Global Brands Dynamics: Implications for Building Corporate Identity in Emerging Markets

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The purpose of this paper is to investigate dynamics of the most valuable Chinese brands by applying the Zipf-Pareto law and the index of Sheppard. Top 100 global brands' values (incl. top Chinese brands) measured by Interbrand BGB100 and Millward Brown BrandZ valuation methodologies were compared with respect to the emergence of power laws in the size distribution. The results of the analysis show that the distribution of the most valuable Chinese brands' satisfies the Zipf-Pareto law. These results are compared to the findings for the top 100 global brands dynamics. Based on the research results authors conclude that the system of the most valuable Chinese brands tends to reach equilibrium but due to the external factors, the growth of the top few brands is limited. The deviations from the power law fit were measured by the primacy index of Sheppard. The achieved results are used to suggest and discuss several implications for brand strategies in emerging markets.

Key words: global brands, emerging markets, nonlinear dynamics

JEL classification: M31.

1. Introduction

The world is changing with a speed which has never been seen before. Years of research done by the McKinsey Global Institute (MGI) and McKinsey's Strategy Practice reveal three major economic forces the global economy has ever seen: the collision of technological disruption, rapid emerging-markets growth, and widespread aging. Much bigger shifts in each of these areas are expected which will tremendously affect economy, social life and personal behaviour worldwide.

First, technology and connectivity have disrupted industries and transformed the lives of billions of people in their different roles as workers, consumers and citizens. The KPMG report on complexity (2011) shows that technology is changing business models, improving processes, and opening new markets, but also creating volumes of new data that must be managed, supported, and secured. More transactions are taking place across more borders. Changing global regulatory environment is forcing businesses to react to ensure compliance while managing new risks. We are witnessing an extraordinary growth in computing capacity, power, and speed of ITC penetration[1]. This acceleration in the scope, scale, and economic impact of technology will be supplemented with a new age of artificial intelligence, consumer products and services, instant communication, and unlimited information which in turn will distress the business in unthinkable way. With instant information and communication, virtually everything is available to anyone, anywhere. Markets are now global and many corporations are often richer and more powerful than many countries.

Second, the world's economic center of gravity has continued shifting from West to East, with China being at the centre of the trend. This shifting locus of economic activity and dynamism to emerging markets and to cities within those markets, will give rise to a new class of global competitors both companies and brands. The global urban population is growing by 65 million a year, and nearly half of global GDP growth between 2010 and 2025 will come from 440 cities in emerging markets, 95% of them being almost unknown small and medium-sized cities in emerging markets. According to the data provided

[1] According to the Moore's Law, the overall processing power for computers doubles every two years.

by the Global Cities Index and Emerging Cities Outlook[2] (A.T.Kearney, 2014) there are six cities from Asia in top 20 global cities and nine in top 20 emerging cities in 2014. Beijing is ranked in top 20 by both indices. This shifting balance of power has been indicated as a transition from Globalisation 2.0 (Western-dominated) to Globalisation 3.0 (China-dominated) (Walker, 2007)[3]. Globalisation 3.0 is characterised by the fact that the West no longer dominates the world's savings, and as a result no longer dominates global investment and finance. The erosion of Western power is accompanied by the erosion of the authority of the grand institutions of Globalisation 2.0, which sustained power by enforcing the implicit rules of Western economic orthodoxy. This situation is confirmed by the 2014 FDI Confidence Index ranking and scores[4]. The first and second place are occupied by United States and China with maintained ranking from 2013 (respectively 2.16 and 1.95 out of maximum 3.0)[5].

As we can see in Figure 1 and Figure 2 there are obvious differences in the structure of the globalisation process between Bulgaria and China, especially for the elements "personal contact" and "cultural proximity". The tendency toward globalisation is positive as a whole for both countries with two "jumps" in cultural proximity (1989 and 1997) for China and one "jump" in social globalisation and cultural proximity (1993) for Bulgaria.

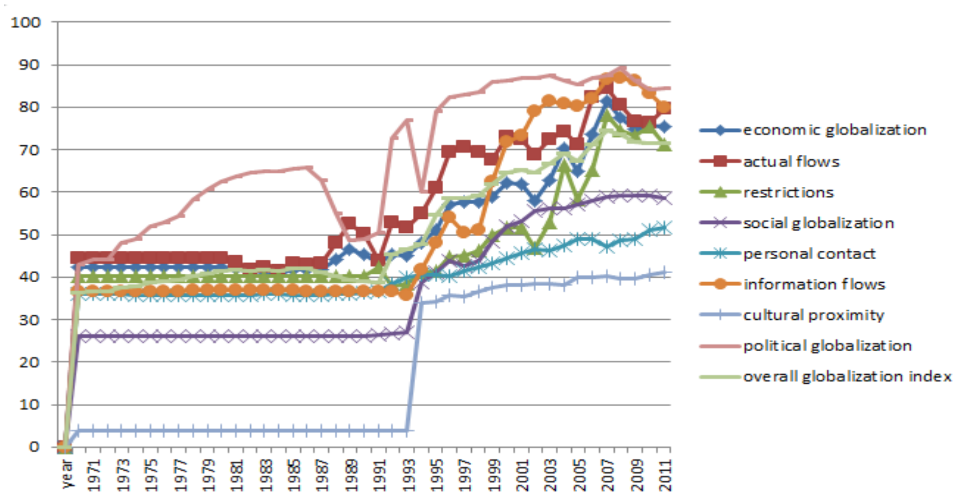

Figure 1. KOF Index of Globalisation for Bulgaria, 1971 – 2011
Source: Data set from http://globalization.kof.ethz.ch/ [last visited on 29.03.2015]

Regarding the second economic force, there is a group of scholars and researchers (Distler, 2005; Laudicina, 2012) who suggest that the locus of global economic, political and demographic power has been shifting with growing intensity from Global North (developed countries) to Global South (developing countries) as well. Both trends affect global supply chains decisions, especially their sourcing locations as well as expansion strategies of the companies.

[2] A.T.Kearney's Global Cities Index (GCI) examines a comprehensive list of 84 cities, measuring how globally engaged they are across 26 metrics in five dimensions: business activity, human capital, information exchange, cultural experience, and political engagement since 2008. Emerging Cities Outlook (ECO) complements the GCI.
[3] The exact moment of the shift is considered to be the accession to WTO membership of China on December 11, 2001.
[4] The Foreign Direct Investment Confidence Index®, established in 1998 by A.T.Kearney, ranks countries based on how changes in their political, economic, and regulatory systems are likely to affect foreign direct investment inflows in the coming years.
[5] There are scholars (Dreher, 2006) who question the statistical significance of FDI Confidence Index since it covers only 67 countries, there is no clear explanation about the weights and cultural factors are excluded. They propose KOF Index of Globalisation which measures the three main dimensions of globalisation: economic, social and political, and includes sub-indices referring to: actual economic flows, economic restrictions, data on information flows, data on personal contact and data on cultural proximity. An alternative perspective to measuring globalisation from the perspective of nation-states can be found in UNCTAD's "Transnationality Index" (TNI). Although ostensibly a measure of how internationalised MNCs are, the TNI can also be construed as reflecting organisational responses to globalisation.

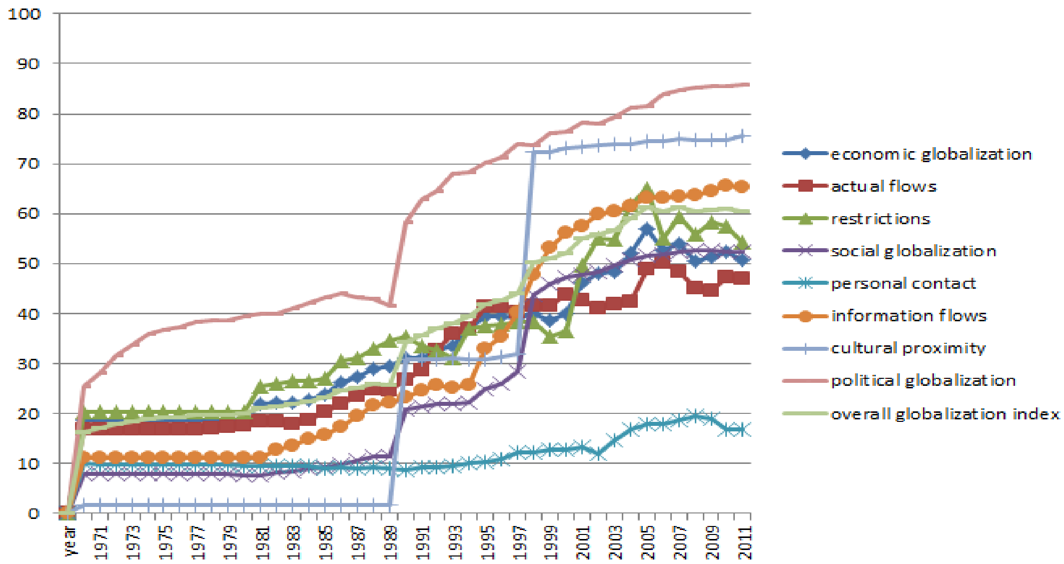

Figure 2. KOF Index of Globalisation for China, 1971 – 2011

Source: Data set from http://globalization.kof.ethz.ch/ [last visited on 29.03.2015]

Third, the rapid aging of the world's populaton will create a massive set of economic pressure. The baby boomers have begun retiring. Aging has been evident in developed economies for few years, with Japan and Russia seeing their populations decline and the trend is spreading slowly to China. It is expected that during the next few years it will "reach" Latin America.

The researchers suggest that during the collision of these three forces, the resulting change will be so significant that much of the management and marketing expertise, know-how and intuition that have surved in the past will become irrelevant. Companies will face with more discontinuity and volatility, with long-term charts no longer looking like smooth upward curves, with outdated long-held assumptions, and useless formerly powerful business models (Dobbs et al., 2014).

The circumstances described above present a perfect explanation of a situation when low-probability, high-consequence events can dominate the impacts and societal concerns which is called by Nordhaus (2011:1) "the problem of fat tails" or "tail events".

2. Dynamics of Global Brands' Values and Power Laws

According to the framework developed by Strogatz (1994: 9-10), the application of complexity theory and nonlinear dynamics in economics is a part of the spatio-temporal complexity and belongs to the frontier studies. These studies deal with many variables ($n \gg 1$) and they are characterised by their nonlinearity. During the last decade a constant flow of multiple applications of nonlinear dynamics and deterministic chaos in economics has been developed (Chatrath, Adrangi, and Dhanda, 2002; Goodwin, 1990; Majumdar, Mitra & Nishimura, 2000; Pesaran and Potter, 1993; Rosser, 1999; Vitanov, Dimitrova, and Kantz, 2006). In the last two decades various methods of nonlinear dynamics and chaos theory have been frequently used to analyse various branches of economics (Markose, 2002). He divided these methods into three groups. The first group includes formalist/deductive methods and related dynamical systems, e.g. classical methods of optimisation, classical probability and econometric models. These methods have an implication for economic models studying perfect competition, market completeness, command economy. The second group is the so called 'New logic' or mathematics of incompleteness. These methods have been applied by renown economists like Hayek (1967, 1982) in his studies on the limits of constructivist reason and later (Hayek, 1952,1982) on cognitive incompleterness and Lewis (1985,1987) with his work on algorithmic unsolvability of general equilibrium prices. Inductive methods and self-organising dynamics comprises the third group. Some of the most important implications of these methods in the field of economics emphasise on market incompleteness, irregular innovation based structure changing dynamics in capitalist growth, stock market crashes and non-Guassian asset returns with fat tails.

Following the abovementioned discussion two questions could be posed: (1) Shall we face the phenomenon of fat tails for the most valuable Chinese brands?, and (2) Shall we face a small number of extremely highly valued Chinese brands and a vast number of medium to low valued Chinese brands (a brands hierarchy)?

2.1. Rank approach and non-Gaussian distributions. Zipf-Pareto law

Rank approach is based on preliminary ordering (ranking) of the subgroups (having similar value of the studied objects) with respect to decreasing values of some quantity of interest (Vitanov et al., 2014: 120). Then the subgroups could be studied with respect to their rank from the point of view of selected quantity. The rank denotes the number of the position of the value x of the studied random variable when all values of the random variable are listed in a list ordered by decreasing frequency $n(x)$. It is stated in specialised literature (Khaitun, 1983; Vitanov et al., 2014) that in natural sciences most of probability distributions are frequency distributions while in social sciences most of probability distributions are rank distributions. Many processes in nature can be described by the binomial distribution, Poisson distribution or by the Gaussian distribution. But there are also non-Gaussian distributions. Their specific features are as follows:

First, non-Gaussian distributions have a "fat tail". The probability of tail events is much greater than as it was predicted by the normal distribution. The fat-tailed probability distribution associated with the power law.

Thus the logical question is: Shall we face the phenomenon of fat tails for the most valuable Chinese brands?

Second, non-Gaussian distributions are asymetric.

Shall we face a small number of extremely highly valued Chinese brands and a vast number of medium to low valued Chinese brands?

Third, non-Gaussian distributions have only finite number of finite moments. For an example for the Zipf-Pareto law (with characteristic exponent α) a moment of order $n < \alpha$ exists. And if $\alpha = 1$ (as in the case of many practical applications) then there is no finite dispersion. According to Vitanov et al. (2014:127) the non-existence of the finite second moment violates an important requirement of the central limit theorem (namely existence of finite second moment) and thus some distributions do not converge to the normal distribution which means that there is a class of non-Gaussian distributions that describe another "non-normal" world. Many social and economic systems belong to this world.

The Zipf distribution is one of a family of varied scaling relationships (Bettencourt et al, 2007). The rank-size rule is a very simple scaling law followed by many observations of the ubiquitous empirical patterns in physical and social systems (Chen, 2011:1). The numerical relations between rank and size generally follow Zipf's law, and the scaling exponent (β) is close to β=1 in most cases (Krugman, 1996). During the last years, a number of scientists are interested and confounded by the rank-size pattern, which appears in many complex systems. The particular case $\beta = 1$[6] represents a desirable situation, in which forces of concentration balance those of decentralization. In this case the rank-size relationship is called the rank-size rule (Vitanov and Dimitrova, 2014:11). The rank-size rule describes a certain remarkable statistical regularity and forms a source of considerable interest in many fields, such as the distribution of city sizes in a country (Batty, 2008; Vitanov and Dimitrova, 2014), sizes of companies (Axtell, 2001), wealth distribution (Clementi, et al., 2012), street hierarchies (Jiang, 2009), etc. In accordance with Zipf's law, when log rank is plotted against log size, a line with slope = -1 ($\beta = 1$) appears. If the rank-size rule of Zipf holds well in marketing and specifically in the field of branding, this will mean that the brand of rank n has a value proportional to $1/n$ or, in terms of the distribution, the probability that the value of a brand is greater than some V is proportional to $1/V$: V (Value > V) = α/V^{β}, with $\beta \cong 1$. Our proposition states that since the global brands' values are considerable, practically there is no upper limitation and Zipf-Pareto law can be applied. During the literature search nothing was found about the implementation of rank-size rule to the distribution of global brands' values.

2.2. Power laws

It has been known for many years that there are large deviations from the normal or bell-curve distribution for the stock market as well as for many other phenomena (Nordhaus, 2011). A particularly

[6] When $\beta = 1$ it is considered that the classical Zipf's law exists. When $\beta \neq 1$ without any limitation it is considered that we have Zip-Pareto law. In the same situation but with a upper limitation the Zipf-Mandelbrot law exists.

interesting probability distribution that may have fat tails is one that is known as the “power law.” The quantitative and formal development of the personal or size distribution of income and the measurement of income inequality was first introduced by the Italian economist Vilfredo Pareto (Clementi et al., 2012:1). Pareto discovered that the relative number of individuals $Q(> w)$ with an annual income larger than a certain value w is proportional to a power of *w*:

$$Q(> w) \sim w^{-\alpha}. \quad (1)$$

Other ways to express the same relation are (Blank and Solomon, 2000: 280):

- in terms of the probability for a person to have an income between *w* and *dw*

$$P(w)dw \sim w^{-1-\alpha}\, d(w). \quad (2)$$

- by expressing the income *W(n)* of the various individuals in descending order: *W(1)* being the income of the person with the highest income, *W(2)* the income of the person with the second highest income and so on

$$W(n) \sim n^{-1/\alpha}. \quad (3)$$

The plot of *W(n)* on a double logarithmic scale is called a “Zipf plot” (Zipf, 1949, cited in: Blank and Solomon, 2000:280) and leads in the case of a power law (Eq. (3)) to a straight line with slope $-1/\alpha$. A power law is a relation of the type $Y = kX^{\alpha}$, where *Y* and *X* are variables of interest, α is the power law exponent, and k is typically an unremarkable constant (Gabaix, 2009: 256). By meaning (Stanley et al., 1996; Ioannides and Overman, 2003; Newman, 2005; Cordoba, 2008; Gabaix et al., 2003) the power laws are useful tools in studying complex systems because scaling relations may indicate that the system is controlled by a few rules that propagate across a wide range of scales. Power law is also a form taken by a remarkable number of regularities, or laws, in economics and finance (Gabaix et al., 2003). Similar to Eq. (3) power laws were discovered in a wide range of other than income distribution fields, e.g. individual wealth distribution (Clementi et al., 2012), sizes of companies (Axtell, 2001), sizes of cities (Vitanov and Dimitrova, 2014), stock market returns, trading volumes (Gabaix, 2009), etc. There is a notion in specialized literature that power laws give the hope of robust, detail-independent economic laws. A particular case of a distributional power law is the rank-size rule of Zipf.

The level of dominance is measured by the index of Sheppard (Sheppard, 1982) (Eq. 4).

$$P_{rN} = \frac{1}{N-2} \sum_{r=1}^{N-2} \left[\frac{\ln(N_r) - ln(N_{r+1})}{\ln(N_{r+1}) - ln(N_{r+2})}\right] \times \left[\frac{\ln(r+2) - ln(r+1)}{\ln(r+1) - ln(r)}\right] \quad (4)$$

where N = number of observations, N_r = r-th observation, N_{r+1} = observation with a rank (r + 1).

3. Methodology and results

Based on aforementioned discussion, authors focused this study on the most valuable Chinese brands as a system of brands. It was assumed that there are variations in the factors which affect the distribution of their values as well as that these variations can be modelled by stochastic processes. Since the authors were interested in global brands’ values distribution, than the starting point of the research methodology should be the selection of a proper stochastic process instead of model equation of factors affecting brand value. The basic assumption states that the explanation of the distribution of the most valuable Chinese brands needs only an implementation of mathematical model based on stochastic process with proper characteristics.

The authors investigate dynamics of the most valuable Chinese brands by applying the Zipf-Pareto law and the primacy index of Sheppard. Following the purpose of the paper – to investigate dynamics of the most valuable Chinese brands, we defined the following twofold research goal of present study: (1) to analyse if the state of equilibrium of the ranked Chinese brands (based on their values) fits to the power law, and (2) to examine if the deviations from the power law are characterised by the index of Sheppard. Next, three research hypotheses were proposed:

RH1: The distribution of the most valuable Chinese brands (measured by Interbarnd valuation methodology) satisfies the Zipf-Pareto law.

RH2: The distribution of the most valuable Chinese brands (measured by Millward Brown BrandZ valuation methodology) satisfies the Zipf-Pareto law.

RH3: The system of the most valuable Chinese brands satisfies the primacy index of Sheppard.

The performance of top 50 /100 Chinese brands was checked against real data on their values measured by Interbrand and Millward Brown's BrandZ valuation methodologies and datasets. In order to check the validity of the proposed model, the authors analysed the values of the most valuable Chinese brands from 2012 to 2015[7] and concluded an excellent agreement with the data that is superior to any other model already known in the literature. The performance of rank-size rule and power law was checked against these data.

The empirical analysis is employed to show that the rank-size rule could be implemented to the distribution of brands' values. The analysis is based on considerations of complex systems, i.e. finding whether power or other simple law fits are appropriate to describe some internal dynamics. It is observed that the ranking is specifically organised: a major class comprising a few brands emerges every year. Other classes, which apparently have regular values, occur subsequently. Thus, the notion of the Sheppard primacy index (Sheppard, 1982) is envisaged to describe the findings.

3.1. Results and discussion

During the first stage of present research the most valuable Chinese brands were compared with respect to the emergence of power laws in the size distribution. The analysis of the data set started with representation of empirical distributions and their corresponding rank-size relationships for the period from 2012 to 2015. Next, a rescaling procedure to log-log distributions was performed. The distribution of rescaled values and a power law fit for the same period are given in Figure 3.

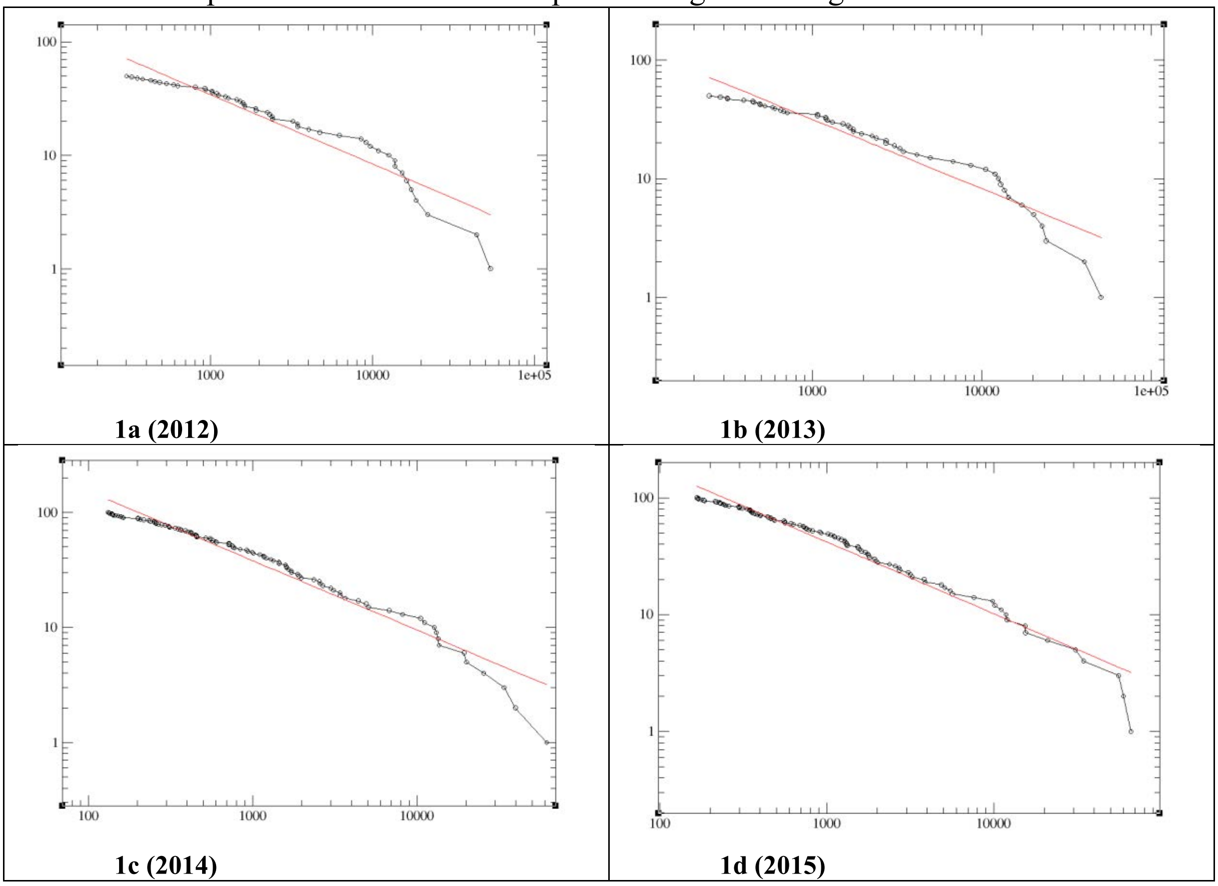

Figure 3. Rank-size relationship for the rescaled values V of the most valuable Chinese brands (N = 50 / 100), 2012-2015

Based on curve estimation results (Figure 3) the authors suggested that top 10 brands should be excluded from the data row and should be analysed separately since their distribution differs substantially from the distribution of the rest. After the modification of the data set it has been found that the rank-size relationship seemed to be almost folding on a unique relationship and described a state near equilibrium (Figure 4).

[7] Interbrand data set for the most valuable Chinese brands was available only for 2014.

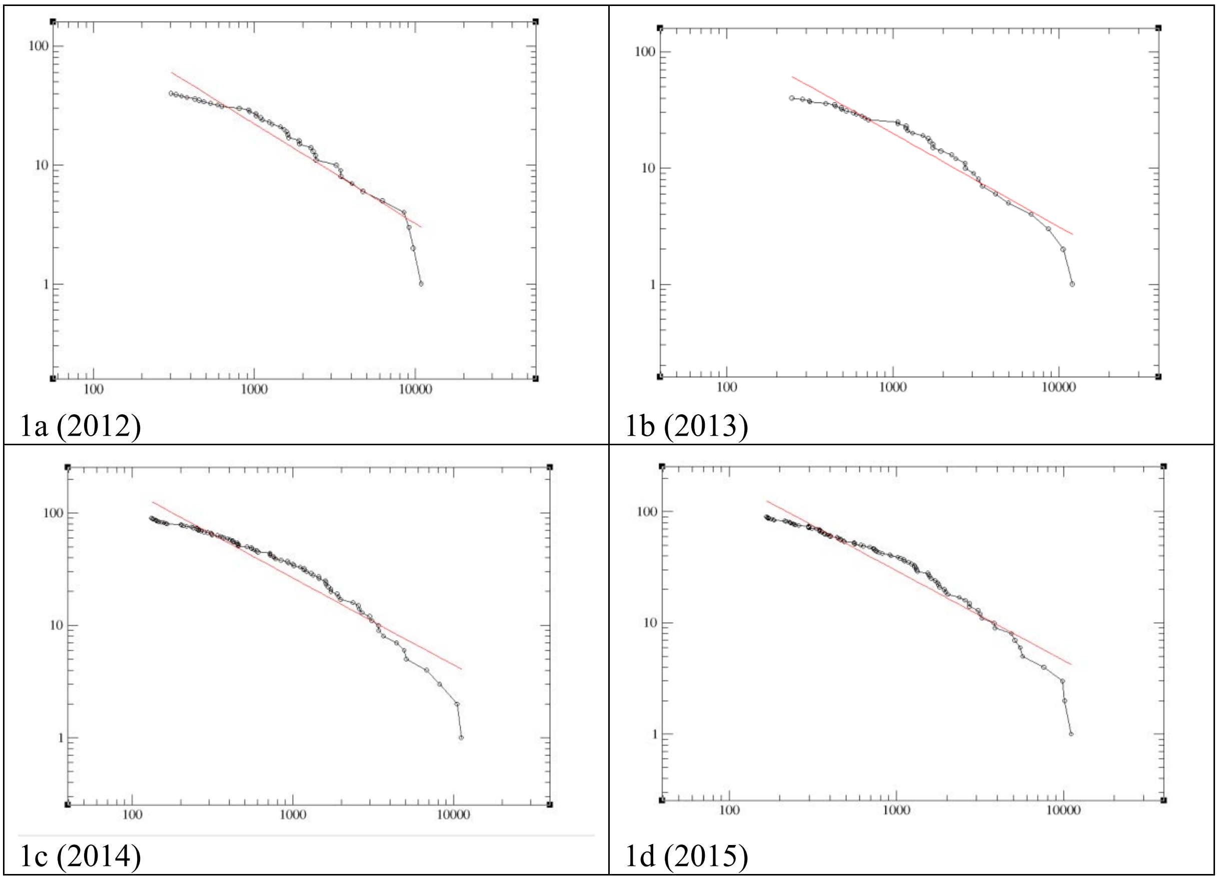

Figure 4. Rank-size relationship for the rescaled values V of the most valuable Chinese brands (N = 40 / 90), 2012-2015

Hence, a conclusion was drawn that the system fluctuates around a status of equilibrium, hence the parameters of the power law will change slowly with the time. In such situation managers have to focus on gap dynamics and associated processes. A clear distinction between fluctuations and disturbances should be made in order to take the most appropriate long-term marketing decisions. Such a distinction could be quite slippery since it depends on the view point, i.e. managerial focus. For instance, if we consider a decision to exclude a certain brand from product portfolio. Can it be regarded as a fluctuation or disturbance?

The calculated power law fit characteristics for both data sets are presented in Table1.

	Millward Brown BrandZ			**Interbrand**		
ear	Power law	Corr. coef.	Regr. coef.	Power law	Corr.coef.	Regr. coef.
012	$y = 7287.3\ x^{-0.839}$	-0.949	-0.839	n.a.	n.a.	n.a.
013	$y = 5266.4\ x^{-0.807}$	-0.955	-0.807	n.a.	n.a.	n.a.
014	$y = 5607.8\ x^{-0.776}$	-0.956	-0.776	$y = 31803\ x^{-1.076}$	-0.964	-1.076
015	$y = 7887.4\ x^{-0.809}$	-0.958	-0.809	n.a.	n.a.	n.a.

Table 1. Summary of power law fit characteristics: correlation coefficient and regression coefficient (slope), N = 40 / 90 (2014, 2015)

The evolution of the power law exponent indicates the position of the state of equilibrium, which very slightly changes during the years included in present research. The power law exponent for Millward Brown BrandZ set fluctuates around a value of -0.8. Similar results were achieved during previous research on top 100 global brands for both data sets for the period from 2000 to 2014. Since $\alpha \approx 1$ we can suppose that the situation within the system of the most valuable Chinese brands is characterised by the forces of concentration which balance those of decentralisation.

The first hypothesis of present research states that the distribution of the most valuable Chinese brands (measured by Interbarnd valuation methodology) satisfies the Zipf-Pareto law. Based on aforementioned results authors conclude that the distribution of the most valuable Chinese brands is non-Gaussian and it satisfies the Zipf-Pareto law. It means that the moments depend considerably on the size of the sample and the probability of extreme events becomes larger. The same conclusion is done for the second research hypothesis which states that the distribution of the most valuable Chinese brands (measured by Millward Brown BrandZ valuation methodology) satisfies the Zipf-Pareto law. We can conclude that the system of top Chinese brands is controlled by a few rules that propagate across a wide range of scales. Despite the fact, that China is an emerging market, the dynamics of Chinese brands follows the same stohastic complexity as the dynamics of the top global brands (Vassileva, 2015).

As we can see in Figures 3 and 4, there are three classes of brands which are naturally formed. That is why, the index of Sheppard was calculated for the system of the most valuable Chinese brands (Table 2) to study their primacy (or "hierarchy"). The problem of primacy comprises an essential issue in the analysis of distributions of top Chinese brands' values being a part of the assessment of their dynamics.

Year	Millward Brown BrandZ	Interbrand
2012	2.421	n.a.
2013	1.612	n.a.
2014	2.661	2.341
2015	2.839	n.a.

Table 2. Index of Sheppard calculations for the most valuable Chinese brands

The third research hypothesis that the system of top Chinese brands satisfies the primacy index of Sheppard has been confirmed. It was found out that P_{rN} (see Eq. 4) exceeded one (ranging from 1.612 to 2.839) for the whole system (N= 50 / 100 observations) which suggests primacy. Hence, the results support the proposition that there is a great level of dominance within the system of the most valuable Chinese brands.

This corresponds to the changing focus of marketing decision support systems (Lilien et al., 2013: 221) which usually support strategic decisions but nowadays it is expected that they have to assist operations decisions as well using proper marketing analytics. Described approach to the system of top brands reflects the notion of a brand not merely as a set of relations between products but "as a set of relations between products in time" (Lury, 2004: 2). The key assumption is that time is dynamic, where dynamism is not an activity of fixed objects moving through static space, but a process of differentiation.

3.2. Conclusions, limitations and implications for future research

Economic systems are constantly evolving. Companies are facing a growing number of both market challenges and business opportunities. Despite the variations in global brands' values during the last decade, only small changes occur in the rank-size relationship, including the emerging markets. The system of top Chinese brands fluctuates around a status of equilibrium, hence the parameters of the power law will change slowly with the time. The classes within the system of global brands should be determined naturally according to their fit to the power law and deviations should be characterised by the primacy index of Sheppard.

Several implications for future research were defined.

First, it is interesting to be explored further if tail events matter for investors in emerging markets, in particular in case of M&A decisions or global branding strategies, especially market expansion.

Second, in order to support marketing managers for their strategig branding decisions it would be noteworthy to test superstar models (Gabaix & Landier 2008, Rosen 1981) to see if the link among stakes (e.g., advertising revenues), talents (e.g., the capability of a designer), and income is predicted by these theories.

Third, with the availability of big data sets what new power laws will be discovered?

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