Grande Ecole – Majeure Finance

RESEARCH PAPER

Academic Year 2017 - 2018

How to value brands properly?

A case study on Huawei Technologies

Xiaoqi YANG

Yinghao CHEN

Under the supervision of Professor Patrick LEGLAND

June 2018

Abstract

Brand, showing the identity of an object, has a long history in human life. As the consumption market develops in the modern society, it has been commonly acknowledged that brands constitute a significant part of the value of a business and bring added value to different parties including various stakeholders of the company, potential investors, and of course, consumers.

Thus, the valuation of brands, for both commercial and financial purposes, is becoming an increasingly interesting topic. Although the valuation of such intangible asset is not easy to identify due to the nature of asset, various methods have been developed by both the academic world and specialized professionals in the field.

This research paper will try to define the concept of a "brand" and "brand equity", assess the major brand valuation methods and discuss different approaches, comparing their scope of application, assumptions, major features, advantages and shortcomings. A case study on the brand equity valuation of Huawei Technologies brand will be presented as a practical application of brand valuation methods, where specific studies on its business, market evolution and business projections will also be included.

In the end, we presented our recommendation on the design of appropriate methodology, estimation of key assumptions and comparison of results, as well as specification on the valuation of private company-owned brands.

Key words: brand, brand equity, brand valuation, Huawei Technologies

Acknowledgement

We would like to express our gratefulness to those who have contributed to the completion of this research paper and those who have helped us achieve our academic goals throughout our studies in HEC.

First, we would like to thank Professor Patrick LEGLAND, who has directly instructed us on this research paper. He introduced us to this interesting topic of brand valuation during his courses, advised us on the overall structure of the research paper, and supervised the whole process, especially when we need guidance.

Second, we would like to thank all the professors and staff in HEC, who have equipped us with solid knowledge on finance and business management through insightful lectures. At the same time, the analytical mindsets and approaches on which we have been trained in practical case studies are indispensable for the completion of our research paper.

Third, we would like to extend our gratitude to all the people and institutions who have supported our studies in France: our family and friends, who love and care about us all the time; our home university Peking University, who has trained us as quick-learning and open-minded bachelor's graduates who are adaptable in an international environment; Campus France, who has supported our studies and followed our projects; and the French community, who have shown welcome and kindness.

Table of Contents

List of Tables

List of Figures

1 Introduction: Brand and brand equity

1.1 What is a brand?

A product is something that is made in a factory; a brand is something that is bought by a customer. A product can be copied by a competitor; a brand is unique. A product can be quickly outdated; a successful brand is timeless.

--Stephan King, WPP Group, London

Although the modern concept of "brand" has only been widely discussed and debated as an interesting marketing topic since decades ago, there is no doubt that brand is as ancient a concept as civilization itself. In fact, the word "brand" is derived from the Old Norse word *brandr*, meaning "to burn", as a traditional means to mark the ownership on livestock with a hot iron, a method still used until today (Keller, 2003a). While since late nineteenth-century, due to the significant trends of industrialization and therefore the accompanied disruption of mass-production and development of mass-distribution, large manufacturers felt threatened by the emergence of a large number of competitors' products circulating in the open market and were looking for a way to distinguish one's products from another in order to earn customers' long run loyalty with their specific brand. The modern concept of brand was introduced and gaining more and more power as a marketing tool in light of the emergence of intense competition among a huge number of players as well as a much easier access to various products in the market.

As the concept of "brand" evolves through years, however, the original idea which consists in defining the ownership has switched to emphasizing the quality of products (Yang et al., 2012) and communicating information (Moore and Reid, 2008). Today in the consumption society, brands are already everywhere and penetrate nearly all aspects of our daily life: food, clothing, electronic devices, nearly everything for daily uses are tagged with a brand. In the meantime, for any product, we find a flood of different brands which can sometimes really bring a headache to consumers when they make up their choice. One interesting question to bring up is, why consumers

would choose one brand over another? It's true that people might choose Mercedes-Benz over some other car brands because of the high quality and better customer experience from technical aspects, but for some other commodity products, it's sometimes hard for consumers to even tell the difference (Coca-Cola vs. Pepsi, for example). This is common within many industries today as companies invest huge money on product development and improvement, so that the functional differences can be lowered to nearly invisible for most common customers. Then why, among similar offers, many people still have preference for a certain brand name even sometimes that means a much higher price? The magic lies in the brand: as an article on Forbes points out, "People don't have relationships with products, they are loyal to brands" (*Why Brand Building Is Important*, Scott Goodson).

In recent years, more and more research has been focusing on brand management and brand valuation and to start with this topic, we need to first look at the different roles a brand serves for both customers and companies and then we'll explain why it's gaining important attention for academic and practical reasons.

As the origin of the word suggests, a successful brand should first serve as a powerful tool of identification for the brand owner, that is to say, a differentiation factor which is well designed to create awareness among consumers about one or several specific products or service, then even better, about the company itself. For example, when we think of big names like Coca-Cola, Disney, Google, etc., it's not only the red-bottle soft drink, cute cartoon characters or the searching engine that pop up in our head, but also the company's founding history, rich cultural heritage and strong emotional liaison which turn out to be more powerful and sustainable with consumers. If we went through the history of modern brands, it is not hard to realize that the development of modern brands has been closely related to that of trademark and copyright laws. These increasing needs of identification or differentiation not only show the idea that a brand name can help customers rapidly find what they prefer in a sea of brands, but also emphasize the fact that the confidence or attachment of customers towards a brand comes firstly from the embedded brand identity. In the meantime, from customers' perspective, a brand represents also an image of their personality. As more and more people in today's society are willing to attach a "label" or a name to their

consumption, brands to some extent help demonstrate the personal image of the consumer through his or her act of choosing a certain brand over another.

Another important function of brands is the role as information carrier. A successful brand should tell a customer a huge quantity of information about its product: What is the nature of the product? How about the quality? What is the level of the price? etc. Furthermore, companies use brands as an implicit way to promise a consistent quality because customers will generally expect a certain quality level associated with a specific brand. For example, when we talk about Apple, we spontaneously link it to a wide range of innovative, high-tech electronic devices as well as high-quality after-sale customer services. This also partially explains why people would be willing to line up or order new iPhones online even before all the information of the new products are released by the company, that is, customers already form their understanding of the new products even before information is available. Brand itself communicates, stores and builds information which in turn affects customers' confidence and lets them know what to expect when they place an order.

Brands also play an important role particularly for enterprises due to its potential of bringing added value, generating profits and fostering future growth of the business. A research conducted by Brand Finance shows that under the new economy, the total intangible assets would account for, on average, more than half of global enterprise value, replacing the tangible assets as the most important source of added value to a company. In certain sectors like software, internet and pharmaceuticals, intangible assets can even amount to around 90% of total value, which is significant in terms of value creation for a business. Brand, first of all as an intangible asset, shares the cash flow-generating feature like any other assets and impacts a business's value through its influence on customer acquisition and business strength, thus it is significantly important to analyze a brand and arrive at a numeric valuation in order to better understand the growth perspectives of a company in the long run. In addition, getting a range of brand valuation can help the company position its brand among the peers through comparison.

However, one interesting point to be mentioned is that although in general, brand should be the most powerful base for the business value creation, it can at the same time play as a liability which in some way destroys the value of a business. For example, during the summer of 2010, Foxconn,

the China-based technology producer which manufactures iPhones and iPads, was labeled "the suicide factory" as a result of nine incidents involving employees leaping to death due to overly tough working conditions. This in turn led to a brand crisis for Foxconn who enjoyed little brand identity before and who suddenly needed a global PR to manage the brand image crisis and find a way to tell their story. What's worth noting is that under such condition, Apple, the main customer of Foxconn, was afraid that their brand image could in turn be impaired by these incidents and had to step in and fix the problem.

1.2 What is brand equity?

As we already discussed the definition and main functions of brands above, we now move to the concept of brand equity, which was first used by advertising practitioners and marketing researchers in the 1980s and then became a popular topic with the introduction of David A. Aaker's most important work, *Managing Brand Equity*, in 1991. In his book, Aaker defines brand equity as "*a set of brand assets and liabilities linked to a brand, its name and symbol, that add to or subtract from the value provided by a product or service to a firm and/or to that firm's customers"*. To put it another way, brand equity refers to the aggregate of customers' belief on the products or services. This concept of connecting brand with "equity" sets a milestone for studies on brands because it describes how brand helps to generate value for firms and that brands can actually expand its impacts beyond marketing tactics and become a decisive factor at the executive table.

One main reason why brand equity is gaining great interests stands at a strategic point of view that a company with a strong brand will be more capable of expanding their business, putting a price premium, gaining more market share and improving operating performance even within a fierce competitive landscape in the market. Brand equity is closely related to the longevity of the business and represents a powerful driver to influence the decision-making process of different parties like consumers, executives and investors. Thus, it is important to understand how the brand equity can be created, in other words, how the brand's assets are integrated and strengthened to create value for both customers and companies.

As David A. Aaker introduced in his book, brand equity consists of five foundations: brand loyalty, brand name awareness, perceived brand quality, brand associations, and other proprietary brand assets like patents and trademarks. We will not go into details on the five factors since we do not focus on the marketing techniques in this paper, but it is necessary to understand that each of the five dimensions is interrelated with each other and collectively reinforce the strength of brand equity; in the meantime, more than being the inputs of brand equity model, the five dimensions can also act as outputs which result from an enhanced brand equity of the company. For example, if a company manages to enhance its customer loyalty by successful marketing strategies, the brand equity will be increased, while in turn the stronger brand should enhance customers' stickiness to it. Since brand equity is largely based on the conceptual customer perceptions and experiences, it is not hard to find out that a strong brand equity then brings about value to consumers through various ways as we've discussed in the first part of this chapter.

Another reason for growing interests surrounding brand equity is financially based. For example, under the context of mergers, acquisitions and divestitures, there is often need for attaching a numeric value to the assets for accounting purposes and valuation justification. Thus, in the following part, we will discuss how brand valuation is useful under different contexts and its impacts on financial aspects of the company.

1.3 The importance of brand valuation

1.3.1 Valuation framework

Before we go into details on brand valuation methodologies, it is essential to first answer the question: what exactly is being valued when we speak of brand valuation? In fact, all brands first naturally come up with a certain business, so it is important to firs view a brand within its context of business when we conduct the valuation, and then as a brand matures, it separates itself from the product and becomes a more transferable asset.

The brand valuation framework consists of three scopes which, from the largest to the narrowest, are branded business value, brand contribution and brand value.

- **Branded business value** refers to the value of business operating under a certain brand name. In case of a mono-brand company such as Hermès and Nike, the branded business value should equal the total Enterprise Value.
- **Brand contribution** refers to the overall economic benefits derived from a brand. A company with one or several strong brands benefits from stronger bargaining power with stakeholders like consumers, suppliers and investors, thus enhance their value creation through higher price premiums, larger sales volumes, combined with lower operating and/or financing costs over other generic products or weaker brand products.
- **Brand value** captures a more specific valuation of the brand as an intangible asset, which by definition in International Accounting Standard (IAS) 38, refer to "identifiable non-monetary asset without physical substance". Under such scope, we usually assume that the brand can be sold or transferred and arrive at a value directly linked to the transferable element of the brand, which generally is the trademark. Brand value measures how much operating income and free cash flow are generated by the brand, taking into account the brand's power on sales and cost control as well as consumer purchase decisions.

1.3.2 Commercial brand valuation

For brand managers or advertising practitioners, their definition of brand valuation is more often focused on the first two scopes, that is, branded business value and brand contribution. Since companies can realize significant economic value generated from their brands, there have been increasing needs for effective brand management, making sure the alignment of brand image with other tangible and intangible assets of the business. In this case, brand valuation is mostly used for commercial purposes and managerial decisions, including but not limited to:

- Brand architecture: to strategically build up a "family tree" of brands and better define the relationship between the parent brand and various child brands.
- Market strategy: to create a long-term strategic plan for marketing campaigns and other commercial activities.
- Resource and budget allocation: to efficiently allocate resources among different business units based on their brand power.

- Performance quantification: to measure the return on brand investment and compare key metrics with other peers in the market, or to quantify and discuss the marketing results at the board meetings. In addition, brand valuation provides a way to explain financial performance of the firm through qualitative metrics such as consumer satisfaction, brand awareness, etc.
- Risk mitigation: strong brands can create steady if not increasing demand into the future, thus ensuring less risky returns on investment.

Thus, marketing people often highlight the broader impacts of brand brought to the business and don't go calculate the "trademark" value since it is of little commercial interest for them.

1.3.3 Technical brand valuation

However, what interests us in this paper is the so-called brand valuation for "technical" purposes or financial uses. Instead of showing the total value of a branded business, the term "brand valuation" in the rest of this paper will refer to the value created by a brand as a separate asset or as an asset arising from contractual or legal rights.

For financial-linked purposes, brand valuation can be useful in the following contexts:

- Licensing Arrangements: to decide the **optimal royalty rate** that the company can exploit for a licensing agreement, or alternatively, co-branding opportunities. Also used for any transfer of brands between two subsidiaries of the consolidated group.
- Merger and Acquisition Planning: to evaluate mergers or acquisitions opportunities using brand valuation to help price the arm's-length sale of the target's brand assets and identifying how the acquisition brand would add or destroy value post-transaction.
- Joint Venture analysis: to maximize the value creation contributed by brands in case of joint ventures or partnership relations by measuring the equity allocations and establishing optimal profit sharing mechanism between different parties.
- Tax purposes: to establish a most tax-efficient strategy regarding a certain brand. For example, if the company operates globally and is able to locate the brand ownership in a low-tax rate country and increase the proportion of profits generated from that jurisdiction, then the firm can benefit from less tax payment.

- Accounting compliance: to capitalize brand assets on the balance sheet for internal and/or external financial reporting uses, according to different accounting standards such as US GAAP, IAS and other country-specific requirements. Useful for preparing the acquisition accounting, the derived value first recorded on the balance sheet can later be tested periodically for impairment needs. Although there are still a lot of debates on whether to put brand on the Balance Sheet to better narrow the discrepancy between the company's stock price and their tangible assets, most companies do include discussions on their brand value in a separate section of the financial report if they would love to inform their shareholders of such information.
- Litigations: to quantify the asset lost profits, impacts on royalty rate or other economic damages arising out of legal defense or any disputes involving trademark violation.
- Securitization: to leverage the brand's economic value and use it as a financing collateral for cash flow-based for asset-based debt facilities.
- Investor relations: to better communicate the performance and growth perspectives of the company since academic research has shown evidence that strong brand value contributes to shareholder's return.
- Regulatory compliance and corporate governance

From the uses of brand valuation listed above, we can conclude that brand valuation can serve from many different perspectives and bring added value to different parties including the company, its employees, investors and customers. Thus, brand valuation is a very important topic for both academic and practical reasons.

1.4 Accounting standards for brand valuation

In this section, we will briefly introduce the brand recognition methods under the main accounting frameworks: US GAAP (Generally Accepted Accounting Principles) and IFRS (International Financial Reporting Standards).

1.4.1 US GAAP accounting methods

In general, the company can develop its brand in two ways: it can simply purchase an existing brand from another company which incurs a purchase price or it can build and develop a brand internally which generates historical costs in advertising, marketing, etc.

For the acquired brands, the amount recorded on the book is recognized as the goodwill which is usually derived using Purchase Price Allocation methods. The idea is when acquiring a company, the purchase price is often higher than the net asset value of the target and this premium is due to the fact that the brand account for a large portion of the market value of the company, and goodwill is thus recorded on the balance sheet to reflect the exceeding amount over the book value. For internally developed brands, the value of the intangible assets is not recorded on the book, only the costs associated with the creation, development, maintaining of brand are recognized as expenses. Such expenses as hard material costs, research investment, advertising costs, etc. can be used for calculating the brand value because they are directly linked to the brand development and contribute to the brand value enhancement.

Normally, as the value is initially recognized on the book at the historical cost, there should be no revaluation of such intangible assets, and the asset value would remain at the historical level (that is, the purchase price) unless there are amortization or impairment adjustments.

For intangible assets with limited life of use, according to the accounting methods, the accountant should choose an appropriate amortization schedule which assumes the value of the asset will reduced to a certain residual value in a certain period of time. However, brand assets are usually considered as having indefinite lives, thus there should be goodwill impairment testing during the lifetime of the assets. The impairment is incurred when the carrying value of assets are superior than the market fair value. In such case, when the value on the book is actually inflated, there should be an asset write-down of the amount which equals to the difference between fair value and carrying amount, that is, the impairment of goodwill. Such impairment loss can happen due to several reasons: perhaps the initial premium was too high which overpriced the brand value of the acquired business, or there was a market downturn or negative economic impact which in turn impacted the brand value, etc. The main idea of such impairment is to check if the value of

the brand is broadly in line with the market. However, it is true that assessing fair value of a brand can be difficult due to lack of enough transactions, yet existing market data and brand analysis from consulting agencies and valuation service providers will give a good estimation for comparison.

Once the impairment is done, the reversal of such loss is not allowed under GAAP accounting standard. Also, revaluation of intangible assets can only allow a write-down of asset value, which means that if the fair value is actually higher than the historical cost recorded, there should be no according adjustments.

Since brand value is not a mandatory information to release to public in the annual financial report, the company can decide if or not to include the brand valuation in their notes or how detailed they would love to publish relevant information. However, today more and more large-scale companies with a well-recognized brand would love to include in their financial reports a discussion of their brand assets, because as stated in the previous parts of this chapter, brand assets are of great value to the company, and is a good signal for investors to understand the key drivers of the business's future growth.

1.4.2 IFRS accounting methods

Under IFRS accounting standards, some differences are introduced while most of the general rules for recognizing intangible assets under GAAP still apply.

For most of the time, internally developed brands shall not be recognized on the balance sheet unless the brand is acquired from another company or from a merger transaction. When recognizing costs, however, IFRS categorizes the "research phase" and "development phase" based on the stage and purpose of activities. Costs generated in the "development phase" which satisfy certain criteria will then be capitalized, while other costs such as advertising will be recognized as expenses when incurred.

When conducting impairment testing, IFRS uses the concept Cash-Generating Unit (CGU), which is the defined in the IAS 36 as "the smallest identifiable group of assets that generates cash inflows". Similar to GAAP, IFRS then compares the recoverable amount of the CGU with the

carrying amount, if the latter is higher, then the difference of two amounts will be recognized as an impairment loss.

2 Literature review of major brand valuation methods

Chapter 2 presents a literature review of the major brand valuation methods. We focus on both academic research papers and methodologies developed by practitioners in the market, in order to understand the rationales of each approach and method and how they are used in practice.

We categorize the brand valuation methods into higher-level approaches: cost-based approach, market-based approach, income-based approach and other approaches.

1) The cost-based approach, as the name suggest, focuses on what has been spent to create the brand equity value estimates brand equity value by calculating past investment in R&D and marketing activities. Major methods include historical cost method and replacement cost method.
2) The market-based approach believes in the power of "market pricing" and estimates the brand equity value based on comparable transactions of brands.
3) The income-based approach focuses on how the brand creates value and estimates bran equity value based on future financial benefits generated by the brand. This approach is the most commonly used in practice. Major methods include price premium method, royalty savings method, demand drivers / brand strength analysis method and margin / profitability comparison method.
4) Other approaches include real option, CAPM model and residual method.

2.1 Costs-based approach

The cost method could be derived from an old value concept "Labor Theory of Value" advocated by some early economists like Adam Smith, who argues that instead of the demand and supply curve that we usually use to find the optimal market price of a product, the economic value of a good or service could be measured by the average number of necessary labor hours required to produce it. The principle of this method is quite straightforward: as companies are willing to invest huge amount of money, time as well as human capital into the brand creation and development, we could create a direct link between the whole investment amount and the eventual

brand value, and then we calculate how much to spend in order to build or reproduce a brand of equivalent strength and utility to the company by the given valuation date (Anson, Noble, Samala, 2014).

In the BSI ISO: 10668, the cost method is defined as follow:

"The cost approach measures the value of a brand based on the cost invested in building the brand, or its replacement or reproduction costs […] it is based on the premise that a prudent investor would not pay more for a brand than the cost to replace or reproduce the brand. The actual cost invested in the brand shall encompass all costs spent on building the brand up to the value date."

As stated above, usually the cost-based approach can be further divided into two sub-methods, historical cost method and replacement cost method.

2.1.1 Historical cost method

Using historical cost method, one takes into account all the historical costs spent in creating and developing the brand if it is built internally from inception or the costs spent since the recognition of the brand if it was acquired from outside.

Identifying the costs that should be incorporated in the calculation is crucial to this method. Theoretically, all the costs which contribute to the brand building should be considered. As Anson, Noble and Samala presented in their paper "*IP Valuation: What methods are used to value intellectual property and intangible assets?"*, there are mainly three categories of costs:

- Hard costs which refer to purchase of materials and relevant asset
- Soft costs which refer to immaterialized expenses like personnel expenses, engineering time, designs, etc.
- Market costs which refer to general advertising, marketing, market testing and communication expenses for the purpose of enhancing brand strength

One interesting point that Anson, Nobel and Samala brought up in their paper is, apart from the direct costs generated from branding activities, opportunity costs should also be taken into account. Imagine that there is suddenly an unexpected strategic shift of the Management or fierce market competitive landscape which in turn cause a delay or even failure of market entry, that means there are opportunity costs related to such event. In their example showed in the paper, the authors used a "multiplier for opportunity cost" which is above 100% and then multiplied by the sum of costs on the book to arrive at the total brand value today.

Pros and Cons

The main advantage of historical cost method lies in the simplicity or the ease to conduct and the fact that it is objective despite who conducts the valuation. As straightforward it is, there is no need for any assumptions to make in this approach, although one might argue that there would be differences regarding the appropriate accounting items chosen for the valuation, yet it is simply a sum of accounting numbers and gives a quick global idea of the brand value. Even different parties should arrive at similar results and when there's disagreements, it's also easy to put it on the table, check numbers and clarify the differences. By nature, it generally provides a floor value for the brand (Anson, Nobel & Samala, 2014), so it is good for valuator to have an idea on the minimum value represents the brand. In addition, historical cost method can be effectively used at the very early stage of brand building because as business grows and matures, some specific market application or benefits can be identified, and the initial costs on the book related to technology investment will be likely to far differ from its true value (Anson, Nobel & Samala, 2014).

In terms of shortfalls, however, historical cost method does suffer from a couple of problems:

Firstly, the process to aggregating the costs can be a time-consuming and troublesome matter. To sum up all the historical costs that are invested in brand creation and development, one should carefully review the financial statements and related notes of all past years since inception of brand and identify which expenses or cash flows are attributable to brand building. The question is, should all periods be included for the calculation, and if yes, how to deal with all the old brands with perhaps a hundred of years' history and the earlier financial accounts might not be found?

Then, even though the step of identifying and classifying costs can be already quite tricky because it is hard to sort out all the expenses that directly or indirectly contribute to brand, the next step of telling how much percentage of each item should we take into account should not be any easier. Furthermore, after we capitalize marketing costs, we have to decide a way to schedule the amortization during brand's expected life, which can also make a difference to the valuation.

Secondly, Past costs cannot be a good guide for current value. The method ignores the time value of money and any impacts caused by inflation. This shortcoming can be partially offset by the method proposed by Reilly and Schweihs, who suggest adjusting the actual cost of launching the brand by inflation every year. Another fact explaining this shortcoming is that even costs for same activities can actually vary a lot in different times and situations. For example, marketing campaigns could cost less if they were conducted several decades ago or given the context that there existed fewer competitors in the market, but imagine today if we want to create a brand with the same market power and position, is it still possible to spend the same amount of money to build up image and acquire clients? Not realistic. For example, if we only look at the historical marketing costs of Coca-Cola, since it is an old brand established long time ago, it benefited from the lower level of costs previously and thus leads us to a much lower brand value.

Thirdly, recapture of all historic costs can be difficult and as a company develops its brand, it also generated long-term non-cash investments which cannot be accurately recorded on the financial reports with an exact number. For example, professional training and evolvement of employees, the quality control of products, the development of team culture and spirit, specific professional expertise built through time, etc. All these items do affect the true brand value because they strengthen client's confidence and build brand image and trust over time. Another example should be the opportunity cost in brand building which is linked to giving up the price premium in order to gain more customer loyalty (Kapferer, 2012). Kapferer points out that sometimes companies compensate a higher price for an upgraded product compared to their peers just to be more attractive and enhance the brand's market power. However, according to the historical cost method, all such effects are not taken into consideration.

In addition, is there necessarily a direct link between the financial investment amount and the brand value of the company? It is reasonable to think of a case where the company spent loads of

money but still failed to build up a brand, and what if the brands that we are evaluating also face the same problem? Since the company can make bad decisions, the marketing team could be not competent enough or that the expenses were not used efficiently, we can never know how much proportion of the financial investment are in fact working and contributing to the brand.

Moreover, the competitive position of the brand is also neglected in this method. In addition to all the costs recorded on the financial statements, management plays an essential role in bringing about value and enhancing or destroying reputation of the brand. Marketers whose work is focused on adding value to the brand through strategic plannings would definitely reject the historical cost approach because it doesn't reflect all the results from improved brand management in the book account. Thus, even if we imagine two companies with exactly same expenses on brand, they can arrive at considerably different value if one managed and ran the brand well and the other managed it poorly.

Finally, since the method is only using past figures on the book, it fails to evaluate the brand earnings potential in the future. This, by nature, is probably the most important flaw of cost method because when we value a brand or company, we are always supposed to focus on the future rather than historical results. The efficiency of money spent with brand development can be a concerning issue and consequently, the costs incurred in the past tell us nothing about the brand's future potential even when they are fairly adjusted to current price levels.

In a word, historical cost method should generally deliver the most conservative value compared to other methods (Seetharaman, Nadzir & Gunanlan, 2001), but it has several flaws which make it an impractical method taken in real life.

2.1.2 Replacement cost method

Like historical cost method stated above, replacement cost method is also based on the sum of relevant costs attributable to brand building, however, the difference is instead of summing up the past figure, we look at how much to spend today in order to recreate or purchase a brand of an equivalent utility to the company (Anson, Nobel & Samala, 2014), that is to say, with similar brand image, value proposition, market visibility, etc.

Pros and Cons

In terms of advantages, replacement cost method can be seen as an improvement of historical cost method because it is valuing the brand using the cost level today thus considering the time value of money.

Kapferer (2012) stated that when we consider recreating a brand today, we should depart from a number of characteristics of the brand including market share vs. competitors, brand awareness and image, geographic coverage, distribution channels, etc. While then when it comes to do practice, this method is only way more complicated. It cannot overcome all the problems of historical cost method while at the same time raising some new concerns. Kapferer (2012) pointed out that for some old giant brands, it is impossible to recreate them because the context of brand building is not even similar anymore today.

Firstly, some brands were first created in a period when the marketing expenses were small enough and brands counted more on word-of-mouth marketing. While today it won't work anymore because of the huge customer base and fierce competition. Kapferer argues that the only possibility to make "unaided awareness" happen is kicking out a competitor in the field due to the effect of memory blocks. However, no one would be willing to leave the ground in this case. Secondly, this method neglects the already established success of the brand. Who has the confidence to recreate the brand Coca-Cola today with the same performance? Brands who are first-movers or early players definitely have a competitive advantage over others and if they turn out to be successful, it is hard for others to imitate. The specific know-how, brand image and a strong culture are all cumulated through time and impossible to be recreated from scratch. Kapferer (2012) also points out that purchasing an existing strong brand is way more safer and more preferred than recreating a brand. We've seen several failures in new product launches and companies more favor takeover bids to get other brands under their umbrella.

Compared to historical cost method, replacement cost method is more subjective since it requires opinions from different parties and the procedures are ambiguous (Kapferer, 2012). However, although the cost methods are not really practical in real world, it is a methodology which offers us a minimum value which can help construct the valuation range.

2.2 Market-based approach

The market-based method, as defined, is based on the market transactions of brands. It is defined under BSI ISO:10668 as follow:

"The market approach measures value based on what other purchasers in the market have paid for assets that can be considered reasonably similar to those being valued. […] Data on the price paid for reasonably comparable brands shall be collected and adjustments shall be made to compensate for differences between those assets and the brand under analysis. For selected comparables, multiples shall be computed on the basis of their acquisition price. Those multiples shall then be applied to the aggregates of the subject brand."

According to this definition, it is not hard to conclude that market approach is based on the idea when a brand is sold, the price can be defined using comparable transactions in the market assuming that the asset in question is not unique. Just like using the transaction multiples in merger and acquisition deals for corporate valuation, we can also use multiples to derive a proper brand value. The process is similar:

- First, search for all the recent sales and transaction that involve similar brand assets operating in same or similar business, geography, of similar size and market position. The more similarity between the assets, the more representative the comparables are.
- Then, choose the multiple metric. The core step of this method is to find an appropriate multiple metric, that is, the price divided by an accounting item such as EBITDA, sales or net income. These are the most commonly used metrics, but other metrics can also be useful depending on the industry. For example, for hotels, we might find RevPar (Revenue per average room) a more interesting key metric when conducting analysis. Furthermore, we should use multiples that are relatively consistent within the industry, that is to say, if we find a lot of variations through our sample, the corresponding one might not be a good indicator.
- Calculate the sample average of the multiple or use the median of the sample.
- Finally, apply the multiple to the target's accounting metric and get the value.

The assumption behind this method is that the open market is efficient enough that the transaction price can correctly reflect the value of the assets, or at least, fall in right range of the

value. In general, the open market transactions often reflect the highest value at which the purchaser and seller are willing to enter the transaction. When one party would love to sell the brand, it is logical to get reference on recent similar transactions, given that enough similarity between brands should suggest similar multiples, and the two parties will both act in their best interests to get a fair enough price. Brealey and Meyers (1991) suggest that when the price proposed is higher than the net present value of the profits generated by the brand in the future, the buyer should accept the price.

Pros and Cons

The big advantage of market transaction multiple method is that it is reliable and useful when there's enough data available, because the market transactions are generally assumed to be rational and objective. Simply as the name puts, the market approach should be used when there's an active market environment where truly comparable transactions and relevant data can be found. However, when applying the multiple, it is important to make adjustment depending on the differences of transactions (strategic buyer, embedded future options, etc.).

Although market approach should be useful for valuation, the lack of data can make it not applicable in real life. Unlike tangible assets which are more frequently exchanged in the market where public information can be found, intangible assets are not often bought and sold, and among the transactions in the market, often we do not find true comparables because the market position of brands in the same industry can be very different, or we fail to get access to data because of the fact that company do not always disclose relevant brand value in the transaction. In addition, as discussed above, the market approach is based on the assumption of market efficiency, so that if there has been a brand mispricing in certain industries due to bubbles or temporary recessions, the brand will be mispriced and this effect will still to be carried on to the future. Especially for brand assets which have a relatively short history of transaction and smaller pool of data available, the market might not have a good sense of the right valuation which reflect the features of the company's intangibles. In this case, the market method can also be complicated because there's a need for evaluating the features of the target's brands rather than simply taking the average (Bojraj and Lee, 2002).

2.3 Income-based approach

The value of a brand lies in its capability to generate future financial benefits, and therefore equals the present value of these future financial benefits linked to the brand. The income-based approaches assess the value of brands by estimating the value of future revenues, profits or cash flows that are attributable to the brand through its useful lifetime, which are then converted to a present value by discounting or applying a multiplier (capitalization factor).

The income-based approaches give a rather intrinsic estimation of the brand value because they follow the origins of the value of brands, while it usually requires a large number of inputs and assumptions and time-consuming modelling process. Salinas and Ambler (2009) groups the major income-based methods into 12 groups. We focus on the four major income-based methods most commonly used in practice: price premium method, royalty savings method, demand driver / brand strength analysis method and margin / profitability comparison method.

2.3.1 General considerations

Generally, there are two methods to factor the risk level into the valuation: discount rates and multiples. According to Salinas and Ambler (2009), 57% of income-based methodologies use discount rates to deal with risk.

2.3.1.1 Discount rate

The discount rate is the rate at which a future value is converted to present value. It reflects the time value of money at a certain level of risk, and therefore equals to the required rate of return specific to the brand.

Some practitioners use WACC (weighted average cost of capital) of the firm who owns the brand as the discount rate in calculating brand equity value. This method is easy to apply, and could be suitable when the firm owns and manages a single brand, as the WACC of a firm is highly accessible and confirmed by auditors if the firm is public. Some argue that the risk of intangible assets is generally higher than that of tangible assets, and therefore that of average business risk,

and that appraisers should apply a discount rate higher than the WACC of the firm who owns the brand even if the brand is the single brand that the firm owns and manages.

According to the analysis by Salinas and Ambler (2009), 55% of the methods that use discount rate as treatment of risk adjust the discount according to the specific brand risk, while 45% of them apply either WACC or CAPM (Capital Asset Pricing Model) model.

For example, The Advanced Brand Valuation (ABV) model of GfK-PwC-Sattler proposes to calculate brand-specific risk premiums in relation to a "brand risk score" based on six risk factors (psychological strength according to BPI, historical development, market share, distribution, repurchase rate and aided awareness).

The choice of discount rate significantly impacts the outcomes of income-based brand valuation methodologies. However, choice of an appropriate discount rate that fairly reflect the brand-specific-risk is "more of an art than a science".

2.3.1.2 Multiplier

An alternative method that deals with risks is to apply a "multiplier", also called a "capitalization factor", to the value of a reference period. Using a multiplier is based on the assumption that the ratio between brand equity value and the estimated cashflow or profits of a certain period can be forecast. A higher multiplier represents lower volatility of future cashflows and profits from a stronger brand, while a lower multiplier represents higher uncertainty of future cashflows and profits from a weaker brand. This method requires a single value of a certain reference period, which can be of either one year or average of multiple periods and therefore, either actual historic or estimated future value, and therefore is quick and flexible to apply.

For example, Interbrand developed in 1988 the multiplier model ("Annuity Model"), where brand equity value is calculated by three-year weighted average earnings attributable to the brand multiplied by a "brand strength multiplier". This multiplier is similar to a P/E ratio (Price-to-Earnings ratio) and reflects the position of the brand among its competitors and an outlook of its future performance in the market. The multiplier (ranging from 0 to 20) is determined by the brand's brand strength score (ranging from 0 to 100) on seven aspects, including leadership,

stability, market, international image, trend, support and protection. The relationship between the multiplier and the brand strength score is S-shaped, which takes into consideration the weak position of a completely new brand, rapid growth after a brand gains awareness and low or even stagnating growth of a dominant brand.

2.3.1.3 Brand useful life

Another consideration is the remaining useful life of a brand. It is widely assumed that a brand has indeterminate life, but there are factors that can impact the useful life of a brand.

Lifecycle: A brand typically goes through five phases – development, introduction, growth, maturity and decline. It is necessary to understand which stage the brand is currently positioned in order to determine the appropriate remaining useful life of the brand.

Functional versatility / technological innovation: Products could suffer from functional or technological obsolescence with the introduction of new generations of products or substitutes, while brand life is not limited if products develop and keep up with customers' changing needs and technological innovation. Therefore, it is important to take into account the brand's capacity in research and development of technology and new products.

Generality: An umbrella brand generally has longer life than its sub-brands, because the risk of sub-brands being obsolete is diversified at the umbrella brand level.

Termination events: A brand's life can go to an end and will hardly recover when certain events occur, for example, a deadly scandal or government bans.

2.3.1.4 Projection period

The projection period is determined in relation to the brand's lifecycle, and should theoretically cover development, introduction and growth stages, as projection parameters vary significantly during these stages and therefore should be carefully treated respectively. Maturity and decline stages are more stable and could be captured by a terminal value.

The typical projection period is 5 or 10 years in practice.

2.3.2 Price premium method

2.3.2.1 Presentation of price premium method

The price premium method estimates the brand equity value by calculating the incremental profits or cashflows generated from the price premium, the difference in price of a branded product compared to that of an unbranded, weakly branded or generic equivalent product. The assumption of the price premium method is that brands provide additional value for customers and therefore are able to charge a price higher than that of an unbranded equivalent product. Brand equity value equals the present value of the after-tax extra profits from the price premium attributable to the brand.

The volume premium method estimates the brand equity value by calculating the incremental profits or cashflows generated from the volume premium, by reference to an analysis of the relative market shares. The assumption of the volume premium method is that brands contribute to gaining larger market share compared to an unbranded product at the same price level.

These two methods are typically used in conjunction to determine the full impact of brands on generating demand.

2.3.2.2 Conjoint analysis

The conjoint analysis studies how much brands impact customers' purchasing decisions by customer survey. Customers are asked to specify their preferences between different combinations of attributes (for example, brand and price) of their purchasing decisions, which allows the appraiser to understand how much the brand attribute to customers' purchasing decision, and further the brand's ability to charge a price premium.

Ferjani, Jedidi and Jagpal (2009) proposes a conjoint approach for consumer- and firm-level brand valuation, which captures the four components of brand equity identified by Keller and Lehmann (2006): biased perceptions, image associations, incremental value and inertia value. This approach starts with establishing the customer's utility function and examining the case in which the customer transforms attribute information into perceived benefits. Given the budget constraint,

market prices, perceived and objective attribute value for each brand and brand image associations, the indirect utility function provides the impact of each of the four brand equity components. A simpler alternative is to work with objective attribute values and infer the impact of attribute perception bias and image associations on brand values from the model.

2.3.2.3 Hedonic pricing model

Hedonic pricing model is a statistical model presented by Sherwin Rosen in 1974 in order to identify price factors and how price factors impact the price. In this model, price *p* is a function of a package of price factors *z*, and coefficients β denote the impact of each price factor on the price

$$p(z) = p(z_1, z_2, z_3 \dots z_n) = \beta_0 + \beta_1 * z_1 + \beta_2 * z_2 + \cdots + \beta_n * z_n + \varepsilon$$

This method has been used in setting the transfer price of intangible assets, and could be useful in brand equity valuation. In the context of brand equity valuation, brand is considered as a price factor, and its corresponding coefficient is the impact of brand on price. It allows appraisers to calculate the price premium - the difference in price with and without brand.

2.3.2.4 Advantages and disadvantages of price premium method

The advantage of this method is that it uses statistical techniques, which reduces subjectivity.

The disadvantage of this method is that it is usually complicated to apply and requires tremendous work in data collection. At the same time, it introduces subjectivity at a different level: the conjoint analysis introduces unreliable elements; the Hedonic pricing model requires selection of price factors, which could be subjective.

2.3.3 Royalty savings method

2.3.3.1 Presentation of the royalty savings method

The royal savings approach determines the brand equity value by estimating the “royalty cost” payable in order to use the brand as if the company did not own the brand and had to get a license

from a third party. The brand equity value is therefore the sum of the present value of royalty savings after taxes over the lifetime of the brand.

Royalty relief method is one of the most commonly used income-based brand valuation methods. It has been developed by various brand valuation providers, yet with the least variation, compared to price premium method and the demand drivers / brand strength method.

Five steps are to be followed:

1) Estimate future revenues (net sales) for a given forecast period
2) Establish the royalty rate range
3) Assess the brand strength
4) Determine the discount rate
5) Calculate brand equity value

$$Brand\ equity\ value = \sum_{t=1}^{T} \frac{Revenue_t * Royalty\ rate * (1 - tax)}{(1 + discount\ rate)^t}$$

2.3.3.2 Determination of royalty rate

The key element in this method is the "royalty rate", which generally takes appraisers the most time and effort. The royalty rate should be set as the transfer price of two unrelated parties, according to the assumption of this method, and could be estimated by referring to similar brands and existing licensing contracts.

There exist various methodological options to determine the royalty rate.

2.3.3.2.1 Method based on brand strength and market comparables

Firstly, a range of the royalty rate can be established from comparable licensing agreements of relevant products in the same industry. It requires detailed analysis of the key clauses of the contracts, such as duration and termination provisions of the agreement, the license's exclusivity, negotiating power of the parties, the product's life cycle, market conditions and the level of operating margin.

Secondly, the brand strength is analyzed relative to the brand's competitors. This analysis is usually starts with certain elements and characteristics of brand strengths, and could be quantified by applying scores to each element, weighted by the importance and relevance of the elements. This analysis gives a relative outcome of the strength of the brand in question compared to that of its competitors, which could impact the royalty rate level of the brand in relation to the industry royalty rate range.

Thirdly, a specific royalty rate is determined for the brand in question taking into consideration of the industry royalty rate range, key clauses of licensing contracts of comparable brands and the brand's relative strength.

2.3.3.2.2 Rules of thumb

An alternative to a detailed brand-by-brand calculation is to apply rules of thumb that are generic to all cases. Rules of thumb is quick to apply and gives a control check that complements the royalty rates given by other methods, while further use is not recommended given the generic nature of this method.

Two general guidelines in determining the royalty rate are 25% of operating profit and 5% of sales. These rules were identified by Robert Goldsheider in 1971, who empirically studied this method on commercial licenses and found out that the royalty rate effectively represents 25% of the license's profits. The percentages can vary for industries, according to the experience of the appraiser.

A German version of rule of thumb is the Knoppe formula. Developed by Helmut Knoppe in 1967, this formula is based on German administrative principle on royalty rates, and could be used as another simple control check.

$$Royalty\ rate\ in\ \% = \frac{Profit\ of\ licensed\ product * 100}{Sales\ of\ licensed\ product * 3}$$

2.3.3.2.3 Cluster analysis

Cluster analysis helps to group variables or individuals into homogeneous clusters.

Similar to the method based on brand strength and market comparables, this analysis starts from detailed review of contractual characteristics of comparable licensing agreements and profitability measures of the brands. Each of these characteristics represent a variable in the cluster analysis. With agglomerative hierarchical clustering method, the optimal number of clusters that maximizes within-cluster similarity and minimizes among-cluster similarity. The cluster that contain the brand in question is considered as the most comparable group, then the median royalty rate of the brands in this cluster is taken as the royalty rate for the brand in question.

This method is helpful when the number of comparables and factors of comparability is huge. It is applicable for intangible assets with low profitability, while not suitable for high-profit assets.

2.3.3.2.4 Kleineidam, Kuebart and Contractor benchmarks

This method focuses on analysis of negotiation on licensing agreements between licensors and licensees.

2.3.3.3 Advantages and disadvantages of the royalty savings method

The advantages of this method include objectivity, industry specificity and theoretical rationality.

1) The result of the royalty savings method is objective as it refers to real transactions between unrelated parties on comparable brands in the same industry, which gives a result that is specific to the industry.
2) This method is theoretically rational as it creates a hypothetical scenario where one company manages the brand and transfers it to the other in exchange for royalty payment, and therefore the brand value is only related to royalties and not related to the production, distribution and selling process of the products under the brand name.

The disadvantages of this method lie in that brands are not comparable due to its nature of uniqueness, and that the royalty savings method systematically undervalues the brand equity.

1) Each brand is unique by definition, which naturally determines the limited number of comparable brands.

2) In the hypothetic scenario assumed by this method, the royalty rate represents only the portion of the brand value that is transferred from the company who owns and manages the brand to the company who uses the brand under license agreement, while the portion of brand value retained by the brand-owning company is not taken into account. The value of owning and taking control of a brand typically consists in the upside value, for example, the right to develop the brand and increase the brand value. Therefore, the royalty savings method systematically undervalues the brand equity and provides a minimum estimation of brand equity value.

In summary, the royalty savings method, widely used in practice, provides a minimum value of what a brand is worth, on a comparable, objective and industry-specific basis.

2.3.4 Demand drivers / brand strength method

2.3.4.1 Presentation of the demand drivers / brand strength method

The demand drivers / brand strength analysis determines the brand value by the level of impact or influence that a brand has on customer's decision to purchase the product, also known as "reasons-to-buy". This method is based on the hypothesis that customers base their purchasing decisions on certain demand drivers, of which some are related to the brand of the product, and that the proportion related to brand is identifiable.

The key of this method is to determine the brand-related portion in the demand drivers, and typically yields a percentage or index that could be applied to revenues, profits or cashflows in order to calculate the brand-related portion in these financial values.

34% of the income-based models identified by Salinas and Ambler (2009) analyze demand drivers and brand strength in order to determine the percentage of brand's contribution to revenues or profits.

2.3.4.2 Determination of brand-related portion in demand drivers

There are generally three methods to determine the brand-related portion in demand drivers, according to whether we consider the brand as a separate demand driver or a common presence in each demand driver and how we assign weights to demand drivers.

The first method assumes that each demand driver can be characterized as either a brand-related driver or a non-brand-related driver, and that each driver has an equal share in their influence in customers' purchasing decisions. It lists in detail all the factors that influence customers' purchasing decisions and specifies the factors related to the brand. The sum of the relative frequencies of brand-related factors represents the brand-related portion in demand drivers that influence customers' purchasing decisions.

The second method assumes that "brand" has a general presence in each demand driver with a different portion, and that each demand driver should be weighted according to their importance in influencing customers' purchasing decisions. The appraiser is required to assign weights to each demand driver and determine the brand contribution as a percentage to each demand driver. The sum of brand contribution weighted by the importance of corresponding demand drivers represents the brand-related portion in demand drivers.

The third method considers "brand" as an independent demand driver, in parallel with the other demand drivers, and studies the relative importance of each factor. The contribution of the "brand" demand driver is estimated by its coefficient in the regression analysis, and represents the brand-related portion in demand drivers.

2.3.4.3 Advantages and disadvantages of demand drivers / brand strength method

The advantage of this method is that it does not require data collection of comparable brands, firms or transaction, and could be conducted through simple market research. The demand drivers are usually pre-determined from a marketing perspective.

The disadvantage of this method are as follows:

1) Selection of demand drivers, assignment of weights and determination of brand contribution allow a significant amount of subjectivity and manipulation of results, which jeopardizes the external validity of this method.
2) Models used by different firms and brand valuation providers vary and are not easily comparable.
3) The interaction between brand and other demand drivers is complex. The choice of a multivariate regression model is arbitrary and often introduces systematic errors.

In summary, this method is conceptually straightforward and easy to implement, but the results are highly dependent on subjective choice of demand drivers and analysis model. This method could be suitable for internal strategy, marketing and management purposes, but it is not reliable enough for estimating the fair value of a brand.

2.3.5 Margin / profitability comparison

2.3.5.1 Presentation of margin comparison method

The margin / profitability comparison method compares the financial performance of the business operation with a brand with that of its competitors or of an unbranded operation. The value of the brand is reflected in its ability to earn a larger gross margin from economies of scale and to earn a higher profit from saving in promotion and administrative expenses. Unlike the price premium method, the margin / profitability comparison method is suitable for brands that cannot charge a price premium but help control costs and increase profitability.

2.3.5.2 Comparison of margin / profitability

There are generally three methods in comparison of margin / profitability.

The first method compares the gross margin of the business operation of the brand with the average gross margin of its relevant competitors. The difference is multiplied by the net sales of the brand to calculate the value of economies of scale attributable to the brand.

The second method compares the EBIT/sales ratio of the business operation of the brand with the average EBIT/sales ratio of its relevant competitors. The difference is multiplied by the net sales of the brand to calculate the value of economies of scale attributable to the brand.

The third method is similar to the second method, expect that the comparison refers to an "equivalent generic product". The EBIT/sales ratio of the equivalent generic product" is calculated by assuming a 5% return on capital employed and a capital employed to sales ratio equal to that of the sector. The difference in EBIT/sales ratio between the brand operation and its "equivalent generic product" is multiplied by the net sales of the brand to calculate the brand equity value.

2.3.5.3 Advantages and disadvantages of margin / profitability comparison method

The advantage of this method is that it is useful for brands that do not charge price premiums.

The disadvantage of this method is that it assumes that the brand is the other factor that impacts the profitability of a business operation and does not take into consideration the other factors not related to the brand. Therefore, it will very likely over- or underestimate the brand equity value.

In summary, this method is not theoretically sound as it ignores non-brand-related factors that impacts profitability but could be used as a check to complement other methods, especially for brand that do not charge a price premium.

2.4 Real option method

Option is a very important and useful tool in financial markets that's massively used for the purpose of hedging. A financial option holder has the right but not the obligation to buy (call) or sell (put) the underlying asset at a previously decided price before or exactly on the exercise date depending on the type of the option. The value of a call or a put is divided into two parts: intrinsic value, which is simply the difference between the strike price and spot price depending on which type of option the holder has, and time value, which refers to the value embedded in the option based on the fact that since the underlying asset can be volatile over time and thus there is value caused by such uncertainty or volatility. An option contract will give the holder an opportunity to

exploit the upside while protecting oneself from downside risks (except for the premium paid for entering the contract).

Introduced by Myers in 1977, real option valuation is aimed at plugging flexibility into the DCF models. Real option follows the same principal of financial options. When using option valuation model to price the asset, we are considering the assets as a set of options which give the owner a right to receive more options and exploit future cash flow generation. The use of real options to value brand assets was proposed by Damodaran in 1996. When a company develops its branding strategies, the marketers are inevitably facing a great deal of uncertainties due to the varying customer behavior and changing market landscape, thus flexibility is key to leveraging brand strategies (Aaker 2004a, 2004b; Fischer, 2007). As Trigeorgis and Baldi (2012) discussed in their paper *Valuing Brand Strategies with Real* Options, brand management is a staged process involving creation, reinforcement and leveraging of brand, thus the brand value should reflect the Management's flexibility in conducting strategic plans and exercising the options of:

- brand expansion (expand existing products into new markets or new target customer) through wider geographic reach, improved distribution networks or penetration into new market segments; and
- brand extension (extend the brand to new product lines) through new product designs within the same category or portfolio diversification with creation of entirely new business lines.

Real option valuation is usually proposed as a complementary method to deal with some of the difficulties that traditional approach like DCF and comparable multiples would encounter. For example, when we use DCF to value the assets, we project the future cash flows based on a couple of assumptions and then discount them using a discount rate which is supposed to reflect the risk of the assets. However, the true riskiness related to the cash flow should not be constant through the whole future period and what if the real picture turns out to be even better than the projection? Thus, DCF fails to capture the cycle of assets' risk or the upside of the volatility, and it also neglects the case when there are several options involved, especially for early start-ups or growth companies who have growth projects on their table and need to take decisions. Multiple method,

as discussed before, is not practical due the lack of market data, but even if the data are available, we have the problem of choosing the real "comparables" which have similar growth options as the target and we need to make sure that the market is efficient enough that it doesn't misprice the asset. Thus, real option turns out to be a complementary tool which breaks the simple linear function between a company's operating profit and its valuation and introduces a more complicated set of options which better incorporate the Management's strategic view, market volatility, adaptability to changes and decision flexibility.

Trigeorgis and Baldi (2012) considered the brand development as several options, each providing the company with the right but not obligation to invest in brand enhancement and move to the next stage. The option has the payoff structure as follow:

$$E = \max(-I + eV, 0)$$

where

I = the cost of brand development strategies (marketing, communication, etc.)

V= PV of cash flows generated by the unbranded business

e= factor which indicates the expansion strategic results applied to the underlying assets V thus that e*V refers to the value generated by exercising the option.

For expansion strategies, the underlying asset (V) should equal to the parent brand value while for extension strategies, V refers to the present value of cash flows attributable to the newly branded products. Finally, Trigeorgis and Baldi (2012) arrived at an expanded brand equity value:

$$\textit{Expanded Brand Equity Value} = \textit{Parent Brand Value} + E^{Exp} + E^{Ext}$$

The Binomial Model

The real option valuation is thus the sum of a basic value of the firm which is usually derived using DCF methods and the value of the option. Binomial model can be used to discover the value assuming time as a discrete variable. Simply put, the binomial model is based on a series of decision tree and at each node, we can get two possible results (a success and a failure value), then

we'll go for the one direction that leads to the maximum profits. Woodward (2003) suggests the following steps to construct a binomial model:

1. Draw a tree diagram with all possible steps.
2. Identify the probability that each result might occur and calculate the expected value using the probability and payoff.
3. At each node, choose the branch with the highest value.
4. Discount the outputs at a proper discount rate (e.g. WACC) to get the final value.

The advantage of this method is that Binomial tree is a simplified methodology which assumes most time only two possible results for each decision and is more intuitive in terms of conducting the valuation. It also allows a certain way of flexibility because it allows to value the option at any time of its life so that it is useful to value the American options, in case that the brand strategies can actually be carried out before the exercise date of the option so that the decision makers are benefitting from flexibility which should be reflected in the valuation. However, to truly reflect the value of the option, this method needs a lot of calculation process on the decision result and related discount factor, and the fact that we use two branches at each node is not realistic. If more possible results are introduced in the model, the way to decide the probability of occurrence and calculation process can be even more complicated and problematic.

Black-Scholes model

Black-Scholes formula as the most popular option pricing model is used to calculate the value of call options. The formula is based on the assumption that the option is European option, which should be exercised only at expiration date, and it gives a theoretical value because options can be influenced by a set of factors and indeed complicated to derive a value. Later on, as option method is applied to value real assets, the Black-Scholes formula is also used to value investment opportunities.

The formula of call option's value is as below:

$$C = S*N(d_1) - Xe^{-rt}*N(d_2)$$

$$d_1 = \frac{\ln\left(\frac{s}{x}\right)+\left(r+\frac{\sigma^2}{2}\right)t}{\sigma\sqrt{t}}$$

$$d_2 = d_1 - \sigma\sqrt{t}$$

where

S = the present value of all future cash flows, the value of the underlying assets

X = the strike price, which refers to the initial cash outflow committed in the project.

r = risk-free rate

t = exercise date, the time horizon of the option

σ= the implicit volatility of the underlying asset

N(d) = cumulative normal probability density function

The advantage of Black-Scholes formula is that this is a formula with defined parameters to plug in, and if all the parameters are ready, it is a quick way to get to a theoretical value of the option. However, it is acknowledged that Black-Scholes is more useful and easily applied for shares than real assets because parameters like volatility is much easier to get from former markets data for shares while for real assets like brand assets, it is hard to get a proper volatility. In addition, since the Black-Scholes are only used for European options, this assumption cannot always hold because brand strategies and investments can be done before the "expiration date" and should imply an actually higher value due to the flexibility on exercising the option.

2.5 Alternative valuation methods

Besides the most commonly seen methods described above, there exist other valuation models which are also useful for certain practical cases. In the following sub-sector, we will introduce a number of alternative methods which are also interesting as complementary tools and reference.

2.5.1 Interbrand valuation method

Founded in 1974, Interbrand has developed deep expertise in brand valuation and has been a pioneer in the field, helping a number of companies get a brand value on their financial statement. As their methodology develops over the years, Interbrand has finally put together a model which takes into account multi-perspective metrics.

The key idea of the Interbrand valuation model is perfectly aligned with the corporate finance theory, which values the brand through the net present value of future earnings generated by brand. To break it into details, the process is shown in the chart below:

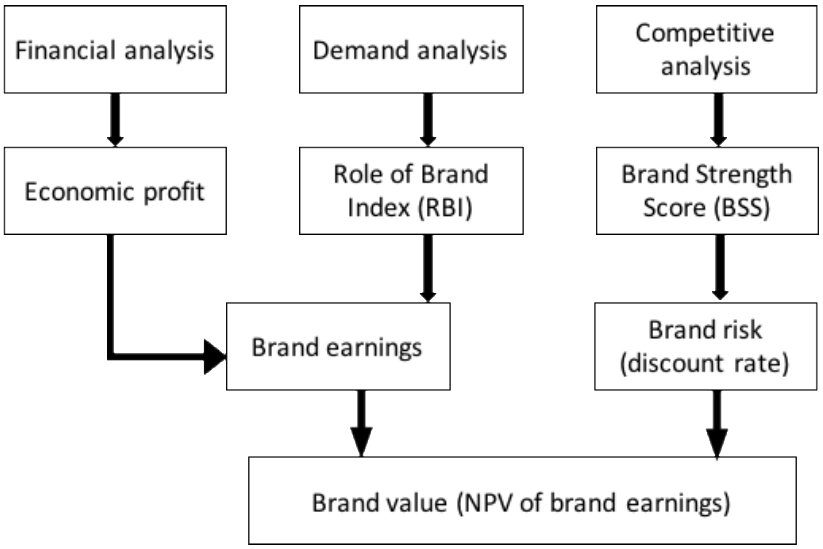


Figure 1 Interbrand's Brand Valuation Methodology

Before conducting detailed analysis, the process is often started with segmentation of business in terms of product lines, geographical footprint, customer groups, etc. This step could be crucial for this valuation model and make big impacts because there are sometimes huge differences in the three key factors (financial metrics, market position and brand strength) across different segments. Thus, to yield a solid brand value through this model, we should take into account the proper way of segmenting the business and look at the valuation first from each segment level. The segmentation criteria can be based on the number of sufficiently different business lines (e.g.

large conglomerates operating in various markets) or on the Management's needs for strategic purposes. After segmentation, we then look at business from three perspectives.

The objective of financial analysis is to first identify the intangible-attributable revenues generated by the products or services. Here, Interbrand use the term "Economic Profit" to refer to the Intangible Earnings, which are effectively calculated by deducting from brand product revenues all the operating costs, taxes and a charge for the capital used to generate the brand's revenues. This way of determining Intangible Earnings is quite conservative because it first subtracts the required returns on company's tangible assets to get a pure "intangible return" and then allows for another fair return on the capital employed for brand development such as working capital and PP&E. Finally, the earnings left are awarded to the all the intangibles including brands, patents, etc. Like DCF method, the final output of financial analysis is to build an earnings projection for an explicit period of five or six years, which serves as the basis of this model. A terminal value should be determined at the end of the projection period.

Next step is called demand analysis, which is in fact determining how much proportion of earnings calculated in the previous step should be attributable only for brands. Here we introduce a term "Role of Brand Index" (RBI) which is a percentage quantifying the power of brand when a consumer makes purchasing decisions, relative to other factors like price movements, distribution channels, etc. Sometimes brand is a big deal for making decisions: for example, for some commodity products or consumer goods, it's really difficult for consumers to tell the difference between various brands, so people rely on the reputation of the brand and tend to trust those with a proven track record before. In other cases like luxury goods or fragrance, there is often a personal emotional tie between the customer and a brand, where people see brand as a good illustration of identity and demonstrate strong stickiness to the product. Often RBI can fall in different ranges by industry or sector, which is normal, but for any brands there exist ways to exploit their brand proposition and increase the brand power. According to Interbrand, RBI can be decided in three ways:

- Primary research, which uses specific models and research statistics to derive the RBI,
- Existing research combined with Interbrand opinion, and
- Qualitative assessment, which is the last approach when no research is available.

After determining a proper RBI, we should multiply the percentage by the economic profits derived in the first step and get the earnings fully contributed by the brand.

The third metric to be evaluated is the brand strength. The ultimate objective of this step is to get a discount rate that best incorporates and reflects the brand's risk profile and then be applied to discount the brand earnings. Interbrand first uses a Brand Strength Score (BSS) ranging from 0 to 100 to test the brand's ability to generate sustainable profits into the future. Ten factors are believed to be the most relevant in this case: clarity on the brand proposition, commitment to brand, security, responsiveness to market, authenticity, relevance, differentiation, consistency, presence and customers' understanding. Then we compare all the above metrics with an "ideal" brand which is virtually risk free and score the brand strength. As risk is inversely related to the strength, then we use a specific formula to derive the discount rate which could then be used to discount back the brand earnings to present and arrive at the final brand value.

In general, Interbrand valuation method takes into account both internal (company management) and external (consumer) factors, which can be widely used across various sectors. However, since this method is a mix of quantitative and qualitative analysis, it is commonly argued that the determination of RBI could lack objectivity since it's based on some market data and expert's view on this brand, which might lead to a result far from the truth. RBI is itself a crucial input in the model which can produce a huge difference on the final result. Furthermore, there're inevitable overlaps between the determination RBI and discount rate. Normally some risks of the brand assets will be both factored in the index as well as the brand strength score, so that the correct discount rate can be hard to decide.

2.5.2 Brand valuation model based on CAPM

As the name of this method suggests, this valuation is based on the CAPM commonly used in the financial markets:

$$r_e = r_f + ß*(r_m - r_f)$$

The expected return of equity (r_e) is derived from both the expected market risk premium and the company's business risk, or asset risk. According to the CAPM, the higher the risk of the

company's assets, the higher the expected return should the investor receive. Assuming that there is a relationship between the corporate's reputation and investors' perception of risk on the company, if a company has developed a strong brand power, which translates into a better business reputation, then the shareholders of this company would be willing to accept a lower expected return of their investment given the same business risk because of the improved corporate reputation, thus the cost of capital should be lowered for the company. As the discount rate is reduced, the increase in the enterprise value is thus a reference to the embedded brand value (Srivastava et al., 1997).

This valuation model has some strong points since unlike most of other methodologies, it doesn't need to use any consumer perspectives of the brands, market comparable analysis or financial accounts calculations, this model is built on the long-time established CAPM model and could be straightforward to conduct. The value derived from such method also represents the profits of brand generated for a broader group of stakeholders, taking into consideration all the investors of the company (Salinas, 2009). However, Salinas also discussed some shortfalls of this model in her paper. For example, since the model is based on the CAPM, it inevitably suffers from the inner constraints of the CAPM model which puts strict assumptions such as a perfect market condition. However, it is obvious that the financial market is not perfect at all and using the model can introduce some problems that are difficult to solve with. In addition, to get the ß that investors would be willing to sacrifice for the improved brand reputation, regressions need to be run on historical data, however, this process would introduce some residual errors which sometimes can be quite significant and should not be neglected, and since the model itself has flaws, more statistically significant factors might be missed in the model. Besides, since the method calculates the value that reflects the change in risk perspective of the investors facing an improved business reputation, the resulting amount only represents a relative brand value assuming an enhancement in brand assets compared to a former status. The method can also be quite limited because it can only be applied to companies which have enough reliable data to conduct CAPM analysis.

2.5.3 Residual Method

The idea of residual method is to isolate the intangible asset value from the market cap of the enterprise.

Intangible Asset = Market cap - Tangible Assets

As the formula show, the residual method calculates the value of intangible assets which include brand as an important portion. The method is easy in calculation, but the simplicity also shows that the residual approach is not reliable for brand valuation because brand is only a part of the intangible assets and can be of different importance to different type of companies, thus the value derived in residual method can be considered as a maximum value of the corporate brand. Besides, it is also questionable to easily calculate the intangible asset value by subtracting the tangible asset value from market cap. This formula should be based on the assumption that the market is efficient enough so that the value is reflected correctly in the share price. However, it is widely acknowledged that the market is not efficient and there's mispricing due to several reasons.

3 Case study: Brand equity valuation of Huawei Technologies

Chapter 3 presents a case study on the brand equity valuation of Huawei Technologies. The objective of this valuation exercise is not to arrive at a fair value of the Huawei Technologies brand, but to apply the valuation methodologies introduced in Chapter 2, by using real-life data, market analysis and reasonable assumptions based on financial analysis of the company to get an idea of the level of brand value of Huawei Technologies. As we illustrate the steps of valuation and elaborate the results, we would like to see if the fact that a brand is in strong growth or privately owned would require any specifics in valuing its brand equity value.

3.1 Introduction

To start with, we will first present the general information of the Huawei Technologies, with a brief introduction on company's main business and competitive positioning, with a focus on its market dynamics and financial performance.

3.1.1 Presentation of Huawei Technologies

A brief history

Huawei Technologies Co., Ltd. is an information and communication technology (ICT) service provider. Huawei was founded by Ren Zhengfei, who took the strong ambition to build a domestic telecommunication brand which would be able to compete with foreign peers both in China and internationally, during the year 1987, a period when the Chinese government is encouraging and supporting the investment and development of local telecommunication infrastructures. During the early years of development, the company was mainly concentrated on expansion through rural areas and small cities where large population helped the company to quickly gain market share and recognition thanks to its customized strategies. In the year 1994, the company signed the contract to take in charge the foundation of the first national telecommunications network for the People's Liberation Amy of China. As the country puts constraints on the foreign players entering the market, Huawei was able to benefit from a more protective environment and develop its business as a mainstream telecommunication brand.

Later on, as the company kept developing its technologies, Huawei never forgot its strong ambition to go overseas and develop as an international brand. From 1997 when the company first signed its overseas contract with a company in Hong Kong to deliver fixed-line network services, Huawei has continuously expanded its international reach and signed contract with strong partners such as IBM, Vodafone, British Telecom, etc. Its rapid expansion is also marked by the R&D centers opened worldwide and the large number of specialized employees to serve the company's development. The company currently has more than 180,000 employees worldwide, operating in more than 170 countries and regions and serving more than one third of the population, with 14 R&D institutes & centers and 36 joint innovation centers. ICT infrastructure stands at the core business of the company and Huawei has been leveraging its expertise to become the third largest global manufacturer and provider of telecommunication equipment by market share, and brand has also stepped in the competitive landscape of smartphone where it can benefit from the established brand recognition in the market and its broad network and partnerships.

Business Overview

Huawei is a leading global provider of ICT infrastructure services and smart device, providing the customers with a full range of products and services including mobile, broadband, core network, transmission network and data communication.

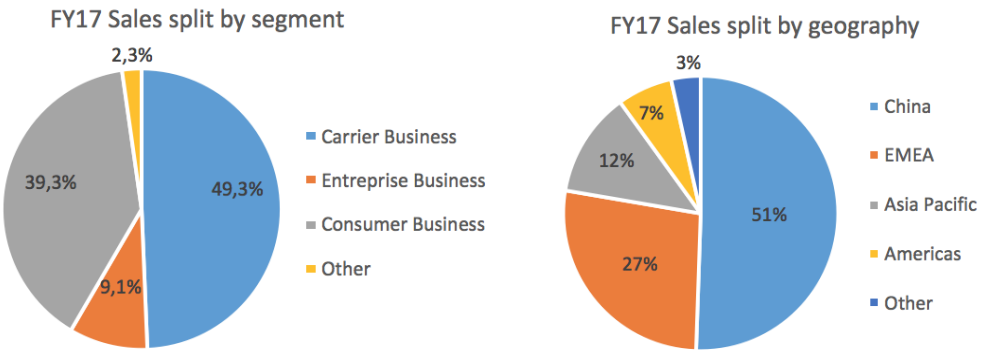


Figure 2 Huawei FY17 Sales Split by Segment / Geography

As shown in the charts above, Huawei is a company operating across the world with four main business lines:

- Carrier Business (49.3% of FY17 Total Revenue, 2.5% y-o-y growth vs. FY16): the objective is to help carriers simplify their networks by providing unified platforms which enable efficient exchange and transmission of data. The carrier business segment develops various kinds of network and help the telecom carriers to implement smooth end-to-end integration of their networks. The Carrier Business represents one important business line of Huawei and accounted for nearly a half of the annual revenue.
- Enterprise Business (9.1% of FY17 Total Revenue, 35.1% y-o-y growth vs. FY16): Huawei is aimed for contribute to the inevitable digital and technological transformation today. This segment provides the enterprises and other institutional users with information and communication solutions, through network construction, unified communication and collaboration, advanced computing system, big data, etc. Huawei offers enterprises a set of useful tools including security service, data management, storage monitoring, cloud operating platforms, all of which help the companies smooth their day-to-day operations and enhance data transformation and communication in a secured and fast-connected environment. Huawei has built strong relationships with big companies and 197 of Fortune Global 500 companies have chosen Huawei to accompany their informational and digital strategies.
- Consumer Business (39.3% of FY17 Total Revenue, 31.9% y-o-y growth vs. FY16): the goal of Huawei is to build a world that's better connected, and the consumer business produces and manufactures mobile broadband devices, smartphones and applications or tools. The products and services cover wireless communication, video solutions and a wide range of broadband devices. Starting as a component manufacturer of smartphones, Huawei has steadily moved up along the value chain and today presents itself as an outstanding intelligence device provider, competing with the strong players like Apple and Samsung.
- Other business is mainly marked by its cloud platforms, which is aimed to build a comprehensive set of services on the cloud platform through solid and long-term partnerships and collaborative ecosystem. The company is also seeking to further develop its cloud business by searching for proper partnerships abroad, mostly foreign operators in

its local market, to expand its cloud platform. The company also provides one-stop AI platform as services to enterprises.

The performance in different regions is largely impacted by the overall economic condition and different market positions of the brand. Half of the company's revenue is generated in China, the domestic market of Huawei, where the ongoing 4G network and rapid growth in telecommunication and smartphone market has driven the sales growth over the year. In the rest of Asia-Pacific region as well as EMEA, the company benefitted from a growing market share, underpinned by increasing trends of digital transformation, while the revenues in the Americas were negatively impacted by the telco cycle fluctuation in Latin America.

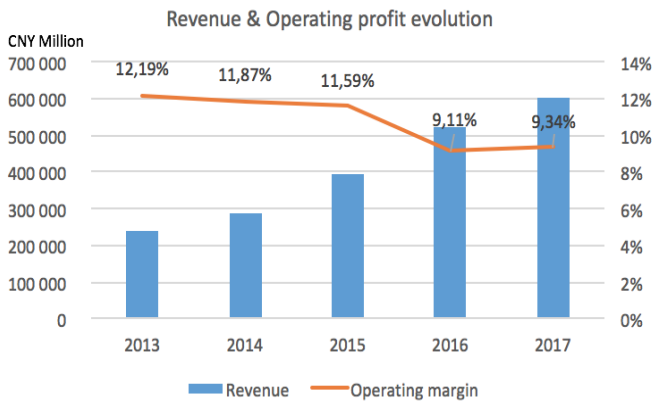


Figure 3 Huawei Revenue and Operating Profit Evolution

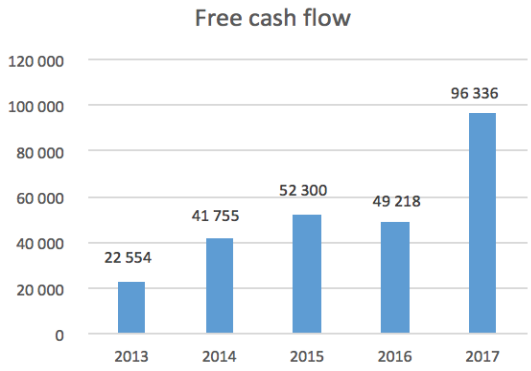


Figure 4 Huawei Free Cash Flow Evolution

As the charts above show, the revenue of the company has been rapidly growing to the level of 603,621 million CNY in 2017, 15.7% y-o-y growth and representing a CAGR of 26.1% over the period 2013-2017. The operating profit stands at 47,455 million CNY in 2017, showing a 28.1% y-o-y growth, despite a decrease in the operating margin over the past five years. More detailed analysis on financial performance and cash flow generation will be presented in the later financial analysis section.

SWOT analysis

Strength

- Established market leader in the emerging market and rapid expansion into European markets. Being one of the first movers in its domestic market, Huawei has a competitive advantage over its competitors with strong market share and geographic coverage. In the meantime, the company is seeking to broaden its way and enter the international market.
- Strong focus on innovation in technology and R&D achievements. Huawei operates in a fast-moving technological industry where innovation is key for competitiveness. The company always has a strong focus on its technology development and innovation, putting investment in especially R&D activities to keep in pace with the new challenges and customers' needs.
- Good performance in its key business lines, with strong track record of revenue growth and profitability margin thanks to the low-cost structure and resulting good operational efficiency.

Weakness

- Much of the revenues are still concentrated in mainland China and Asia-Pacific area, and the company is indeed facing certain difficulties to break into especially the US market and compete with big players.
- Lack of worldwide acknowledged fame due to the Chinese origin of the brand.

Opportunities

- Strong strategic partnerships with international companies and groups, helping Huawei gain solid and resilient growth. The partners range from foreign government department (eg. UK Trade and Investment) to large companies searching for digital solutions, and the various and diversified blue-chip customer base allows Huawei to develop a good reputation and grow internationally.
- Increasing demand in smartphones which provides potential for Huawei to exploit its consumer business segment and gain more market share. Especially the development of 4G network. more sophisticated demands required by the smartphone consumers and currently positive market environment can give the company great potential to drive up their revenue and enhance their brand power.

- New IT solution needs are emerging in the market and Huawei could take initiatives and seize the growth opportunities.

Threats

- Fierce competition in the telecommunication service industry: there exist a large number of players trying to provide network infrastructure products and benefit from the positive market prospects. The key point to win is lying in the company's ability to increase its manufacturing efficiency, the service's price/quality ratio and the cost control strategies.
- Market consolidation trends will create some big player with more bargaining power and rich resources, which represent a threat for the company.
- Uncertainties in the market can also have negative impacts. The technological industry is fast-changing and has to rapidly adjusted to match the new informational achievements and trends. The digital transformation is disruptive for a lot of industries and is itself a source of uncertainty, and the frequently changing environment will require the company to fast adapt to the latest movements and trends.

3.1.2 Choice of brand

We chose Huawei Technologies as the object of our case study mainly due to the following three reasons.

First, Huawei Technologies is a one of the best-known Chinese brands not only in China but also internationally. As presented in the beginning of this chapter, since inception of the company, Huawei has continuously innovated its technology, seized the opportunities and largely benefited from the fast-growing technology sector to provide comprehensive and attractive offers to its clients. The company's growth path in both domestic market and foreign lands is impressive and the brand name Huawei today represents a strong voice in the ICT market and has been creating strong value for the company and its customers as well as contributing to the market as a whole. In 2018, Huawei appeared again on Forbe's most valuable brands list and is one of the top Chinese brands in terms of brand valuation. We firmly believe that it is a successful brand with great value

and strong potential, thus it is good to conduct the valuation in order to better understand the company's business and value drivers.

Second, despite the fact that Huawei Technologies is a private company, financial information is highly accessible as Huawei Technologies has been releasing annual and quarterly reports regularly since 2005. However, it is true that the relatively limited time scope will put a constraint for the application of certain methodologies as will be detailed later. One interesting topic that we are looking into is that, since the brand should be managed in a matter to maximize shareholders' value, here in the case of a private company without the needs to take into consideration its share price performance in the capital markets, we would like to see if there would be any specifics to notice in valuing the brand equity when a brand is owned by a private company.

Third, Huawei Technologies owns one major brand. For a company or a business group which operates under a number of different brands, it would be more complicated and difficult to conduct the brand valuation due to the complexity of processing data and making relevant assumptions. Choosing a company with one brand will simplify the valuation process and in turn be expected to arrive at a more reasonable valuation result.

3.1.3 Market analysis and strategies

We will present the present performance and outlook in the ICT sector in which Huawei operates, including key trends and drivers in principal market. Then, we will discuss Huawei's company strategy which helped the brand grow and expand.

ICT market overview

During the past year, the global ICT market has seen continuous expansion. Information technology and telecom sales are expected to continue to grow at around 3% p.a. in the following two years. Inside the sector, communication tools and products remain the major driver of the spending in ICT sector, while other services like business software are also expected to demonstrate good increase in sales. The market drivers still center around the wide digital

transformation in diverse industries, the impact of Internet of Things (IoT) and the usage of AI and data processing tools.

However, ICT sector does face some new challenges and needs for shifts due to the recent macro and micro context:

- The macroeconomic and geopolitical condition shows a level of uncertainty of the market driven by the ongoing negotiations around Brexit, pressure on increasing rate, FX variations, etc.
- A shift in business model is in need for a lot of ICT companies. As mentioned before, to win the ICT market competition, a company needs to demonstrate advanced and high-quality technology, latest views on the market transition, high level of security in communication and data services, etc. Since the market has gathered a large number of players due to its strong attractiveness, ICT companies are facing increasing competition and increasing needs to maintain and gain more market share.
- Thus, today in the ICT market or into the near future, a popular trend should be the consolidation of market players. More merger deals should be seen in the market, as some companies are willing to benefit from the economies of scale and get access to more resources.

Chinese ICT sector

Since Huawei has a strong positioning in its domestic market and China still represents a huge and important market for the company with great potential, it's interesting to have a closer look at the Chinese ICT sector.

The overall performance of ICT sector in China is still strong during the year 2017, driven by advanced technological innovations including the hot topics of Big Data, Cloud storage, Artificial Intelligence, etc. According to the Ministry of Industry and Information Technology, the total ICT output is more than CNY 18 trillion in 2017, representing c.9.1% y-o-y growth, although lower than the level of 2015 and 2016 (Atradius market monitor report).

Although the sector grew at a faster pace than the national GDP, 2017 demonstrated some concerns and challenges for the existing players. Firstly, demand for electronic devices has seen a general decrease due to the already high penetration rate of the market and a lack of innovative functional improvements in PC and smartphone devices. Secondly, competitions from both local and international peers are becoming even fiercer and the competitive landscape give ICT companies a lot of pressure on how to maintain their margin when they have strong needs in investment in technology while the cost of labor is also gradually growing in the domestic market. In addition, in April 2018, US is considering launching a punitive tariff on Chinese telecom and smartphone products, which will no doubt have a short-term negative impact on the whole Chinese ICT sector. However, in the long run, the sector will be able to regain dynamics by focusing more on the newest technological trends rather than traditional telecommunication products.

In general, the Chinese ICT market is still underpinned by positive fundamentals and China is a huge market which is fast expanding and offers great opportunities for new technologies. In recent years, China has seen upbeat trends in technology development and consumers have a favorable appetite for intelligent products and new applications of latest technological breakthrough. Thus, despite the fact that the labor cost in domestic market is higher and that there's fierce competition in the market, ICT sector still shows good potential for strong growth in the near future.

Huawei's Strategy

Starting as a provider of ICT infrastructure, Huawei has seen the most fast-changing period in the industry despite of the relatively young age of the company. The most important vision of Huawei is to ensure a good communication provided to its clients for different needs. Thus the top one enterprise value is to be always client-centric and put customers' needs at first. Huawei serves a large variety of customer base, while the key relations are maintained with telecommunication carriers, who can also become important partners of the company. Huawei is keen on providing customized services to match each carrier's requirements and at the same time, developing a long-lasting partnership to result in a win-win strategy for both parties.

Secondly, a mid- and long-term strategy of Huawei today is to develop its smartphone business, which marks an important expansion from B2B to B2C operations. The digital transformation no doubt has brought enormous shocks but also opportunities to nearly every industry, and one significant trend is people's needs for more sophisticated functions on their smartphones and this also generates good challenges for the players. Identifying the huge opportunities in the field, Huawei plans to exploit its leadership in technology innovation and positions itself as a problem-solver dedicated to providing advanced solutions to phone user.

The most shocking fact about Huawei could be the capability of this young company with only thirty years' history to break into overseas market and establish global leadership as a strong brand. When Huawei tries to enter a new market, the company is always seeking to sign contracts with government entities, which will first establish a trustworthy and reliable image in the local market. It is acknowledged that Chinese brands often suffer from the negative "Made in China" perception they go abroad and this view of low-cost low-quality products can somehow impair the company's profitability due to the difficulty in demanding a price premium. Thus, Huawei has invested huge amount in marketing and branding campaigns, establishing positive and sustainable brand images, managing public relationship with local institutions, etc. Huawei identified marketing as a key and indispensable input and worked closely with several advertising and digital agencies and over the years, its marketing strategy has resulted in better visibility and brand recognition among customers worldwide.

Another strategic growth driver is the M&A transaction. Mergers and Acquisitions transactions can be of great added value for brand building for young business like Huawei because firstly, it creates a pool of resources where both parties can share their information and professional expertise. In addition, Huawei can acquire brands and product which is aligned with its expansion plans and brings competitive advantage to the business. For example, since 2003, Huawei has built joint ventures with leading partners in network solutions, including 3Com and later Symantec. After a failure to buy 3Com, Huawei managed to acquire all the shares of Symantec in the JV. The deal brought Huawei a great expertise in R&D and helped the company to leverage its competitive edge.

In conclusion, Huawei centers its business strategy on providing best-class technology solutions to clients' needs, for which purpose the company has been focusing on R&D and advanced technology innovation. In addition, being global is also a top ambition of the company's strategic plan, and the company has invested large amount of tangible and intangible resources to develop a strong global brand.

3.1.4 Financial analysis

In this section, we will present the five-year financial highlights of the company and comment on the operating results.

Huawei Income Statement					
(CNY million)	**2013**	**2014**	**2015**	**2016**	**2017**
Sales	**239 025**	**288 197**	**395 009**	**521 574**	**603 621**
Revenue growth (%)	*9%*	*21%*	*37%*	*32%*	*16%*
COGS	(141 005)	(160 746)	(230 312)	(311 445)	(365 479)
Gross profit	**98 020**	**127 451**	**164 697**	**210 129**	**238 142**
as % of sales	*41%*	*44%*	*42%*	*40%*	*39%*
Operating costs	(205 699)	(249 501)	(343 769)	(465 180)	(536 063)
EBITDA	**33 326**	**38 696**	**51 240**	**56 394**	**67 558**
as % of sales	*14%*	*13%*	*13%*	*11%*	*11%*
Depreciation and amortization expenses	(4 198)	(4 491)	(5 454)	(8 879)	(11 174)
EBIT	**29 128**	**34 205**	**45 786**	**47 515**	**56 384**
as % of sales	*12%*	*12%*	*12%*	*9%*	*9%*
Net financial costs	(3 942)	(1 455)	(3 715)	(3 737)	(573)
Share of profit from JV and associates	(24)	303	(84)	280	317
Pre-tax income	25 162	33 053	41 987	44 058	56 128
Income tax	(4 159)	(5 187)	(5 077)	(7 006)	(8 673)
Net income	**21 003**	**27 866**	**36 910**	**37 052**	**47 455**
as % of sales	*8,8%*	*9,7%*	*9,3%*	*7,1%*	*7,9%*

Source: Huawei annual reports 2013-2017
Table 1 Huawei Income Statement (2013-2017)

In FY17, sales recorded a 15.7% y-o-y growth and a $CAGR_{13\text{-}17}$ of 26.1%, largely driven by the rapid growth of consumer business segment. EBITDA stood at CNY 67,558 million, with a stable margin at 11%. At the net profit level, Huawei has seen its net income growing 28.1% y-o-

y, mainly driven by the increasing topline as well as enhanced operating efficiency and a reduction in foreign exchange losses. To continuously enhance the brand strength, Huawei has increased its investments in both R&D and Selling & Administrative expenses, but thanks to the increased operating efficiency via the management transformation, the percentage as of sales of such expenses has seen a decline.

Huawei Balance Sheet (Economic view)					
(CNY million)	**2013**	**2014**	**2015**	**2016**	**2017**
Tangible assets	22 209	27 248	35 438	49 307	56 089
Goodwill and intangible assets	8 514	5 946	6 031	8 907	10 479
Financial assets	584	540	3 961	3 003	5 965
Other assets	12 905	18 614	24 619	25 811	25 960
Fixed assets	**44 212**	**52 348**	**70 049**	**87 028**	**98 493**
Accounts receivable	78 005	79 580	93 260	107 957	107 595
Inventory	24 929	46 576	61 363	73 976	72 352
Other current assets	23 070	52 901	36 462	50 522	49 967
Accounts payable	(31 980)	(45 899)	(61 017)	(71 134)	(72 866)
Other current liabilities	(89 200)	(122 110)	(149 125)	(164 205)	(193 232)
Working capital	**4 824**	**11 048**	**(19 057)**	**(2 884)**	**(36 184)**
Capital Employed	**49 036**	**63 396**	**50 992**	**84 144**	**62 309**
Loans and borrowings	23 033	28 108	28 986	44 799	39 925
Other non-current liabilities	13 136	13 351	13 498	22 259	22 115
Cash and cash equivalent	(73 399)	(78 048)	(110 561)	(123 047)	(175 347)
Net financial debt	**(37 230)**	**(36 589)**	**(68 077)**	**(55 989)**	**(113 307)**
Equity	**86 266**	**99 985**	**119 069**	**140 133**	**175 616**
Capital Invested	**49 036**	**63 396**	**50 992**	**84 144**	**62 309**

Source: Huawei annual reports 2013-2017, adjusted to economic view by author
Table 2 Huawei Balance Sheet - Economic View (2013-2017)

Huawei Cash Flow Statement					
(CNY million)	**2013**	**2014**	**2015**	**2016**	**2017**
Cash flows from operating activities:					
Cash receipts from customers	293 317	367 827	424 413	555 918	669 545
Cash paid to suppliers and employees	(269 598)	(321 201)	(411 482)	(547 331)	(618 305)
Other operating cash flows	(1 165)	(4 871)	36 384	40 631	45 096
Net cash from operating activities	**22 554**	**41 755**	**49 315**	**49 218**	**96 336**
Net cash from (used in) investing activities	**(8 037)**	**(26 209)**	**2 244**	**(28 524)**	**(24 657)**
Net cash from (used in) financing activities	**(7 126)**	**(10 406)**	**(19 763)**	**(10 851)**	**(16 936)**
Net increase in cash and cash equivalent	**7 391**	**5 140**	**31 796**	**9 843**	**54 743**
Cash and cash equivalent at January 1	67 180	73 399	78 048	110 561	123 047
Effect of foreign exchange rate changes	(1 172)	(491)	717	2 643	(2 443)
Cash and cash equivalent at December 31	73 399	78 048	110 561	123 047	175 347

Source: Huawei annual reports 2013-2017
Table 3 Huawei Cash Flow Statement (2013-2017)

In FY17, Huawei has seen a strong increase in its cash position, mainly driven by the cash inflow from operating activities, which stood at CNY 96,336 million, a 95.7% y-o-y growth. The increase was attributable to the net profit growth as well as positive impact from changes in operating assets and liabilities. As a result, the company has a solid balance sheet with sold cash position.

3.2 Key assumptions and financial projection

Before application of various brand equity valuation methods, we dedicate this section to presenting our preliminary assumptions that are common to various valuation methods and financial projection for Huawei's future operations. We believe that this preliminary and centralized presentation of key assumptions and financial projection forms a good basis for the valuation and helps us to explain the valuation process clearly, as well as serving the three following purposes:

First, these assumptions constitute the inputs of the valuation models, which will be presented in section 3.3. As explained in chapter 2, the assumptions taken are crucial to the results of the brand equity valuation, and therefore should be carefully chosen and justified.

Second, the process of taking assumptions allows us to compare their characteristics, such as data availability, easiness to collect data, level of subjectivity or objectivity.

Third, we are also interested in how sensitive each valuation method is to key assumptions, that is to say, the level of impact of the assumptions made on valuation results. For this purpose, we will present sensitivity analysis in the valuation process to show how valuation results react to changes in value of key assumptions.

3.2.1 Key assumptions

3.2.1.1 Choice of major comparable brands

We start by identifying the major comparable brands and associated companies, as quite a few valuation methods involve comparison or benchmark with market comparable brands or firms.

We focus on international brands in key Telecom industry segments, especially infrastructure OEMs and Device OEMs, where Huawei takes an active share. These brands operate in the same or similar industry as Huawei does, and therefore share similar market conditions, opportunities and risks. We select comparable brands whose owning company is listed in the stock market in order to get better data availability and market valuation appetite, and to put our valuation in the current market conditions. At the same time, we try to take a diversified portfolio of the comparable brands in terms of their origin country, listing stock market and major operating currency, in order to get a global and balanced view of Huawei's competitive market conditions.

With the factors above taken together, we arrive at the following comparable brand portfolio, consisting of 8 international brands in the telecom industry, covering China, Asia Pacific, EMEA and Americas regions. These comparable brands, with rich information available, will help us better position Huawei in its market conditions.

Huawei Comparable Brands							
(millions)	Currency	Market Cap	EV	EV/EBITDA 2017	EV/EBITDA 2018	EV/EBIT 2017	EV/EBIT 2018
ZTE	CNY	76 737	78 483	7,7x	9,6x	10,4x	16,2x
Ericsson	SEK	227 730	220 000	N/A	12,6x	N/A	25,3x
Nokia	EUR	27 554	23 221	15,8x	7,5x	N/A	10,6x
Apple	USD	927 683	961 583	12,6x	12,0x	14,5x	13,9x
LG	KRW	14 721 710	22 187 259	4,7x	4,2x	7,6x	6,4x
Samsung	KRW	335 141 900	273 313 879	3,5x	3,0x	4,8x	4,2x
Sony	JPY	6 854 654	6 125 791	4,3x	5,4x	8,6x	N/A
Lenovo	USD	6 491	9 377	8,7x	6,4x	27,6x	12,7x
Average multiples				**8,2x**	**7,6x**	**12,2x**	**12,8x**

Table 4 Huawei Comparable Brands

3.2.1.2 Discount rate

We start by calculating the cost of capital of Huawei Technologies company based on the WACC (Weighted Average Cost of Capital) model.

$$WACC = r_D * \frac{D}{D+E} * (1 - tax) + r_E * \frac{E}{D+E}$$

where the cost of equity (r_E) is calculated based on the CAPM (Capital Asset Pricing Model):

$$r_E = r_f + \beta * ERP$$

Risk-free rate (r_f): We take 3.6%, China 10-year government bond yield in June 2018, as the risk-free rate, as the company is headquartered in China, and over 50% of its revenues come from China. The risk specific to countries and regions due to Huawei's global presence will be factored into through the estimation of the equity risk premium.

Gearing ratio (D/E): We take the average gearing ratio of Huawei's major comparable brands as Huawei's target gearing ratio. Although Huawei has negative net financial debt and therefore a negative gearing ratio during the past five years, we believe positive gearing will be necessary to support its future rapid growth, and therefore we calculate Huawei's target gearing ratio at 0.07, based on its comparable brands.

Beta (β): We take the average unlevered beta of Huawei's major competitors as the unlevered beta of Huawei, and then re-lever the beta based on Huawei's target gearing ratio. The levered beta of Huawei based on its target gearing ratio of 0.07 is estimated at 1.12x.

Huawei Gearing Ratio and Beta						
(millions)	Currency	Market Cap	EV	Gearing ratio	Beta	Unlevered Beta
ZTE	CNY	76 737	78 483	0,02	0,93x	0,91x
Ericsson	SEK	227 730	220 000	(0,03)	0,82x	0,84x
Nokia	EUR	27 554	23 221	(0,16)	1,18x	1,36x
Apple	USD	927 683	961 583	0,04	1,21x	1,17x
LG	KRW	14 721 710	22 187 259	0,51	0,86x	0,60x
Samsung	KRW	335 141 900	273 313 879	(0,18)	1,34x	1,59x
Sony	JPY	6 854 654	6 125 791	(0,11)	1,25x	1,37x
Lenovo	USD	6 491	9 377	0,44	0,87x	0,63x
Average gearing ratio				0,07		
Average unlevered beta						1,06x
Huawei levered beta						**1,12x**

Table 5 Huawei Gearing Ratio and Beta

Equity Risk Premium (ERP): We calculate the equity risk premium based on the sales-weighted average country equity risk premium. As indicated below, we first calculated the equity risk premium for each region, based on country equity risk premium data, weighted on country GDP. Then we calculated the average equity risk premium weighted by Huawei's geographical sales breakdown and arrive at 6.17%.

Cost of debt (r_D): We calculate Huawei's cost of debt based on its 5-year average interest rate (the sum of interest expenses and bank charges divided by total loans and borrowings).

Effective tax rate (tax): We calculate Huawei's effective tax rate based on its 5-year average effective tax rate. We kindly note that Huawei is eligible for China's tax benefit policy targeted at Chinese high-tech corporations and benefits from a corporate income tax rate of 15%.

Huawei Equity Risk Premium			
(CNY million)	**Sales 2017**	**% of total sales**	**Equity risk premium**
Total sales	**603 621**	**100%**	
China	305 092	51%	5,89%
EMEA	163 854	27%	6,62%
Asia Pacific	74 427	12%	6,45%
Americas	39 285	7%	5,81%
Other	20 963	3%	6,24%
Weighted Average ERP			**6,17%**

Table 6 Huawei Equity Risk Premium

Huawei Cost of Debt (pre-tax)					
	2013	2014	2015	2016	2017
Interest expenses	1 358	1 659	1 536	2 271	2 942
Bank charges	324	451	638	100	124
Total loans and borrowings	23 033	28 108	28 986	44 799	39 925
Average cost of debt	7,3%	7,5%	7,5%	5,3%	7,7%
5-year average average cost of debt					**7,1%**

Table 7 Huawei Cost of Debt (pre-tax)

Huawei Effective Tax Rate					
	2013	2014	2015	2016	2017
Effective tax rate	16,5%	15,7%	12,1%	15,9%	15,5%
5-year average effective tax rate					**15,1%**

Table 8 Huawei Effective Tax Rate

With the above assumptions, we estimate the WACC of Huawei at 10.2%.

Huawei WACC Calculation		
Risk-free rate (%)	3,6%	China 10-year government bond yield
Equity Risk Premium (%)	6,2%	Sales-weighted average of country ERP
Huawei Levered Beta (x)	1,12	Average of comparable brands
Cost of Equity (%)	**10,5%**	
Cost of Debt before tax (%)	7,1%	5-year average interest rate
Tax rate (%)	15%	5-year average effective tax rate
Cost of Debt after tax (%)	**6,0%**	
E/(D+E) (%)	0,94	Average of comparable brands
D/(D+E) (%)	0,06	Average of comparable brands
Huawei WACC	**10,2%**	

Table 9 Huawei WACC Calculation

The discount rates used for impairment test of intangible assets by Huawei, as specified in annual reports, are as follows. Given the similar risk-free rate as that of today (3.6%), we believe that we could estimate the discount rate for intangible assets by referring to these rates and therefore we take the average of the 3-year discount rates and estimate the discount rate for intangible assets at 16%.

Huawei Intangible Asset Discount Rate			
	2012	2013	2014
Risk-free rate	3,5%	3,8%	4,1%
Intangible discount rate	14,5%	17,0%	16,4%
Average discount rate	**16,0%**		

Table 10 Huawei Discount Rate for Intangible Assets

A simple comparison of the two discount rates suggests that the discount rate for intangible assets is higher than the WACC of the company. This corresponds to some practitioners' opinion, as mentioned in chapter 2, that intangible assets are generally riskier than tangible assets and therefore the discount rate used for intangible assets should be generally higher than the cost of capital of the company. In our valuation exercise, we will use the company WACC to discount the free cash flows for the firm (in the general Discounted Cash Flow valuation for the company), while use the discount rate for intangible assets to discount the streams directly related to the brand (for example, in the royalty savings method).

3.2.2 Financial projection

We choose to estimate the financial elements of Huawei for the future 10 years (2018-2027) and take the years of 2028 and beyond as a perpetual growth period.

Sales growth (%): The sales projection for the year of 2018 is taken from Huawei's sales target ($102.2 billion) released in January 2018, as well as the breakdown for each business segment. For sales from Carrier Network Segment, we see a slight decrease in sales and therefore conservatively assume no further growth in this segment. For Enterprise Segment, Consumer Segment and other items, where major growth comes from, we project three phases of growth as follows.

- Rapid growth phase (2018-2022): Given the ambitious expansion and rapid growth of Huawei currently, we estimate the next five years to continue the relatively rapid growth. The growth rate remains at a high level, with a slight decrease of 3% each year.
- Soft landing phase (2023-2027): Following rapid growth, we estimate the five years of soft landing, where growth is slower and slightly approaching a flat growth of 3%. The annual sales growth rate decreases linearly till reaches the stable growth rate.
- Stable growth (2028 and beyond): We estimate stable and perpetual growth starting from the year of 2028. The perpetual growth rate is estimated at 3%, as specified in Huawei's 2014 annual report.

Huawei Financial Projection												
		Rapid growth					Soft landing					Stable
(CNY million)	**2017**	**2018E**	**2019E**	**2020E**	**2021E**	**2022E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**
Sales	**603 621**	**654 080**	**715 380**	**774 241**	**826 761**	**868 954**	**909 928**	**948 863**	**984 924**	**1 017 286**	**1 045 171**	**1 067 887**
Sales growth (%)	*15,7%*	*8,4%*	*9,4%*	*8,2%*	*6,8%*	*5,1%*	*4,7%*	*4,3%*	*3,8%*	*3,3%*	*2,7%*	*2,2%*
Sales from Carrier Network Segment	297 838	288 000	288 000	288 000	288 000	288 000	288 000	288 000	288 000	288 000	288 000	288 000
growth rate (%)	*3%*	*-3%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Sales from Enterprise Segment	54 948	67 840	81 722	95 992	109 874	122 468	134 779	146 426	157 014	166 153	173 481	178 685
growth rate (%)	*35%*	*23%*	*20%*	*17%*	*14%*	*11%*	*10%*	*9%*	*7%*	*6%*	*4%*	*3%*
Sales from Consumer Segment	237 249	282 240	327 296	369 725	406 563	434 875	462 285	488 369	512 698	534 853	554 432	571 065
growth rate (%)	*32%*	*19%*	*16%*	*13%*	*10%*	*7%*	*6%*	*6%*	*5%*	*4%*	*4%*	*3%*
Sales from other items	13 586	16 000	18 363	20 524	22 324	23 611	24 864	26 069	27 212	28 279	29 258	30 136
growth rate (%)	*29%*	*18%*	*15%*	*12%*	*9%*	*6%*	*5%*	*5%*	*4%*	*4%*	*3%*	*3%*
Gross profit	**238 142**	**258 049**	**282 234**	**305 455**	**326 176**	**342 822**	**358 987**	**374 348**	**388 575**	**401 342**	**412 344**	**421 305**
as % of sales	*39%*	*39%*	*39%*	*39%*	*39%*	*39%*	*39%*	*39%*	*39%*	*39%*	*39%*	*39%*
EBITDA	**67 558**	**68 678**	**75 115**	**81 295**	**86 810**	**91 240**	**95 542**	**99 631**	**103 417**	**106 815**	**109 743**	**112 128**
as % of sales	*11%*	*11%*	*11%*	*11%*	*11%*	*11%*	*11%*	*11%*	*11%*	*11%*	*11%*	*11%*
Capex	18 109	19 622	21 461	23 227	24 803	26 069	27 298	28 466	29 548	30 519	31 355	32 037
D&A	(11 174)	(12 285)	(14 775)	(17 338)	(19 613)	(21 444)	(23 036)	(24 572)	(25 972)	(27 237)	(28 380)	(29 437)
EBIT	**56 384**	**56 394**	**60 340**	**63 957**	**67 197**	**69 796**	**72 506**	**75 059**	**77 445**	**79 578**	**81 363**	**82 691**
as % of sales	*9%*	*9%*	*8%*	*8%*	*8%*	*8%*	*8%*	*8%*	*8%*	*8%*	*8%*	*8%*
Net income	**47 455**	**48 944**	**53 530**	**57 935**	**61 865**	**65 022**	**68 088**	**71 002**	**73 700**	**76 121**	**78 208**	**79 908**
as % of sales	*7,9%*	*7,5%*	*7,5%*	*7,5%*	*7,5%*	*7,5%*	*7,5%*	*7,5%*	*7,5%*	*7,5%*	*7,5%*	*7,5%*

Table 11 Huawei Financial Projection (2018-2028)

Growth margin (%): The gross margin is stable at 39% and we assume that Huawei will keep this margin in the future.

EBITDA margin (%): The EBITDA margin (EBITDA/sales) has been slightly decreasing and stable at 11% since 2016. We estimate this margin to keep at a level of 10.5%, with a slight decrease due to potential increase in operating costs from rapid expansion.

D&A (Depreciation and amortization): We estimate the Capex (capital expenditure) as 3% of sales, which is the average Capex/sales ratio of the comparable brands and we assume the capital expenditure are depreciated and amortized for five years staring from the next year following capitalization.

EBIT is thus calculated by subtracting D&A expense from EBITDA.

Net Income (%): The net income margin has been fluctuating between 7% and 10% during the last five years, with a slight downward trend. We therefore take the average margin of the year of 2016 and 2017 and arrive at 7.5% net income margin, which is within the range of the net income margin range of its comparable brands (6.3% - 8%).

3.2.3 Enterprise Value (EV) estimation

We present a preliminary estimation of Huawei's Enterprise Value (EV) with two methods – the multiples method and DCF method.

Huawei Enterprise Value Estimation - DCF Method												
(CNY million)	**2017**	**2018E**	**2019E**	**2020E**	**2021E**	**2022E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**
Sales	**603 621**	**654 080**	**715 380**	**774 241**	**826 761**	**868 954**	**909 928**	**948 863**	**984 924**	**1 017 286**	**1 045 171**	**1 067 887**
EBIT	**56 384**	**56 394**	**60 340**	**63 957**	**67 197**	**69 796**	**72 506**	**75 059**	**77 445**	**79 578**	**81 363**	**82 691**
NOPAT	**47 851**	**47 859**	**51 208**	**54 278**	**57 027**	**59 233**	**61 533**	**63 700**	**65 724**	**67 535**	**69 050**	**70 177**
+ D&A	11 174	12 285	14 775	17 338	19 613	21 444	23 036	24 572	25 972	27 237	28 380	29 437
- CAPEX	(18 109)	(19 622)	(21 461)	(23 227)	(24 803)	(26 069)	(27 298)	(28 466)	(29 548)	(30 519)	(31 355)	(32 037)
- Change in WCR	3 718	(8 951)	(10 875)	(10 442)	(9 317)	(7 485)	(7 269)	(6 907)	(6 397)	(5 741)	(4 947)	(4 030)
Free Cash Flow	**44 634**	**31 570**	**33 647**	**37 947**	**42 521**	**47 124**	**50 003**	**52 899**	**55 752**	**58 513**	**61 128**	**63 548**
Discount rate	10,2%											
Discount factor		0,9072	0,8230	0,7467	0,6774	0,6145	0,5575	0,5058	0,4589	0,4163	0,3777	0,3426
Discounted Free Cash Flow		28 641	27 693	28 334	28 803	28 959	27 878	26 755	25 582	24 358	23 085	
PV of 2018-2027	**270 089**											
Perpetual growth rate	2%											
Terminal Value (beyond 2028)												788 992
PV of Terminal Value	**270 319**											
Enterprise Value	**540 408**											
Implied EV/EBITDA	8,0x											
Implied EV/EBIT	9,6x											

Table 12 Huawei Enterprise Value Estimation – DCF Method

In the Discounted Operating Free Cash Flow for Firm (DCF) method, we used the standard model based on our financial projection presented earlier. We took Huawei's WACC (10.2%) as the discount rate. The Enterprise Value is estimated at CNY 540 billion.

Huawei Enterprise Value Estimation - Multiples Method					
(CNY millions)		Comparable brands EV/EBITDA 2017	Comparable brands EV/EBITDA 2018	Comparable brands EV/EBIT 2017	Comparable brands EV/EBIT 2018
		8,2x	7,6x	12,2x	12,8x
Huawei EBITDA 2017	67 558	552 139	511 095		
Huawei EBITDA 2018	68 678	561 295	519 571		
Huawei EBIT 2017	56 384			689 821	720 000
Huawei EBIT 2018	56 394			689 941	720 126

Table 13 Huawei Enterprise Value Estimation - Multiples Method

In the multiples method, we calculated the EV/EBITDA and EV/EBIT multiples for the comparable brands identified and multiplied by Huawei's EBITDA and EBIT respectively. In order to avoid impact of unusual items, we used financial numbers from both 2017 and 2018. The Enterprise Value is estimated in the range of 511-720 billion CNY.

3.3 Brand equity valuation

In this section, we choose from the various valuation methods introduced in Chapter 2 the appropriate methods to apply to the Huawei Technologies brand, based on the assumptions presented in section 3.2, and compare results from different methods.

3.3.1 Choice of valuation methods

We start with choosing appropriate methods to apply for our case study.

For cost methods, as discussed in Chapter 2, they suffer from various disadvantages, the most important one being looking back rather than looking forward view of the value. In the case of Huawei Technologies, the financials are available only from year 2005, which is not long enough since the brand has a thirty-year history. However, despite the lack of some relevant data, we decided to use available figures to conduct the historical cost method and replacement cost method to get a good idea of brand cost evolution in recent years when the company has more and more invested in brand building activities.

For market methods, to apply the multiples, we should use recent and comparable market transactions, get the brand value paid during the deal and use appropriate metrics to get the multiple which will then be applied to the target. However, in the case of Huawei Technologies, we didn't recognize comparable deals within the market where we can find reliable data to conduct the valuation method. Thus, we will skip the market approach.

Income-based methods are the most relevant and most used valuation techniques in brand valuation practice, so we will have a detailed valuation using three methods. These methods are relatively more quantitative and are supported by concrete financial and market figures. On the other hand, some input parameters are subjective and require estimation, which means that the accuracy of valuation results is dependent on the quality of input values.

1) Price premium method: We will look at how the Huawei Technologies brand charges a price premium compared to unbranded products, and estimate the brand equity value based on the brand's ability to charge and maintain a price premium. The price and

characteristics of products are easy to access, and the challenge is to define comparable brands and to calculate the average price premium rate, which can be very subjective.

2) Royalty savings method: We will calculate the brand equity value based on Huawei's hypothetical savings on royalty by owning this brand. The royalty rate is usually calculated from existing licensing contracts in the industry, and this method is the most standardized method, with little variation, which adds to the comparability of its results.
3) Demand drivers / brand strength method: We will analyze consumers' purchasing decisions and identify the brand-related portion within the demand drivers. This method has many variations and can give very different results. We will need help from consumer behavior reports by marketing and branding experts.

Finally, on top of the income approach that we used, we will apply the real option method to arrive at an additional option value that can reflect the result of Huawei's growth option in their European business.

3.3.2 Cost-based approach

3.3.2.1 Historical cost method

In this section, we'll apply the cost methods to have a view of the company's brand value. The idea of the method is to sum up all the historical brand-related costs such as marketing, advertising and R&D costs and use it as a reference to the value of brand. Huawei Technologies only started to report its expense split since 2009, so that given the time horizon limit, we used the available figures and made the following assumptions:

- Since the company didn't release its detailed marketing expenses in its income statement, so we take a conservative assumption that brand-related marketing expenses account for a changing percentage of its recorded Sales, General and Administrative costs.
- For R&D expenses, as described in the financial report of Huawei, the company is putting increasing effort on its R&D in order to enhance its brand strength. We take an increasingly important percentage of brand-associated costs in R&D, assuming a more efficient cost structure given the company's expansion and established position in the market.

The output is as follow, using the data available for the period 2009 – 2017: the brand equity value, represented by the total costs attributable to the brand, is estimated at CNY 239,528 million.

Huawei Brand Equity Valuation - Historical Cost Method									
(CNY million)	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Sales	**149 059**	**185 176**	**203 929**	**220 198**	**239 025**	**288 197**	**395 009**	**521 574**	**603 621**
Sales growth rate	*17%*	*24%*	*10%*	*8%*	*9%*	*21%*	*37%*	*32%*	*16%*
Selling/General/Administrative	**24 169**	**30 996**	**33 770**	**38 667**	**38 052**	**47 468**	**62 281**	**86 442**	**92 681**
as % of sales	*16,2%*	*16,7%*	*16,6%*	*17,6%*	*15,9%*	*16,5%*	*15,8%*	*16,6%*	*15,4%*
Percentage attributable to brand	10%	11%	12%	13%	14%	15%	15%	15%	15%
Research & Development	**13 340**	**16 556**	**23 696**	**29 747**	**31 563**	**40 845**	**59 607**	**76 391**	**89 690**
as % of sales	*8,9%*	*8,9%*	*11,6%*	*13,5%*	*13,2%*	*14,2%*	*15,1%*	*14,6%*	*14,9%*
Percentage attributable to brand	25%	30%	35%	40%	45%	50%	50%	50%	50%
Brand related costs	**5 752**	**8 376**	**12 346**	**16 926**	**19 531**	**27 543**	**39 146**	**51 162**	**58 747**
Total Value									**239 528**

Table 14 Huawei Brand Equity Valuation – Historical Cost Method

Here we also did a sensitivity table to reflect how the result change if we change the assumption on the percentage, which estimates a range of CNY 215-263 billion.

Huawei Brand Equity Valuation - Historical Cost Method - Sensitivity Analysis										
(CNY million)		**Percentage of SG&A related to marketing**								
		6%	**7%**	**8%**	**9%**	**10%**	**11%**	**12%**	**13%**	**14%**
Percentage of R&D attributable to brand	**5%**	145 060	149 605	154 150	158 695	163 241	167 786	172 331	176 876	181 422
	10%	164 131	168 677	173 222	177 767	182 312	186 858	191 403	195 948	200 493
	15%	183 203	187 748	192 294	196 839	201 384	205 929	210 475	215 020	219 565
	20%	202 275	206 820	211 365	215 911	220 456	225 001	229 546	234 092	238 637
	25%	221 347	225 892	230 437	234 982	239 528	244 073	248 618	253 163	257 709
	30%	240 418	244 964	249 509	254 054	258 599	263 145	267 690	272 235	276 780
	35%	259 490	264 035	268 581	273 126	277 671	282 216	286 762	291 307	295 852
	40%	278 562	283 107	287 652	292 198	296 743	301 288	305 833	310 379	314 924
	45%	297 634	302 179	306 724	311 269	315 815	320 360	324 905	329 450	333 996

Table 15 Huawei Brand Equity Valuation – Historical Cost Method – Sensitivity Analysis

3.3.2.2 Replacement cost method

Then we apply the replacement cost method. Here the main difference compared to the historical cost methods is to consider the time value of money in the valuation, because all the historical cost registered on the financial statements should indeed have a higher present value today. Thus, based on the hypothesis we made for the former case, we use the Chinese inflation data during the period 2009-2017 as well as the discount rate that we presented before. Although we recognize that the current WACC that we calculated is based on today's macro-economics and current financial structure of the company, we still use it as a way to take into account the time value of money based on the particular risk of the business.

This method estimates the bran equity value at CNY 367,285 million, and sensitivity analysis (on discount rate and percentage of R&D contribution to brand) are presented as follow:

Huawei Brand Equity Valuation - Replacement Cost Method									
(CNY million)	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Sales	**149 059**	**185 176**	**203 929**	**220 198**	**239 025**	**288 197**	**395 009**	**521 574**	**603 621**
Sales growth rate	*17%*	*24%*	*10%*	*8%*	*9%*	*21%*	*37%*	*32%*	*16%*
Selling/General/Administrative	**24 169**	**30 996**	**33 770**	**38 667**	**38 052**	**47 468**	**62 281**	**86 442**	**92 681**
as % of sales	*16%*	*17%*	*17%*	*18%*	*16%*	*16%*	*16%*	*17%*	*15%*
Percentage attributable to brand	10%	10%	13%	15%	18%	18%	18%	18%	18%
Research & Development	**13 340**	**16 556**	**23 696**	**29 747**	**31 563**	**40 845**	**59 607**	**76 391**	**89 690**
as % of sales	*9%*	*9%*	*12%*	*14%*	*13%*	*14%*	*15%*	*15%*	*15%*
Percentage attributable to brand	25%	30%	35%	40%	45%	50%	50%	50%	50%
Brand related costs	**5 752**	**8 066**	**12 515**	**17 699**	**20 862**	**28 729**	**40 703**	**53 323**	**61 064**
China inflation (%)	-0,7	3,3	5,4	2,6	2,6	2,0	1,4	2,0	0,6
Cumulated inflation factor	0,993	1,026	1,081	1,109	1,138	1,161	1,177	1,201	1,208
Cost considering inflation	**5 712**	**8 274**	**13 531**	**19 633**	**23 744**	**33 351**	**47 912**	**64 023**	**73 758**
Discount rate	10,2%								
Discount factor	2,1793	1,9771	1,7937	1,6272	1,4763	1,3393	1,2150	1,1023	1,0000
Costs considering Time Value	**12 448**	**16 359**	**24 269**	**31 947**	**35 052**	**44 667**	**58 214**	**70 571**	**73 758**
Total value									**367 285**

Table 16 Huawei Brand Equity Valuation – Replacement Cost Method

Huawei Brand Equity Valuation - Replacement Cost Method - Sensitivity Analysis										
(CNY million)		**Discount rate**								
		6%	**7%**	**8%**	**9%**	**10,2%**	**11%**	**12%**	**13%**	**14%**
Percentage of R&D attributable to brand	**5%**	329 640	337 238	345 077	353 165	361 511	370 123	379 010	388 181	397 646
	10%	330 714	338 395	346 324	354 507	362 955	371 675	380 677	389 971	399 565
	15%	331 788	339 553	347 570	355 849	364 398	373 226	382 344	391 760	401 485
	20%	332 861	340 710	348 817	357 191	365 842	374 778	384 011	393 549	403 405
	25%	333 935	341 868	350 064	358 533	367 285	376 330	385 677	395 339	405 325
	30%	335 009	343 025	351 311	359 875	368 728	377 881	387 344	397 128	407 244
	35%	336 083	344 183	352 557	361 217	370 172	379 433	389 011	398 917	409 164
	40%	337 157	345 340	353 804	362 559	371 615	380 984	390 678	400 707	411 084
	45%	338 231	346 498	355 051	363 901	373 059	382 536	392 344	402 496	413 004

Table 17 Huawei Brand Equity Valuation – Replacement Cost Method – Sensitivity Analysis

3.3.3 Income-based approach

3.3.3.1 Price premium method

The price premium method focuses on the brand's ability to charge a price premium on its products, compared to the price of an unbranded generic equivalent product. Assuming no additional costs associated with charging a price premium and no loss in sales volume, the brand equity value is thus defined as the present value of future post-tax price premia.

$$Brand\ equity\ value = \sum_{t=1}^{T} \frac{Revenue_t\ *\ Price\ premium\ rate\ *\ (1 - tax)}{(1 + discount\ rate)^t}$$

The key parameter in this method is, by definition, the price premium rate, which reflects the average price difference between products of this brand and those of unbranded equivalent.

In Huawei's case, we choose to focus on its Consumer Segment, especially smartphones, as smartphones are one of Huawei's biggest and high-growth product lines and the most significant source of price premium. Comparably, the Carrier Network Segment has relatively lower price premium advantage, and the Enterprise Segment accounts for smaller portion of total sales. The smartphone product line offers a huge variety of products and renews its product portfolio regularly. With the rapid innovation in the technology market, the competition is active and fierce, which enables us to find comparable brands and models with similar characteristics easily.

We identified the four major Chinese smartphone brands (Xiaomi, Meizu, Oppo, Vivo) besides Huawei, with similar market positioning. Xiaomi and Meizu offer similar variety of models in the market, target lower market positioning and set price significantly lower than Huawei. Oppo and Vivo are two brands that feature on camera functionality and spend a huge amount of advertising costs; they offer fewer models, target relatively higher market positioning and set prices similar to Huawei, sometimes even higher.

We calculated the average price of the major models in the market in 2017 for each brand and defined the average price of the four brands' average prices as the market comparable average price. Then we compared this market comparable average price with the average price of Huawei's major smartphone models, which indicates a price premium rate of 12% for Huawei.

Huawei Price Premium				
Brand	**Number of models**	**Average price**	**Min price**	**Max price**
Xiaomi	12	1516	499	3499
Meizu	15	1532	699	2999
Oppo	6	2282	1299	3499
Vivo	7	2355	1098	3499
Comparable average		1921		
Huawei	21	2146	599	4699
Price premium rate (%)		**12%**		

Table 18 Huawei Mobile Phone Price Premium

We assume that this price premium rate of 12% decreases slightly by 1%, given the increasingly competitive conditions in the smartphone market and squeezed capacity to charge a price premium, till it reaches a stable price premium level of 2.2% (perpetual sales growth rate)

starting from the year of 2027. Then we applied yearly price premium rate to the forecast sales of Huawei's Consumer Segment (mainly consisting of mobile phones) to calculate the yearly price premium earned from the brand. These yearly price premia, after subtracting taxes, are discounted by the discount rate for intangible assets.

Huawei Brand Equity Valuation - Price Premium Method												
(CNY million)	**2017**	**2018E**	**2019E**	**2020E**	**2021E**	**2022E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**
Sales from Consumer Segment	**237 249**	**282 240**	**327 296**	**369 725**	**406 563**	**434 875**	**462 285**	**488 369**	**512 698**	**534 853**	**554 432**	**571 065**
Price premium rate	12%	11%	10%	9%	8%	7%	6%	5%	4%	3%	2%	2%
Price premium (pre-tax)	27 711	30 290	32 023	32 669	32 070	30 180	27 700	24 633	21 000	16 837	12 198	12 563
Tax rate	15%											
Price premium (post-tax)	**23 517**	**25 706**	**27 176**	**27 725**	**27 216**	**25 613**	**23 508**	**20 905**	**17 822**	**14 289**	**10 352**	**10 662**
Discount rate	16,0%											
Discount factor		0,8623	0,7436	0,6412	0,5529	0,4768	0,4112	0,3545	0,3057	0,2636	0,2273	0,1960
Discounted price premium		22 167	20 208	17 777	15 049	12 212	9 665	7 412	5 449	3 767	2 353	
PV of 2018-2027	**116 059**											
Perpetual growth rate	2,2%											
Terminal Value (2028 and beyond)												77 449
PV of Terminal Value	**15 183**											
Brand Equity Value	**131 242**											
as % of EV	24%											

Table 19 Huawei Brand Equity Valuation - Price Premium Method

Huawei Brand Equity Valuation - Price Premium Method - Sensitivity Analysis									
(CNY million)		**Discount rate**							
		12%	**13%**	**14%**	**15%**	**16%**	**17%**	**18%**	**19%**	**20%**
Price premium rate	**3,7%**	70 133	68 145	66 495	65 104	63 915	62 887	61 989	61 198	60 497
	5,7%	86 965	84 977	83 327	81 936	80 747	79 718	78 821	78 030	77 328
	7,7%	103 797	101 809	100 159	98 768	97 578	96 550	95 653	94 862	94 160
	9,7%	120 628	118 641	116 991	115 600	114 410	113 382	112 484	111 694	110 992
	11,7%	137 460	135 473	133 823	132 431	131 242	130 214	129 316	128 526	127 824
	13,7%	154 292	152 304	150 655	149 263	148 074	147 046	146 148	145 357	144 656
	15,7%	171 124	169 136	167 486	166 095	164 906	163 878	162 980	162 189	161 488
	17,7%	187 956	185 968	184 318	182 927	181 738	180 709	179 812	179 021	178 319
	19,7%	204 788	202 800	201 150	199 759	198 569	197 541	196 644	195 853	195 151

Table 20 Huawei Brand Equity Valuation – Price Premium Method – Sensitivity Analysis

We estimate the brand equity value at CNY 131,242 million. The sensitivity analysis shows how the brand equity value react to different discount rates and price premium rate assumptions and estimates a range of CNY 113-149 billion.

3.3.3.2 Royalty savings method

The royalty savings method assumes a hypothetical scenario where the company did not own the brand but rather license the rights to use the brand from a third party who manages the brand. By actually owning the brand, the company saves an amount of annual royalty payment, and the brand equity value is thus defined as the present value of future post-tax savings on royalty payment.

$$Brand\ equity\ value = \sum_{t=1}^{T} \frac{Revenue_t * Royalty\ rate * (1 - tax)}{(1 + discount\ rate)^t}$$

The key parameter in the royalty savings method is the royalty rate, which the company would have to pay if it did not own the brand itself but rather license the brand from a third party. The royalty rate is usually determined by referring to existing licensing contracts in the same industry, with adjustment to contract details.

According to Galetovic, Haber and Zaretzki (2018), of the 39 potential licensors in the smartphone value chain, 29 licensors charged royalties in 2016. The royalties range from $1.6 million to $7.7 billion, summing to $14.2 billion in total, on the basis of $425.1 billion in mobile phone sales. This indicates a royalty yield of 3.3% ($7.2 per phone). When the scope is limited to smartphones only, the royalty yield is 3.4% of selling price ($9.6 per phone).

We applied the royalty rate of 3.4% to the projected sales from the Consumer Segment to calculate yearly pre-tax royalty savings. After subtracting taxes, we discounted the post-tax royalty savings by the discount for intangible (16.0%) and assumed the same perpetual growth rate of 2.2%. We estimate the brand equity value at CNY 79,483 million.

Huawei Brand Equity Valuation - Royalty Savings Method												
(CNY million)	**2017**	**2018E**	**2019E**	**2020E**	**2021E**	**2022E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**
Sales from Consumer Segment	**237 249**	**282 240**	**327 296**	**369 725**	**406 563**	**434 875**	**462 285**	**488 369**	**512 698**	**534 853**	**554 432**	**571 065**
Royalty rate	3,4%											
Royalty savings (pre-tax)	**8 066**	**9 596**	**11 128**	**12 571**	**13 823**	**14 786**	**15 718**	**16 605**	**17 432**	**18 185**	**18 851**	**19 416**
Tax rate	15%											
Royalty savings (post-tax)	**6 846**	**8 144**	**9 444**	**10 668**	**11 731**	**12 548**	**13 339**	**14 092**	**14 794**	**15 433**	**15 998**	**16 478**
Discount rate	16,0%											
Discount factor		0,8623	0,7436	0,6412	0,5529	0,4768	0,4112	0,3545	0,3057	0,2636	0,2273	0,1960
Discounted royalty savings		7 023	7 022	6 841	6 486	5 983	5 484	4 996	4 523	4 069	3 637	
PV of 2018-2027	**56 064**											
Perpetual growth rate	2,2%											
Terminal Value (2028 and beyond)												119 463
PV of Terminal Value	**23 419**											
Brand Equity Value	**79 483**											
as % of EV	15%											

Table 21 Huawei Brand Equity Valuation – Royalty Savings Method

We also prepared sensitivity analysis to see how the brand equity value react to different discount rates and royalty rate assumptions, which estimates a range of CNY 65-102 billion.

Huawei Brand Equity Valuation - Royalty Savings Method - Sensitivity Analysis										
(CNY million)		Discount rate								
Royalty rate		12%	13%	14%	15%	16%	17%	18%	19%	20%
	1,5%	50 922	45 812	41 597	38 066	35 066	32 488	30 249	28 289	26 558
	2,0%	67 896	61 082	55 463	50 754	46 755	43 317	40 333	37 718	35 410
	2,5%	84 870	76 353	69 329	63 443	58 443	54 146	50 416	47 148	44 263
	3,0%	101 844	91 623	83 195	76 132	70 132	64 976	60 499	56 577	53 115
	3,4%	115 424	103 839	94 287	86 283	79 483	73 639	68 565	64 121	60 198
	4,0%	135 792	122 164	110 926	101 509	93 509	86 634	80 665	75 437	70 821
	4,5%	152 766	137 435	124 792	114 197	105 198	97 463	90 748	84 866	79 673
	5,0%	169 741	152 705	138 658	126 886	116 887	108 293	100 831	94 296	88 526
	5,5%	186 715	167 976	152 523	139 575	128 575	119 122	110 915	103 725	97 378

Table 22 Huawei Brand Equity Valuation – Royalty Savings Method

3.3.3.3 Demand drivers / brand strength method

The demand drivers / brand strength method studies the factors affecting consumers' purchasing decision and determines the brand-related portion in the demand drivers, then this percentage is applied to revenues, profits or cash flows. In our case study, we apply the brand-related percentage to Free Cash Flows and define the brand equity value as the present value of future brand-related free operating cash flows.

$$Brand\ equity\ value = \sum_{t=1}^{T} \frac{FCF_t * Brand\ related\ portion}{(1 + discount\ rate)^t}$$

The key parameter in the demand drivers / brand strength method is the brand-related portion that forms consumers' purchasing decisions. In Huawei's case, we choose to focus on its smartphones and see how the brand of Huawei influences consumers' decisions to buy its smartphone. In addition to the reasons mentioned earlier, as smartphones are so popular and people tend to renew their smartphones regularly, consumer behaviors in the smartphone market have been well studied by both academics and media. We have access to an abundant amount of analyses on consumers' perceived value of smartphones, their decision process when purchasing smartphones and especially how they choose to stay with the same brand or switch to another brand.

According to Sina's study of mobile phone purchase decision based on a population of 18,642 in China in 2015, Huawei ranks 2nd in terms of brand loyalty, scoring 40%, second to Apple's 54%.

This score indicates that 40% of current Huawei smartphone owners were using another Huawei smartphone before switching.

This study also analyzed the factors affecting consumers' purchasing decisions in choosing Huawei's mobile phones. We categorized these twelve factors into three groups: brand-related, partly bran-related and not brand-related. Three reasons are directly related to the brand and we took full weight of these three factors; two reasons are partly related to the brand and we took half weight of these two factors. Adding up the weights, we estimate a 28% brand-related portion in consumers' decisions to purchase a Huawei mobile phone. This percentage of brand-related portion is specific to Huawei, lower than the average percentage of 33%.

Huawei Brand Strength				
Reasons to buy	Weight	Brand-related ?	Brand-related	Not brand-related
Attractive design / function	14%	No		14%
High quality-to-price ratio	22%	No		22%
Low price	17%	No		17%
I'm used to the products of this brand	6%	Yes	6%	
I'm a fan of this brand	8%	Yes	8%	
A lot of people use this brand	7%	Yes	7%	
Word of mouth	9%	Partly	5%	5%
It suits my identity / personality	5%	Partly	3%	3%
Promotion	5%	No		5%
Advertisement	1%	No		1%
Salesperson	0%	No		0%
Other	6%	No		6%
	100%		**28%**	**72%**

Table 23 Huawei Demand Drivers / Brand Strength

We applied this percentage to projected Free Cash Flows and discounted these cash flow with the discount rate for intangible assets (16.0%). The perpetual growth rate is estimated at 2.2%, consistent with the DCF valuation. We estimate the brand equity value at CNY 83,595 million.

Huawei Brand Equity Valuation - Demand Drivers / Brand Strength Method												
(CNY million)	**2017**	**2018E**	**2019E**	**2020E**	**2021E**	**2022E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**
Free Cash Flow	**44 634**	**31 570**	**33 647**	**37 947**	**42 521**	**47 124**	**50 003**	**52 899**	**55 752**	**58 513**	**61 128**	**63 548**
Brand-related portion	28%											
Brand-related Free Cash Flow	12 498	8 840	9 421	10 625	11 906	13 195	14 001	14 812	15 611	16 384	17 116	17 793
Discount rate	16,0%											
Discount factor		0,8623	0,7436	0,6412	0,5529	0,4768	0,4112	0,3545	0,3057	0,2636	0,2273	0,1960
Discounted brand-related FCF		7 623	7 006	6 813	6 583	6 291	5 756	5 251	4 773	4 319	3 891	
PV of 2018-2027	**58 306**											
Perpetual growth rate	2,2%											
Terminal Value (2028 and beyond)												129 000
PV of Terminal Value	**25 289**											
Brand Equity Value	**83 595**											
as % of EV	15%											

Table 24 Huawei Brand Equity Valuation – Demand Drivers / Brand Strength Method

We also prepared sensitivity analysis to see how the brand equity value react to different discount rates and the portion of demand drivers related to the brand assumptions, which estimates a range of CNY 70-98 million.

Huawei Brand Equity Valuation - Demand Drivers / Brand Strength Method - Sensitivity Analysis										
(CNY million)		Discount rate								
		12%	13%	14%	15%	16%	17%	18%	19%	20%
Brand-related portion	12%	40 253	38 839	37 664	36 673	35 826	35 094	34 454	33 890	33 390
	16%	53 671	51 785	50 219	48 898	47 768	46 792	45 938	45 187	44 520
	20%	67 088	64 731	62 774	61 122	59 711	58 490	57 423	56 484	55 650
	24%	80 506	77 677	75 329	73 347	71 653	70 187	68 908	67 780	66 780
	28%	93 924	90 624	87 883	85 571	83 595	81 885	80 392	79 077	77 910
	32%	107 341	103 570	100 438	97 796	95 537	93 583	91 877	90 374	89 040
	36%	120 759	116 516	112 993	110 020	107 479	105 281	103 362	101 671	100 170
	40%	134 177	129 462	125 548	122 245	119 421	116 979	114 846	112 967	111 300
	44%	147 594	142 409	138 102	134 469	131 363	128 677	126 331	124 264	122 430

Table 25 Huawei Brand Equity Valuation – Demand Drivers / Brand Strength Method – Sensitivity Analysis

3.3.4 Real option method

As discussed in Chapter 2, the real option methodology is one complementary tool to use based on the income-based approaches, taking into consideration the volatility of future fluctuations. The main idea of using real option method is to assume that the brand gives the company an opportunity to grow their brand value by exercising the growth option. This method requires two steps: 1) value the brand equity value assuming no growth in the future, based on an income-based method; 2) calculate the value of the growth option; 3) add the value of the growth option to the brand equity value assuming no growth.

1) Brand equity value assuming no growth

We calculate the brand equity value assuming no growth based on the Royalty Savings method, as presented in section 3.3.3.2. The yearly sales of the Consumer Segment is assumed to stay at the 2017 level and the royalty rate of 3.4% is taken from the average rate in the mobile industry. The brand equity value assuming no growth is estimated at CNY 41,533 million.

Huawei Brand Equity Valuation - Real Option (assuming no growth)												
(CNY million)	**2017**	**2018E**	**2019E**	**2020E**	**2021E**	**2022E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**
Sales from Consumer Segment	**237 249**	**237 249**	**237 249**	**237 249**	**237 249**	**237 249**	**237 249**	**237 249**	**237 249**	**237 249**	**237 249**	**237 249**
Royalty rate	3,4%											
Royalty savings (pre-tax)	**8 066**	**8 066**	**8 066**	**8 066**	**8 066**	**8 066**	**8 066**	**8 066**	**8 066**	**8 066**	**8 066**	**8 066**
Tax rate	15%											
Royalty savings (post-tax)	**6 846**	**6 846**	**6 846**	**6 846**	**6 846**	**6 846**	**6 846**	**6 846**	**6 846**	**6 846**	**6 846**	**6 846**
Discount rate	16,0%											
Discount factor		0,8623	0,7436	0,6412	0,5529	0,4768	0,4112	0,3545	0,3057	0,2636	0,2273	0,1960
Discounted royalty savings		5 903	5 090	4 390	3 785	3 264	2 815	2 427	2 093	1 805	1 556	
PV of 2018-2027	**33 128**											
Perpetual growth rate	0%											
Terminal Value (2028 and beyond)												42 875
PV of Terminal Value	**8 405**											
Brand Equity Value	**41 533**											

Table 26 Huawei Brand Equity Valuation – Real Option Method (1/3)

2) Value of the growth option

From the perspective of expansion plans, expanding geographical reach is one of the top opportunities to grow business. In Huawei's case, we have identified from their annual report and press releases that one of the company's most important KPI is market share growth in each geographical area, especially Europe because it represents a large market with stable needs and gradual growth, and since Huawei has recently proved a great success in gaining market share, it is possible for the company to win more brand recognition among the clients, compete with other players and enhance their market position. We choose to consider global growth rather than geographical breakdown because Huawei has very diversified presence in the world, and it would be very difficult to project sales and market share growth by region.

We choose to focus on mobile phone business because it is the focus of Huawei's business line, and the world mobile phone market size has been growing rapidly. As illustrated in the financial report, Huawei has put more and more efforts on developing its smartphone solutions and tried to compete with international giant players like Apple and Samsung. As a result, we assume that the mobile phone segment will be the key growth driver for the company and thus we consider the option of investing more to boost mobile phone sales of the company.

In terms of assumptions, we assume that the further expansion globally will result in the potential increase in market share. According to the mobile phone market data, Huawei represents 11.6% of global mobile phone market share in 2017, a huge jump from the year 2014 when it only has c. 4% of total market. This strong increase is a good proof of Huawei's strategic focus on mobile phone market and since it started small, the company demonstrated a good potential of

increasing its position. The global mobile phone sales is expected to be relatively stable for the next few years, which might give Huawei some pressure on gaining market share. In consequence, we take the total market sales as of 2017 and the projected growth in our model as current condition. Since Huawei has a strong ambition and already established brand name globally, we make the assumption that the company will be able to capture around 20% of the market share by the year 2020, given that Apply and Samsung currently hold 30% of the market, so that the good chance for Huawei is to attracting clients from other smaller or local brands. Given the historical market share growth, this assumption is rather conservative and achievable for the company.

Huawei Brand Equity Valuation - Real Option Method

(CNY million)

Global mobile phone market		**Huawei's global presence**	
Total market size	2 048 150	Huawei's market share	11,6%
Market projected annual growth (18-21)	1,3%	Last 3 year point change	9,7
		Huawei FY17 brand sales	237 249
		as % of Total Sales	39%
2019 Target		**2022 Target**	
Global mobile market size	2 135 250	Global mobile market size	2 317 900
Target market share	15,0%	Huawei's target market share	20%
Segment Sales if target achieved	320 288	Segment Sales if target achieved	463 580
Segment Sales if target not achived	247 338	Segment Sales if target not achived	268 496
Additional cash flow	72 949	Additional cash flow	**195 084**

Table 27 Huawei Brand Equity Valuation – Real Option Method (2/3)

Below is a summary of calculations. Here we use the current global mobile phone market size and projected growth as a starting point, then calculate the additional cash flows that would be generated if the target market shares are met. We calculate the discount rate used to discount the investment amount during years, using US 10-year treasury as the risk-free rate and other metrics in line with the assumptions that we have made above. For the Capex, we took our projected capex and assumed that 50% of total capex will be used for expansion.

Under all the assumptions, we conducted the Black & Scholes model to calculate the option value. The key inputs are as follow:

- Underlying asset: present value of future additional cash flows
- Strike price: the discounted value of all investment cash flows
- Cash flow volatility: 33.5%, which is based on our assumption. We will conduct the sensitivity test on volatility, however, since the time horizon of decision is only one year, we do not see too much influence of volatility on the value of the option.

- Risk-free rate: 10-year US treasury yield

Huawei Brand Equity Valuation - Real Option Method (continued)

(CNY million)

Discount rate for global expansion	
Risk-free rate	2,90%
Company beta	1,12
Equity risk premium	6,24%
Cost of equity	9,88%
Cost of debt before tax	7,10%
Effective tax rate	15,10%
Cost of debt after tax	6,0%
WACC	**9,7%**

Required investment		2019	2020	2021
Total capex forecast		21 461	23 227	24 803
out of which for expansion	50%	10 731	11 614	12 401
Discount factor		1,0000	0,9120	0,8317
PV of capex at 2018		10 731	11 614	12 401
PV of total capex incurred		**34 746**		

Option value	
Required investment in 2019	34 746
PV of additional cash flow in 2022	134 951
Investment decision delay	2
Risk-free rate	2,90%
Cash flow volatility	30%
S	134 951
E	34 746
d1	3,55
d2	3,12
N(d1)	1,000
N(d2)	0,999
Option value	**102 163**
Brand equity value assuming no growth	41 533
Brand equity value with option value	**143 696**

Table 28 Huawei Brand Equity Valuation – Real Option Method (3/3)

3) Brand equity value with growth option

By adding the value of the growth option (CNY 102,163 million) to the brand equity value assuming no growth (CNY 41,533 million), we estimate the brand equity value with growth at CNY 143,696 million.

We also prepared sensitivity analysis to see how the brand equity value react to different assumptions on the percentage of investment attributable to brand, cash flow volatility and target market share, which estimates a range of CNY 124-163 million.

Huawei Brand Equity Valuation - Real Option Method - Sensitivity Analysis (1/2)										
(CNY million)		Cash flow volatility								
		10%	15%	20%	25%	30%	35%	40%	45%	50%
Percentage of investment attributed to expansion	30,0%	156 809	156 809	156 809	156 809	156 809	156 809	156 811	156 820	156 843
	35,0%	153 530	153 530	153 530	153 530	153 530	153 531	153 537	153 557	153 604
	40,0%	150 251	150 251	150 251	150 251	150 251	150 254	150 269	150 309	150 390
	45,0%	146 972	146 972	146 972	146 972	146 973	146 981	147 010	147 080	147 211
	50,0%	143 693	143 693	143 693	143 693	143 696	143 713	143 765	143 879	144 072
	55,0%	140 413	140 413	140 414	140 414	140 421	140 453	140 541	140 710	140 981
	60,0%	137 134	137 134	137 134	137 136	137 151	137 207	137 342	137 582	137 943
	65,0%	133 855	133 855	133 855	133 859	133 887	133 979	134 175	134 500	134 964
	70,0%	130 576	130 576	130 577	130 585	130 634	130 774	131 046	131 470	132 049

Table 29 Huawei Brand Equity Valuation – Real Option Method – Sensitivity Analysis (1/2)

Huawei Brand Equity Valuation - Real Option Method - Sensitivity Analysis (2/2)										
(CNY million)		Target market share 2022								
		16%	17%	18%	19%	20%	21%	22%	23%	24%
Percentage of investment attributed to expansion	30,0%	92 678	108 707	124 741	140 775	156 809	172 843	188 877	204 912	220 946
	35,0%	89 414	105 432	121 463	137 496	153 530	169 564	185 598	201 633	217 667
	40,0%	86 172	102 162	118 186	134 218	150 251	166 285	182 319	198 353	214 388
	45,0%	82 971	98 906	114 914	130 941	146 973	163 006	179 040	195 074	211 109
	50,0%	79 832	95 672	111 650	127 667	143 696	159 728	175 761	191 795	207 830
	55,0%	76 778	92 474	108 401	124 399	140 421	156 451	172 483	188 517	204 551
	60,0%	73 833	89 326	105 173	121 141	137 151	153 175	169 206	185 238	201 272
	65,0%	71 016	86 243	101 977	117 897	133 887	149 903	165 930	181 961	197 993
	70,0%	68 346	83 241	98 823	114 675	130 634	146 636	162 656	178 684	194 716

Table 30 Huawei Brand Equity Valuation – Real Option Method – Sensitivity Analysis (2/2)

3.4 Summary of valuation results and comments

We have used six major methods to estimate the brand equity value of Huawei and have received varying results. The following table summarizes the results of our estimation of Huawei's brand equity value from different valuation methods.

Huawei Brand Equity Valuation - Summary of Results				
Approach	Method	Valuation		
		Low	Base	High
Cost-based	Historical cost	215 911	239 528	263 145
Cost-based	Replacement cost	357 191	367 285	377 881
Income-based	Price premium	113 382	131 242	149 263
Income-based	Royalty savings	64 976	79 483	101 509
Income-based	Demand drivers	70 187	83 595	97 796
Other	Real option	124 399	143 696	163 006
Mean			**137 469**	
Average			**174 138**	

Table 31 Huawei Brand Equity Valuation – Summary of Results

The results range from CNY 79 to 367 billion, with a median of CNY 137,469 million and an average of CNY 174,138 million. Sensitivity analyses suggest that results could go as low as CNY 65 billion or as high as CNY 378 billion.

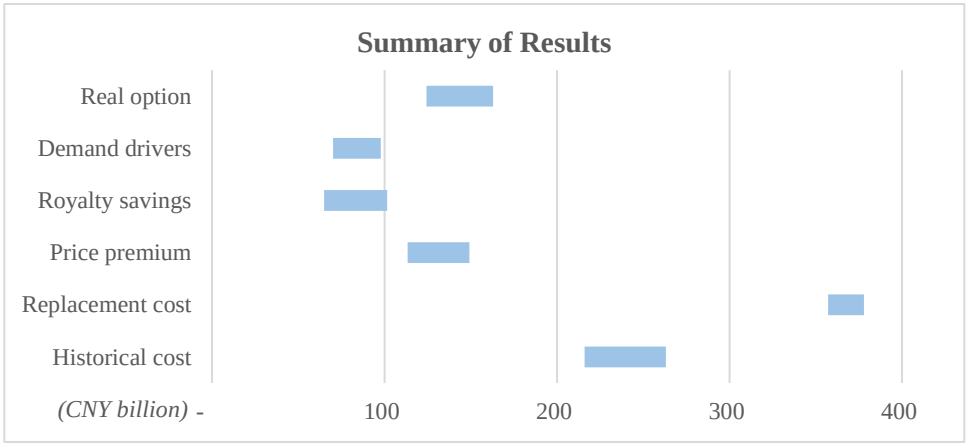


Figure 5 Huawei Brand Equity Valuation - Summary of Results

In order to better understand the results, we propose a three-step analysis process:

1) First, we will compare the results with benchmarks, i.e. the brand value estimated by market brand valuation experts and institutions and see how our results differ and why;
2) Second, we will analyze the results by approach and see the trend and bias of each approach in general;
3) Third, we will comment on major characteristics, challenges we encountered in the implementation process and our proposed solutions of each method.

3.4.1 Comparison with benchmark

We first refer to the brand value estimation provided by existing brand valuation experts in the market, look at how our results differ and how we could potentially explain the difference in valuation results by looking into more details in the methodology and assumptions taken. We will see what interesting conclusion we could draw from this comparison.

We identified four major brand valuation institutions that publish global brand rankings regularly: Brand Finance, BrandZ, Forbes and Interbrand. The brand value estimated by the four institutions vary significantly, in a range of CNY 43-243 billion. The average value stands at CNY

117,616 million, which is not too far from the median value of our valuation. We believe that our valuation result is in the appropriate range.

Huawei Brand Equity Valuation - Benchmark			
Provider	**Valuation ($m)**	**Valuation (CNYm)**	**Rank**
Brand Finance	38 046	243 494	25
BrandZ™	20 388	130 483	49
Forbes	8 400	53 760	79
Interbrand	6 676	42 726	70
Average	**18 378**	**117 616**	

Table 32 Huawei Brand Equity Valuation – Benchmark

Brand Finance

The highest valuation of $38 billion (CNY 243 billion) is given by Brand Finance, almost twice the second highest valuation. It applies a method that combines brand strength analysis and royalty rate method, which requires the following three steps:

1) First, it calculates the "Brand Strength Index" (BSI) based on a balanced scorecard that measures the brand's investment in marketing, stakeholder equity and business performance.
2) Second, industry-specific royalty rates are calculated by referring to comparable licensing contracts based on Brand Finance's extensive database. The Brand Strength Index is applied to the industry-specific royalty rate to determine the brand-specific royalty rate.
3) Third, the brand-specific royalty rate is applied to forecasted revenues attributable to the brand to calculate "brand revenues". Post-tax "brand revenues" are discounted to a present value, the sum of which represents the brand value.

The methodology developed by Brand Finance is very similar to the income-based methods we have applied, while gives a much higher estimation of Huawei's brand equity value. Given the other benchmark and our results, we believe that it is too high. The potential explanation of this difference could be as follows:

1) Brand Finance has overall stronger projection of Huawei's growth in the future;
2) Brand Finance has higher estimation of the royalty rate of the mobile industry – the valuation implies a royalty rate of 10% based on our sales projection;

3) In our valuation with royalty savings method, we only focused on the Consumer Segment and systematically underestimated Huawei's brand equity value, while Brand Finance considers the entirety of the business.

BrandZ

BrandZ gives the second highest valuation at $ 20,388 million (CNY 130,483 million). This estimation is the closest to the average value of the four benchmarks and to the median value of our valuation.

The methodology that BrandZ follows is similar to the demand drivers / brand strength analysis method we presented and consists of four steps:

1) Apportion corporate earnings to each brand by their "Attribution Rate" to calculate the earnings attributable to each brand ("Branded Earnings").
2) Apply the "Brand Multiple" to current branded earnings to calculate the "Financial Value" – this step is similar to the multiples method in estimating Enterprise Value (EV) as we used in section 3.2.3.
3) Calculate the "Brand Contribution" by in-depth quantitative consumer research – according to Millward Brown, this is what makes BrandZ "so unique and important".
4) The Brand Value is calculated by multiplying the "Financial Value" by the "Brand Contribution".

We believe that BrandZ's methodology is well customized for each brand based its brand strength research, which is "ongoing worldwide, online or face-to-face, and builds up a global picture of brands on a category-by-category, and country-by-country basis".

Overall this is a good method, while one disadvantage of BrandZ's methodology is that it takes current earnings and multiples to calculate the Enterprise Value. The problem with multiples is that it is based on market information rather than the specific characteristics of this brand, and that it lacks "future orientation" to a certain extent.

Forbes

Forbes estimates a brand value of $ 8.4 billion (CNY 54 billion) for Huawei, much lower than that of Brand Finance and BrandZ. Forbes' valuation methodology is based on the brand strength method and involves three steps:

1) Calculate 3-year average EBIT, subtract a charge of 8% of the brand's capital employed, and apply the maximum corporate tax rate in the parent company's home country to calculate the post-tax net earnings.
2) Allocate a percentage of the post-tax net earnings to the brand. This percentage is calculated for each industry, based on what roles the brand plays in an industry. For example, brands play a more important role in luxury goods industry than the oil industry.
3) Apply the 3-year average P/E price-to-earnings multiple to the 3-year average post-tax net brand earnings to calculate the brand value. The P/E multiple of private firms are calculated based on a comparable public firm.

This methodology is very easy and quick to apply, as it requires limited assumption specific to the brand, which is on the other hand its major disadvantage and reduces the accuracy of the result.

1) The 8% required return of capital employed is a generalized assumption and is not necessarily proper for every brand, given different risk profiles of each industry and company;
2) The percentage of earnings attributable to the brand is calculated at the industry level, which captures the level of competitiveness of different industries but lacks specificity of the competitive status of each brand inside the industry;
3) All the inputs in this valuation model is based on past activities rather than future-oriented.

Interbrand

Interbrand gives the lowest valuation of Huawei's brand value at $ 6,676 million (CNY 42,726 million). This result is similar to that of Forbes and the lower bound result of our income-based methods. We have presented Interbrand's valuation methodology in section 2.5.1, which in brief requires four steps:

1) Financial analysis: forecast the profits of branded products and services, then subtract required return on intangible assets from forecasted earnings to calculate the brand earnings (Economic Profit);
2) "Role of Brand" analysis: measures the portion in consumers' decision to purchase attributable to the brand relative to other factors and apply this portion to forecasted profits to calculate the earnings attributable to the brand alone;
3) "Brand Strength" analysis: measures brand performance relative to competition.

The Interbrand method requires the most details and probably takes the most time to complete among the four benchmark methods. It considers brand-specific earnings, competitive status in the industry and forecasts future financial performance.

While we have applied a similar approach with our selected income-based methods, the difference in value results could potentially be explained by the following presumptions:

1) The financial projection of Huawei by Interbrand is more conservative: lower growth rate, shorter projection period before stable growth rate, lower margin and profitability;
2) Similar to Forbes' required return on total capital employed, Interbrand assumes required return on intangible assets without specifying a generalized rate of required return for all brands – this step systematically makes Interbrand's valuation lower than our results from income-based methods;
3) The "Role of Brand" assumption is more conservative: Interbrand might have assumed lower portion of mobile phone purchasing decision attributable to the brand;
4) The "Brand Strength" assumption is more conservative: Interbrand might have assumed more competitive market conditions and less advantaged situation for Huawei.

In summary, by referring to benchmarks, we believe that the results from our cost-based methods are too high, while the results from our income-based methods and real option method are in the good range.

3.4.2 Comments on high-level approaches

If we look at our valuation results at the level of valuation approaches, it is clear that the cost-based approach tends to estimate a relatively higher value (probably too high); the income-based approach tends to estimate a relatively lower value; while the real option method estimates a value between the two approaches.

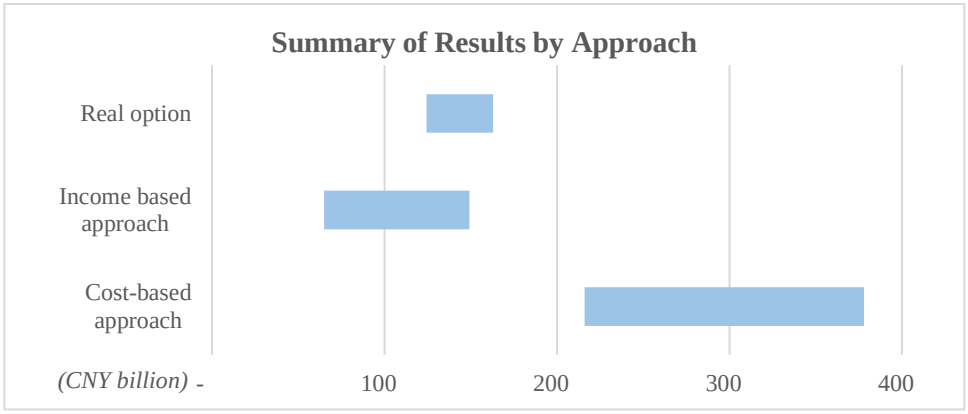


Figure 6 Huawei Brand Equity Valuation - Summary of Results by Approach

Cost-based approach

The cost-based approach looks at what has been invested in R&D and sales / marketing that creates the brand equity value. Normally we should get a low value by conducting historical cost method, however in this case the cost methods gave much higher results, and we think the reason might be the ineffectiveness of investment in R&D or marketing activities because such investment does not necessarily add to brand equity value as we mentioned in Chapter 2. We would suggest that in our case of valuing the brand equity of Huawei Technologies, the cost methods are not applicable.

This approach is the easiest to apply – it required limited and easy-to-find inputs and very simple calculation, but, conceptually, it is far less than convincing, as there is no direct relationship between the amount of investment in R&D and marketing, especially given Huawei's significant expenditures in R&D.

One potential situation where the cost-based approach could be suitable might be valuation of a startup brand in a startup industry, where no financial forecast is available.

As mentioned in Chapter 2, the cost-method is not often used, but provides an alternative valuation method that could be used when all the other approaches are not feasible and can provide a reference point to the results of other valuation methods.

Market-based approach

We did not use a separate market-based method, but the concept of referring to comparables is well integrated in our valuation with other methods. There are at least three moments where we integrated the concept of the market-based approach in our valuation process:

1) In the Enterprise Value estimation, we used the multiples method in parallel with the DCF method to get a reference range of valuation.
2) When we calculated the WACC of Huawei, we assumed the target gearing ratio and unlevered beta of Huawei at the average level of its comparable brands.
3) When we applied the royalty savings method, we determined the royalty rate based on the industry average royalty yield, which is calculated by referring to comparable licensing contracts.

Although the standard market-based approach for brand equity valuation is difficult to implement due to lack of information, we could integrate this approach into other methods in estimating certain assumptions that are influenced by the market and comparable brands.

Income-based approach

The income-based approach estimates the future financial benefits generated by the brand. It is the most conceptually convincing approach as it is future-oriented and tracks the origin of value creation. The result from income-based methods largely depend on assumptions.

The biggest advantages of the income-based approach lie in its future-orientation, specification to the brand and flexibility.

1) This approach estimates future earnings attributable to the brand – forward-looking;
2) This approach focuses on the specific brand itself, without defining the brand value be referring what its comparable brands are worth, and the inputs and assumptions can be specific to the brand, which gives the "intrinsic value" of the brand;
3) Practitioners have developed quite a few methods based on this approach, each method with quite a few variations – these methods can be chosen and integrated to suit specific needs in a very flexible way.

The biggest disadvantage of the income-based approach is that it usually requires a large number of inputs, especially inputs requiring subjective estimation, and takes a large amount of time in modelling. At the same time, the results are largely sensitive to certain subjective assumptions and could be easily manipulated.

Generally, we believe that the income-based approach is the most conceptually convincing, robust, implementable and well-developed approach so far.

3.4.3 Comments on specific methods

Historical cost method

This method is the easiest to apply and requires almost no modelling technique, while the result is hardly accurate.

1) This method is less than conceptually convincing, as the brand equity value does not have direct relationship to the amount of investment in R&D or marketing activities.
2) The result largely depends on the number of years we trace back and thus is very arbitrary.

Generally, we do not think this is a proper method to estimate the brand equity value especially for our case, but it can be used when there is lack of time as it is very easy to implement.

Replacement cost method

On top of the historical cost method, the replacement cost method considers the time value of past investment and multiplies a higher discount factor to investments more in the past. We would

say that this consideration is good in the sense that the marginal utility of investment in the brand's early years are higher than when it grows bigger, but in fact it does not really make sense, as the effectiveness of investment in creating brand equity value is not related to when it is invested, but rather how the investment is used.

The fundamental problem with this method is that it takes an accounting view, while the brand valuation is, by definition, an economic view. Therefore, we do not recommend this method.

Price premium method

From our experience in applying this method to Huawei's brand valuation, the price premium method is generally easy to apply and produces a reasonable estimation on the following conditions:

1) The products and services are standard (at least similar) and easily comparable;
2) The prices of similar products vary with brands in the industry;
3) The brand targets a market positioning higher than average, or at least not low-price positioning;

Among the three income-based methods we selected for brand valuation of Huawei, the price premium method gives the highest estimate. This bias of over-estimation is understandable as the price difference across brands is attributable to other factors besides the brand, such as distribution channels. Also, the pricing does not necessarily reflect the brand's ability to charge a price premium – the over-pricing might be a marketing mistake.

We would recommend this method for brand valuation of brands that operate with a higher-than-average positioning in an industry where prices vary with brands.

On top of the standard method, there is room for improvement: the price premium could be further broken down to a portion attributable to the brand and a portion that is not attributable to the brand – integrating the concept of demand drivers / brand strength analysis could be a potential solution.

Royalty savings method

The royalty savings method is one of the most standardized method, with very minor variations. It is commonly used in market practice due to its convincing concept, standard process and comparable results. Like the price premium method, the royalty savings method is based on sales forecast, while the brand equity value is defined as a "negative cost" – the hypothetical royalty savings. The key to arrive at a good estimate result is to determine the appropriate royalty rate, especially given that the result is extremely sensitive to the royalty rate.

In our valuation, we followed the common practice of taking the average royalty rate in the mobile phone industry. The problem with this estimation is that the royalty rate is not specific to the brand, and if we apply the same royalty rate the value other brands in the same industry, the results will totally depend on the sales size and tax rate. Despite the negative view, we believe that this practice could be useful for highly competitive industries where all brands produce highly similar products and for brands that target at a medium position the industry. For example, it is acceptable to apply the average royalty rate to brands like Huawei and Oppo, but not to Apple or Xiaomi.

Overall, we believe that the royalty savings method provides a reasonable estimation of brand value and we recommend this method to be one of the first choices. To further improve the accuracy of result, we could adjust the royalty rate according to the brand's ability to charge a price premium or the brand's impact in influencing consumers' purchasing decisions.

Demand drivers / brand strength analysis method

The demand drivers / brand strength method is the most commonly used method among brand valuation providers, according to Salinas (2009). This method has its origins from marketing and branding practices and focuses on the analysis of the portion of consumers' purchasing decisions attributable to the brand, which is the closest to the definition of brand equity.

The key parameter is the portion of brand's impact in consumers' purchasing decisions, which is heavily studied by marketing experts.

We recommend this method to be one of the first choices of brand valuation. As we mentioned earlier, the analysis of brand strength could be integrated into almost any other valuation method in order to arrive at a result more specific to the brand.

Real option method

The application of real option model is fairly new to brand valuation, and it helps capture the uncertainty of future performance into the brand equity valuation. The real option model is a versatile tool and allows us to define the "option" according to the brand's characteristics. A common practice, as we followed in our case study, is to assume a "growth option" provided by the brand. The brand equity value is calculated by adding the option value to the brand equity value assuming no growth (usually calculated from one of the income-based method).

In general, we believe the real option method is a nice tool, while the assumptions regarding future uncertainty such as future sales target and cash flow volatility require very subjective judgement and should be estimated carefully. We would recommend that the real option method be integrated into income-based methods to factor in future uncertainty.

In summary, each method has its suitable situation, pros and cons. We have identified the two strongly recommended brand equity valuation methods: the royalty savings method and the demand drivers / brand strength analysis method. Also, we believe it is beneficial to integrate the concept of one method to another, and the most versatile and compatible methods are the demand drivers / brand strength analysis method and the real option method, as well as the general concept of the market approach.

4 Recommendation on brand equity valuation

Chapter 4 summarizes the key conclusion we have illustrated through our research paper and presents our recommendation on brand equity valuation, based on the case study on Huawei.

We have identified the three key steps to appropriate brand equity valuation:

1) Design the appropriate methodology – it ensures a good start and efficient use of time;
2) Take appropriate estimation of key assumptions – this determines the accuracy of the valuation results to a large extent;
3) Compare results with sensitivity analysis, other methods and benchmarks – this helps us understand the robustness of the valuation results.

4.1 Design of appropriate valuation methods

Every brand is unique and there is no skeleton-key solution for valuation. Designing the appropriate valuation methods is the starting point of the valuation process and determines how we should allocate time in an efficient way, given that some valuation approaches can be very time-consuming.

We could start by identifying the purpose of the valuation and certain characteristics of the brand and of the industry to determine the suitable valuation methods.

- The purpose of the valuation determines the required level of result accuracy and the effort to allocate. For a rough result within a very limited time, the historical cost method could be a good choice and probably the only choice. If high accuracy is required and time allows, it is beneficial to apply several methods with high result accuracy and compare results.
- The development stage of brand determines the availability of data, which potential limits us to certain valuation methods.
- The characteristics of the industry and competitive status of the brands also determines which method could better capture the brand value. For example, the price premium method is most suitable for industries where brand largely influence pricing abilities.

We propose five dimensions that measure the reliability and efficiency of valuation methods:

- Reliability: accuracy of results, sensitivity and subjectivity
- Efficiency: difficult of gathering inputs and complexity of modelling

Method	Reliability			Efficiency	
	Accuracy	Sensitivity	Subjectivity	Difficulty of gathering inputs	Complexity of modelling
Historical cost	Low	Low	Low	Easy	Low
Replacement cost	Low	Low	Low	Easy	Low
Market-based	High	Low	Average	Difficult	Average
Price premium	Average	Average	High	Average	Average
Royalty savings	High	High	High	Average	Average
Brand strength	High	High	High	Average	Average
Margin comparison	Average	Average	Average	Average	Average
Real option	Average	Average	High	Difficult	High
CAPM model	Average	Low	Low	Average	Low

Table 33 Comparison of brand valuation methods on reliability and efficiency

In general, the royalty savings method and the demand drivers / brand strength analysis method provide the most accurate results and therefore are the two strongly recommended brand equity valuation methods from us.

At the same time, we would like to highlight that brand valuation methods are not exclusive but rather complementary. As we mentioned in Chapter 3, it is beneficial to integrate the concept of one method to another, especially the analysis of brand strength and the real option method, as well as the general concept of the market approach.

4.2 Estimation of key assumptions

After having deigned an appropriate brand valuation, we need to gather inputs required, and some of these inputs require subjective estimation, which can be difficult and time-consuming to estimate. In order to allocate our time and effort more efficiently, it is necessary to identify the "key assumptions" to focus on.

The “key assumptions” are usually easily identifiable as suggested by the name of the method, for example, the “royalty rate” in the “royalty savings method” and the “price premium rate” in the “price premium method”. These assumptions need to be carefully estimated by definition. Apart from these straightforward situations, we could identify other key assumptions with the help of sensitivity analysis. The assumptions that largely influences the final result need to be carefully treated as well.

Various criteria exist that define a “good” estimation for an assumption, one being the level of specificity, especially in the context of brand equity valuation. The more specific to the brand, the better assumption. In situations where brand-specific estimation is not available, we propose to start with the industry average, adjusted by the competitive status of the brand within the industry.

Taking the example of Huawei’s brand equity valuation, we applied the average royalty rate of the mobile phone industry, which is acceptable as Huawei is competing in the medium positioning of the industry, while this royalty rate must be adjusted higher if the valuation target is Apple, who definitely deserves a higher royalty rate due to its leading position in the mobile phone industry.

Also, we recommend a range estimate of assumptions that arrive at a range estimate of the brand value, which gives a “reasonable area” of results from a specific method. It can be easily achieved from data tables and allows results from different methods to be more comparable.

4.3 Results comparison

After arriving at a point result from a valuation method, it is very important to check if the result makes sense, with three levels of comparison: comparison with results from the same method but different assumptions – sensitivity analysis; comparison with results from alternative methods; and comparison with benchmarks.

1) Sensitivity analysis could be easily implemented by identifying the key assumptions in the valuation and creating data tables, and it allows us to assess how results move if assumption values change. It also allows us to estimate a range of values, which naturally increases the credibility of the results and makes results from different methods more comparable.

2) Comparison with the results from other alternative valuation methods provides a different angle of thinking. For example, we have an estimated result from an income-based method, then we could apply the historical method to see how much has been spent to create this brand equity. This allows us to roughly estimate the investment effectiveness.
3) Comparison with benchmarks is another natural way to check if the valuation results are in the good range. Besides comparing results of brand value from major brand valuation rankings, it is also beneficial to understand the methodologies followed by the ranking providers, which helps explain the sources of differences.

In summary, comparison of results helps us understand the good range of the brand value. Also, brand equity valuation is not s static process but rather dynamic – we can always adjust our models and assumptions after understanding the source of difference in comparing to the results from another method or benchmark.

4.4 Specification for private company-owned brands

We have explained in section 3.1.2 that one of the reasons why we choose Huawei Technologies as the target of our case study is that this brand is owned by a private company, so that we are able to analyze the specification of valuing a brand owned by a private company.

Generally, we do not see the necessity to significantly adjust the brand valuation models for private company-owned brands. The biggest difference lies in the availability of information, not only official and detailed financial reports but also market information.

The biggest challenge we have during the valuation process is lack of information. For example, financial figures are not available at a detailed level, no financial projection from brokers, capital structure is not clear without the market value of equity, and let alone estimation of Enterprise Value. Lack of these pieces of basic information makes valuation more difficult.

What we propose is to take advantage of concept of the market-based approach and refer to comparable information. For example, in our brand valuation of Huawei, we took the average gearing ratio of its comparable brands as the target gearing ratio. We forecasted its sales based on

past trends and its sales target for 2018, at the segment level, which is the highest detail level in the annual reports.

Another interesting fact we have noticed is that the estimation of brand valuation provided by major brand valuation experts vary significantly. This could be attributed to lack of information, and brand valuation experts make their own subjective assumptions, compared to the situation with public companies that are covered by equity research analysts, who often share similar opinion. The huge difference in benchmark values makes it difficult for us to compare our results to the benchmarks. We carefully checked the brand valuation methodology followed by each of the brand value ranking providers and came up with explanations.

5 Conclusion

In this research paper, we started by defining a "brand" and the concept of "brand equity" and explaining the importance of appropriate brand valuation.

Then we reviewed the major existing brand equity valuation methodology, categorized by approaches: cost-based approach, market-based approach, income-based approach and other approach.

Next, we presented a case study on the Huawei Technologies brand and applied selected methods to estimate the brand equity value of Huawei; we analyzed the results from different methods and compared with benchmarks in order to understand the characteristics of each approach and method.

Last, we summarized our thoughts in the valuation exercise and provided our recommendation in the brand equity valuation practice, from the design of valuation methodology, to estimation of key assumptions, and to results comparison.

In the end, we would like to share some further thoughts on brand valuation:

1) Each brand is unique and brand valuation is "an art, not a science". It is crucial to plan and design a customized methodology according to the brand's characteristics and the purpose of the valuation activity.
2) From the perspective of the standard-setting bodies, there is necessity to establish a set of brand valuation methodologies that are standardized while flexible, conceptually convincing, clear in implementation, in order to arrive at credible and comparable results.
3) We would be interested in further research that focuses on industry-specific brand valuation practices and innovative application of the real option method.

References

Books

AAKER, D. A. (1991). *Managing brand equity: capitalizing on the value of a brand name*. New York: Free Press. 1991.

CONTRACTOR, F. J. (2001). *Valuation of intangible assets in global operations*. Quorum Books. 2001.; Wesport.

KELLER, K. L. (2013). *Strategic brand management: building, measuring and managing brand equity*. Harlow: Pearson. 2013.

PAUGAM, L., ANDRE, P., & PHILIPPE, H. (2016). *Brand valuation*. New York: Routledge. 2016.

SALINAS, G. (2009). *The international brand valuation manual: a complete overview and analysis of brand valuation techniques, methodologies and applications*. Chichester: Wiley. 2009.

Journal Articles

Anson, W., Noble, D., & Samala, J. (2014). IP valuation: what methods are used to value intellectual property and intangible assets?. *The Licensing Journal*, (2). 1.

Anson, W., Suchy, D. P., & Ahya, C. (2005). *Intellectual property valuation: A primer for identifying and determining value*. Chicago, IL: American Bar Association, Section of Intellectual Property Law.

Attri, R., Maheshwari, S., & Sharma, V. (2017). Customer Purchase Behavior for Smartphone Brands. *IUP Journal Of Brand Management*, *14*(2), 23-37.

Baldi, F., & Trigeorgis, L. (2009). Assessing the Value of Growth Option Synergies from Business Combinations and Testing for Goodwill Impairment: A Real Options Perspective. *Journal Of Applied Corporate Finance*, *21*(4), 115-124.

Ferjani, M., Jedidi, K., & Jagpal, S. (2009). A Conjoint Approach for Consumer- and Firm-Level Brand Valuation. *Journal Of Marketing Research (JMR)*, *46*(6), 846-862.

Galetovic, A., Haber, S., & Zaretzki, L. (2018). An estimate of the average cumulative royalty yield in the world mobile phone industry: Theory, measurement and results. *Telecommunications Policy*, *42*(3), 263-276.

Ganesan, P., & Sridhar, M. (2014). SMART PHONE ATTRIBUTE CHOICE AND BRAND IMPORTANCE FOR MILLENNIAL CUSTOMERS. *Journal Of Contemporary Management Research*, *8*(2), 71-89.

Haba, H. F., Hassan, Z., & Dastane, O. (2017). Factors Leading to Consumer Perceived Value of Smartphones and its Impact on Purchase Intention. *Global Business & Management Research*, *9*(1), 42-71.

Jyotirmoy, S., & Neelotpaul, B. (2016). A Comparative Study on Factors Affecting Consumer's Choice on Purchasing a Cellular Phone across India & US. *International Journal Of Business And Social Research, Vol 6, Iss 6, Pp 59-67 (2016)*, (6), 59.

Kapferer, J. (2012). The new strategic brand management: advanced insights and strategic thinking, fifth edition.

Salinas, G., & Ambler, T. (2009). A taxonomy of brand valuation practice: Methodologies and purposes. *Journal Of Brand Management*, *17*(1), 39-61.

Virvilaitė, R., & Jucaitytė, I. (2008). Brand Valuation: Viewpoint of Customer and Company. *Engineering Economics*, *56*(1), 111-119.

Sam, D., & Lynette, R. (2002). Options theory and options thinking in valuing returns on brand investments and brand extensions. *Journal Of Product & Brand Management*, (2), 115-128.

Shabrin, N., Khandaker, S., Kashem, S. A., Hie, C. K., & Susila, T. (2017). Factors affecting smartphone purchase decisions of generation-Y. *Journal Of Contemporary Issues In Business And Government, The*, (1), 47.

van Putten, A. B., & MacMillan, I. C. (2004). Making Real Options Really Work. *Harvard Business Review*, *82*(12), 134-141.

Yessica, G. L., Mauricio, Z. C., & Cecilia, M. O. (2012). Enfoque de opciones reales para la valoración financiera de marcas / Real Options Approach to Financial Valuation of Brands. *AD-Minister*, (21), 9.

Online Resources

Adamska, M. (2017, June). *The difference between the three most popular rankings of the world's most valuable brands*. Retrieved from https://brandstruck.co/blog-post/difference-three-popular-rankings-worlds-valuable-brands/

Applied Value. (2016). *Financial Performance Trends in the Telecom Industry Q3 2016*. Retrieved from http://www.appliedvaluegroup.com/telecom-report-1/

Atradius. (2018, June). *Market Monitor report: Focus on ICT performance and outlook.* Retrieved from https://group.atradius.com/documents/mm_ict_2018_eng.pdf

Badenhausen, K. (2018, May 23). *The World's Most Valuable Brands 2018: By The Numbers*. Retrieved from https://www.forbes.com/sites/kurtbadenhausen/2018/05/23/the-worlds-most-valuable-brands-2018-by-the-numbers/

Brand Finance. (2018, February). *Brand Finance Global 500 2018*. Retrieved from http://brandfinance.com/images/upload/bf_global2018_500_website_locked_final_spread_03042018.pdf

Brown, M. (2014). *BrandZ Top Global Brands 2014 – Valuation Methodology*. Retrived from http://www.millwardbrown.com/brandz/top-global-brands/2014/methodology

Haigh, D. (2016) *Understanding the Importance of Brand and Valuation.* Retrieved from http://www.marques.org/conferences/archive/20160304/presentations/download.asp?FN=Workshop%20-%20Understanding%20the%20Importance%20of%20Brand%20Valuation.pdf

MarketLine. (2018, April). *Global Mobile Phones Industry Report*. Retrieved from MarketLine database.

MarketLine. (2018, February 26). *Huawei Investment & Holding Co., Ltd. Company Profile*. Retrieved from MarketLine database.

MartinRoll. (2018, February). *Huawei – Transforming A Chinese Technology Business To A Global Brand*. Retrieved from https://martinroll.com/resources/articles/strategy/huawei-transforming-chinese-technology-business-global-brand/

International Monetary Fund. (2018, April). *World Economic Outlook*. Retrieved from International Monetary Fund database.

Rocha, M. (2012). *Brand Valuation: A Versatile Strategic Tool for Business.* Retrieved from https://www.interbrand.com/views/brand-valuation-a-versatile-strategic-tool-for-business/

Xie, Z., Guo, X., & Wang, S. (2015, April). *The study of mobile phone purchase decisions*. Retrieved from http://tech.sina.com.cn/mobile/n/n/2015-04-29/doc-icczmvup0601222.shtml

Appendices

Appendix 1 – Huawei Balance Sheet (Accounting View)

Huawei Balance Sheet (Accounting view)					
(CNY million)	**2013**	**2014**	**2015**	**2016**	**2017**
Assets					
Goodwill and intangibles	5 753	2 597	2 725	4 795	5 327
Property, plant and equipment	22 209	27 248	35 438	49 307	56 089
Long-term leasehold prepayment	2 761	3 349	3 306	4 112	5 152
Interests in associates and joint ventures	481	655	528	484	750
Other investments, including derivatives	584	540	3 961	3 003	5 965
Deferred tax assets	11 577	14 916	16 900	16 933	18 565
Trade receivables	335	446	2 098	3 776	2 451
Other non-current assets	988	2 917	5 553	5 722	5 665
Total non-current assets	**44 688**	**52 668**	**70 509**	**88 132**	**99 964**
Inventories	24 929	46 576	61 363	73 976	72 352
Trade and bills receivable	78 005	79 580	93 260	107 957	107 595
Other current assets	14 525	24 913	21 815	27 916	25 371
Other investments, including derivatives	8 545	27 988	14 647	22 606	24 596
Cash and cash equivalents	73 399	78 048	110 561	123 047	175 347
Total current assets	**199 403**	**257 105**	**301 646**	**355 502**	**405 261**
Total assets	**244 091**	**309 773**	**372 155**	**443 634**	**505 225**
Equity					
Equity attributable to equity holders of th	86 207	99 940	119 021	140 094	175 585
Non-controlling interests	59	45	48	39	31
Total equity	**86 266**	**99 985**	**119 069**	**140 133**	**175 616**
Liabilities					
Loans and borrowings	19 990	17 578	26 501	40 867	38 338
Long-term employee benefits	9 608	9 731	11 533	19 652	19 073
Deferred government grants	2 746	2 656	1 965	1 534	1 340
Deferred tax liabilities	476	320	460	1 104	1 471
Other non-current liabilities	782	964	-	1 073	1 702
Non-current liabilities	**33 602**	**31 249**	**40 459**	**64 230**	**61 924**
Loans and borrowings	3 043	10 530	2 485	3 932	1 587
Income tax payable	4 034	5 947	4 213	4 100	4 390
Trade and bills payable	31 980	45 899	61 017	71 134	72 866
Other current liabilities	80 448	108 308	133 779	145 448	168 609
Provisions	4 718	7 855	11 133	14 657	20 233
Current liabilities	**124 223**	**178 539**	**212 627**	**239 271**	**267 685**
Total equity and liabilities	**244 091**	**309 773**	**372 155**	**443 634**	**505 225**

Source: Huawei Technologies annual report 2013-2017
Table 34 Huawei Balance Sheet – Accounting View (2013-2017)

Appendix 2 – Huawei Operating Working Capital Projection

Huawei Operating Working Capital Projection												
(CNY million)	**2017**	**2018E**	**2019E**	**2020E**	**2021E**	**2022E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**
Accounts receivable	107 595	116 589	127 516	138 008	147 370	154 890	162 194	169 134	175 562	181 330	186 301	190 350
as % of sales	*18%*	*18%*	*18%*	*18%*	*18%*	*18%*	*18%*	*18%*	*18%*	*18%*	*18%*	*18%*
Inventory	72 352	78 400	85 748	92 803	99 098	104 156	109 067	113 734	118 056	121 935	125 278	128 000
as % of sales	*12%*	*12%*	*12%*	*12%*	*12%*	*12%*	*12%*	*12%*	*12%*	*12%*	*12%*	*12%*
Accounts payable	(72 866)	(78 957)	(86 357)	(93 462)	(99 802)	(104 896)	(109 842)	(114 542)	(118 895)	(122 801)	(126 168)	(128 910)
as % of sales	*-12%*	*-12%*	*-12%*	*-12%*	*-12%*	*-12%*	*-12%*	*-12%*	*-12%*	*-12%*	*-12%*	*-12%*
Operating Working Capital	**107 081**	**116 032**	**126 907**	**137 349**	**146 666**	**154 151**	**161 419**	**168 326**	**174 723**	**180 464**	**185 411**	**189 441**
Change in Operating Working Capital	**(3 718)**	**8 951**	**10 875**	**10 442**	**9 317**	**7 485**	**7 269**	**6 907**	**6 397**	**5 741**	**4 947**	**4 030**

Source: Estimation of author
Table 35 Huawei Operating Working Capital Projection (2018-2028)

Appendix 3 – Huawei Discount Rate for Impairment Test on Intangible Assets

	As at December 31	
	2014	**2013**
	%	**%**
Sectors under Enterprise business group		
– Discount rate	**16.4**	17.0
– Terminal value growth rate	**3.0**	5.0
Beijing Huawei Longshine		
– Discount rate	**15.5**	17.9
– Terminal value growth rate	**3.0**	3.0

	As at December 31	
	2013	**2012**
	%	**%**
Sectors under Enterprise business group		
– Discount rate	**17.0**	14.5
– Terminal value growth rate	**5.0**	10.0
ITS Bahrain		
– Discount rate	**N/A**	36.4
– Terminal value growth rate	**N/A**	4.0
Beijing Huawei Longshine		
– Discount rate	**17.9**	19.1
– Terminal value growth rate	**3.0**	3.0

Source: Huawei Technologies annual report 2013, 2014
Table 36 Huawei Discount Rate for Impairment Test on Intangible Assets (2012-2014)

Appendix 4 – Global Mobile Phone Market Size

Table 1: Global mobile phones market value: $ billion, 2013–17

Year	$ billion	€ billion	% Growth
2013	275.4	243.3	
2014	303.8	268.3	10.3%
2015	306.0	270.3	0.7%
2016	308.0	272.1	0.7%
2017	315.1	278.3	2.3%
CAGR: 2013–17			3.4%

SOURCE: MARKETLINE

MARKETLINE

Source : Marketline, Global Mobile Phones Industry Profile (2018)
Table 37 Global Mobile Phones Market Value (2013-2017)

Table 5: Global mobile phones market value forecast: $ billion, 2017–22

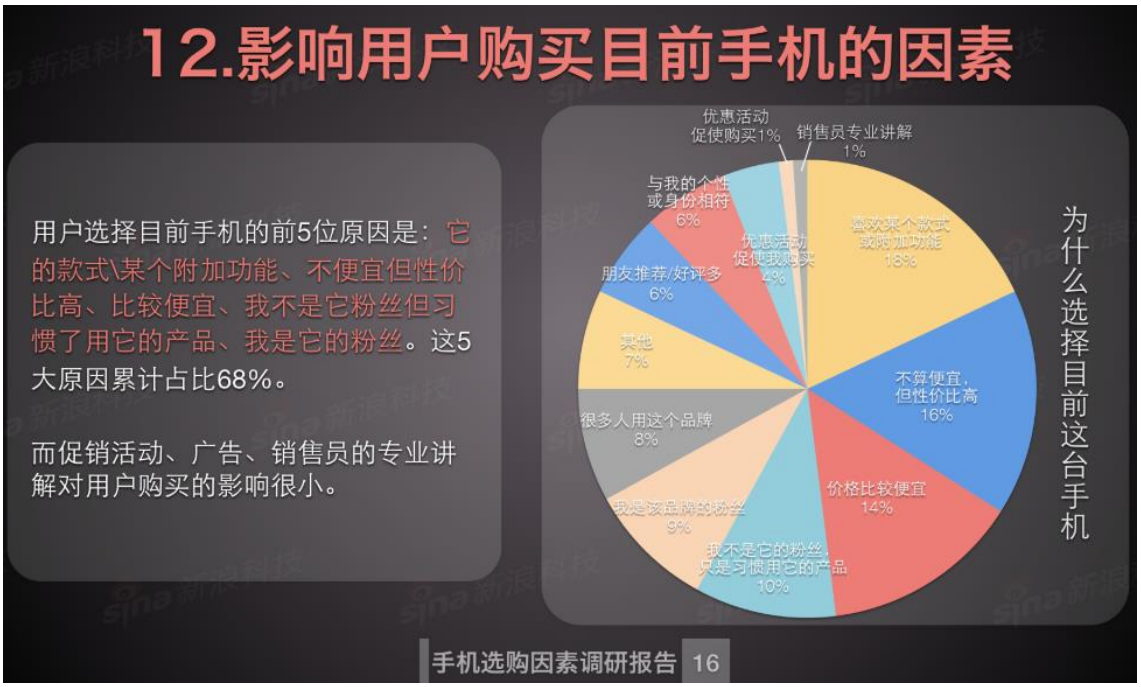
Year	$ billion	€ billion	% Growth
2017	315.1	278.3	2.3%
2018	322.5	284.9	2.4%
2019	328.5	290.2	1.9%
2020	334.0	295.1	1.7%
2021	339.1	299.6	1.5%
2022	346.6	306.2	2.2%
CAGR: 2017–22			1.9%

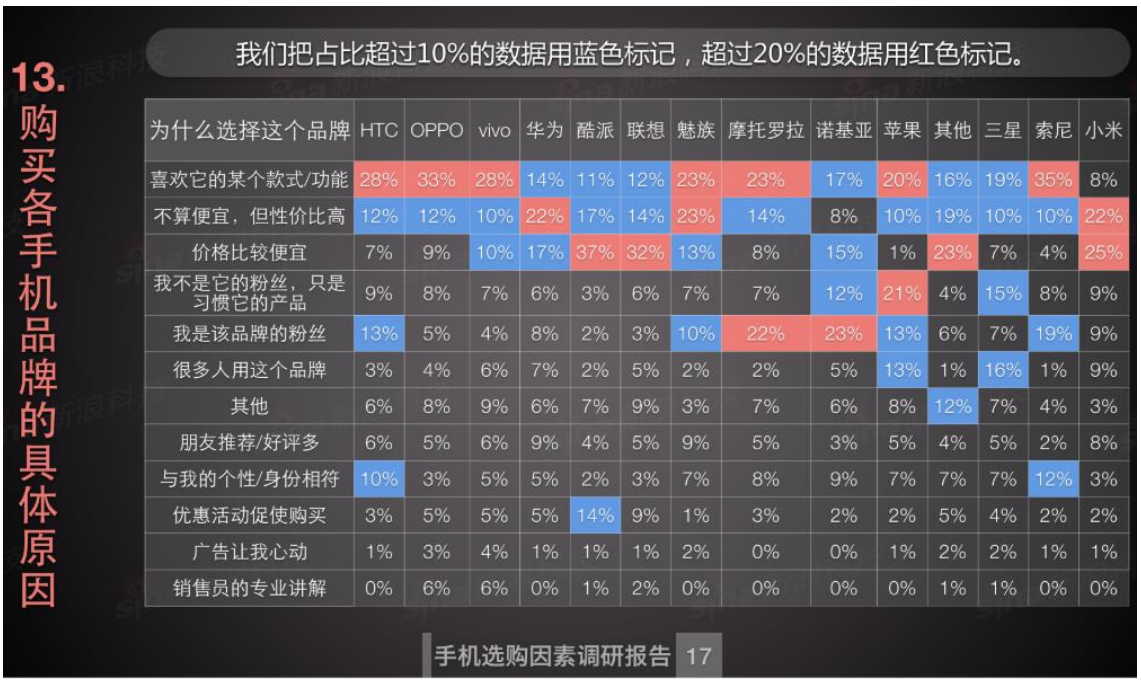
SOURCE: MARKETLINE

MARKETLINE

Source : Marketline, Global Mobile Phones Industry Profile (2018)
Table 38 Global Mobile Phones Market Value Projection (2017-2022)

Appendix 5 – Factors Affecting Purchasing Decisions of Mobile Phones





为什么选择这个品牌	HTC	OPPO	vivo	华为	酷派	联想	魅族	摩托罗拉	诺基亚	苹果	其他	三星	索尼	小米
喜欢它的某个款式/功能	28%	33%	28%	14%	11%	12%	23%	23%	17%	20%	16%	19%	35%	8%
不算便宜，但性价比高	12%	12%	10%	22%	17%	14%	23%	14%	8%	10%	19%	10%	10%	22%
价格比较便宜	7%	9%	10%	17%	37%	32%	13%	8%	15%	1%	23%	7%	4%	25%
我不是它的粉丝，只是习惯它的产品	9%	8%	7%	6%	3%	6%	7%	7%	12%	21%	4%	15%	8%	9%
我是该品牌的粉丝	13%	5%	4%	8%	2%	3%	10%	22%	23%	13%	6%	7%	19%	9%
很多人用这个品牌	3%	4%	6%	7%	2%	5%	2%	2%	5%	13%	1%	16%	1%	9%
其他	6%	8%	9%	6%	7%	9%	3%	7%	6%	8%	12%	7%	4%	3%
朋友推荐/好评多	6%	5%	6%	9%	4%	5%	9%	5%	3%	5%	4%	5%	2%	8%
与我的个性/身份相符	10%	3%	5%	5%	2%	3%	7%	8%	9%	7%	7%	7%	12%	3%
优惠活动促使购买	3%	5%	5%	5%	14%	9%	1%	3%	2%	2%	5%	4%	2%	2%
广告让我心动	1%	3%	4%	1%	1%	1%	2%	0%	0%	1%	2%	2%	1%	1%
销售员的专业讲解	0%	6%	6%	0%	1%	2%	0%	0%	0%	0%	1%	1%	0%	0%

Source: Sina Tech, The study of mobile phone purchase decisions (2015)
Table 39 Factors Affecting Decision of Purchasing Mobile Phones