

THE MANAGEMENT TRANSFORMATION OF HUAWEI: CONCLUDING THOUGHTS FROM A COMPARATIVE PERSPECTIVE

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Chapter 10

THE MANAGEMENT TRANSFORMATION OF HUAWEI

by

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Abstract: This chapter offers concluding thoughts on the entire Huawei study—the totality chapters and commentaries. It offers comparative perspective by placing the firm in the larger context of corporations in China and to some extent in other countries. The comparison with many other firms throughout the entire book reveals that Huawei is among a select number of firms that are able to grow at very high rates by continuously transforming themselves. Consistently investing at least 10% of sales starting on R&D at least since 1998 was an important ingredient of this growth. But the importation of western best practice routines and the steering of this process by the Huawei founder and the top management team underlie this ability to grow. Huawei stands out among many Chinese companies that internationalize by relying solely on organic growth rather than on growth through acquisitions. Huawei is also different from state-owned companies (SOEs) that dominate a number of sectors in the Chinese economy in that Huawei motivated a large fraction of employees by giving them shares in a profit-sharing plan so that hard working employees could make a substantial amount of money. Building all chapters, we provide advance management theory by articulating in detail the meta-routines that underpin Huawei’s dynamic capabilities. Finally, we discuss the challenges to future growth of the firm, including geopolitical cross-currents the firm currently finds itself in.

1. Placing Huawei in a Larger Context¹

In this final chapter, we want to offer some concluding thoughts from a comparative perspective and place Huawei in the larger context of corporations in China and in a few instances in the context of non-Chinese corporations when such comparisons are particularly instructive. We also identify the contributions the entire study makes to the theory of routines and dynamic capabilities to change routines and discuss the challenges Huawei will face in the next 10 years to continue to grow at a similar high rate.

We asked scholars to comment on individual chapters to help place Huawei in such a larger context and compare them whenever possible to other firms. In their commentary, Lewin, Välikangas, and Zhang (2019) note that Huawei is not unique as a

¹ I would like to thank Bin Guo and in particular Can Huang for feedback and suggestions for this concluding chapter.

success story from Asia. Matsushita Industrial Company (more widely known as Panasonic) and Kyocera from Japan, Acer from Taiwan, and Haier and Lenovo from China also have achieved what is rare among start-up companies: to grow into a sizable multinational enterprise. Lewin, Välikangas, and Zhang (2019) argue that in all of the cases including Huawei, strategic IQ of a leader (Levine, Bernard, & Nagel, 2017) was crucial for the success of the firm. Examining the leadership style of the Huawei founder and long-term leader Ren Zengfei described throughout this book, Lewin et al. argue that Ren managed to build at Huawei a high-commitment and high-performance culture that early focused on merely importing western best practices and later experimented with modifying the imported routines to make them work even better in the context of Huawei. Lewin, Välikangas, and Zhang (2019) see the employee profit-sharing mechanism that rewards high performers as a crucial pillar of the firm's success. But they also highlight that Ren was able provide an additional motivation for the predominantly Chinese employees by convincing them that by growing Huawei into an industry-leading multinational enterprise, they all participated in a mission to contribute to the building of China. Even though Huawei internationalized widely, in 2017 roughly 77% percent of 180,000 employees continued to be Chinese nationals (Tao, 2018), and can potentially identify with building a leading Chinese global enterprise. In short, Lewin, Välikangas, and Zhang (2019) see Ren's leadership as a key ingredient why Huawei has been able to adapt to large environmental changes.

In her commentary on Chapter 2, Chen (2019)—who is both knowledgeable of Chinese and Western firms—highlights that not just the CEO but the entire management of team of Huawei's executive team has played an important in guiding the repeated

transformation of the firm. She notes that Huawei has been much better able to adapt changes in the telecommunication industry than the mobile phone pioneering company Motorola which went defunct in 2011 after operating independently for 83 years. After repeated attempts to turn the business around after the internet bubble burst in 2001, a large part of Motorola's business was first sold to Google in 2011 for US 12.5 billion², which in turn sold it the Chinese manufacturer Lenovo for US 2.91 billion³, while keeping the valuable portfolio of Motorola patents. Particularly interesting for Western readers, she explains that Huawei's top management emphasis on initiating and championing change stands out in the context of Chinese companies. Chen (2019) identifies a number of interesting questions for future investigations. To make further contribution to the literature on top management teams, we agree that it would be valuable to investigate in more detail what factors stayed stable in the top management and what factors changed.

Commenting on Chapter 3, Song (2019) who has written a book about Samsung (Song & Lee, 2014) sees some striking parallels between Huawei and Samsung. Both firms went through long-term corporate transformation over the past 30 years to become global players. Both firms in recent decades also had strong CEOs who acted as important motivators and supporters of the change. Furthermore, both firms benchmarked themselves with the best firms in the west, and this seems to be a winning move for companies that want to catch up with the best companies in the world. But there are important differences in the details: Huawei hired a large number of foreign consultants

² <https://techcrunch.com/2011/08/15/breaking-google-buys-motorola-for-12-5-billion/>

³ <https://www.theverge.com/2014/1/29/5358620/lenovo-reportedly-buying-motorola-mobility-from-google>

to imitate exactly IBM's product development routines, whereas Samsung from the beginning used its in-house think tank to benchmark with the west and then adopt and diffuse those practices which were compatible with Samsung's existing corporate culture and systems of routines. Huawei only later started to modify routines. Of course, in later transformation efforts of Huawei—as detailed in Chapters 4, 5, 6, 7 and 8, Huawei gained more confidence to become involved in steering the transformation efforts itself even though it still employed the best western consultants to transfer know-how. We believe that part of differences between the approaches of the two firms can be explained by the fact that Samsung is almost 50 years older than Huawei, having been founded in 1938. Also, Korea was more developed in the 1990s than China, making it easier to draw on local expertise rather than hiring western consultants. Song makes the important point that both Samsung and Huawei are outliers in their respective countries. Creating firms that are able to grow to the scale of Samsung and Huawei is a remarkable success, underlining that it is important to study the details as we are doing in this book.

In his commentary on Chapter 4, the supply chain scholar Shi (2019) notes that many companies mistakenly believe that simply acquiring a computer-oriented management information system (MIS) can improve their business. Companies often fail to analyze exactly what business processes their strategy requires and what organizational routines need to be put in place so the MIS hardware can achieve its positive effect. When Huawei first wanted to improve its supply chain practices (1999-2003) in response to rapid breakneck growth, the leadership recognized that it lacked know-how how put in place an effective new system. Coming to this realization requires some humility that is often scarce among successful startups who infer from their success that they can more or

less do everything well. Because Huawei developed trust in the quality of IBM consultants in transferring best practices to Huawei with the IPD initiative, Huawei also adopted completely the IBM system of routines in its first transformation effort of supply chain management. Shi himself has studied Huawei's supply chain processes extensively. Reflecting on this first and the second big initiative to create a global supply chain from 2005, Shi (2019) formulates an interesting generalization: Huawei always seems to implement a new business process first and later tries to modify its organization after the business process is proven to be effective and well-established. It would be very useful to investigate further whether this is as well true of other firms that successfully implemented new supply chain routines. We agree with Shi (2019) that one important area for future research on the Global Supply Chain is how Huawei dealt with the complexity challenges and how one would measure such complexities. An answer to this question would be relevant for most firms, as the global business environment is becoming faster moving and more complex.

Commenting on Chapter 5, Mudambi (2019)—a leading scholar of international business and Multinational Enterprises (MNEs)—helps put Huawei in the larger context of MNEs from emerging economies. He points out that the challenges that Huawei faced in its financial management are typical for latecomer MNEs from emerging economies. The desire for rapid growths often leads subsidiaries to implement their own financial standards adapted to their local needs, which makes it difficult for top management to evaluate the relative profitability of the various country subsidiaries. For this reason, financial standardization is a requirement if top management wants to ensure that capital and managerial attention is directed to those subsidiaries that generate the most value and

profits. As we have seen with earlier transformation initiatives of Huawei, an effective way to learn world best practices is to hire a competent consulting organization that has helped implement new financial systems with many other companies before and that can guide the client firm on how to implement systems of routines. Mudambi arrives at the key conclusion that merits to be repeated: Although the MNEs are embedded in so many different national contexts and even though managers have limited bandwidth all the information impinging on them, well-designed organizational routines are able to create transparency and cohesion in a global enterprise.

Because of her extensive experience with and her writing on HR practices of many Chinese firms (Xin, 2013), Xin (2019) is able to place Huawei's HR transformation in context. One of her key messages in her comment on Chapter 6 is that the advanced HR practices of Huawei have also been adopted by other leading companies such as Haier, Alibaba, and Industrial and Commercial Bank of China (ICBC) in China, but that small and medium-sized companies have not adopted best HR practices and can learn from the example of Huawei. Xin also articulates a number of additional questions for future research on Huawei's HR practices. Because R&D is so central to Huawei's success, we agree that it would be useful to investigate further how Huawei's R&D function manages to access, attract, train, develop, evaluate and retain local talent as well as develop leadership in critical overseas operations. One question Xin (2019) does not address in her commentary but in our view is also worthy of further investigation given the important role consultants played in transferring best practice to Huawei: Have other Chinese firms such as Haier, Alibaba, and ICBC also used international HR consulting firms such as the Hay Group to implement world-class HR practices? Or have they tried

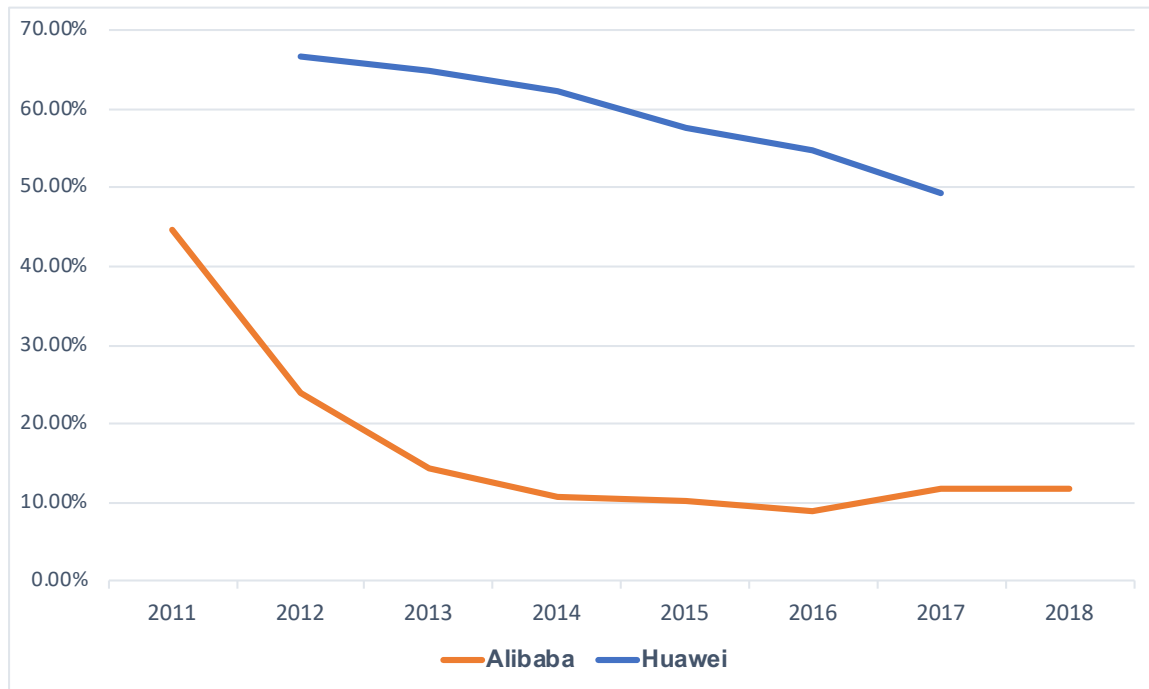
to copy other Chinese firms maybe even Huawei, or have they used some Chinese HR consulting firms?

The international business scholar Carl Fey comments on Chapter 7, which describes the internationalization process of Huawei that began around 1997. Fey brings to this task extensive knowledge of MNEs in Europe and in China as he spent almost five years (2011 to 2015) in China. Based on this experience, he developed a framework (Fey, Nayak, Wu, & Zhou, 2016) to analyze the internationalization strategies of emerging market multinational enterprises such as Huawei. In his commentary, Fey (2019) observes that few firms have changed so much as Huawei has in such a short period of time. To get a better sense how international Huawei is compared to other prominent companies from China, we put together comparative figure the percentage of the revenues that are not made in China, i.e. international revenues, of both Huawei and Alibaba.⁴

What Figure 1 clearly shows is that over the years 2012 to 2017, Huawei's international sales have been much larger than Alibaba's, giving Huawei a large incentive to learn best practices from different countries around the world. To our surprise, the data also show that the percentage of international sales has dropped for both companies in recent years. It would be useful to study this more systematically for Chinese MNEs because it is such a counterintuitive finding.

⁴ We were not able to get systematic data for another Chinese internet leader, Tencent Holdings, mainly active in games and services around the ubiquitous Wechat messaging app that now is imitated by Facebook for its success in building an entire ecosystem of personal services (banking, hiring taxis, etc.) around its instant messaging services. We could obtain data for one year. Tencent business revenue in 2016 was 152.35 billion yuan (22.69 billion \$US), the revenue from China mainland was 144.37 billion yuan (21.50 billion \$US), accounting for 94.77%, and the revenue from overseas markets accounted for 5.23%.

Figure 1: Share of Foreign Sales of Huawei and Alibaba (2011-2018)



Source: Our calculations based on data provided by Statista.com

Fey (2019) also finds it noteworthy that —unlike most documented cases of organizational change where initially only a small number of employees embrace the change (see Kotter, 1996)—in the case of Huawei most employees of the firm seemed to have embraced the change. This is of course not entirely true, as we documented in the instance of the first change initiative (IPD) that was described in detail in Chapter 3. Especially after the first transformation effort proved to be a demonstrable success, getting employees behind major transformation efforts was easier. It is important to reemphasize that a key reason why large numbers of employees would embrace change

was the profit-sharing plan that Huawei developed before the major change initiatives started: Many employees would personally benefit from a better-run organization, so they had great incentives to get on board with such changes.

Fey (2019) highlights that Huawei picked up a best practice from its Sudan subsidiary and spread it around the world. This shows that Huawei has a strong culture of learning from wherever the source of new knowledge may reside and that the firm is able to embed this learning into routines. What this shows even more is that Huawei is able to connect international subsidiaries well with the learning processes at the center of the firm in China. One way this happened is through rotating key employees to foreign posts. We agree with Fey that it would be useful to know more details than presented in Chapter 7 how this process took place, because the literature on MNCs has shown that things done at one subsidiary at the periphery are often not picked up on and spread around an MNC. We also agree with a second recommendation Fey makes for future research. It would be beneficial to explore more what changes needed to be made at headquarters to effectively support foreign operations. Similarly, it would be very useful to investigate the relative importance of these changes compared to getting the design of foreign subsidiaries right.

Before becoming a university professor, Frans Greidanus worked at Philips R&D organization from 1982 to 2013, holding many managerial jobs including head of Philips Research Asia and CTO Philips Asia. Given his deep knowledge about R&D in a world-class technological company, he can put Huawei's transformation of its R&D function (Chapter 8) in perspective. Greidanus (2019) notes that it is quite typical that an R&D organization in a growing firm goes through the five transformational changes we identified in the case of Huawei. What is remarkable, in Greidanus' view, is how quickly

Huawei went through the five stages. Phillips (founded in 1891) had 128 years to go through what Huawei (founded in 1987) went through in less than three decades. Greidanus also explains that the rapid growth of R&D personnel at Huawei is also unprecedented compared to Western companies that operate in the space of Huawei. He also puts into focus that Huawei is going counter to the trend in Western technology companies that in the past two decades reduced or even cut long-term research, AT&T with its Bell Laboratories being perhaps the most stark example of this development (Gertner, 2012). Greidanus (2019) also raises a number interesting question for further research on Huawei's R&D organization. How does Huawei manage its portfolio of R&D projects and who decides on the budget of the various research projects? Is it at the business or the corporate level or a mixture beyond the two?

Chapter 9 compared the IP strategy of Huawei to one of its key international competitors, Ericsson. We were somewhat surprised to find that Huawei, even though its number of patents initially is much lower than that of Ericsson, shows no significant differences from Ericsson in both terms of the key technological classes the firm patented in and the relative frequency with which it patented in those classes. To catch up with leading western telecommunication firms, Huawei invested in the same key technologies. Chapter 9 also presents detailed data on the share of patents in various generations of mobile technology. Huawei had a small share of patents in 3G technology but substantially increased its share in 4G (LTE) Standard Essential Patents, taking an intermediate position (No. 7) among the leading developers of technology, i.e. Samsung, Qualcomm, InterDigital, Nokia, LG, Ericsson, NTT Docomo, NEC, Sharp, Panasonic, Motorola Mobility, Apple, Innovative Sonic, and ZTE (companies are listed a decreasing

order in terms of total patents). In recent years, Huawei has obtained in 5G technology the largest number of standard essential patents of any company in the world. These data show Huawei transformed itself from an imitator of Western innovation to company that contributed substantially to the creation of 4G and even more so to 5G technology. We pick up this theme one more time at the end of this chapter.

2. Organic Growth and not Growth through Acquisitions

As we saw in Chapter 8, to upgrade its capabilities Huawei built research centers all over the world to tap into foreign research and development expertise. Huawei tried to build capabilities organically. In this respect, Huawei is different from many other Chinese companies in that it has not acquire major foreign companies to upgrade its capabilities. Chinese firms have been on a spending spree all over the world to buy advanced companies. In 2012, for example, Chinese firms engaged in 457 mergers and acquisitions with a transaction value of US\$ 43.4 billion (Huang & Sharif, 2015). We will detail five prominent examples. Among the most prominent transactions in recent years was the Geely acquisition of the car maker Volvo from Ford Motor company in 2010. Geely's goal was to acquire advanced car design and technology, and over time transfer some of the Volvo's capabilities to Geely's Chinese operations and thereby become more competitive in the huge Chinese car market. (China had already become the largest in the world by sales volume at the time.) Another example is China Aviation Industry General Aircraft (CAIGA), which is the largest aircraft manufacturer in China. In 2011, it bought US-based Cirrus Aircraft, which at the time was second largest single engine aircraft manufacturer (Huang & Sharif, 2015). The purpose of the acquisition was to use Cirrus's world-wide sales and marketing capabilities to help CAIGA develop

global markets. A year later, in 2012, China's largest construction equipment company, the Sany Group, acquired the German company Putzmeister. Putzmeister is a maker of high-tech concrete pumps (Huang & Sharif, 2015). The stated purpose of the acquisition was to obtain cutting edge technology. This acquisition also set off some alarms in Germany that the country might lose control of its famous mid-size hidden champions to China (Klawitter & Wagner, 2012).

Since 2003, the Chinese government has pursued the goal to develop a strong wind-energy sector (Chinese Wind Energy Association, 2014). Chinese companies in the wind technology sector have acquired European companies to upgrade their own technological and distribution capabilities. In 2008, Goldwind acquired 70% ownership of Vensys Energy, located in Germany. The company is a leader in direct-drive permanent magnet wind turbines. A year later, Huiteng Windpower bought the world leading blade design firm, Composite Technology Center, by acquiring the parent firm CT Holding B.V (Huang & Sharif, 2015).

Viewing Huawei in the context of other Chinese companies that obtained their advanced technology by acquisition, it is even more remarkable how Huawei—by only investing consistently more than 10% of sales in R&D for more than 20 years, built up cutting edge technological skills particularly in the latest 5G technology, as we described in Chapter 9.

3. Huawei is Different from State-Owned Companies

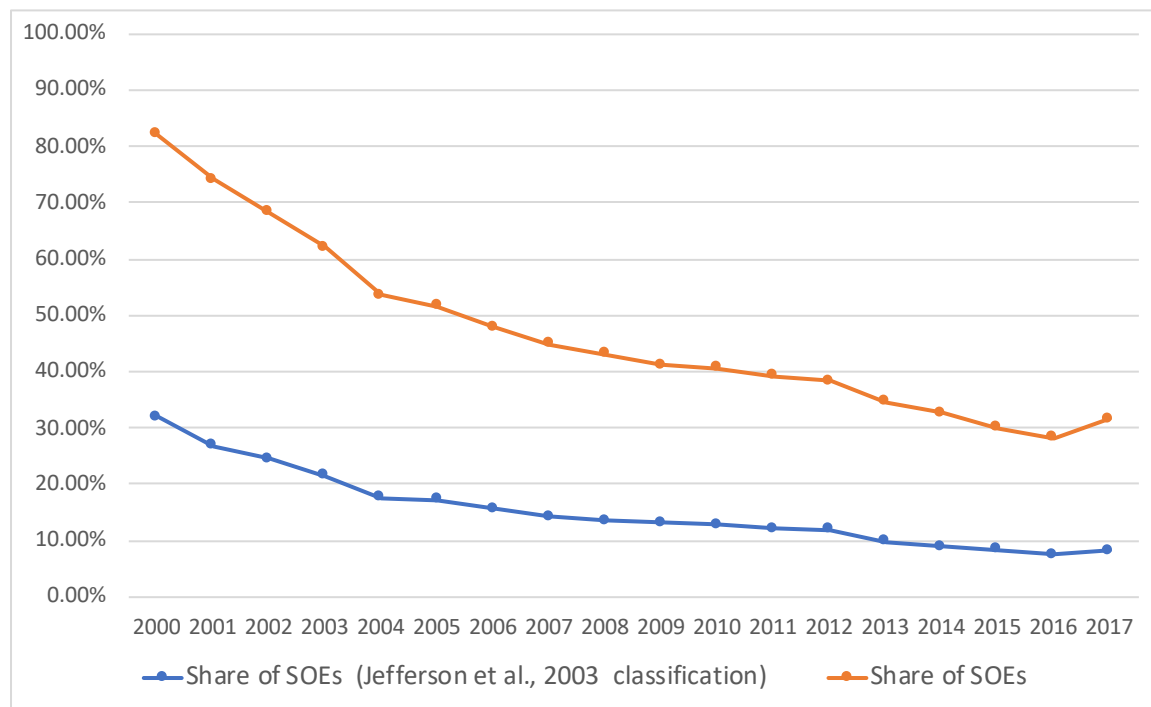
Huawei is also different from Chinese state-owned companies (SOEs), which come in many forms. Some of the SOEs are fully owned by the state, while others are

even listed on the stock exchange, as is the case the Huawei competitor Datang. All different types of SOEs are controlled by the state, however, and therefore top managers have much less degrees of freedom compared to truly private companies. Huawei, as we have detailed throughout this book, was founded by private individuals who were driven by the desire to create wealth for themselves and later for many employees. The key is founder Ren Zhengfei also set the goal of becoming a leading ICT company in the world by making profits, reinvesting substantial parts of its profits to finance growth, and by motivating employees to work very hard on behalf of Huawei by involving a large portion of profits in profit-sharing. State-owned companies in China, on other hand, have different fundamental goals. Either they continue to be protected by the state to maintain employment (for example the steel industry) or the government has restricted or banned outright private ownership of firms in particular sectors that the government deems crucial for guiding the economy: energy (e.g. SINOPEC, China Energy Corporation), electrical grid (State Grid Corporation of China), telecommunications (e.g. China Telecom, China Unicom and China Mobile), and banking (e.g. Industrial and Commercial Bank of China-ICBC; China Construction Bank-CCB, Bank of China-BOC, and Agricultural Bank of China-ABC). Between 2012 and 2017, the central government merged 34 centrally controlled SOEs, bringing them from 196 in 2012 to 98 by 2017. Among the largest 500 Chinese companies, the majority are SOEs (Q. Chen, 2018).

But the prominence of SOE among large firms gives the wrong impression about the motor of the Chinese economy since 1978. Non-SOE companies such as Huawei have been the chief engine of economic dynamism and growth in the Chinese economy and not the often very protected or at least state-favored SOEs. Consistent with this

evaluation, the share of economic activity of SOEs has declined substantially over time. Systematic data on manufacturing and utility sectors are available since 2000 (See Figure 1). If one uses a less restrictive definition of SOEs (including state-owned enterprises, state-owned jointly operated enterprises, wholly state-owned enterprises and shareholding companies controlled by state-owned enterprises), the share has gone down from 82% in the year 2000 to 32% in 2017. Using the more restrictive definition of Jefferson, Albert, Xiaojing, and Xiaoyun (2003) (including state-owned enterprises, state-owned jointly operated enterprises, and wholly state-owned enterprises only), the share of SOEs was already only down to 32% in 2000 and now has declined to 8% of all economic activity. Both time series show clearly that the private sector is propelling China's catching up with the most advanced economies (Lewin, Kenney, & Murmann, 2016).

Figure 2: Share of Economic Activity in Chinese Manufacturing and Utility Sectors (2000-2017)

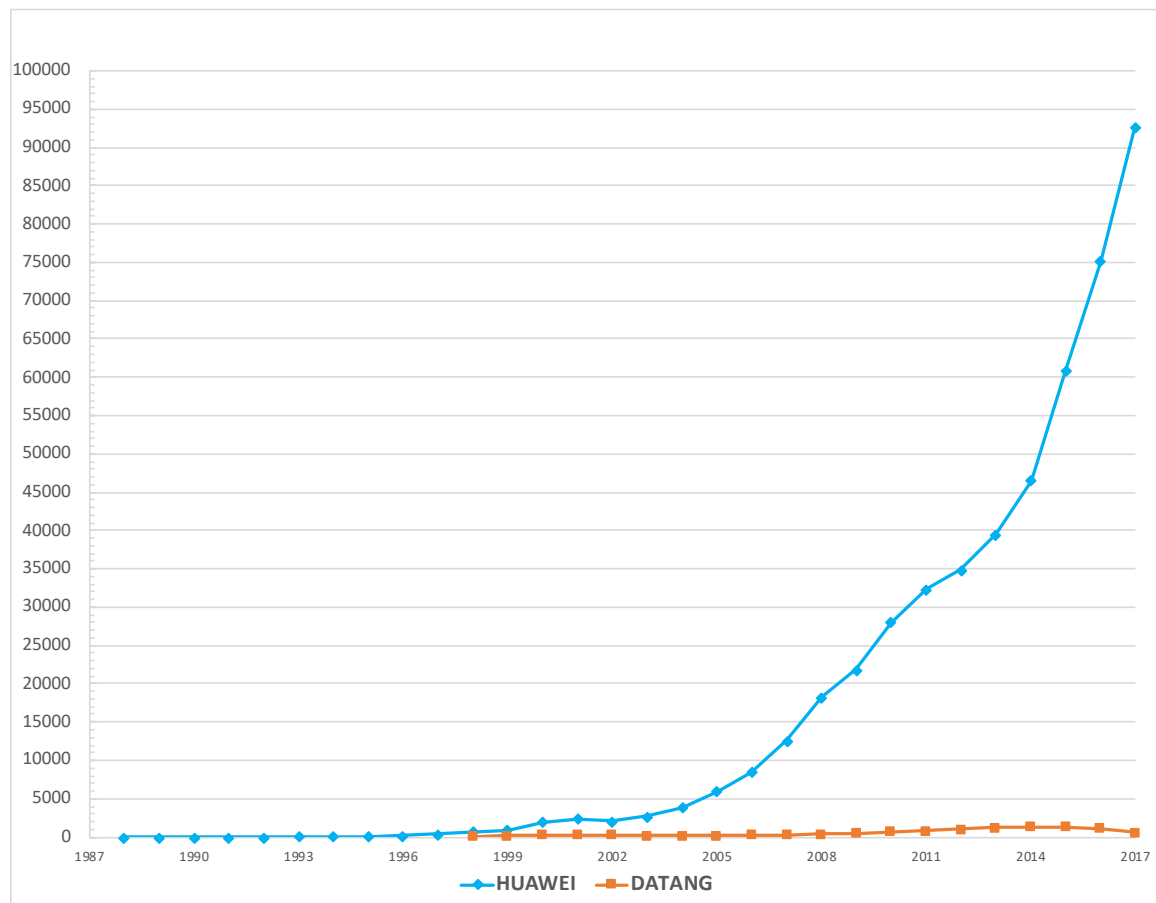


Source: Our calculations from data provided by National Bureau of Statistics of China.

A comparison of Huawei and the aforementioned Datang Telecom Technology (DTT) company—an SOE and a direct competitor in the telecommunications industry, tells a similar story as Figure 2 did for the entire Chinese economy. There are clear benefits of being a privately controlled company. In Chapters 1 and 5, we described in detail that Huawei has a unique ownership structure where a large number of managers and employees share in the profits that Huawei is making. The growth rates of the two companies (see Figure 3) over the past 20 years show the motivational benefits when managers and employees see themselves as owners directly benefit from higher growth and profits. Huawei grew dramatically while Datang grew very little. In recent years, Datang incurred great losses and is facing the risk of being delisted from the Shanghai

Stock Exchange (Zhang, 2018). We do not want these statements to be construed that we are against state-owned enterprises either in the China or the West. The point we want to highlight, however, is that private enterprise is the motor of much of the innovation and the efficiency gains in the economy and that the direct comparison of Huawei and Datang illustrates this point forcefully one more time. Or to put it in another way, an economy only made up of SOEs would never perform as well as an economy that had a large share of private enterprises. The interesting question is when it makes sense for a state to control enterprises. In China, the answer to date has been to maintain control and direct many more business firms than is the case in the West.

Figure 3: Sales Growth of Huawei and Datang since 1988 (in Million US\$)



Source: Company Annual Reports

4. Contributions to Literature on Routines and Dynamic Capabilities

We now want to discuss the contributions our study of the transformation of Huawei made to the literature on routines and dynamic capabilities. Scholars of strategic management view superior firm capabilities (Helfat & Winter, 2011; Teece, Pisano, & Shuen, 1997) as one of the two key sources of competitive advantage—the other being the choice of a product or service market that offers an attractive landscape for avoiding competition (McGahan & Porter, 1997; Porter, 2008). (From here on we will use the term products to refer both to physical products and services, as many products have services built into them (e.g. customer service) and as modern advanced economies are over 80% made up of services rather than manufacturing and agriculture (Murmann, 2013)). Firm capabilities, particularly in the case of complex products, are underpinned by a large bundle of routines that finely coordinate the actions of individual employees to create the competitive products (Becker, Lazaric, Nelson, & Winter, 2005; Nelson & Winter, 1982). The concept of a routine, therefore, is a key concept for understanding how firms are able to generate productive collective action reliably on an ongoing basis. In the introduction, we wrote that when we initially examined the development of Huawei, we noticed that the breaking of old routines and the creation of new routines appeared central to how Huawei managed to successfully transform itself. For this reason, we decided to use as our overarching analytic lens the theory of routine-based organizational capabilities (Becker et al., 2005; Murmann, 2003; Nelson & Winter, 1982; Nigam, Huising, & Golden, 2016; Parmigiani & Howard-Grenville, 2011; Szulanski & Jensen, 2008; Winter, 2003).

Only a few studies (e.g., Daniel M. G. Raff, 2000; D. M. G. Raff & Scranton, 2017) have examined explicitly both the creation and the change of existing routines. To our knowledge, no study has investigated the creation and change of routines from the startup phase all the way to becoming a large multinational corporation with 170,000 employees. Most organizations never achieve such growth because they are not able to make the changes to their existing routines and their leadership frames required to bring this about (Witt, 2000).

Another feature that makes our study special is that we examine most major functions of an organization. Until now, most studies that examine routines as the building block of organizational capabilities focused on parts of organization, for example, the production system (Fujimoto, 1999), product development (Obstfeld, 2012), total quality management (Rother, 2010) or customer service call centers (Pentland & Rueter, 1994). In Chapters 3 to 9 we have provided a very detailed view of how Huawei in every major functional area of the corporation (Management, Product Development, HR, Supply Chain, Finance, R&D, Intellectual Property, and International) created routines and after some time broke the routines and created new ones. Pisano (2017) emphasized that such studies are necessary to make advances in the dynamic capabilities theory.

In the introduction chapter, we provided a sketch of the meta-routines that governed the change process at Huawei. We wrote in Chapter 1 that, “One can speak about Huawei developing meta-routines that constituted dynamic capabilities (Winter, 2003) to transform itself continuously. These meta-routines involved (1) bench-marking with the best firms in the world; (2) hiring leading Western consultancy firms, which

would help close the capability gap with the best foreign firms by transferring templates for best practices; (3) initially copying foreign routines as faithfully as possible; (4) having the CEO and the other top managers deeply involved governing the change.” We now want to fill out this sketch with more details, using Teece (2007) on dynamic capabilities as a theoretical frame.

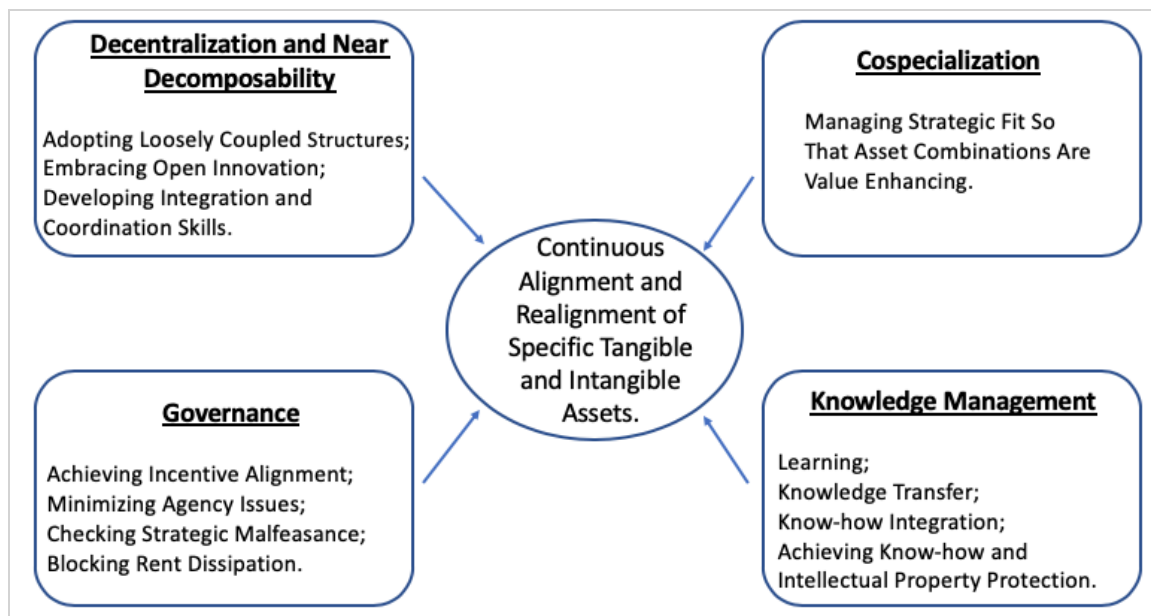
In this article, he goes well beyond the pioneering work on the concept on dynamic capabilities (Teece et al., 1997). He integrates a massive amount of literature on the concept (Eisenhardt & Martin, 2000; Helfat et al., 2009; Winter, 2003, to name only a few prominent pieces) and provides some micro-foundational ideas, which allow us to assemble evidence that Huawei indeed possessed change routines that amount to a dynamic capability. Teece (2007) distinguishes between three classes of dynamic capabilities, those capabilities that allows a firm to

- (1) sense new opportunities (e.g. Huawei leadership recognizing in early 1990s that moving to digital telephony would open up great opportunities for selling mobile telephony equipment rather than equipment for fixed-line telephone services),
- (2) seize new opportunities (e.g. Huawei making R&D investments to master digital technology and build equipment for it starting in 1993)
- (3) transform⁵ the enterprise (e.g. Huawei engaging in major transformation initiatives analyzed in Chapters 3 to 9).

⁵ Teece (2007) often uses the term “reconfiguring” instead of “transforming” in the article, but essentially, he means the same thing with both terms. The key point is that this third class of dynamic capabilities is different from sensing or seizing opportunities. All three classes need to be present if a corporation wants to stay adapted to changing environments and increase its likelihood that it will over longer periods of time at least make profits that cover the cost of capital.

It is important to stress that our book presented very little about the first two micro foundations of dynamic capabilities—sensing and seizing opportunities. Indeed, we see it as a great opportunity for future research to focus on how Huawei has developed routines for sensing and seizing new opportunities. In this book, we focused almost entirely on the third category, transformational or reconfiguration capabilities. Teece (2007) identifies four major categories of transformational capabilities that he labels as *Decentralization and Near Decomposability*, *Cospecialization*, *Governance*, and *Knowledge Management*. Figure 4, which is taken directly from Teece, spells out what he regards as some of the elements of this for categories.

Figure 4: Combination, reconfiguration, and asset protection skills



Source: Teece (2007, Fig. 3)

Throughout our book, we have presented evidence for all the elements in Figure 4. To just give one example, Huawei adopted a loosely coupled structure when it created a separate business unit for running consumer business (smartphones, PC, wearables,

connected home) and the network business (selling telecommunication equipment to operators like Vodafone or ATT) and the corporate business (Cloud, enterprise IT infrastructure). We will not revisit all the examples for the other elements in Figure 4.

Reflecting, however, on the entire history of Huawei from 1987 to 2018, we believe that change meta-routines deserve a more prominent place in the figure. If one carefully reads his article, it is clear that Teece (2007) recognizes how central top management leadership is to corporate transformations. In the conclusion of his synthesizing article, Teece (2007) writes: “Dynamic capabilities reside in large measure with the enterprise’s top management team, but are impacted by the organizational processes, systems, and structures that the enterprise has created to manage its business in the past” (p. 1346). He also invokes the concept of routines several times, and if asked he would almost certainly acknowledge that how the leadership plans and carries out change in a routine way is very important for the success of a transformation. For these reasons, we do not want to give the impression that Teece does not understand the importance of meta-routines for change. Nonetheless, since figures and diagrams are what often counts most in transferring arguments to the readers minds, we believe Teece’s (2007) Figure 3 (our Figure 4) needs some adjustment to give a more prominent role to change meta routines and supporting values and ideas among top management team members. We believe the change meta routines and supporting values and ideas are at the heart of a transformation capability.

To justify the proposed changes to Teece’s Figure 3 (our Figure 4) let us revisit the key features how the top management team (TMT) of Huawei orchestrated the major transformation projects that changed routines in the various functions of Huawei (for

details see Chapter 2). It seems important to separate analytically between values and ideas of the top management team that support these change routines on the one hand and the change routines that coordinate individuals to initiate, monitor and execute major changes on the other. Please note that we structured the information in a form of a table because this makes it easier to show how values and ideas support particular aspects of the change meta routines. The values and ideas were in existence at least since 1998, but they may not all have existed in the first few years, a period which is much less well documented than the period when the Basic Law (see Appendix D) was published. We do not repeat the information of Table 1. Therefore, please read all of the information in the table so you can easily follow the arguments afterward.

Table 1: Change Meta Routines at Huawei and their Supporting Values

Values & Ideas		Change Meta Routines
Ensure long-term survival of firm	→	Constantly implant sense of crisis into the whole company
Constant change is good and necessary for survival		Assign managerial talents to the major change initiatives and only promote them to the top management if they have proven themselves as change managers.
Top management needs to be deeply involved in change and lead by example		Every major change effort will have an executive steering committee to oversee a change project management office that in turn will orchestrate various projects teams. Founder and head of hired consulting firm will act not be chair but are members of the ESC to help make strategic decisions for major change initiatives. Founder will not participate in every meeting of ESC and only participate at stage-gate points and when internal resistance needs to be overcome.

	One executive director, or senior vice president from the top management team will be appointed as the sponsor of a specific change implementing project.
Not all functional areas in the firm can be changed at once without creating chaos that would jeopardize survival of the firm.	Review all aspects of business and decide which ones constitute the most pressing bottleneck for improving performance. First, roll out changes in one unit and check that they work before rolling the changes routines out to the rest of the organization.
Always be open for and devote substantial time to learning from diverse sources of expertise around the world.	Find a consulting firm in the particular area the firm wants to change that can transfer world's best practice. When appropriate first copy exactly entire system of routines and later make incremental adjustments.
Always be patient with reaping benefits from major change initiatives and keep a long-term perspective.	Structure open-ended contracts with consultants so they do not make them leave before the new routines are running smoothly. Instruct finance department to pay whatever it costs to have world class consultants on multi-year engagements.

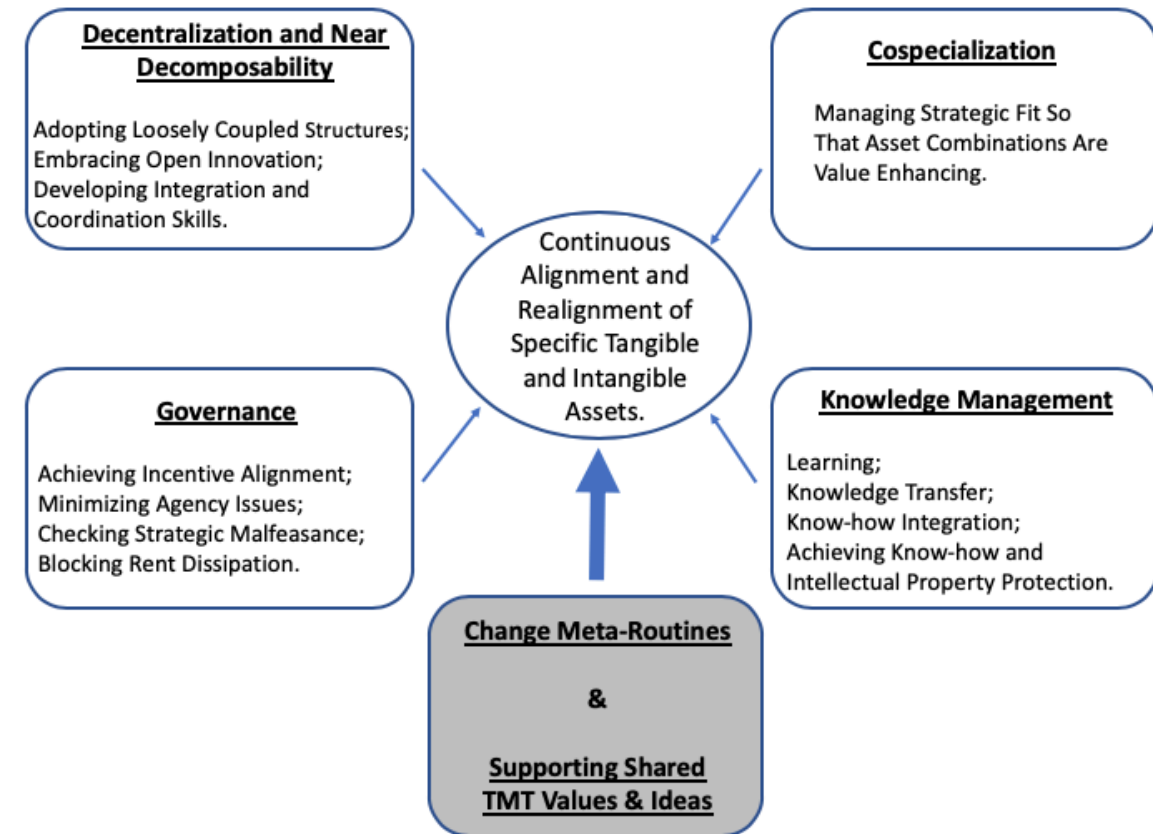
It is important to stress here that Huawei has not hired top management team members from the outside. All TMT members are long-term Huawei employees who have proven that they share the values of constant change to enhance chances survival of the firm (see Chapter 3 Appendix 1).⁶

⁶ In a recent interview (Kharpal, 2019) Ren (the founder of Huawei) made clear that additional profits that the firm is making are not being distributed to employee shareholders but to fund more basic R&D within Huawei and give funds to universities to enhance Huawei ability to get access to advance knowledge in universities. Ren apparently sees this as key for enhancing the future survival chances of the firm.

Meta-routines have much less detail than the routines that govern operational areas of a firm (Helfat & Winter, 2011). But as Table 1 makes clear, values and ideas shared by Huawei top management together with change routines that are invoked when existing operational routines no longer are effective can constitute a dynamic capability that allows a firm to repeatedly recreate fit between a changing environment and the firm's strategy. As we have shown throughout our book, the meta-routines for change will also be gradually enriched and modified, but this will happen much more infrequently than changes in detailed operational routines that guide each of the functions of the organization.⁷ Given the importance of developing change meta-routines and supportive shared TMT values and ideas, we think it is important to add this result to Figure 4 and create a new Figure 5.

Figure 5: Transformation/Reconfiguration Skills (modified Teece 2017, Fig. 3)

⁷ The description of the change meta-routine is most accurate for the period from 1998 to 2005. The current meta-routine may be slightly different.



Huawei, in our view, highlights that developing change-meta routines and supportive values among TMT members is crucial for developing a dynamic capability for change. This strikes us as much more important than some of the elements Teece has in his original figure, and hence we also made the causal arrow from this box thicker than those from the original four boxes.

5. Challenges to Future Growth

Huawei faces a number of challenges if it wants to continue to grow at the same speed it did from 2007 to 2017, when sales increased from US\$ 12.5 billion to 92.5

billion (see Appendix A). This represents a 22.5% increase in sales per year. As companies become large, further growth becomes more difficult and typically slows down (Murmann, Korn, & Worch, 2014). Simple math explains why: Growing 100% from 1000 employees only required Huawei to add another 1000 employees. If Huawei wants to grow another 100% from its 2017 level of 180,000 employees, it would have to add 180,000 employees, or 180 times as many as when it grew from 1000 from 2000 employees. That is a lot of hiring. If Huawei only interviews 5 people for every job, it would have to interview 900,000 people to fill the 180,000 positions. To train up 180,000 people and imbue them with the values of the firm so they act consistent with what the company wants is a task that is a lot more challenging than doing the same for 1000 employees. It is not surprising, then, that firms generally find it difficult to maintain their culture and existing routines when a large number of new employees is added at very fast (Witt, 2000) and the development of Huawei described in this book clearly has proven this point again.

If Huawei wants to stay true to its corporate strategy of operating only in the ICT sector, its growth is limited by the growth of the ICT sector. At present, sales growth for this sector for the next 5 years is projected to be 6% percent (IDC, 2018a), which is substantially lower than the 22.5% Huawei has been growing at over the past decade. Huawei apparently wants to fuel its growth by increasing its consumer business group from US\$ 47 billion to 150 billion by 2023 (Ren, 2019). Unless Huawei is better able to forecast demand than IDC, this is a highly optimistic projection, as for example global smartphone sales are only predicted to grow by from 1.46 billion in 2017 to 1.67 billion

units in 2022 (IDC, 2018b) and PC and tablet shipments are forecast to decline through 2023 (McGrath, 2019).

Hence, the high growth in the consumer sector can with high probability only be achieved if Huawei further takes share from its existing competitors—a strategy that is not without problems as Huawei has recognized since 2002, when Western competitors started to fail. Even if Huawei can continue to grow during the next five years by taking massive share away from other companies in the consumer market, its organic growth will eventually be limited if it stays only in the ICT sector. Many companies, when faced with slowing growth in their core business, venture into unrelated industries that offer better growth options but then often run into trouble because they do not have the capabilities to compete in the new sectors. For this reason, Huawei may face a stark strategic choice in the next decade: to stay focused on the ICT sector and accept lower growth rate or diversify into other sectors with all the risks that an unrelated diversification entail. In a recent interview, Ren acknowledged that the massive investments the company plans to undertake in fundamental research means that, “That future may be closely related to our business, but it also may not be” (Kharpal, 2019). This suggests that he is already toying with the idea of diversification from the core. Whether this will be successful depends not only on the investments Huawei made in broadening its fundamental research portfolio but also on whether other firms have market-specific capabilities in the new markets that Huawei seeks to enter and if these skills are difficult to imitate (see Pisano, 2017, for a good discussion of this point).

There is a third challenge to growth resulting from the geopolitical struggle between the US and China. As we saw in Chapter 9, Huawei’s technological position in

5G technology is much stronger than in previous generations of mobile infrastructure equipment. Huawei now is a technological leader possessing the largest number of Standard Essential Patents. Huawei has pursued for many years the strategy to become a significant player in the rollout of 5G technology all over the world. But in 2018, various actors within the US government have stepped up their campaign to persuade other Western governments to ban Huawei equipment from the national 5G infrastructure rollouts (Woo, 2018). What is more, the US has launched a criminal probe of Huawei in the wake of alleged theft of trade secrets in the US (Strumpf, Hong, & Viswanatha, 2019). Realizing a threat to Huawei's future development, the typically media shy founder Ren has granted many interviews. This comes in the wake of Huawei's CFO's, Meng Wanzhou arrest in Canada on the request on the US in December 2018. The US is accusing Meng of having violated a trade embargo against Iran and having made false statements. Meng also happens to be the daughter of the Huawei founder, and hence her arrest is troubling to Ren well beyond the fact that a top management person of Huawei has been arrested. In a March 2019 interview with the BBC (2019), Ren issued strong fighting statement that Huawei will not accept the US government attack on it and that it will to fight the efforts to undermine the firm. Ren tried to rally all employees, stating confidently that, "The US cannot crush us" (BBC, 2019). A few weeks later, Huawei took the unprecedented step of suing the United States government, alleging that parts of the defense policy bill passed in August 2018 that put a ban on Chinese companies are unconstitutional (Strumpf, 2019). The act was passed in part to punish China for claiming control of areas of the South China Sea that the US views as an illegitimate military action in international waters (O'Keeffe & Hughes, 2018). Irrespective of

whether Huawei is found guilty in one or more of the US investigations, it is clear that Huawei is being caught in a geopolitical struggle between the US and China. It is too early to tell whether the US government will be able to persuade many other Western governments aside from Australia to entirely ban Huawei from providing 5G equipment. Germany and the UK have recently stated that they will not fully ban Huawei providing 5G equipment (Nakashima & Fung, 2019). And some experts have started to argue that the US government claims about the danger of Huawei's ability to act as a spy on behalf on the Chinese government when Western telecom companies use Huawei equipment are overblown (The Associated Press, 2019). The Economist (2019) has recently told policy makers that "*Banning one of China's leading firms from operating in the West should be a last resort.*" It is difficult for Western policy makers to ask China to allow foreign companies fair access to the Chinese market and at the same time block Huawei completely from Western countries.

If one thing is for sure, it is that Huawei will continue to face the challenge to transform itself as it has done throughout its history. When Steve Jobs died, many commentators speculated that Apple under Tim Cook would flounder. This did not happen, and Apple market capitalization grew from \$347 billion to \$922 billion in 2018 (Dormehl, 2018). Similar questions have been asked about how Huawei would perform if Ren Zhengfei were no longer at its helm. While Ren undoubtedly played a key role guiding and helping to transform Huawei over the past 30 years, Huawei has developed a culture and routines for change that in our view should provide for substantial continuity. Indeed, the 10 years after Ren has fully passed on the torch of leadership at Huawei will provide a unique opportunity to examine how much a firm's ability to change depends on

effective impersonal routines and how much it depends on single powerful individual who is able to get large number of other people to cooperate and move the company in a different direction. If after Ren's departure the *Management Transformation of Huawei* comes to an abrupt end, the analysis we offered in this book would be proven wrong.

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