

EXPLORING ON-LINE SOCIETAL RISK PERCEPTION FOR HARMONIOUS SOCIETY MEASUREMENT*

Xijin TANG

*Institute of Systems Science, Academy of Mathematics & Systems Science, Chinese Academy of Sciences,
Beijing, 100190, China
xjtang@iss.ac.cn (✉)*

Abstract

The nearly 30-year economic growth miracle brings the consequent tremendous poor-rich gap leading strong drives for social transformation in current China. Chinese top leaders have realized to increase the peoples' income, improve quality of life and construct a "harmonious society" as key missions especially in recent 10 years. How to measure a harmonious society is one important topic as different measures may lead to different development policies. This paper outlines over 10 indices relevant to measure a harmonious society. Some are global indicators, while some are contributed by domestic researchers and arouse debates. Most of those indicators require conducting surveys on social attitudes under micro levels, which is always time consuming with problem of data quality. As Internet technology advances provide ways to record and disseminate fresh community ideas and thoughts conveniently, detecting topics or emotions from on-line public opinions is becoming a trend or one supplement way to overcome those data acquisition problems. This paper discusses one approach to on-line societal risk perception using hot search words and BBS posts. Such a trial aims to provide another way to societal risk perception different from those in traditional socio psychology studies. Challenges are also indicated.

Keywords: Harmonious society measurement, BBS posts, Baidu hot search words, societal risk perception, on-line opinions

1. Introduction

China has created an economic miracle since its economic reforms and opening-up policy in the late 1970s, which leads the country to the world's second largest economy by gross domestic product (GDP) and purchasing power

parity. The Engle coefficients of both urban and rural households are on a falling trend. In 1978, the Engle coefficient of urban households is 58% and it has fallen to 36% in 2007. With regards to the rural households, the Engle coefficient has decreased from 68% in 1978 to

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43% in 2007. The decrease of the Engel coefficient indicates that the residents' consuming level and quality are significantly improved. The success of China's economic policies and the manner of their implementation has resulted in immense changes in Chinese society. Along with the great improvements of personal income and living standards, the income inequality, or one of its measures, the Gini coefficient, increases significantly, too, which indicates widening wealth disparities between different regions and industries, as well as among various groups in every social stratum. Even disputes aroused as the National Bureau of Statistics of China (NBS) disclosed the country's Gini coefficients between 2003 and 2012 for the first time since 2000, it is undoubted that the country's Gini coefficient probably will maintain over 0.4 for a long period.

Current China is under going grand social transformation with "an increasing divided society: a tattered social and welfare system, massive unemployment, structural poverty, and rising environment concerns" (Zheng & Tok 2007). It was reported that "China averaged 500 large-scale protests per day" in 2011 (Ramzy 2012). As a matter of fact, social alarming or early warning of social stability has already been noticed and studied along the growth of GDP at an average rate of 10 percent (Gu et al. 2005, Song 1995, Wang 2006, Yan 2005, Zhu 1992). Ultimately, a "Harmonious Society" and the Scientific Development Concept proposed by Chinese top leaders since 2004 become main goals of the government toward a well-off society ("Xiaokang Society"). Furthermore, adopting Internet technologies to enable government online promotes more openness.

Online administrative consultation (or networked politics) is also adopted by local administration or congress representatives (Huang & Dai 2011). Meanwhile more social conflicts and disputes are exposed, disseminated and widely debated among Chinese netizens strengthens the calls for further changes or reforms. On the other hand, more free active discussions over social media are leveraged with Internet governance and censorship (Mueller 2011, Ramzy 2012). Lots of studies, especially toward the highlighted events, are undertaken on microblogging public opinions. With higher Gini coefficients during the past years and intensively exposure of a variety of social conflicts among different social strata, how to measure a harmonious society in China scientifically is an issue worth discussions, especially for effective social management and policy making.

This paper at first addresses some known indicators relevant to measure a harmonious society. Problems are also addressed about the data collection for appropriate measurements, while making use of on-line data for somewhat objective measures becomes a trend. This paper tries to apply socio psychology research results to on-line societal risk perception based on hot search words and BBS posts, which may be another vision of the societal risk or accumulated individual anxieties. Some initial results are given. Challenges are addressed.

2. Relevant Measures of a Harmonious Society

To construct a harmonious society was formally proposed by Chinese top leaders at the Fourth Plenum of the 16th CPC Central

Committee held in September of 2004¹. The Scientific Development Concept is an active response to the problems of sustainable economic growth and social inequality which may lead to social unrest and even turmoil. A lot of practical studies have already conducted toward how to measure a well-off or harmonious society, not only at national level, but at municipal/provincial/regional level as well (Zhu 1992, MacPherson & Cheng 1996). Actually, how to measure a harmonious society is not a well-defined problem. Researchers in Hong Kong conducted studies toward constructing a modern theoretical conception of a harmonious society and took a test (Wong & Shik 2011). In this section some relevant indicators are outlined based on the indicators' names, meanings or missions. Available rankings of China under those indices are addressed. Some studies by domestic researchers are also referred for comparisons.

2.1 The Gini Coefficient

The Gini coefficient or Gini ratio is a widely used measure of inequality of income or wealth. A ratio of one means perfect inequality, with one person commanding all of the income of one society, while a ratio of zero represents perfect equality, i.e. each person has equal shares.

According to China's annual Gini coefficient figures from 2003 to 2012 published by NBS in January of 2013, the country's Gini coefficient reached its highest level in 2008, standing at

0.491, but began to drop after that. In 2012, the coefficient reached 0.474. Those figures aroused disputes. Some other reputable economists and research institutes have voiced skepticism about the NBS figures, arguing that cannot fully reflect the reality of China's massive income inequality. A report released on December 9, 2012, by China Household Finance Survey and Research Center, affiliated with the Southwestern University of Finance and Economics (SWUFE) located in Chengdu, indicated that in 2010 the Gini coefficient based on China's household income was 0.61, a sharp contrast with NBS figure (Lan 2013). Whatever, by international and historical comparisons, China's inequality is not quite in the same ranks as the most unequal African and Latin American countries, but close thereby at an alert level. The Gini coefficient figures brought strong calls for reforms of the country's income distribution system.

2.2 The Legatum Prosperity Index

Based in London, the Legatum Institute (LI) is an independent policy, advisory and advocacy organization. Since 2009, LI started to release the Prosperity Index (PI) as "a unique and robust assessment of global wealth and wellbeing, which benchmarks 142 countries around the world in 8 distinct categories: economy, education, entrepreneurship & opportunity, governance, health, personal freedom, safety & security and social capital"². The credo of the PI is that the most prosperous nations in the world are not necessarily those with only a high GDP, but are those that also have happy, healthy and free citizens. China ranked 58 in 2009 with no

¹ Central Committee of the CPC, "Communique of the Fourth Plenum of the 16th CPC Central Committee", September 19, 2004, accessible via <http://cpc.people.com.cn/GB/64162/66174/4527266.html>. Retrieved on May 22, 2013.

² <http://www.li.com/programmes/prosperity-index>

change next year, rose to 52 in 2011, but dropped to 55 in 2012. In 2013 China's ranking lifts to 51 with rankings of 7 on economy, 54 on education, 66 on entrepreneurship & opportunity, 65 on governance, 68 on health, 111 on personal freedom, 92 on safety & security and 25 on social capital. The improvement comes from a rise in economy sub-index and safety & security sub-index with rankings drop in the other sub-indices.

LI also released one in-depth report on ranking China (Meredith 2012). "China had morphed from an agricultural backwater to the world's second largest economy". In three decades, China had lifted 600 million people out of poverty. "From 1980 to 2008, per capita income, measured in terms of purchasing power, rose eleven-fold". It is speculated that after 1978-1990 and 1990-2008 2-phase development, China enters the 3rd phase while it is concerned whether Chinese economy could keep growing at anywhere near that pace without fundamental structural changes. That report also listed China's rankings in several other global indicators for comparison, Average Life Satisfaction (2011, 80/142), Per Capita GDP (2010, 77/142), WEF Global Competitiveness Index (2011, 26/142), UN Human Development Index(2011, 101/187)³, Heritage/WSJ Economic Freedom Index (2011, 135/179), Transparency International Corruption Perceptions Index (2011, 75/182) and World Bank Doing Business Index (2012, 91/183). Those rankings also indicate that China is still a developing country.

Even doubts toward China's transformation at the 3-phase development exist worldwide,

³ China HDI rank keeps same in 2012 based on 2013 UN HDI report.

some domestic studies exhibit quite different things. It was widely discussed in some Twitter-like microblogs in China, e.g. Sina Weibo, in 2012 about a study on the so-called Chinese Revitalization Index (CRI). Yang & Tan (2012) constructed an index with 6 primary indicators and 20 sub-indicators so as to monitor and measure the "Chinese Nation's Revitalization Process". The value of CRI is between 0 and 1, calculated by linear weighted summation of the score to each indicator. By defined benchmarks and weights to each indicator, the CRI valued 46.4% in 2005 and 62.7% in 2010, which showed big progress achieved along the revitalization process. But the results shocked Chinese netizens and aroused disputes on scientific measurements (Tong 2012). In November of 2013, the CRI inventors published the latest CRI measurement at their Sohu blog and declared that the 2012 CRI was 65.3% with 28 sub-indices which again led to lots of critiques at home and worldwide. Obviously, "Yang's index probably isn't going to catch on internationally"⁴ even Yang himself wants to link the index to the "Happiness Indices".

2.3 The Happiness Indices

During the 2011 week-long National Day holiday, the China Central Television (CCTV) broadcast a series called "Happiness Survey" as the journalists carried out *vox pop* interviews by asking people whether they were happy and what happiness meant for them. A very famous

⁴ Jamil, A. "China's 'rejuvenation index' greeted with derision", <http://www.ft.com/intl/cms/s/0/533bcb7a-535c-11e3-b425-00144feabdc0.html#axzz2lfDFI5nM>. Retrieved on November 25, 2013.

eccentric response was of hot discussions on-line via BBSs and microblogs in China⁵. Initially those discussions were just simple criticisms of that program. Gradually the debate went further about the meaning of happiness, and the conditions required in the attainment of happiness. Such kind of discussions continued after the release of the 2013 Chinese Family Happiness Survey results on the International Day of Families (May 15).

It is quite natural to suppose that the society is harmonious means the societal members are happy. Thus happiness is an important index about the quality of life and society. In 1972, the King of Bhutan stated Gross National Happiness (GHP) to be more important than GDP. Bhutan's GNH index is a multi-dimensional measure, provides an overview of performances across 9 dimensions: psychological well-being, health, time use, education, culture diversity and resilience, good governance, community vitality, ecological diversity and resilience, and living standards (Ura et al. 2012).

The World Happiness Report 2012 gave a comprehensive summary on happiness studies. On the happiness measures and improving happiness levels, both external factors and personal features which affect the happiness were discussed (Helliwell et al. 2012). Globally happiness measures are mainly conducted by the Gallup World Poll (GWP), the World Values Survey (WVS) and the European Social Survey (ESS). Helliwell & Wang (2012) took in-depth analysis of those measures of subjective well-being, the general expression used to cover

a range of individual self-reports of moods and life assessments. Their studies summarized all three surveys in well-being measures. Based on GWP 2007-2010 data, China ranked No. 92 among 129 countries or regions on life satisfaction.

No further details were addressed how GWP or WVS collected data on their surveys in China. Easterlin et al. (2012) took more analysis on China's life satisfaction (1990-2010) based on 6 surveys conducted by 5 different organizations. Relevant happiness surveys are also taken by institutions in China mainland (Lin & Sun 2013). In 2010 a research group of the Financial and Economic Affairs Committee of the National People's Congress (2010) published the results of a survey on urban residents' sense of happiness, which showed 74.2% of the 4,800 respondents in 24 cities felt "comparatively happy" or "very happy", and 12.3% answered "unhappy". During August to October in 2012, the China Population Welfare Foundation (CPWF), jointly with the Renmin University of China, carried out the "Chinese Family Happiness Development Index" research project and conducted a door-to-door survey of 9,604 adults and 2,372 children in 16 cities. The results showed that 83.8% Chinese families felt "very happy" or "happy"⁶.

In the World Happiness Report 2013, China's ranking of happiness is 93 among 156 countries, where the happiness is measured from 6 dimensions (independent variables): GDP per capita, social support, health life expectancy,

⁵ <http://www.thechinastory.org/key-article/are-you-happy-chinese-reflections-on-a-state-of-mind/>. Retrieved on May 21, 2013.

⁶ "Two-thirds of Chinese families 'not very happy' " issued by CPWF on May 15, 2013. Available via http://news.xinhuanet.com/politics/2013-05/15/c_115783018.htm. Retrieved on August 6, 2013.

freedom to make life choices, generosity and perceptions of corruption (Helliwell et al. 2013). Such kind of study reflect similar missions as many other social indicators, such as UN *Human Development Index* and OECD *Better Life Index*. The OECD Better Life Initiative allows a better understanding of what drives the well-being of people and nations and what needs to be done to achieve greater progress for all. BLI consist of 11 dimensions (topics), housing, income, jobs, community, educations, environment, civic engagement, health, life satisfaction, safety and work-life balance (OCED 2011). An interactive BLI tool is launched in May of 2011 that allows people to compares countries' performances according to their own preferences in terms of what makes for a better life. Currently, only OCED countries are of BLI ranks, while more countries will be included in the future.

2.4 Green GDP and GDP Quality Index

Those prosperity, happiness or better life indices do not weight economic measures as an important component. As a matter of fact, the Scientific Development Concept proposed in 2004 reflected that Chinese top leaders have noticed the environmental degradation and widening income disparities in the pursuit of pure GDP growth which resulted in insufficient industrial innovation and affected the society's harmony. The central government tried to adopt other measures, such as Green National Accounting, to guide national development. "Green National Accounting (Green GDP Accounting for short) refers to an accounting system deducting natural resources depletion costs and environmental degradation costs, so as to assess the quality of economic development

in real sense"⁷. Also referred as Green Accounts, Green GDP Accounting is a program originally proposed by the World Bank "to measure the value and benefits of ecosystems to provide countries with more information to assess the true costs and benefits of projects that may threaten the integrity of important ecosystems" (de Sherbinin et al. 2013).

The China Green National Accounting Study Report 2004 was published jointly by the State Environmental Protection Administration of China (SEPA) and NBS on September 11, 2006. That report was the first of that kind on environmentally-adjusted GDP accounting in nation's government level worldwide. "The preliminary results show that economic loss caused by environmental pollution reaches 511.8 billion yuan, accounting for 3.05% of national GDP in 2004 while imputed treatment cost is 287.4 billion yuan, accounting for 1.80% of that".

The central government expected to enable the Green GDP serve as a political tool to adjust local governments' attention from pure GDP growth to "people-centered" development (Zheng & Chen 2006). However the Green GDP effort was ill-fated and might not be much more than a "propaganda slogan". Despite initial support for the project from the central government and some pilot programs, "local recalcitrance, bureaucratic infighting, and elite party politics eroded support" (Watts 2011). Five years later, Professor Niu Wenyuan, from CAS Institute of Policy and Management, proposed a new indicator, "GDP quality index", which

⁷ "Green GDP Accounting Study Report 2004 issued". Accessible via http://www.gov.cn/english/2006-09/11/content_384596.htm. Retrieved on May 23, 2013.

measures the economy not just by size, but by sustainability, social equality and ecological impact as well. The GDP quality index includes 5 components with 15 indicators. The 1st component refers to the economic quality, which considers the amount of resources and energy needed to generate each 10,000 yuan of GDP, together with the proportion of fiscal revenue to GDP. The 2nd denotes the social quality, which measures social progress, including education levels, unemployment ratios and differences between urban and rural areas. The 3rd is the environmental quality, which assesses the amount of waste and carbon generated per 10,000 yuan of economic activity. The 4th refers to the quality of life, which figures in per capita income, life expectancy and farmers' living standard. The 5th refers to the management quality, which measures the proportion of tax revenue used for public security, the durability of infrastructure and the proportion of public officials in the overall population. Niu (2011) applied his defined measures toward 31 provinces, autonomous regions and municipalities and generated rankings for 30 except Tibet region. The rankings brought political pressure, not from the central government but from the provincial level. For example, Ningxia ranked the last across the western regions. Officials from Ningxia doubted the results with Ningxia's ranking under NBS's well-off societal indicator⁸, which measured from 6 dimensions, economic development, social harmony, quality of life, democracy & legal system, culture & education, and

⁸ "What is China GDP quality index?"
<http://society.people.com.cn/GB/15469344.html>.
Retrieved on August 12, 2013.

environment, as referred by Zhu (1992). Obviously some of those social indicators for the well-off society are adopted by CRI.

The "quality index is simpler to understand and measure as it is based on available government statistics. Green GDP, by contrast, required officials to compile extra data" (Watts 2011). The fate of GDP quality index is still under observation. Both of the GDP quality index and its measurements need to be adjusted to avoid just an annual ranking of provinces in mainland China. Moreover, the measurements of the GDP quality index for one province along years are required to show the changes in quality of socioeconomic development of that province, which may be helpful to decrease the political pressures to some extent.

2.5 The Harmony Indices

Here 3 typical studies relevant to measure one harmonious society are briefed.

2.5.1 The Harmonious Society Index

In October of 2006, Beijing municipal Bureau of Statistics released the report on Beijing Harmonious Society Index⁹. That index consists of 34 sub-indices by 3 categories. One category refers to *the reality of social conflicts* with 13 sub-indices (3 on the poor-rich gap, 5 on social stability, and 5 on resources & environment). The 2nd category is *social attitudes and requests* with 6 sub-indices. The 3rd is *social intervention capabilities* with 15

⁹ "The Deputy Director of Beijing Statistic Bureau talked about the Beijing's Societal Harmony Index", Oct 18, 2012. Accessible via
http://www.gov.cn/zwhd/2006-10/18/content_416088.htm. Retrieved on May 21, 2013.

sub-indices (4 on social security, 2 on public opinions, 4 on legal system, 2 on emergency responses and 3 on community services). It was reported that the 2006 Beijing's HSI was 115.77 with measurement of 21 indicators. The annual average growth between 2001 and 2006 was 2.47% (Cui et al. 2008). However, no further measurements are released in recent 5 years. No other figures contributed by other provinces are reported for comparisons.

2.5.2 The Psychological Harmony Levels

In comparison with the above-mentioned index to measure the harmonious society in China, researchers in the CAS Institute of Psychology conducted serious research on social harmony and early warning of social conflicts, especially mass incidents (Wang 2006, Zheng et al. 2012). They took periodical surveys on socio psychological harmony indicators to monitor public attitudes and sense symptoms of the mass incidents in some provinces. Then they call for inclusion of socio psychological indicators into societal management decision support system and construct platforms to monitor public attitudes across the country. Before the 2008 Olympic Games, they conducted a survey to perceive the societal risk in Beijing area (Zheng et al. 2009). Those studies contribute soft or subjective indicators to measure a harmony society, as a supplement to those hard or objective indicators, such as the Gini coefficient. No national figures or provincial rankings have been reported. Those studies still took traditional socio psychological ways, not considering on-line opinions.

2.5.3 The Harmony Index to Measure National Harmony

After studying many global indicators on freedom, wealth or happiness, to rank countries, such as UN HDI, GNH Index, NEF Happy Planet Index¹⁰, Social Progress Index¹¹, etc., scholars from Tsinghua University Bell & Mo (2013) reveal that most of those social indicators "neglect the importance of rich and diverse social relations for human well-being". They explore the meaning of harmony under different cultures, especially under the context of those ancient Chinese philosophies, and then propose the Harmony Index which attempts to measure the extent of harmony (peaceful order and respect for diversity) by 4 different types of relations: the relation between family members, the relation between members of a society (or country), the relation between countries, and the relation between humans and nature. The appropriate measures are explained in details toward those indicators for 4 types of relations. Compared with other leading global indices, the HI is less influenced by economic output and the extent of democracy.

Trial rankings of 27 countries are given with limited reliable data under a set of original HI indicators. Among 27 countries, China ranks 13 under non-graded HI and 14 under Graded HI which assigns extra weights to the "harmony in

¹⁰ Happy Planet Index (HPI) is one measure of global well-being and environmental impact that was introduced by the New Economics Foundation (NEF). <http://www.happyplanetindex.org/>

¹¹ Social Progress Index (SPI), launched in 2013 to provide an alternative to GDP as an indicator of human welfare by Professor Michael Porter of the Harvard Business School. SPI tracks social and environmental outcomes. <http://www.socialprogressimperative.org/>

the family”. By reducing some measurements for “harmony in the family”, 43 countries are ranked while China ranks 23 by both HI calculations. The results are quite surprising, and need to be further investigated and reviewed. For example, neither South Korea nor Japan is ranked, while both countries are always ranked by most global indicators. Thus more evidential comparisons are required.

2.6 The Tightness Score

Diversity of cultures is deemed valuable toward harmony measurements. Gelfand et al. (2011) conducted studies on comparisons of societal cultures and made the distinction between tightness and looseness cultures. “Tightness-looseness is part of a complex, loosely integrated multilevel system that comprises distal ecological and historical threats (e.g. high population density, resource scarcity, a history of territorial conflict, and disease and environmental threats), broad versus narrow socialization in societal institutions (e.g. autocracy, media regulations), the strength of everyday recurring situations, and micro-level psychological affordances (e.g. prevention self-guides, high regulatory strength, and need for structure)”.

To provide a systematic analysis of tightness-looseness in modern societies, statistical data were collected from 6,823 respondents across 33 nations as well as from existing databases of ecological and historical threats and sociopolitical institutions by 45 authors. The surveyed individuals classified their own nation as tight, loose, or in between by degrees of agreement with six statements, yielding tightness scores that ranged from a low

of 1.6 in Ukraine to a high of 12.3 in Pakistan. China’s tightness score is 9.5, ranked just below Pakistan (12.3), Malaysia (11.8), India (11.0), Singapore (10.4) and South Korea (10.3).

This study also theorizes there is a close connection between the strength of everyday situation and the chronic psychological processes of individuals within the nations.

Above we brief over 10 indices which provide diverse modeling of a harmonious society, advocated in China since 2004. There may be other relevant measures in different perspectives. For example, the Forbes Misery & Reform Index¹², seemingly negative indicator relevant to a harmony state of a nation. China ranks the 2nd among that measurements in 2009 while actually allows more improvement rooms. Except those global indicators which rank countries almost every year, the indicators proposed by domestic researchers are difficult to conduct continual and consistent measurements due to the weakness in index design and lack of available data. Similar situations happened to those indicators on societal stability proposed earlier by domestic sociologists (Song 1995, Yan 2005, Zhu 1992) and could be transformed into harmonious indexes by use of same social indicators. As a matter of course, most of them are hard measures and come from different governmental offices. If no official data provided, few can be measured. Whatever, to acquire the measurements of those indicators takes cost and time, while the public may

¹²

<http://www.forbes.com/global/2009/0413/034-tax-misery-reform-index.html>. Retrieved on November 30, 2013.

question the results and express criticisms on-line nowadays.

Zhu (1992) have once addressed basic steps to select appropriate indices for practical assessment of a well-off society, which is actually a system engineering procedure toward social problems. How to incorporate a range of social indicators relating to a variety of societal aspects is actually societal systems engineering practice, and assessment results will influence and shape the future of the concerned region as a whole. Thus challenges come from both theoretical and practical dimensions.

Next we present an exploratory undergoing research to acquire public concerns from the BBS posts or hot search words contributed by search engines to perceive societal risks, as one supplement way to provide data to enable feasible measurement of a harmonious society.

3. Perception of On-line Societal Risks

Media revolutions are happening in current China with the Internet plays a central role. New media bring dramatic changes toward social living and cultures, offering people to fully express opinions and then rebuilding the civic life. During the period of 1990s, referred as an era of the BBS, famous sites such as Tianya Club (or Tianya Forum) and the Strong Nation Forum under People's Daily Online in mainland China contributed diversified opinions toward almost every aspect of the Chinese society. As entering the Web 2.0 era, microblogging enables any specific issues in any place attract public attentions from almost every microblogger. It is natural to make use of those free opinions from both Web 1.0 and Web 2.0 platforms to acquire the whole societal images quickly.

3.1 Societal Risks Perception

In happiness research, survey is a normal method. Respondents have to answer questions, such as "How happy are you now?" or "What comes to mind when you hear the word 'happiness'?" Word association is used widely. The words or phases, such as "happy", "lol" (laugh out loud), "like", "love", "joy", "got an offer", "delicious food", "blue sky", "smiles", etc. may be all relevant to a state of happiness. Word association has once been adopted in societal risk perception research (Zheng et al. 2009).

As respondents may not expose real thoughts at surveys due to a variety of factors, the human's own BBS posts, comments, blogs, etc., published freely and actively via Web 1.0/2.0 media may be more objective to reflect one's mind. With help of computational linguistics, it is possible to use written languages to explore the state of happiness instead of direct inquiries. Algorithms to detect positive and negative sentiments have generated to make large-scale online text sentiment research possible, such as diagnosing trends for happiness in society via blogs (Dodds & Danforth 2010). Earlier people started to use query data of Google search or social media to detect influenza epidemics (Ginsberg et al. 2009, Corley et al. 2010). It is worth exploring to detect societal risks from queries, BBS and microblogs.

One of advantages of using Web texts to acquire public attitudes is the timeliness. Annual reports of those global social indicators, e.g. HDI, PI and World Happiness reports, exhibit efficient work, while not all global indicators can rank countries each year especially at their initial periods. Seasonal screening may only be

limited to one specific sector or area, while there are no such kind limitations with operations on-line. Thus detection of the netizen's happiness state may be one meaningful supplement to measure the public's happiness state, as well as to the societal risk perception.

Zheng et al. (2009) constructed a framework of societal risk indicators including 7 categories and 30 sub categories based on word association tests (Table 1). The 30 sub categories are also referred as risk hazards with different dimensions compared by socio psychological ways. To help human's encoding tasks and validate some hypotheses in that study, two qualitative meta-synthesis supporting technologies, CorMap and iView, were applied to help grouping the associated words into clusters and detect the main hazards (Tang 2009). Currently, on sub-category "Beijing Olympic Games" within the nation's security category is changed to "very important major events" so as to refer "WorldExpo 2010", "2010 Asian Games", etc.

3.2 Monitoring Societal Risk Levels by Hot Search Words and BBS Posts

One query, BBS post, blog or one piece of microblog reflects what is concerned by the actor. Thus, features words contributed from the search queries, BBS posts, blogs/microblogs may be regarded as votes of the actors toward the concerned topics. By labeling those on-line expressions with relevant societal risk categories, we may get an estimation of societal risks levels within a period. Next trials to use Baidu hot search words and Tianya posts are addressed.

Baidu is the biggest Chinese search engine worldwide. The news portal of Baidu presents 10 to 20 hot query news words updated every 5 minutes automatically, as shown in Figure 1. A specific Web crawler was developed to download hot search words list hourly from news.baidu.com since March of 2011 (Wu & Tang 2011). Each hot phase is given one score ranged 1 to 20 according to its hourly rank. Everyday we get a daily list including normally around 30 to 70 hot search words, together with

Table 1 Category of societal risks originally encoded by researchers at CAS Institute of Psychology

Main Category	Sub Category
Nation's Security	Terrorism & cults, Taiwan issue, political stability, nation's security and foreign relations, Beijing Olympic Games*
Economy & Finance	Financial problems, economic problems
Public Morality	Ethics & morality, integrity & reputation, general mood of the society
Daily Life	Health, education, employment, prices, transportation, food and medicine safety, housing, fake & shoddy goods
Social Stability	Serious epidemic, poor-rich gap, safety at work, crime & mass incidents, issues on agriculture, farmer and rural area
Government Management	Corruption & degeneration, governance ability, legal system, social security & social warfare
Resources & Environments	Natural disaster, population, energy shortage & environment pollution



Figure 1 Hot news search words updated at Baidu news portal

words in both frequencies and scores are somewhat different from the Baidu official daily top 20 general hot news search words, since Baidu removes those sensitive words due to censorship. For example, one day in July of 2011, our top 1 hot search word “knifeman in Xinjiang” ranked by hot score was not seen at the Baidu hot word daily list.

With the hot search words list, we identify the corresponding societal risk of those hot words manually. Given the daily hot search risk-relevant words, we calculate the societal risk levels of that day as one ratio of total frequency of risk labeled words over total frequency of hot words. The risk level can also be computed using hot score of each word. Similarly weekly or monthly risks levels can be acquired. Figure 2 shows the daily total risk levels based on Baidu hot search news words by their frequencies from November of 2011 to

October of 2012. Figure 3 is the monthly risk levels of the total and each sub-category risk on Baidu hot search words during the same period.

From Figure 3, it is seen that “daily life” risk level is often higher than those of other societal risk categories. A drop of societal risk level in August of 2012 shown by both Figures 2 and 3 may be attributed to the London Olympic Games, when many hot search words were on

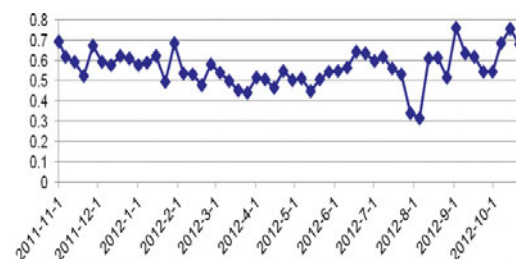


Figure 2 Weekly societal risk levels of Baidu hot search words (November, 2011 to October, 2012)

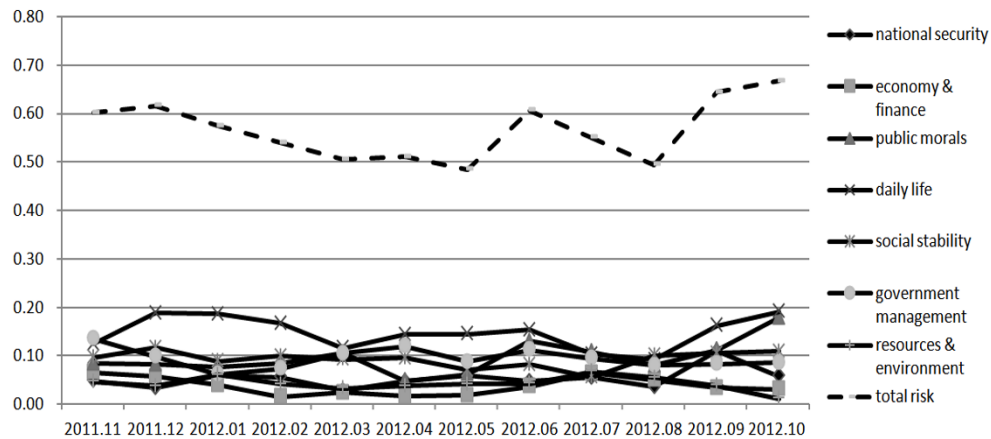


Figure 3 Monthly societal risk levels of Baidu hot words by main and sub categories (November, 2011 to October, 2012)

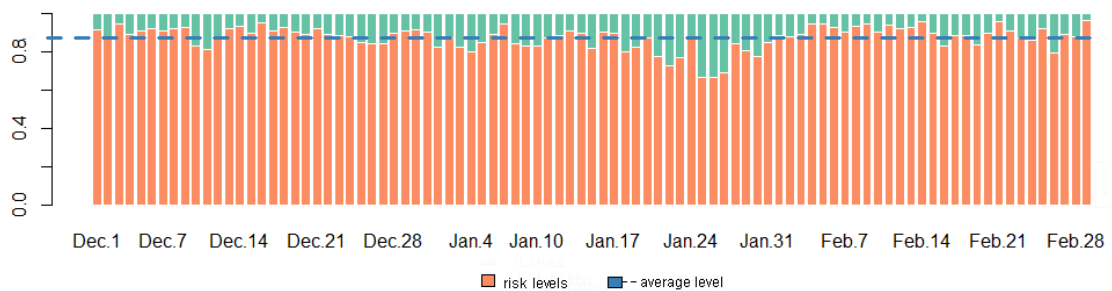


Figure 4 Daily societal risk levels of Tianya Zatan new posts (December of 2011 to February of 2012)

sports and then labeled risk free. Such a phenomenon may be a hint toward how to take intervention to lower the societal risks.

Similar trials are also taken to the posts published at “Tianya Zatan”, the main board of public opinions on living and society and the 2nd largest board at “Tianya Club”. A specific Web crawler was developed to download the new posts and updated posts (Zhang & Tang 2011). By manual risk labeling of new posts at Tianya Zatan board during December of 2011 to February of 2012, we got 3-month daily risk levels by ratio of risk labeled new posts over the total new posts (Figure 4). The decrease on risk

levels was observed during 2012 Chinese New Year holidays (January 23-29). The average daily risk level by 3-month new posts at Tianya Zatan is around 0.8, much higher than that estimated from Baidu hot search words of the same period (up to 0.6). The category of “public morality” risk is somewhat the highest risk category on average among 7 risk categories, followed by “daily life” and “government management”. The initial results provoke more tests to be taken. For example, using updated posts instead of new posts for on-line societal risks estimation is more reasonable. Moreover, 3-month posts are not enough in practical

studies. Then more labors in risk labeling are expected for more samples across a long period.

3.3 Challenges to Automatic Risk

Identification of Hot Search Words or BBS Posts

Both Baidu Vision and Tianya Vision have been developed to download both Baidu hot words and Tianya Zatan posts, which are processed and stored for search and a variety of exploratory analysis. Around 1000 new posts and over 4000 updated posts are released in Tianya Zatan Board every day. Normal Web text mining steps are taken to process Tianya posts. More difficulties are being confronted in design of algorithms for automatic assigning either one hot phase or one BBS post with an appropriate societal risk category. Currently 3 main challenges are confronted.

1) The emerging words with risks. The risk identification is not like the sentiment analysis, which usually classifies texts into positive/negative or positive/neural/negative emotions. The majority of sentiment words are rather stable with no quick change. As to feature words corresponding to societal risks, the stable sets are comparatively quite smaller with burst of new words, especially those famous terms from highlighted social events. In China, the human name, which is easily selected to represent one typical hot social event, emerge almost weekly, such as “我爸是李刚 My Dad is Li Gang” (either social stability or governmental management), “郭美美 Guo Meimei” (whose corresponding societal risk usually refers to government management, sometimes to public morality), “小悦悦 Xiao Yueyue” (either daily life or social stability), etc.

2) The transfer of the word's risk. That refers to the word's corresponding risk is evolving along the time. For example, during the 2012 London Olympic Games, the phase “Liu Xiang's failure in hurdles” was labeled “daily life/health” at first as the famous hurdles athlete LIU Xiang, a super star in China, failed at the 1st hurdle and then hopped the full 110 meter stretch. Soon it was disclosed that Liu Xiang's appearance on the track was just a designed show! Public critiques soon overwhelmed. Then the risk label relevant to “Liu Xiang” was “public morals” with sub category of “integrity & reputation”. In October of 2012, Liu Xiang went to USA for surgery. We labeled the risk of “Liu Xiang went USA for surgery” as “daily life/health” again. Thus the risk relevant to one person within a short time still transfers and only phases for machine learning do not work effectively. Then relevant news texts are crawled and extracted simultaneously to provide corpus for automatic risk identification. Experiments are conducted, while accuracy is barely needed to be improved (Hu & Tang 2013).

3) Widely usage of argots and proverbs. Because of Internet censorships (King et al. 2013), people prefer use different terms even metaphors to express their opinions in order to avoid blocking. Such kind of situations happens too often toward those posts of Tianya Zatan board. By trials, the precision of automatic risk identification, especially toward Tianya Zatan posts is not significantly improved with more samples (Chen & Tang 2013). It is easily for humans to identify the corresponding risk of those posts but quite difficult for machines. Feasible ways are still under exploration.

4. Concluding Remarks

It is widely accepted that serious social inequality does not mean happiness and harmony of a society. Constructing a socialist harmonious society is a hard and urgent task to achieve China Dreams. Appropriate measures (conceptual modeling) of a harmonious society are then required for the crucial debate and assessment about the objectives of public policy and progress. However, to depict a harmonious society with consensus is not a well-defined problem. Besides those controversial indices to measure one harmonious society, some widely accepted indices, Gini coefficient, happiness and harmony indices, etc., are outlined to show a variety of perspectives where a meta-synthetic vision is expected. The relevant domestic studies are also referred for comparisons. Community's doubts about the results of those indicators are mainly attributed to poor index designs or inconsistent measurements. The 2012 World Happiness Report set the OCED guidelines on the measurement of subjective well-being as one case study (Helliwell et al. 2012, pp. 164-166). More measures are required to be seriously studied for horizontal and longitudinal comparisons to avoid the CRI story.

During modeling and measuring in practice, surveys are always time consuming and of high cost. The availability of data with quality always affects measurements of some indicators and then of the whole. Micro level psychological risk perception is always required for measurements of a harmonious state at any scales. The OCED interactive better life index function shows a trend of detecting respondents' senses on-line. This paper proposes one approach to mapping on-line public opinions

into societal risks for on-line psychological risk perception, as one indirect but objective and efficient measurement. The exploratory study is addressed by using Baidu hot search words and Tianya Zantan Board new posts to perceive on-line societal risks which may make it possible to monitor the societal risk monthly, weekly or even daily. Thus automatic corresponding either Baidu hot search words or Tianya posts with appropriate societal risk categories is an urgent task. Some trials are conducted (Chen & Tang 2013, Hu & Tang 2013). Challenges are addressed. Even lots of difficulties exist, a new way is explored to add more evidences toward traditional societal risk perception. Such a vision exposes a useful supplement to tell us daily harmony state, which is quite concerned by both the public and the governmental officials.

Current trials using Baidu hot search words and Tianya Zantan posts are quite small sized. More BBS boards will be tested, while microblogs are also considered. Furthermore social psychology mechanism needs to be studied for validation of such kind of trials.

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Xijin Tang is a full professor in the Academy of Mathematics and Systems Science, Chinese Academy of Sciences. She received her BEng (1989) on computer science and engineering from Zhejiang University, MEng (1992) on management science and engineering from University of Science and Technology of China and PhD (1995) from CAS Institute of Systems Science. During her early system research and practice, she developed several decision support systems for water resources management, weapon system evaluation, e-commerce evaluation, etc. Her recent interests are meta-synthesis and advanced modeling, opinion dynamics, knowledge creation and creativity support systems. She co-authored and published two influential books on meta-synthesis system approach and an oriental systems approach in Chinese. She is the secretary general of International Society for Knowledge and Systems Sciences. She was one of 99 who won the 10th National Award for Youth in Science and Technology in China in 2007.