Demographic And Aging Intensity And Its Economical Threats Chinese Experiences

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Abstract: The study aimed to examine the health care policy implications on demographic and aging phenomena and its economical threats in China. The study use the panel data from 1950-2015 mainly extracted from International Monetary Fund (IMF), United Nations (UN), China NBS, China Statistical Yearbook and World Bank. The multivariate regression model is used to analyse the data at 5% level of significance, with the aid of Minitab 17 English Software. The study finds that the health care policy implementation and practices and the implementation of one child policy will threat the economic growth in China by 2030. The study recommends that, the redefining of the working age population to reflect the life expectancy level in a country. The higher the life expectancy is the higher the retirement age or wide working age; the job redesigning should be done to increase the capacity and ability of the elderly staff to stay in the office and to encourage the immigration as the means of supplementing the workforce in the country.

Index Terms: Health Care Policy, Economic Growth, Population Aging and Demographic Crisis

I. INTRODUCTION

One of the health care policies born challenge is that of causing the aging in both developed and developing countries. The challenge of the demographic crisis, such as overpopulation and population aging are globally noticed. Most of the studies such as John, at el.(2011), Burtless (2013), NIA(2013), UNFPA(2006), Lee, Mason and Cotlear (2010), Chan(2011) and others , find that most of countries are suffering from this kind of demographic and aging problems. They confirm that overpopulation and population aging problems experienced in US, Canada, Thailand, Singapore, Japan, China and others etc. NIA (2013) evidenced that; we are aging- not just as an individual or communities but a world. In 2006, almost 500 million people worldwide were 65 and Older. By 2030, that total is projected to increase to 1 billion-1 in every 8 of the Earth's inhabitants (NIA, 2013). This paper aimed to explore the health care implications on demographic and aging in China; due to overpopulation symptoms and introduction of the one child policy as the one of depopulation strategies in China. China is still experiences the high population and un-weighted working age structure population, the population is skewed to elderly than in working ages of less 60 years. This phenomenon threats the economic growth of China, since workforces are weakened by aging. The problems are claimed to be borne by the successful health care policy implementation and practice since 1950 (Ashton, Hill, Piazza and Zeitz, 1984). The good and stable health policy implemented and practiced by China since 1950 reinforced the primary care for both rural and township, and the good and remarkable work done by barefoot doctors contributed to reinforce the foundation of the life expectancy in China (Liang, Tu, and Chen, 1986). Cangping (2013) and Riley (2004) suggest that advances of health care and nutrition and the introduction of the one child policy in 1979 in China, reduces the mortality rate, total fertility rate, infant mortality rate, less than 5 mortality (child mortality) rate and maternal mortality rate and increases the life expectancy. This situation causes the demographic crisis, the demographic shifts to an elderly society, the aging problem. The implementation of the one child policy in 1979 reduced the weighted national workforce and skewed to elderly population in the later on 2010 (Howe and Jackson, 2011). The policy of one child creates a gender imbalance, numerically favouring men over women (Howe and Jackson, 2011; Chan, 2010; Feng, 2014 and Kaufman, 2011). Does the one child policy threat the workforce of China? Jackson and Howe (2004) suggest that China's workforce ages, young workers will be even less available and China's manufacturing and services sectors will be forced to keep existing workers for a longer tenure or find older workers. This could also slowdown the ability for China to be an outsource supplier for developed countries (Jackson and Howe, 2004; Cai and Wang, 2006). Ultimately, it means that China will no longer be able to rely solely on inexpensive labour to fuel its growth. Instead, China may only be able to grow in line with the growth of its labour force. China may try to respond by moving more into electronics and other medium-tech industries; however increased investment in China's labour force and management cadre is necessary before such a transformation can be successful (WHO, 2012; Hou, 2011; and Peng, 1987). The one problem facing by China is the future loss of economic power due to paralysing its manpower or age work population (Banister, Bloom and Rosenberg, 2010). This study aimed to examine empirically the implications of the introduction of the one child policy in fostering the economic growth in china, to examine the economic health of china.

II. STATEMENT OF THE RESEARCH PROBLEM

The improvement of health care services in China, and introduction of the one child policy in China caused the rapid decrease of the fertility and mortality rate (Hou, 2011; Wang, 2011 Singh, 2012 and others). This creates the favourable environment to population shrinking and increase the longevity. This phenomenon caused the unbalanced age in the population - aging problem. Aging problem now, is looks like

the disaster in both developing and developing countries (Banister, Bloom, and Rosenberg, 2010, and Peng, 1987) .One of the challenges is that, aging is result from the success and improvement of health care policy implementation. Population aging is now suspected to cause economic threats in future in many countries, but, recently no scientific study done, empirically and quantitatively to prove the expected economic threats in future, particularly in China. Most of the findings of the studies are qualitative in nature that lacks their credibility to generalize their findings.   Due to this methodological gap, this paper examined scientifically the empirical economic threats of the health care and demographic problems in China.

III. RESEARCH OBJECTIVES

The study aimed to achieve the following specific objectives:- (i)To examine the implication threats of the one child (depopulation) policy and practices in Chinese economy by 2030 (ii) To examine the implication threats of health care policy implementation and practices in Chinese economy by 2030 (iii) To examine the Chinese workforce Intensity to Chinese economy and to establish economic remedial strategies in China

IV. CONCEPTUAL FRAMEWORK

If we let the economic growth (ω), depends on health care (γ), and age work population (ρ); and the population decay is depends on the total fertility rate (λ), total population (η) and time (τ). (The maximum time is the life expectancy) Under the assumptions that,

(a) Economic growth is direct propositional to life expectancy and total fertility ratio
(b) Economic growth is negatively related with maternal and infant mortality rate
(c) Economic growth is positively related to the population growth
(d) Population economic gearing effects increase as the population increase, and inversely proportional to the one child policy
(e) The population is decaying at the marginal rate as approaches to the maximum limit(age of life of expectancy) and it is a function of total fertility rate and time

Therefore
Economic growth (ω) =
$$f(Health\ care(\gamma), Age\ work\ population(\rho))$$
$$\omega = f(\gamma, \rho) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(i)$$

Taking the first partial derivatives of the function in the equation (i)

$$\frac{\partial \omega}{\partial \gamma} = K_1, \quad \frac{\partial \omega}{\partial \rho} = K_2 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(ii)$$

Whereby,
K_1 =Heath care Economic Gearing Effects (HEGE); the total number of CYN geared by a unit of mortality rate in the economy

K_2 = Population Economic Gearing Effects (PEGE); the total number of CYN geared by a unit rate of population growth rate in the economy

Since,

Economic growth (ω) =
$$\alpha + \beta_1\mu + \beta_2\lambda + \beta_3\eta + \beta_4v + \beta_5\chi + \varepsilon \ldots\ldots\ldots(iii)$$

Where,
α = Constant Value represents the amount of dollars at $K_1\ and\ K_2 = 0$
$\beta's$ = the coefficient values of the variables of both health care and population
μ = Life expectancy in number of years
λ =Total fertility Rate
η = Population growth rate/population
v = Maternal Mortality Rate
χ = Infant Mortality Rate
ε =Estimated error

If the equation (iii) holds, then,
The economic growth will be affected by the declining of the population or reducing the age work population. If we assume that the population is decaying with a multiple of decay factor (φ),

Therefore,   Decaying population (ϕ) = (Total Fertility Rate minus Total mortality Rate Times Number women Times Time period (T).
That is,

$$\phi = p(\lambda - (v + \chi))T \ldots\ldots\ldots\ldots\ldots\ldots.. (iv)$$

$$\phi = \varphi T \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(v)$$

Taking the partial first derivative of the equation (iv) w.r.t   Time period (T),
$$\frac{\partial \phi}{\partial T} = \psi \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(vi)$$

ψ = Decaying Population Intensity (DPI). The number of people deviated from the normal growth of the population in a country.

V. RESEARCH HYPOTHESES STATEMENTS

The study aimed to test the following pair of the hypotheses:-

$H_{0:1}$: There is no significant relationship between economic growth and Decaying Population   Intensity (DPI)

$H_{1:1}$: There is a significant relationship between economic growth and Decaying Population   Intensity (DPI)

$H_{0:2}$: There is no significant relationship between economic growth and   life expectancy

$H_{1:2}$: There is a significant relationship between economic growth and life expectancy

$H_{0:3}$: There is no significant relationship between economic growth and population growth rate

$H_{1:3}$: There is a significant relationship between economic growth and population growth rate

$H_{0:4}$: There is no significant relationship between economic growth and Crude birth rate

$H_{1:4}$: There is a significant relationship between economic growth and crude birth rate

$H_{0:5}$: There is no significant relationship between economic growth and crude death rate

$H_{1:5}$: There is a significant relationship between economic growth and crude death rate

VI. RELATED STUDIES

Banister, Bloom and Rosenberg (2010) suggests that because of the elderly are in general less economically productive than younger people; therefore economic growth will be slower than in the past and relatively smaller working age cohorts of future will be burdened by the support of the elderly population. This finding supported by St.John, Dale and Ashton(2012), who evidenced the problem of funding the aging problems and Bloom, Boersch-Supan, McGee and Seike (2011), Oizumi, Kajiwara and Aratame (2005) who found the increase of the elderly people endanger the economic growth in China and other countries. Fen and Mason (2005), Grundy (2007), Healy (2004), Knodel and Chayovan (2008), Gavrilova and Gavrilov (2009) and others confirm that rapid fertility decline and mortality rates   accelerate an aging process; the findings supported by Singh(2012), Denton and Spencer(1999), Chan(2011), Lee, Mason and Cotlear (2010), UNFPA (2006) and others who suggest that contuse to declines in death rate (good health care), declines of fertility rate and longer life expectancy means more people in the population leading to an increasing demand for services and expenditures related to health care as cited by (Wang, 2010). The United Nations (UN) (2013) examining the world population aging in 2103 found that China is still suffering from the unstable age structures, rapid shifting age structure of the population, low fertility and mortality rates. This study supported by Certified General Accountants Association of Canada (CGAAC) (2005), Grundy (2007), Healy (2004), Fiedler (2007), Bermingham, and others).   Hou (2011) confirms that population aging will let the population enjoying pension benefits accounts for much higher share in whole population than the working age population does. Wang (2011) confirms that annual growth rate of the working age population is beginning to slow down, decreased from 1.39% during the 1990s to 1.28% between 2000 and 2005, and further to 0.81% between 2005 and 2010. Kaufman (2011) and Chan (2010) confirm that, China, the sex ratio at birth in favour of the males and the skewed age ratio and high dependency ratio of the elderly to working population possibly undermine the china's economic competitiveness-one child policy. This finding supported by Center for Health Workforce Studies (CHWS) (2006), Wiener and Tilly(2002), Olive, Foot and Humphries (2014) and others, that evidenced

that aging adding more cost of care financing, that, population shrinking and aging will be accompanied by economic, social and cultural disruption that can only partially be offset by immigration. The issue of working age in the population of China and other countries in the world is discussed by many researchers in linking to the economic growth in both developed and developing countries. Das and N'Diaye (2013), Kim, Liang, Rhee and Kim (1996) and Herlofson and Hagestad (2011) confirm that working age population in China will reach a historical peak, and the beginning of the precipitous decline by 2025. The population aging is confirmed to be due to the rapid process of industrialization and urbanisation, which causes the sex imbalances rate and dependency rate (Kim, Lang, Rhee and Kim, 1996; Zaidi, 2008; Kulik, Ryan, Harper, and George, 2004). In examining the literature reviews of the laid problems, some of the researchers come with the conclusion that, in order to overcome the aging problems the creativity and innovative is required in dealing with unweighted age structure in the population. Kulik, Ryan, Harper, and George (2004), examining the aging population in Europe and North America found that the extension of the retirement age, encourage the immigration in the country will be of advantageous. The innovation and creativity is need for improving the nature of work that will favour the elderly to work for long period of their extension (NIA, 2013; Burtless, 2013; and John, at el, 2011). The literature explains more on the qualitative arguments of the impact of the heath care, demographic and aging policy and practices in China. The literature fails to pin down directly the impact of the one- child policy and health care policy by using quantitative approach. The literature explains more on the tautological argument of the factual situation in China. This paper addresses the empirical facts quantitatively that will increase the generalization of the findings.

VII. METHODOLOGY

The study use the exploratory research design, with quantitative approach by using the panel data from 1950-2015 of the China demographic profiles. The data extracted from the International Monetary Funds (IMF), United Nations (UN), China NBS, China Statistical Yearbook, Worldometer population, World Health Organisation (WHO), Chinese Ministry of Health, China Medical Board, and World intelligence Agency. The data is analysed in stepwise regression, with 0.05 and 0.01 levels of significances, i.e. 95 level of confidence and 99 level of confidence respectively. The multivariate regression model was run to the MINITAB software.

VIII. TESTS OF HYPOTHESES

The five sets of paired hypotheses were tested statistically at 5 per cent and 10 per cent levels of significant. The decaying population intensity has a negative coefficient value of -0.000295, t-value of -7.13 and the p-values of 0.000 found to be statistically significant at 1 per cent level. The p-value is less than 0.01 or 1 per cent, this implies that there is a strong statistical evidence to reject the null hypothesis at this level of significant in the first pair of hypotheses; therefore the null hypothesis of the first pair of the hypotheses is rejected. That is, there is significant relationship between economic growth and decaying population intensity at 99 per cent of confident

level. The life expectancy has a negative coefficient value of -416, t-value of -2.79, and p-value of 0.007 found to be statistically significant at 1 per cent level. The p-value is less than 0.01 or 1 per cent, this implies that there is a strong statistical evidence to reject the null hypothesis in the second pair of hypotheses, that is, the alternative hypothesis is accepted at 99 per cent level of confidence. Therefore, there is a significant relationship between economic growth and life expectancy in China. The population growth rate has a positive coefficient value of 0.000053, t-value 4.40, and p-value of 0.000 found to be statistically significant at 1 per cent level. The p-value is less than 1per cent, this implies that there is a strong statistical evidence to reject the null hypothesis in the third pair of the hypotheses, that is, the alternative hypothesis is accepted. Therefore, there is a significant relationship between population growth rate and economic growth rate. The crude birth rate has a positive coefficient value of 31207, t-value of 0.16, p-value of 0.873 found to be statistically insignificant at 10 per cent level. The p-value is greater than 10 per cent; therefore, there is no strong evidence to reject the null hypotheses of the fourth pair of hypotheses. That is, there is no significant relationship between economic growth and crude birth rate in China. The crude death rate has a negative coefficient value of -30820, t-value of -0.16, and p-value of 0.875 found to be statistically insignificant at 10 per cent level. The p-value is greater than 0.1 or 10 per cent, this implies that there is no strong statistical evidence to reject the null hypothesis in the second pair of hypotheses, therefore, the null hypothesis in the fifth set of hypotheses is accepted, and that is there is no significant relationship between economic growth and crude death rate in China.

IX. FINDINGS AND DISCUSSION

The research aimed to meet three specific objectives that are to examine the impact of the one child (depopulation) policy in Chinese economy, examine the impact of health care policy in Chinese economy, and examines the Chinese workforce Intensity to Chinese economy, and to establish economic remedial strategies in China. The study finds that the population of China is decaying at the rate of 1.47 per cent of its exponential growth (Table 4.1). The Health Economic Gearing Effect (HEGE) of the Chinese health policy is 6.4 million of CYN. That is, China is gaining about 6.4 million for every one rate of total mortality rate reduced. Furthermore, the study finds that, for every population growth rate reduced in China, China losses 3 million of CYN. This is the Population Economic gearing Effect (PEGE), noticing that China is experiencing a negative growth rate. This finding confirms with Banister, Bloom and Rosenberg (2010), Peng (1987) and Wang (2011) who confirm the positive impacts of the health care and population on the economy. This study finds that population, HEGE and life expectancy rates are positive related to the economic growth in China. This study confirms that the growth of the economy influenced by the population of the country in appositive ways. The higher the population fosters the economic growth in China (Figure 4.1). This Finding supported by Cai and Wang (2006), WHO (2012), and Hou (2011) who found the positive impact of the population in economic growth.

Figure 4.1: The regression model on GDP per Capita and Decaying Population Intensity

Fitted Line Plot
GDP Per Capita = 25133 - 0.001460 Decaying Population Intensity

S	9088.61
R-Sq	36.5%
R-Sq(adj)	35.5%
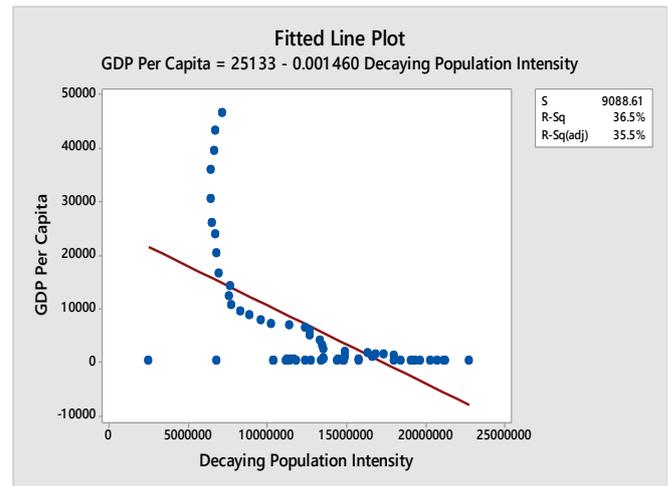
Source: Field Data (2015)

The Figure 4.1 shows the regression model on GDP per capita in Chinese Currency and the decaying population intensity. The graph shows that the line of best fit is determined at the level of 36.5 per cent and is negatively related. That is, the higher GDP per capita in China will be contributed to the higher population or small decaying population intensity. The Decaying population intensity is negatively related to population in China. The study confirms that there is no strong statistical evidence to shows the decline of the economic growth , but the economic growth rate are in the apex of the incline stage and it is hardy observed slowing observed slowing down and further decline by 2030 (Figure 4.3). The economic growth measured in GDP per capita increases as the crude birth rate /fertility rate and decreases as the life expectancy and crude death rate /mortality rate increases. That is, the improvement of the health care in China has a positive impact on economic growth. This finding confirms with Das and N'Diaye (2013), Kim, Liang, Rhee and Kim(1996), Grundy(2007), Certified General Accountants Association of Canada (2005) who find that population with low fertility and low mortality rate encourages economic growth. The study finds that the Chinese workforce Intensity (age work population) is going to be weaken by 2030 as evidenced that the life expectancy is negatively related by the economic growth, and it is projected that life expectancy of the China population is increasing substantially. This finding confirms with National Institute on Aging (NIA) (2013) and Center for Health Workforce Studies (CHWS) (2006) that evidenced the negative economic impact of the longevity in United States. The study confirms more that decelerating of the population in China reduces the economic growth as evidenced that there is a significant relationship in negative ways between decaying population intensity and the economic growth in China. The life expectancy is statistically evidenced by this study to have a negative impact on the economic growth in China. The life expectancy reduces the ability of a country to foster the economic growth. Furthermore the study evidenced that population growth rate is positively related to the economic growth as, found that there is a statistical significant of population growth rate and economic growth. That is the depopulation policy in China such as One –Child policy will reduce the economic growth as the economical threats expected by 2030 to be noticed.

X. CONCLUSION AND POLICY IMPLICATIONS

The paper addresses three main issues that roaring in China, namely health care advancement and its implications in demographic structures and threats on economic growth. The study found that health care advancement, empirically evidenced to cause the population aging in China. The rapid decrease of the fertility /crude birth ratio caused by the introduction of the one child policy as the depopulation policy and the reducing the crude death ratio/mortality ratio causes the changes of the age structure in the population in China, and skewed to the elderly persons. This situation, expected to threats/weaken the workforce intensity in China by 2030. The population is evidenced to slow down but at minimal level and it is noticed that, the life expectancy is negatively influences the economic growth in China. Form this findings, it observed that the population aging is a global problem that will threats the global economy by 2030. It is inevitable phenomena. The only way is not to avoid or escape but to fight against it. This paper recommends the following strategies that will be reducing the acute social and economic of population aging in China and elsewhere in the world. The firstly strategy is the redefining the working age population to reflect the life expectancy level in a country. The higher the life expectancy is the higher the retirement age or wide working age. This strategy would reduce the aging cost and complications such pension and dependency related costs. The second started is the job redesigning to increase the capacity and ability of the elderly staff to stay in the office. If the world would change their mind, and stop to think that population aging is a social and economic problems, the elderly will be pondered as the valuable asset with skills and substantial experiences. The only way to do is to redesign the nature and environment of the elderly job to reflect their age capacity. This strategy is the motivation strategy that encourages retaining of the elderly in the office, continuing to use their skills and experiences in production. The third strategy is to encourage the immigration as the means of supplementing the workforce in the country. This is a strategy that will be used if the first and the second ones will be seen to be insufficiency or irrelevance in policy requirement

REFERENCES

[1] Ashton, B., Hill, K, Piazza, A. and Zeitz, R.(1984). Famine in China, 1958-61. Population and development Review, 10(4), p.613-645

[2] Banister, J, Bloom, D,E and Roseberg, L.(2010). Population Aging and Economic Growth in China. Program on the global demographic of Aging. Working paper series, 53

[3] Bermingham, J. R.(2001).Immigration Not a Solution to Problems of Population Decline and Aging. Colorado Population Coalition. A journal of interdisciplinary Studies 22(4). p.355-363.

[4] Bloom, D.E., Boersch-Supan, A., McGee, P. and Seike, A.(2011). Population Aging: Facts, Challenges and Responses. PGDA Working Paper No. 71.

[5] Burtless, G.(2013). The Impact of Population Aging and Delayed Retirement on Workforce Productivity. Center for Retirement Research at Boston College, Hovey House, 140 Commonwealth Avenue, Chastnut Hill, MA 02467.

[6] Cai, F. and Wang. M. (2006). Challenges Facing China's Economic Growth in its Aging but not affluent Era. China &world economy, 14(5), 20-31.

[7] Cangping, W.(2013). The Aging of Population in China. The Institute of population research, The people's University of China, 39 Haidian Road, Beijing china

[8] Center for Health Workforce Studies (CHWS), (2006). The Impact of the Aging Population on Health Workforce in the United States: Summary of the Key Findings. School of Public Health, University of Albany, 7 University Place Rensselaer, NY 12144-3458

[9] Certified General Accountants Association of Canada (CGAAC). (2005). Growing up: The Special and Economic Implication of Aging Population.

[10] Chan, A.(2011). Singapore's Changing structure and the Policy implications for Financial security, Employment, Living Arrangements and Health Care. Asian Meta Center Research Paper Series No. 3.

[11] Chan, K.W.(2010). The global Financial Crisis and Migrant Workers in China; There is no future as a labourer; Returning to the village has no meaning. International journal of urban and regional research, 34(3), p.659-677

[12] Clarke, E. (2001). Population trends and challenges in Jamaica. Journal of Aging in Emerging Economies. p.22-32.

[13] Das, M., and N'Diaye, P.(2013). Chronicle of a Decline Foretold: Has China Reached the Lewis Turning Point? IFM working paper, 13/26

[14] Denton, F.T. and Spencer, B.G.(1999). Population Aging and Its Economic Costs. A survey of the issues and evidence. QSEP Research Report Series ,340

[15] Feng, W.(2014). China's population destiny: The Looming Crisis. China's Population Destiny, p.244-251

[16] Feng, W. and Mason, A.(2005). "population Aging in China; Challenges, opportunities, and institution' University of Hawaii and the East-west center.

[17] Fiedler, M.(2007). Older People and Public Transport. Challenges and Chances of an Ageing Society. Rupprecht Consult –Forschung and Beratung GmbH, Germany

[18] Gavrilova, N.S. and Gavrilov, L.A.(2009). "Rapidly Aging populations: Russia/Eastern Europe" International Handbook of Population aging, p.113-131.

[19] Gergen, K.J. and Gergen, M.M.(2000). The New Aging: Self Construction and Social values. Social Structures and Aging. New York: Springer.

[20] Grundy, E. (2007). Population Ageing: Causes and consequences. London school of Hygiene and Tropical medicine, UK, CAS Fellow 2006/2007.

[21] Healy, J. (2004). The Benefits of Aging Population. Discussion Paper Number 63

[22] Herloson, K. and Hagestad, G.O.(2011). Challenges in Moving from Macro to Micro: Population and Family structures in ageing societies. Demographic research, 25(10), 338-361.

[23] Hou, L.(2011), challenges and opportunities: The impact of the population. Aging on Marketing in China and Chinese Economy. International Journal of China marketing, 1(2), 70-80

[24] Howe, N. and Jackson, R. (2011). Global Aging and the 2020s. Current history, p. 20-25

[25] Jackson, R. and Howe, N(2004). The greying of the middle kingdom: the demographic and economics of retirement policy in China. Center for strategies and international studies. Prudential foundation.

[26] John. R. B. at el. (2011). Global Population Ageing: Peril Promise, Geneva; World Economic Forum.

[27] Kaufman, J(2011). China Case study on UNFPA. Center for Global Development working Group on UNFPA's Leadership Transition.

[28] Kim, I.K., Liang, J., Rhee, K. and Kim, C.(1996). Population Aging in Korea: Changes since the 1960s. Journal of Cross-Cultural Gerontology, 11, 369-388. Kluwer Academic Publication, Netherlands.

[29] Knodel, J. and Chayovan, N.(2008). Population Aging and the Well-being of Older person in Thailand Population studies Center, Research report 08-659.

[30] Kulik, Ryan, Harper, and George.(2014). Aging Population and management. Academy of management Journal, 57(4), p.929-935.

[31] Lee, R., Mason, A. and Cotlear.(2010). Some Economic Consequences of Global Aging. A Discussion Note for the World Bank. The international Banks for Reconstruction and Development. The World Bank, 1818 H Street, NW. Washington, DC 20433

[32] Liang, J., Tu, E.J and Chen, X.(1986). Population Aging in the people's Republic of China. Social Science medical, 23(12), p.1353-1362

[33] National Institute on Aging (NIA). (2013).Why Population Aging Matter. A global perspective. National Institute of Health, US Department of Health and Human Services.US Department of State.

[34] Oizumi, K., Kajiwara, H. and Aratame, N.(2005). Facing up to the Problem of Population Aging in developing Countries. New perspectives for Assistance and cooperation. Institute for International Cooperation, Japan International Cooperation Agency.

[35] Olive, D., Foot, C., and Humphries, R. (2014). Making our Health and Care Systems fit for an Ageing population. The King's Fund, 11-13, Cavendish Square, London, W1G0AN.

[36] Peng, X.(1987). Demographic consequences of the Great Leap Forward in China's provinces. Population and development review, 13(3), p639-670.

[37] Riley, N.E.(2004). China's population: New Trends and Challenges. Population Bulletin,59(2)

[38] Singh, T.(2012). Demographic dividend in China; The challenge a head. IPCS Series on inside China. China research Programme, IPCS Special Report, 121.

[39] St.John, S., Dale, M.C. and Ashton, T.(2012). A new Approach to Finding the Costs of New Zealand's Ageing population. New Zealand Review, 38, p.55-76

[40] United Nations Population Funds (UNFPA).(2006). Population Ageing in Thailand: Prognosis and Policy Responses. 12th Floor, United nations Buildings.

[41] United Nations.(UN), (2013). World population aging 2013. Department of Economic and Social affairs population division. United nations publications.

[42] Wang, F. (2011). China's population destiny: The Looming Crisis. Brookings, Current History

[43] Wiener, J.M. and Tilly, J. (2002). Population Aging in the United States of America: Implications for Public Programmes; International Journal of Epidemiology, 31, p.776-781.

[44] World Health organisation,(WHO), (2012), Global Health and Aging. National Institute on Aging, National institute of Health, US Department of Health and Human services.

[45] Zaidi, A.(2008). Features and Challenges of Population Ageing: The European perspective. Policy brief, 1, p.1-16.

[46] basis function networks," IEEE Trans. on Neural Networks, vol. 4, pp. 570-578, July 1993.

[47] J. U. Duncombe, "Infrared navigation—Part I: An assessment of feasibility," IEEE Trans. Electron Devices, vol. ED-11, pp. 34-39, Jan. 1959.

[48] C. Y. Lin, M. Wu, J. A. Bloom, I. J. Cox, and M. Miller, "Rotation, scale, and translation resilient public watermarking for images," IEEE Trans. Image Process., vol. 10, no. 5, pp. 767-782, May 2001.