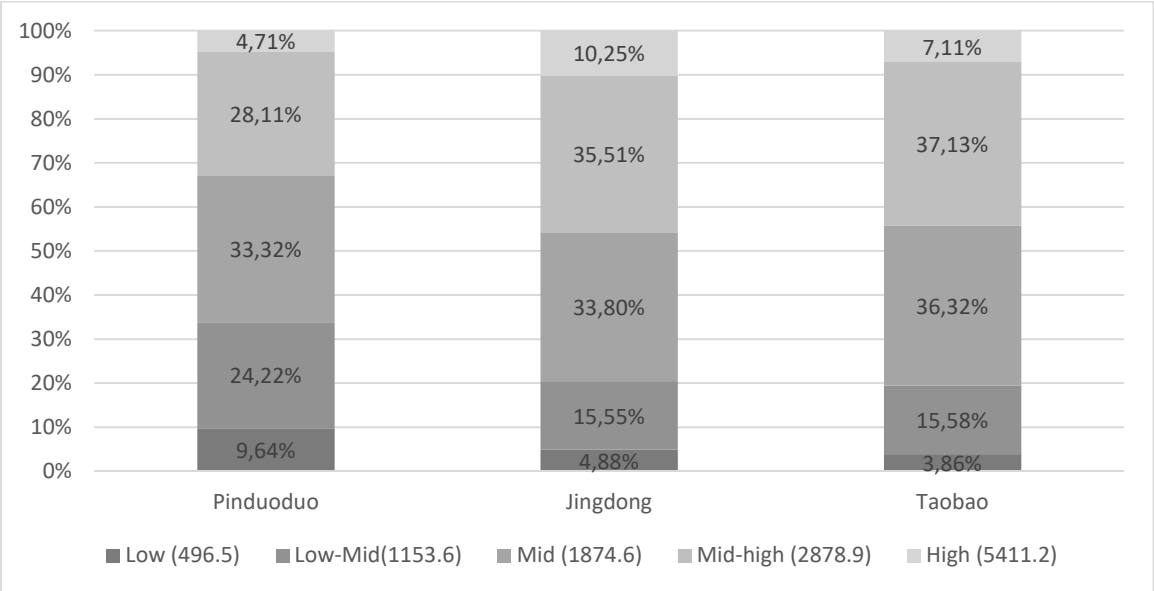
Recent technological advances in the fields of big data management, artificial intelligence, and blockchain have fundamentally reshaped the financial industry. These technologies have enabled some entrepreneurial emerging financial companies to address the long-tail customers. With their technology-driven business models these new firms target small and medium enterprises (SMEs) and low-income populations, and provide microfinancing without mortgage and guarantee (Haddad & Hornuf 2018). The new business opportunities opened by these firms have not yet been taken up by China's incumbent financial firms and remain firmly in the hand of the – mostly private owned and operated – newcomers.

These newcomers have invested massively in business models designed to reduce information asymmetry and transaction costs in the fields of mobile payments, mobile investment, consumer finance and micro-credit. Artificial intelligence and cloud computing are employed to portray LTM customers' consumption behaviour, social credit, experience and social connections. These parameters are then employed as crucial indicators for "financial robots" to decide over the issuance of loans. The well-developed "310" service model—i.e., three-minute application, one-second loan issuing, and zero human intervention—has revolutionized the business and significantly expanded transaction volumes with individual small businesses and consumers. With this service, rural people can establish an essential, but small-scale,

infrastructure to do business. The incumbent commercial banks have until now shown their inability to provide this type of small-scale and highly individualized services.

The existence of LTM in the financial sector is rooted in a variety of phenomena, including institutional discrimination. The most important parameters, however, are the their specific structural features. First of all, the individual LTM customers' value is much lower than that of head customers. At the same time the LTM customer business requires more complex risk management because of customer heterogeneity. Financial actors employing traditional business models would have to devote extraordinary efforts to understand these customer requirements and to design associated services when calculating costs and benefits. Usually this is not a profitable business for traditional banks.

A look at the customer base of three of China's e-commercial platforms—Pinduoduo, Jingdong and Taobao—highlights the challenges of providing LTM financial services. The sample data, shown in Figure 3, suggest a match between online shopping customers and the low-middle income group. For example, nearly two-thirds of Pinduoduo's customers monthly disposable income is less than 1,874.6 Chinese Yuan (CNY) (China's national average monthly disposable income was 2352 CNY in 2018); the high-income group's share is only 4.71%. It would be immensely costly for traditional commercial banks to provide financial transaction services and consumer credit to such a large group as China's low-middle income group based on their pre-fintech business models.

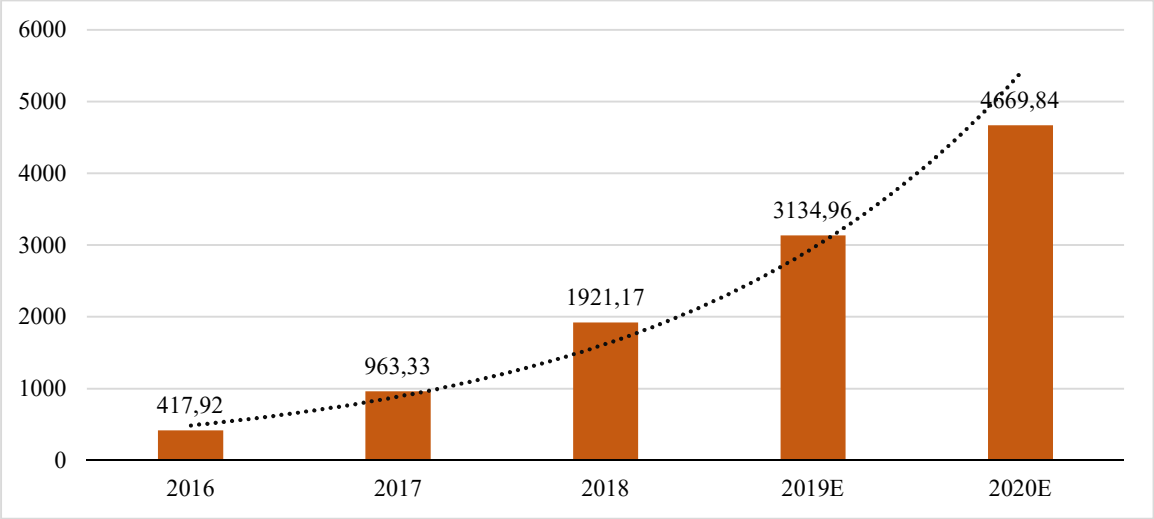


Source: Public Data by Qianfan www.analysys.cn. Note: the number in the brackets indicates monthly disposable income; for example, the low-income group's monthly disposable income is 496.5 CNY.

Figure 3 Customer Structure on Pinduoduo, Jingdong, and Taobao

A second structural feature relates to the sheer number of customers and the large number of transactions necessary to accumulate significant business volumes. Ant Financial, a spin-off from Alibaba Group's Alipay, carries this notion in the company's name itself. As its name "Ant" demonstrates, Ant Financial mainly provides "*ant-like*"

tiny financial services to individual customers and SMEs that lack adequate access to formal financial services. In 2017, Ant Financial issued 600 billion RMB worth of consumption credits (about 95 billion US Dollar), which is 3.7 times what the China Construction Bank issued in the same category. Ant Financial is not the only Fintech operating in this business field and as figure 4 demonstrates, the opening up of the related LTM leads to an exponential growth of consumer finance size in China.



Source: iiMedia Research 2019, 2018-2019 China Fintech Industry Research Report. Available at http://www.iimedia.cn/63370.html

Figure 4 Online Consumer Finance Size (Billion CNY)

Asset-Backed Securities (ABS) are a typical means for companies like Ant Financial to collect capital for their financial services. The pool of ABS usually consists of a group of small and illiquid assets that cannot be invested separately; however, after pooling and securitizing these assets, they can be converted into investment instruments for the capital market. Consumer finance ABS allow the creation of financial products, such as Ant Financial's Huabei or JD Finance's Baitiao, that offer consumers a "buy now, pay later" model for individual small consumer credits. At the same time, the volume of these small individual transactions can be scaled up to huge dimensions, allowing for substantial revenue and profits.

As such, the evaluation of default risks is crucial for companies that issue ABS. A means to cope with this challenge rests with the fact that consumers' digital footprints function as powerful indicators of a these very consumers' preferences, habits, economic situation, etc. They include data on payments and transactions records through Alipay when used on e-commerce platforms. That information, approved by the customers, will measure how trustworthy they are. The Sesame Credit score established by Ant Financial collects consumers' personal demographic information, education, preferences and history of payments, transactions and credit scores, social networks, consumption, etc., and the score Ant Financial provides functions as a criterion for issuing microcredit and providing other services. This innovative crediting system heavily utilizes cutting-edge technologies to evaluate personal credibility, and

although it triggers severe concerns about personal privacy, it has tremendously improved the low-income group's participation in the economy. Meanwhile, such practices have also contributed alternatives to the national credit reporting system in China (Huang, Lei and Shen, 2016).

Besides the microcredit services provided to ordinary consumers, Fintech companies also offer similar services to SMEs. According to the data of China's Ministry of Industry and Information, at the end of 2017, 33% of middle size enterprises, 38.8% of small enterprises and 40.7% of micro firms could not obtain their desired financial needs in the country's financial system. As a result, business development is severely restricted, the overall level of economic activity becomes depressed and consumer demand remains unsatisfied. Companies like Ant Financial have ventured into this – until then under-served market segment – and have greatly contributed to the emergence of small business entrepreneurship in urban as well as especially rural areas.

Buyer-supplier debt relationships (often in the form of triangular debt) play an important role for suppliers' financial constraints. If buyers cannot pay debts in time, suppliers may face low investment-cash flow, and will be in danger of bankruptcy (Itzkowitz, 2015; Liang, Lu, Tsai, & Shih, 2016). A low cash flow rate or a high debt ratio is particularly crucial for SMEs. Alibaba's microcredit system has helped many small and micro firms to establish themselves on Taobao since 2007, which also embedded those firms in Alibaba's business system. In 2018, Ant Financial launched a blockchain BaaS (Backend-as-a-Service) platform to help SMEs in the financial business through block chain-based supply-chain finance solutions. It solves asymmetric information problems significantly for 85% of firms in a supply chain, whereas only 15% of firms can obtain financial services under the non-blockchain technological context. As Figure 5 below illustrates, Firm A, as a core of the value chain, receives supplies from the SMEs. At this moment, the functionality of this supply chain highly depends on whether the SMEs work well or not. Traditionally, SMEs must get loans from commercial banks for producing values that Firm A is demanding, but this will not be easy if the SMEs have not had adequate performance parameters for loan evaluations in commercial banks. In particular, if those SMEs are located in a remote rural area, commercial loans become almost impossible to attain. With blockchain technology, Ant Financial as a financial service platform may evaluate the SMEs and the core firm (Firm A) based on their real historical transaction data (e-commercial chain) on its e-commercial platforms (information chain, e.g. Taobao, Tmall, Alipay, etc.) and provide loan services for the SMEs who supply to Firm A, which will payback loans for SMEs to the financial platform, rather than return payment to the SMEs (financial chain). Such a transaction is highly decentralized and uses zero human intervention. Most importantly, supply chain finance locks the capital into production and in the real economy, because it does not allow the borrowers to invest the loaned capital in other business; moreover, the supply chain also has better knowledge about firms' performance so it can guarantee a low default rate. Supply chain finance also provides a contribution to financial regulation that has been stressed to maintain currency circulation in real production, and reduces unproductive investment in real estate and stocks that may generate asset inflation.

As of the end of 2018, Ant Financial has provided inclusive financial services for more than 10 million small and micro enterprises; among them, 3.2 million relate to agricultural business, with only a 1% non-performance loan (NPL) ratio. Other e-

commerce giants, like JD Finance, Tencent, etc., also have invested tremendously in supply chain finance for SMEs, especially small and micro enterprises. We may predict that such efforts will fundamentally improve the financial condition of China's SMEs and stimulate business activities in the following years.

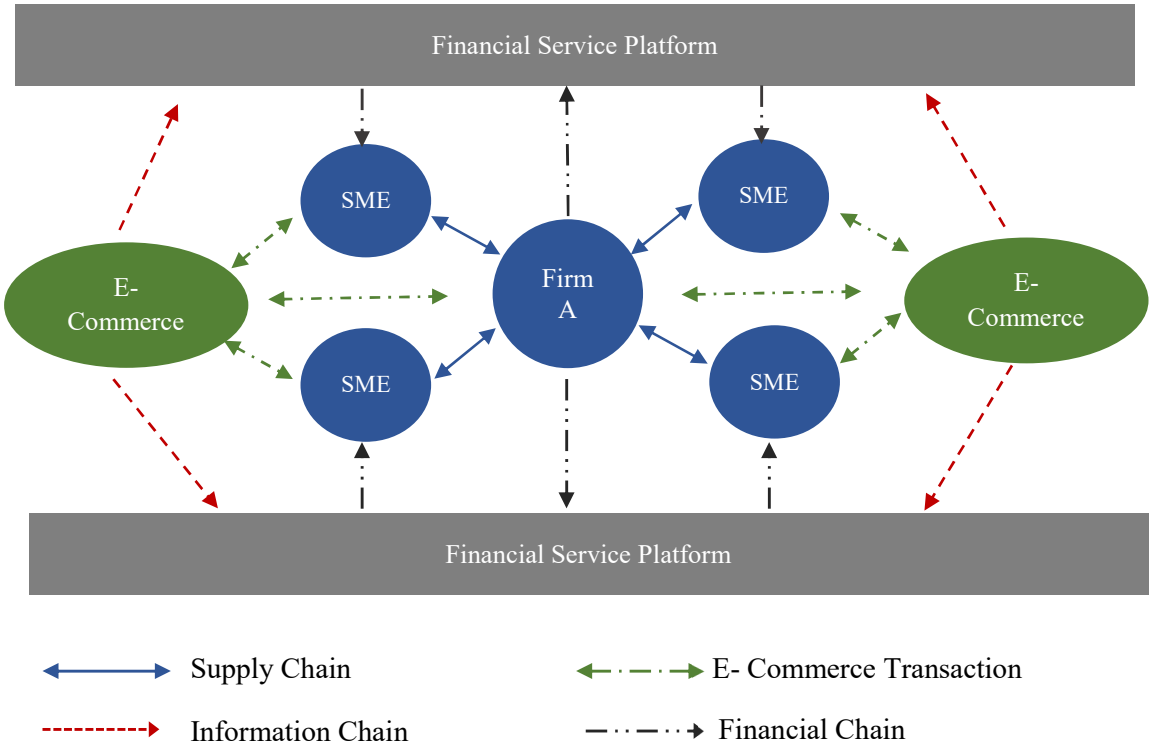


Figure 5 Illustration of supply chain finance

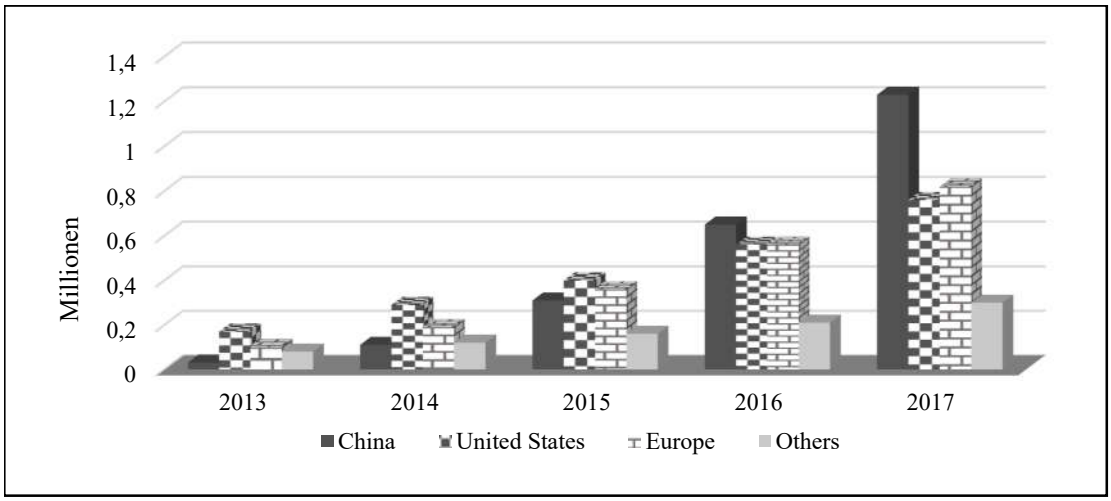
Fintech also creates new business opportunities in LTM-oriented wealth management and online insurance, by improving the accessibility of such services to people living in remote regions and/or featuring low income. Wealth management is usually designed as a business for the rich, however, Yu'E Bao, launched in 2013 by Alibaba, developed and offered such services to all users of Alipay for online shopping. In this business model, customers deposit their "pocket money" in the Yu'E Bao and accrue interest at rates that are higher than those commercial banks can offer. They can then redeem the deposits for shopping purposes without a redemption fee or time lag. Interestingly enough, most Yu'E Bao users do not realize that they participate in the Chinese call money market and are customers of the Tianhong Monetary Fund. This LTM's business model has made the Tianhong Fund become the largest monetary fund in the world in terms of total managed assets. More importantly, Yu'E Bao extended the investment business to people who do not have adequate knowledge of and willingness to participate in financial markets. Moreover, Yu'E Bao-like business can better serve people's daily lives and social and economic activities, and eventually improve economic vitality (Xie, Zou and Liu, 2016).

The period between 2015 and 2017 was a golden age for the internet finance sector. At the same time, the dynamic developments also pushed traditional commercial banks to reform their products and services, and triggered stronger financial stability regulation

concerns. For instance, the central bank started to strictly control the size and volume of ABS from the end of 2017 and in March of that year established the NetsUnion Clearing Corporation as a unified clearing platform for third-party payment institutions. The banking regulators did not just restrict the internet finance sector, but instead took advantage of such a dynamic development to strengthen the regulatory rules for the banking market as a whole (Hou, Gao and Wang, 2016). From a long-term perspective, the ability to adapt to the developing regulatory framework can be expected to constitute a core competence of the Fintech Companies.

2.2 Low-Speed Electrical Vehicles

Pertaining to the environment, many critical factors—for instance, resource constraints and air pollution—require a clean energy economic model. Electric mobility is one of the efforts made towards environmental sustainability in recent decades. Since the 1980s, the Chinese government has started to distribute resources in developing electric vehicles technologies. In 2001, China initiated a small research and development program to create new energy vehicle technologies, which was followed by intensive investment. The central government set New Energy Vehicles (NEVs) as one of China's seven strategic and emerging industries in 2011, and one year later established the National Energy-Saving and the New Energy Automotive Industry Development plans that stimulate technology innovation for global economic advantage. These plans motivate China's commitment to EVs as much as energy security or pollution mitigation (Howell, Lee, & Heal, 2014). Thanks to those efforts, China has become the largest EVs market in the world since 2016, and still experiences exponential growth. See Figure 6.



Data source: Global EV Outlook 2018. Author Self-made Figure.

Figure 6 Number of Electric Vehicles in Circulation

According to the Global EV Outlook 2018 published by the International Energy Agency, in 2017, half of the global one million EV sales were in China. However, the total share of EVs only was 2.2% in China and remained at a low level, which demonstrates significant potential for EVs. China is a latecomer in the automotive industry; thus, China's automotive manufacturing knowledge and technology do not have any advantages compared to developed countries. From a developmental perspective, a strategic catching-up path will be relevant and possibly required. The

Chinese government has subsidized EVs manufactures tremendously; however, another fast growing market, in terms of the sales, is the Low-Speed EVs (LSEVs) market. This market is not included in the statistics in Figure 6 and does not have a position in the national industrial plan until now, although it features sales more than twice those of regular EVs.

LSEVs, similar to Neighborhood Electric Vehicles, are very small and designed for specific demands (e.g., in the airport, parks, campuses, countryside). In most cases, their speeds are lower than 70km/h with a relatively short driving distance and they use lead-acid batteries which are not environmental friendly. Table 1 shows the parameters of two LSEVs (the Zhidou and Levdeo) compared to two regular EVs: the BMWi3 and Tesla S. In terms of design, some LSEVs are labeled as copy-cat cars because they intend to imitate well-established brands' logos or forms.

Table 1: A Comparison between Regular EVs and LSEVs

Parameters	BMW i3	Tesla S	Zhidou D2	LEVDEO
Max. Speed	160km/h	250kM/h	100km/h	50km/h
Max. Distance	260km	426KM	180km	150km
Price (RMB)	449 800	1 250 000	49 800	30 000
Produced Year	2013	2016	2015	2016

EVs represent a complex production system which involves "high cost, engineering-intensive products, systems, networks and constructs" (Hobday, 1998: 690), and requires fundamental innovation in all of the production elements, technologies and systems in order to be ready (Pilkington and Dyerson, 2006). Here, an immediate question is why the LSEVs market is booming even though it is facing an extremely uncertain technological and political environment. In the last ten years, China's national government did not express its regulatory framework accurately to the LSEVs sector, so that most LSEVs companies made speculative bets on the government's potential policies and/or tried to lobby the policy-makers. Hence, in comparison to the considerable and active support given to the regular EVs market, the governmental response to LSEVs is intriguing. LSEVs companies have distinct business strategies to deal with such uncertainties. Some set LSEVs as their primary products and hope (somehow in a gambling manner) that the industrial regulations will take them as part of the mainstream EVs industry; meanwhile, some companies take LSEVs as a type of transitional product that may support them accumulating capital, knowledge and market shares for updating their product into the mainstream EVs market. Both business strategies highlight the significance of LTM's consumers. The first context may convince regulatory ministries through satisfying LTM's demands, whereas the second context may gradually transform their product into regular EVs depending on the capital accumulated in the LTM.

The main success factor of LSEVs has been accurate identification and focus on LTM's customers. LSEVs are affordable and have low maintenance costs. They do not require charging stations or a driver license to operate, and even do not need a registration for a license plate. These favorable conditions enable low-income consumers' dreams of

car ownership to easily come true. From regular EVs maker's perspective, such a group of EVs consumers are not their potential customers, whereas LSEVs makers perceive the so-called potential purchase power as unmet demands. EVs are durable consumption goods and expensive compared to the average income level. Following the conventional head market logic and assuming a certain income disparity, the low-income group will never be able to afford a regular EV. Hence, LSEVs makers—at least most of them—are just producing affordable cars to replace bicycles, buses and three-wheel agricultural vehicles, and are providing a more comfortable traffic experience without too much cost involved. The competition between regular EVs and LSEVs, to some extent, does not exist; most LSEVs consumers have never thought about buying a BMW or Chinese domestic car, and instead have made their trade-off between three-wheel motors, or even e-bicycles, and LSEVs. That is why we have noticed that most LSEVs firms have had a background of producing bikes, e-bikes and agricultural vehicles. They understood the customers' needs and converted them into a LTM's consumers' (kind of) EVs.

However, the cost advantages of LSEVs triggers concerns about its security for the public. The carmakers usually simplify the architecture of a car by, for example, removing crush protection to control cost. According to traffic laws, people cannot drive LSEVs in big cities and public roads. However, such regulations do not constrain the business too much because their targeted consumers live in rural areas and small towns where law enforcement is relatively weak. Naturally, such a regulatory environment has to do with local authorities. In most cases, local authorities protect those LSEVs companies considering its contribution to tax profits and employment, and perceive this as a potential performance parameter. Regardless, those LSEVs companies might have the possibility to become legally recognized, although they may also face large uncertainties in both business competition and national regulations. From a development perspective, flexible regulation might possibly exclude long-term ambitious and innovative efforts from the market but, at the same time, it may protect the possibilities, especially by including infant-innovators. In LTMs, a second-best technology application can satisfy a local and small demand that the head players ignore or perceive as unimportant. For example, Shandong Province holds an impressive developmental perspective which can be demonstrated by the growth rate of LSEVs in Table 2.

Table 2. LSEVs Produced in Shandong

Year	Production Amount	Growth Rate
2010	18 200	---
2011	64 200	252%
2012	83 300	29.76%
2013	121 400	45.74%
2014	187 400	54.36%
2015	347 000	85.17%
2016	622 600	79.42%
2017	756 000	21.43%

Data Source: Shandong Automotive Industry Yearbook (various years)

Shandong Province has a traditional agricultural economy; hence, its primary industries are agriculture-relevant and in terms of for the manufacturing this means: three-wheel vehicles, tractors, and so on. As EVs were set as a nationally-promoted industry, the local companies in Shandong were starting the transition to quasi-EV production by leveraging the previous market and the knowledge that came with it. At the early stage, which was around 2010, LSEVs integrated cheap and old technologies into their old products, for instance a bigger frame and body was installed onto a three-wheel electric motor. Meanwhile, many LSEVs companies started from zero experience in the field, and just combined various EVs' components into an LSEV form. This kind of entrepreneurial activity heavily interrupted the existing market environment and rules of interaction. Many regular EV companies pleaded for the national government and ministries to shut down illegal firms that do not have a car production license. In this context, the national government did not simply stop these LSEVs but instead kept close supervision over them, which was partly a result of local governments' strategic reactions to outside pressure. Howell et al. (2014) argue that the active support from local government to central EVs policies is "closely tied to the political economy of the auto sector and in particular the push for greater concentration" (p.13). Under a "regionally decentralized authoritarian system" (Xu, 2011), local governors are highly motivated to initiate and implement policies for the purpose of promotion; on the other hand, the auto industry is a pillar sector and contributes significant fiscal revenue to the local treasury in many provinces. Also, for some provinces that do not have enough capacity for the automotive industry, they are also willing to share this "industrial cake" by taking the chance of developing EVs.

LSEVs' business strategies are not new; actually, they are repeating what Chinese private automotive manufacturers did in the 1990s. When China initiated joint ventures with multinational automotive companies, such as Volkswagen and BMW, cars started to enter people's consumption and became its own traffic tool. However, it was expensive compared to average income levels; in fact, most Chinese could afford private cars at that time (Gan, 2003). At the same time, multinational corporations almost made local Chinese competitors bankrupt. To promote China's automotive industry, the central government encouraged private investments into the fields. The most successful automotive companies—like Geely, Chery and BYD—were founded from this concern. They started with low-cost cars and product architecture innovation (as LSEVs have) and targeted at low-income consumers. For instance, Geely, which was producing refrigerators and motorcycles, purchased around 70 percent of its components (including the engine and transmission) from Charade, i.e., practically an imitation with little self-design (Wang and Kimble, 2010). People who owned a Chery or Geely car were seen as showing a sign of being low-income urban residents in China at the beginning of the 2000s, just as owners of LSEVs today.

3. A Theoretical Exploration of LTM

Against the background of the two case studies depicted above the question arises, how LTM emerge. Why do incumbent firms refrain from serving (potential) demand expressed by LTM customers and leave this market segment lying idle? And what technological developments as well as entrepreneurial innovations enable new firms to explore these markets?

3.1 Why incumbents do not explore LTM

Obviously LTM hold substantial business potential. This potential, however, appears to lie outside the sphere of interests of incumbents, which stick to head markets and leave LTM lie idle. What are the underlying reasons for this lack of interest on the side of incumbent firms – firms which are usually well equipped with financial and human resources fit to explore these markets?

One explanation may relate to an incumbent's subjective evaluation and response to the potential technological innovation that LTM entail. There is extensive literature that has studied why incumbent firms have difficulties responding to radical innovation. Some authors argue that the core rigidities, which are the inappropriate sets of knowledge in an organization, and core capabilities of incumbent firms create a high opportunity cost for these firms to invest in new technologies. Exploration of the LTM may negatively impact on revenues and profitability in the established head market business (Leonard-Barton, 1992). But the failure of incumbents to enter LTM may also result from their inadequate response to technological discontinuities (Tushman and Anderson, 1986), or ignorance to the importance of potential innovation (Christensen and Rosenbloom, 1995; Christensen and Bower, 1997). At the early stages of e-commerce in China, commercial banks were apathetic to the difficulties of transacting their customers faced. This lack of action created space for e-commerce banks to invent alternative ways to deal with these difficulties and offer their customers new solutions.

When moving the focus of analysis from the industrial or sectoral level to the firm level, we may identify more firm-specific reasons of how incumbents respond to radical innovation. Wesseling, Niesten, Faber, & Hekkert (2015), with a close look at incumbent responses to emerging EVs technologies during 1990-2011, find that the incumbent responses were co-determined by incentives and opportunities. According to their analysis, firms with a strong incentive (e.g., lacking profitability in current products) and opportunity (e.g., with sufficient technological, infrastructural, complementary, reputational assets) will rather opt for the first-mover strategy into EVs markets. They confirm that firms which have little incentive and strong opportunity, or strong incentive and little opportunity, rather employ a laggard strategy in commercializing EVs. No matter what scenario is considered, in comparison the incumbent firms, it appears to be more rational for entrants to explore LTM for the possibility of breaking through entry barriers.

Another explanation relates to the perception of BOP market value (Prahalad, 2004; Kolk, Rivera-santos, & Rufín, 2014). The BOP can be a source of radical innovation (Prahalad, Di Benedetto and Nakata, 2012); however, perceiving the bottom customers as potential considerable market value for incumbents is not a natural vision. The business view of large firms and multinational corporations (MNCs) usually depends on their knowledge and familiarity with those organizations' head consumers. Given that most managers are localized with their specific business arena, it is not surprising for them to put the BOP, and therefore at least one subgroup of LTM, outside of their service scope (Prahalad, 2004).

Secondly, LTM are often characterized by informal, under-regulated structures, like e.g. unregistered LSEVs in China. However, efforts to transfer such business in the formal sector and register businesses requires strategic institutional support (Kistruck *et al.*,

2015). LTMs, hence, are much less common in developed economies than in emerging economies where formal institutional voids (e.g., weak contract enforcement, an unpredictable regulatory framework, inadequate property rights protection, etc.) are comparatively often present. Incumbents usually respond strategically to illegitimate, informal and unregistered actors (Oliver, 1991; Seo & Creed, 2002; Sutter, Webb, Kistruck, & Bailey, 2013) acknowledging LTMs might bear more legal and market risks than the business opportunities warrant. New market entrants are apt to explore LTM and with no existing business at risk, often make up a different opportunity-risk calculation.

3.2 The significance of exploring LTMs

China's cases are not unique. Exploring LTM customers has been a noticeable strategy in developmental projects and businesses, because it may offer significance in the following aspects.

3.2.1 Increasing inclusiveness

The exploration of LTM increases economic inclusiveness and contributes to stable social-economic structures. 37% of adults in low or middle-income countries are excluded from the financial system due to poor accessibility of bank accounts, and this share reaches 80% in countries like Cambodia, Mauritania and Pakistan; about 1.7 billion adults are without bank accounts on a global scale (Demirguc-Kunt *et al*, 2018). Fintech companies can improve low-income working families' financial resiliency and health without further government financial support or new laws or regulations (Baker, 2017). A World Bank's developmental project "value-chain agriculture" has helped to solve the global food crisis of 2007-08 via incorporating smallholder products into corporate markets. Small farmers usually are at the bottom of the value chain and cannot compete with large-scale operations; hence, they have to self-produce for their basic needs on a small scale. To attract those smallholders to supply agricultural products, the project creates a value chain based finance-production nexus to leverage commercial banks to lend to agriculture, since public loans are unavailable to farmers, but also because it helps to establish contractual relations (McMichael, 2013). This project is exactly an inclusive-finance plus value-chain model. Bangladesh's microfinance practice has presented exciting possibilities for reducing poverty by including the poor and extending business (Armendáriz and Morduch, 2010). After years, microfinance has not only grown into a booming industry for those in poorer groups but has also attracted commercial banks that initially had little interests in the business (Kent and Dacin, 2013).

According to its *Plan for Advancing the Development of Financial Inclusion (2016–2020),* China's efforts to develop financial inclusion has targeted small and micro businesses, peasants, urban low-income groups, impoverished groups, the disabled, the aged and other special groups. Through extensively utilizing emerging technologies and the long tail business model, it has established "one of the largest agent networks in the world, thereby extending the reach of the formal financial sector into previously underserved rural areas" (World Bank Group & People's Bank of China, 2018:1).

From a development perspective, exploration of LTMs by non-registered firms also contributes to reducing informality (Porta and Shleifer, 2014). Research finds that

lowering product market regulation, e.g., lowering formal sector entry cost (Charlot, Malherbet, & Terra, 2015) and reducing entry barriers (Ulyssea, 2010) may reduce informality in an economy, which suggests that if policies cannot respond to changing markets adequately, entering the informal sector will be economically beneficial for new businesses. Unfortunately, governmental policies mostly fail in this obvious task. The alternative approach of allowing LTMs may enable innovators to reduce informality and to improve the accessibility of LTMs to modern sectors. EVs are the future of transportation, especially regarding the increasing concerns about climate change; automotive incumbents from both the developed economies and China have heavily invested in the Chinese market but without consideration of the affordability of their products for the LSEVs customers. Massive government subsidies helped the rapid EV market's growth, but in the end might not necessarily bring much welfare to the consumers (Cohen, Lobel and Perakis, 2016).

3.2.2 Technological innovation

LTM constitute a hotbed for testing technological innovations and new business models. This differentiates them from head markets in which incumbents have only limited incentives to implement technological advances and especially disruptive innovations due to their established competitive advantages in established business models and technologies. For a similar instance, IT outsourcing with smaller contracts beyond the key partners is increasingly leveraged by companies to acquire cutting-edge innovation (Su, Levina and Ross, 2016).

Besides environmental and energy constraints, the integration of the industry into the global automotive industry inspires China's EV sector as well. Since the 1980s, "little actual technology was transferred" from foreign firms that operate joint-ventures, and hence China's automakers did not accumulate proper technologies and "were ill-equipped to develop EVs" (Howell, Lee, & Heal, 2014: p.16). Foreign EVs firms still are not willing to deploy EV technologies and expertise in China due to the "restrictive technology transfer and import tariff requirements." Furthermore, China "lacks the capacity to acquire or develop world-class EVs technologies." As an alternative, LSEVs are "perhaps more appropriate for the Chinese market from both supply and demand perspectives" (Howell, Lee, & Heal, 2014: p.20), and help Chinese automotive companies to accumulate technological progress in the field.

At the early stage of product development, talking about who is the winner and who is catching-up must be tentative, because there is no dominating product and design. Furthermore, considering the technological trajectory shifts, the advantages the incumbents have in the internal combustion engine (ICE) vehicles do not guarantee benefits in the realm of EVs. Wang & Kimble (2011) identify that China might not be able to be a leader in creating core technologies for EVs, but can lead in volume production and technology integration, and also gain global competitiveness in the LSEVs sector. In the years, China's government neither legalized nor stopped the production of LSEVs, and instead kept the pressure on and interacted with local governments and LSEV companies. As we have noticed before, most qualified LSEV companies do not utilize conventional low-level technology forever, but gradually narrow the technological gap with regular EVs through substantial intra-cooperation. For instance, BYvin, a leading LSEVs company in Shandong, does not install lead-acid batteries any longer and has invested in internet-car and self-driving projects. Most

impressively, BYvin has tested their self-driving technology in small cities where LTMs typically are.

LTM customers are updating their consumption preferences, and part of them may move to the head market. The dynamic interactions between the two markets are also meaningful for market development and technological progress, in particular, the spillover from LTM to head market deserves strategic concerns. For example, exploring LSEVs also helps to raise consumers' awareness of EVs and eventually contribute to the whole sector.

3.2.3 Market competition

Exploring LTMs, i.e., avoiding too much *one-to-one* competition with the mainstream, may enable "the creativity of the human mind to run wild in its inherent curiosity and inventiveness" (Thierer, 2014: 9) and increase the possibility of out-of-the-box innovation. The explosive development of digital innovation in the last 20 years, as Thierer (2014) notices, did not happen by accident, but also because favorable policy attitudes allowed this internet generation to explore products and markets freely. A critical factor of the success of companies like Ant Finance was their approach to avoid direct exposure to traditional financial institutions and regulators. At the early stage, Yu'E Bao provided their customers with much higher interests rates on their deposits than the central bank's mandated rates (i.e., the interests rate in the market), because it invested in agreement deposits which were not subjected to reserve requirements and reflected the monetary market forces in a more accurate way. Hence, products like Yu'E Bao were more attractive and did not lose their market space until progressive interest rate liberalization changed the market environment (Xie, Zou and Liu, 2016).

Growing with the LTMs, digital financial institutions and Fintech companies are threating to replace traditional financial services, as technological progress lowers transaction costs. Traditionally, commercial banks were the primary channel for selling monetary funds, but they lost a very significant share of their revenues and profits after Alipay launched Yu'E Bao, which integrated fund services and mobile payments. In a state-dominated financial system, internet financial companies were obviously creatively destructive. For instance, Yu'E Bao absorbed significant deposits from commercial banks and, as a compromise, did not sell the fund directly but instead settled the transactions via commercial banks and Tianhong Monetary fund. Nevertheless, commercial banks realized the competition in ways and worked extensively towards internet financing, and since have offered financial services similar to the emerging internet financial firms. Therefore, technological progress can not only provide more financial products but also drive established financial firms to adopt new market and organizational structures (Rajan and Zingales, 2001). Several years later, not only traditional commercial banks transformed their business patterns, but also the emerging internet financial companies are not merely striving to be financial institutions. Instead, they strive to offer financial data technological services that turn their customers into investors in the economy. Together with this transformation, the global financial markets are experiencing a fundamental challenge and reshaping: Artificial intelligence, big data, cloud computing, 5G telecommunication, become highly relevant to financial businesses. Fintech companies may enjoy increasing returns as its big data practices enlarge, and such returns will self-enhance and challenge the whole financial business system.

LSEVs have a business strategy similar to Fintech companies. Since China has explicitly set a sustainability transition mission, incumbents have collected substantial subsidies from the government. New entrants, which are less opt to receive such subsidies, may face unfair competition with the incumbents. However, when firms pursue a low-cost strategy by introducing new products to respond to the changing environment, they may create first mover advantages in comparison to their competitors (Le and Lei, 2018). Moreover, firms sometimes even strategically stay informal to explore the cost advantages of noncompliance (Ulyssea, 2018). Such a LTM scenario provides favorable competition for new entrants and consequently may encourage the incumbents to adopt new technologies as well. Another feature of LSEVs companies is that they seek professional cooperation with EV companies in the head market, which usually provides useful but not crucial information for the production of LSEVs. Such an "informal know-how trading" mechanism may increase knowledge transfer and reduce capacity gaps (von Hippel, 1987).

3.3 How to explore LTMs and Business strategies

3.3.1 Identifying LTM customers

LTMs are defined as targeting consumers who are not covered by the head market, although overlaps in the customer basis may exist in specific fields. The identification of LTM customers may constitute a challenge as income is just one of the parameters. The Alibaba group established Alipay to provide a guarantee mechanism for online transactions amongst strangers. The transformation from Alipay to Ant Financial was not part of their original business plan. When Alipay was initiated, people had never anticipated the impact of future finance technology and mobile internet. A business strategy is not purely designed and requires dynamic responses in the changing business system. Alipay users, strictly speaking, were the e-commerce customers of Alibaba. Only when Alibaba extended its services, for example, mobile payments, Yu'E Bao, etc., these users became relevant for the Fintech sector. Hence, distinguishing LTMs customers from the BOP customers are also retroactive. This requires the business to find out who are potential consumers and what are their needs in a specific business model. For example, Alipay successfully turned commercial banks' customers into its own via providing a more comprehensive service much beyond traditional finance services. However, it would be controversial to argue that Fintech companies were exploring Fintech through LTMs because LTMs are full of unpredictable factors that may be vital in the process of establishing effective Fintech services.

LTMs, in the sense of product exploration, have a similar function as the "lead user" introduced in von Hippel (1986) and explored in von Hippel (1998) and Morrison et al. 2000), and among others. Consumers in LTMs also "have real-life experience" with non-mainstream products and "process concepts of interest... (and) provide accurate data on needs" (von Hippel, 1986: 796). Lead users are not necessarily wealthy and may reveal the gap between products supplied and desired. In this regard, lead users are in the LTMs as well. Identification and attraction of lead consumers has more potential to accelerate EV adoption compared to policies like fiscal incentives or installing charging infrastructure (Moten, Anable and Nelson, 2017). China's failure in subsidizing regular EVs has also confirmed the importance of identifying customers. Many Chinese EV companies cheated the government in reporting sales that decide

how much of a subsidy they can obtain and they exhausted the limited resources to produce EVs according to the parameters the subsidy regulation requires, but not to the consumers need.

3.3.2 Creating awareness and localization

The "4As (*awareness, access, affordability, and availability*)" prerequisites, by Prahalad (2012), for promoting innovation at the BOP are illuminating explorative business strategies in LTMs. The "4As" suggests that firms must ensure that BOP consumers can be aware of, and have access to affordable products, which are available whenever the consumers want. China's success in Fintech, so far, came from its more acceptable integration between financial services and consumers' real-life scenarios, and from better customization of the technologies outside of China. Such a scenarization of finance patterns enables Fintech to offer better matching products and services to customers (Chen, 2016). Fintech companies in China were creating contextual applications by trial and error. The temporary exponential prosperity in peer-to-peer services in ridesharing, bicycle sharing, wealth-management, and food delivery, etc., were tremendous and costly efforts to create customer attachment to Fintech companies. Over the years, they have successfully made most people, including LTM customers, accept and access financial services based on modern finance technologies.

Nevertheless, the awareness of the LTM's value is not enough for exploring the market. London & Hart (2004) state that the business into low-income customers will be different from the western-style developmental pattern, and conventional transnational business models may not be sufficient. Instead of that, localization in partnership and capacity building need proper attention. Entering such a huge market requires cognition of doing business in LTMs, which means designing specificity for the customers there. Companies must accurately identify the customers, and understand that head products cannot satisfy their demands. A deep co-creation in practices is a valuable perspective when exploring the proper business model (Filardi, Barros and Fischmann, 2018). Before entering a specific market, business people often do not have a mature and fixed model to apply, which requires a better understanding of their customers. LTM customers' inadequate exposure in the market generates extra difficulties for LTM businesses.

3.3.3 Playing with Regulations

Before the winners and industrial standards are picked in the market, industrial policies should be flexible enough to allow every creative player a chance of exploration. One-size-fits-all regulation does harm to innovation dynamics but appears to be the predominant feature. Innovative businesses, and revolutionary ones in particular, must utilize certain skills to deal with the rigid and bureaucratic environment. This is why this paper argues that government regulation is also a reason for the emergence of LTM. The evolving regulatory framework usually denotes business opportunities for which primary market forces want. The mainstream "head" players influence the regulatory body according to their interests and needs. China's LSEVs market provides a good example for this phenomenon. The incumbents can lobby the government for maintaining their market shares so that the consumers and products are locked-in. Pilkington & Dyerson (2006) find that the Californian zero-emissions vehicle (ZEV) mandates demanded too radical technological shift, which has been beyond the core

capacity and dominant design of the incumbents and triggered massive resistance from the incumbent players. Offering more action space for firms to grasp a gradual change is an alternative way. In this case, incremental emission reduction regulation has successfully brought about continuous technological efforts to EVs. In Shenzhen, as another example, government-enterprise cooperation has been working well for the deployment of EVs. A striking mechanism is to give significant leeway to do experiments for the benefit of firms, instead of pushing regulation and governance (Li et al., 2015).

Flexible regulations may help informal business in growing. Howell et al. (2014) argue that low-end EVs firms are discouraged due to the national government's explicit goals of developing high-end EVs. However, most low-end EV producers and some local governments have accumulated a considerable capacity to produce low-end EVs, and are still expecting supports at a national level. When market conditions cannot match the anticipated products, then LSEVs, as alternatives, can make a commercial success under their current technical capacity and market demands, even before the conventional EVs become highly perfect (Wu, Ma and Li, 2015). The case in Shandong was to focus on a specific consumer group, i.e., the farmers and the residents in the rural-urban fringe. Most of them do not have driving experience but are passionate about non-human-force transportation. Without LSEVs, there would be another decade to make them consumers in the automotive markets. Hence, LSEVs appeal to a market space that the mainstream firms cannot reach.

Lacking a coordinated standard and regulations may stunt the whole EVs sector (Brown, Pyke and Steenhof, 2010). However, standardization should be evolving. A "*skillful*" constructive interaction with the regulatory department may benefit business, particularly in emerging technological fields and economies. Moreover, when the local government has interests in stimulating local capacity, it will strategically support LSEVs companies. Helveston, Wang, Karplus, & Fuchs (2019) identify that the interactions between national law and local market protection have helped domestic EV firms to accumulate technologies and capital during their experimentation period. Nevertheless, China's fast EVs growth highly relies on industrial policy. Although consumers are growing, sustainable development of the EV industry requires the transformation towards a market-driven approach (Rong et al., 2017). In this regard, LSEVs that are playing with the regulations in LTMs are behaving in a market-driven approach.

An even more radical phenomenon could be observed with regard to regulatory practices in China's Fintech industry. During the early years of market development, Chinese government agencies have abstained from any explicit regulatory intervention in the evolution of new business models and the market roll-out of new technologies in most sub-sectors of the fintech-industry – notably mobile payment and P2P-financing models. And if they did not completely abstain from regulatory control, Chinese government bodies tolerated enterprises to operate in regulatory grey zones or to openly deviate from established regulatory standards. Beneficiaries of this approach have not been entrepreneurial start-ups in the first place, but rather spin-offs of well-established companies (originally) operating outside the financial sector. The Alibaba daughter Taobao is a case in point. The company introduced its first online-payment module in 2003, but obtained the corresponding licence only seven years later in 2010. Until then all transaction conducted via this module were de facto illegal, but tolerated by

government. The same applies to Alipay which was able to operate its online money transfer services from 2005 till 2016 without any regulatory upper limits to amounts transferred. The company's escrow services were first introduced in 2005, but were subjected to regulatory guidance no earlier than 2014 (McKinsey&Company, 2017). This regulatory abstention allowed firms to explore LTM by experimenting with new business models and technologies without any constraints from regulatory practices designed and developed for different, traditional business environments.

4. Conclusion

This paper demonstrated the significance of the LTM model in China's Fintech sector and in relation to LSEVs. These unusual business approaches have helped Chinese companies to explore the reach of business proportions to some groups of customers. The visibility of the business practices made China's market in Fintech and EVs dynamic and vibrant. We introduced the LTM's features in both fields. The success factors in both were focusing on the LTM's customers, and serving them with new products and business models that the mainstream does not cover in order to avoid face-to-face competition. Otherwise, without the niche customer focus, opening opportunities may be not necessarily resulted in an equitable distribution of financial capital across the marketplace (Barzilay *et al.*, 2018). Through the gradual accumulation of technological capacity and capital, both have become visible in the market. Moreover, such a dynamic has driven the mainstream companies to respond to the changes and adopting new technologies and businesses. For instance, ten years ago, commercial banks which had never anticipated that companies like Alibaba and Tencent could grow into a competitor in the financing, now have to implement similar business to maintain their customers.

From the perspective of pushing technological change, LTMs also present advantages compared to the head market, especially as the incumbents lack capacity and motivation to break the fixed patterns. LTMs can skilfully overcome obstructions through targeting a specific customer group in a low-cost and rapid way. We suggested that the essential elements of adopting the LTMs model were to identify the customers, to make them aware of the business, and most importantly, to strategically engage with and alter regulations. By understanding the significance of LTMs, managers may avoid competition in the established markets. By exploring the LTM market with similar but low-cost products, they can accumulate financial resources, technological and market experience enabling them finally to converge to the mainstream products and market.

Our paper had several overlapping ideas with existing studies on niche products and the BOP market. It contributed one specific type of long tail phenomenon into the literature. Nevertheless, our research is not free of limitations. China's cases are representative in most developing economies in general, but considering general similarities in idiosyncratic features of institutional environments and technological contexts, the two industrial cases may not be representative. This paper suggested that LTMs could be an alternative approach to develop the market and technological innovation as incumbents are reluctant to take risks, but we may investigate an evolutionary process where LTM becomes integrated into a head market following by a new LTM process.

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