

UNDERSTANDING THE CHINESE MARKET

The demand for ornamentals



AIPH

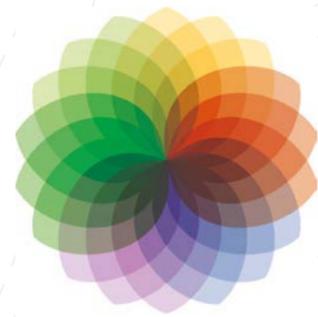
THE INTERNATIONAL VISION PROJECT (IVP)

Methodology, framework and main findings
on the developments of global demand
and production of ornamentals.

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AIPH

I | ABOUT

THE INTERNATIONAL ASSOCIATION OF HORTICULTURAL PRODUCERS (AIPH)

THE WORLD'S CHAMPION FOR THE POWER OF PLANTS

In 1948, amid strained relationships following the end of the Second World War, a group of representatives from the national grower associations of Western Europe came together in Zurich. They were united by an ambition to mend relations between European horticulturists, to rebuild burnt bridges. That vision inspired them to form the Association Internationale des Producteurs de l'Horticulture (AIPH), laying the foundations for an international community that exists to this day.

Since then, things have changed. The world seemed to start spinning faster. We moved from the countryside into the city. We flew to places we never knew existed. We went to the Moon. We started dreaming bigger but sleeping less. We invented the web, the smartphone and social networks. Slowly, sadly, we detached ourselves from the natural world. Our intimate bond with nature, so pivotal to our health and wellbeing, was weakened. We found ourselves living unnatural lives.

That is why AIPH lives and breathes today: to rekindle and maintain an enduring relationship with plants. Serving the diverse needs of growers in a globalised world. Pushing the boundaries of science and sharing cutting edge research. To make clear the value of plants in the urban setting, and to advance the essential role they play in sustaining our planet. To help all of us rediscover an affinity with our surroundings as old as humanity.

Our mission is clearer than ever: to reignite and uphold an appreciation of plants that we believe is a basic human instinct. As an organisation we strive for a world in which humanity, technology and nature exist in healthy and stable equilibrium. By achieving this we will build a balanced and prosperous future for all, sustaining the planet for this generation and the next.

We support and promote the work of our members – the grower organisations around the world who together form our proud AIPH community. Through the expertise and energy they give to horticulture, they embody everything that we stand for.

Globally we act as the central source of industry information. Our statistical yearbook gives an unrivalled view of industry trends and developments, valued by our community and all who take interest in our rapidly moving sector. We bring members together both physically and digitally, and encourage the sharing of new ideas and techniques so that horticulture never stands still.

We advocate fair and robust plant breeders' rights, encouraging innovation and rewarding quality so that growers too can reap the benefits of their work. We promote the most sustainable, ethical and advanced practices in ornamental plant production, celebrating the most progressive growers and sharing pioneering new approaches. This strengthens the ornamental horticulture industry and is an affirmation of our determination to build a more balanced future from the ground up.

We lead global thinking on the successful integration of nature into the built environment. Our Green City initiative promotes the essential role of

plants in creating vibrant urban areas in which people and businesses can thrive. Our environment, human wellbeing, social cohesion and economies are all improved by intelligently designed green space.

Finally, AIPH is responsible for the world's finest horticultural expositions. Upholding the very highest standards, we ensure that approved exhibitions benefit growers and visitors alike by inspiring greater appreciation of ornamental plants. Drawing on experience acquired over generations, we provide organisers with expert guidance to create world class spectacles that live long in the memory. Our great hope is for a world where the essential value of plants is recognised and reflected in every step forward for humanity. AIPH is, and will always be, the world's champion for the power of plants. Our relationship with nature was pivotal in our past. It is fundamental to our future.

WE AIM TO PUT FLOWER, PLANT AND LANDSCAPING SERVICES ON A GLOBAL AGENDA, WITH A VISION TO:

- Stimulate increased demand for ornamental trees, plants and flowers worldwide.
- Protect and promote the interests of the industry.
- Be an international hub for industry information and knowledge exchange.
- Lead best practice in ornamentals production

READING GUIDE

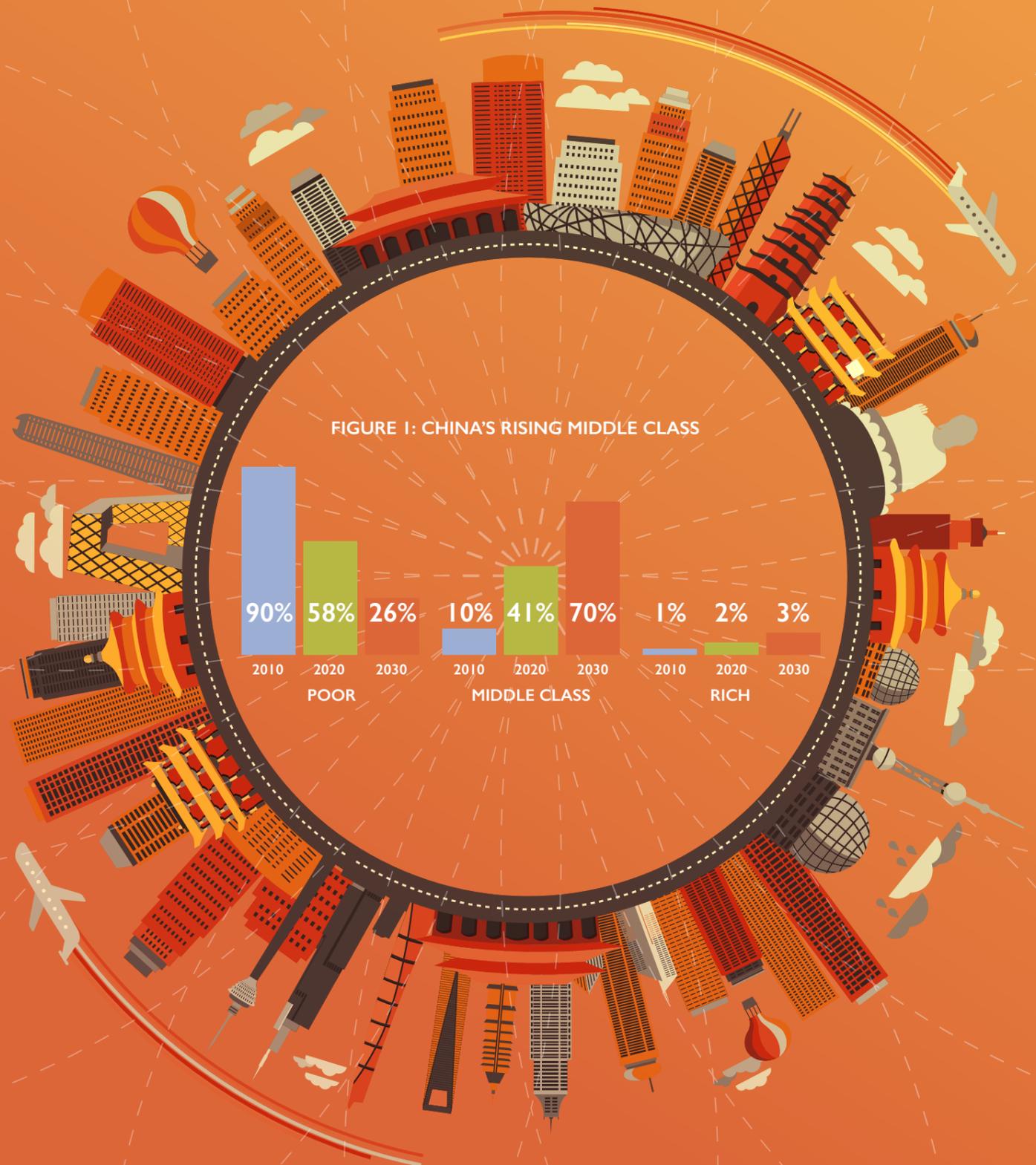
Due to the extensive scope across the entire value chain, spanning the entire globe and covering more than a decade across all world cultures, the researchers acknowledge that these insights will keep evolving over time. The world is changing in regard to every aspect of our societies and with change comes uncertainty. We simply cannot fully foresee the future, but we can do our best to identify and track the drivers for change. That is what this project is about.

In the view of AIPH, this International Vision Project will be a continuous research project because consumers will keep changing and consequently demands adaptation of our industry.

In that interplay, only one thing will not change and that is the change itself. Our industry will need to be resilient to absorb future shifts in demand. As such; this is not only a research project; it is an ongoing process in which the industry's smartest minds work in co-creation to enrich and update the observations and findings. The research team lives and works around the globe and consists of experts with a variety of backgrounds and expertise. For the purpose of continuity, the research framework is not an ordinary one.

The project is split into modules. This report is the main framework of the world's macro socioeconomics and their implications for the ornamentals industry. It is a framework of factors at play in demand and production and presents a summary of the findings..

Each workbook covers a particular region, country or market segment high relevant to the industry. At this stage, each of the three world cores -which currently hold the lion's share of global demand – are covered. Again, these workbooks are work in progress and will keep growing and evolving over time.



WORKING MIDDLE CLASS IN CHINA

The group of key consumers to watch is China's working population aged 15 to 59; a group of people which is nearly one billion in size today, of which approximately 521 million live in urban areas. The group will increase by nearly 20% to over 628 million urban workers by 2030¹. Impressive numbers, but the real growth will be in the doubling of per capita spending².

By 2030 these individuals will have lived their entire lives in post-reform China. This group alone will spend around 12% of worldwide urban consumption³. This target group has the potential to reshape global consumption just as the retired and old of the western world (the richest generation in history) have done in their era.

Spending on non-necessities such as personal care, dining out, recreation and education among the wealthier members of this group already accounts for more than one-quarter of their consumption. These consumers

are now reaching income thresholds at which spending on services takes off rapidly. One major category of spending for this group is education as the current generation invests in the next.

CORE DRIVERS

The consumption of this group, of around half a billion people, is expected to increase from €2 trillion in 2015 to €8.3 trillion in 2030. This means that just 6% of the total world population of 8.5 billion in 2030 is contributing to 28% of the total global urban consumption growth over this period⁴.

The key driver of this is the rapid growth of the Chinese middle class and, especially relevant for ornamentals, the growth in the share of the upper part of the middle class⁵ which is expected to rise from 4% today to 54% by 2030⁶. The infographic opposite depicts the development of

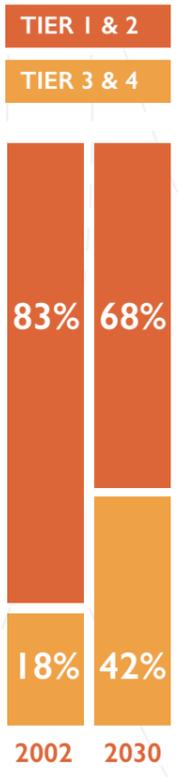
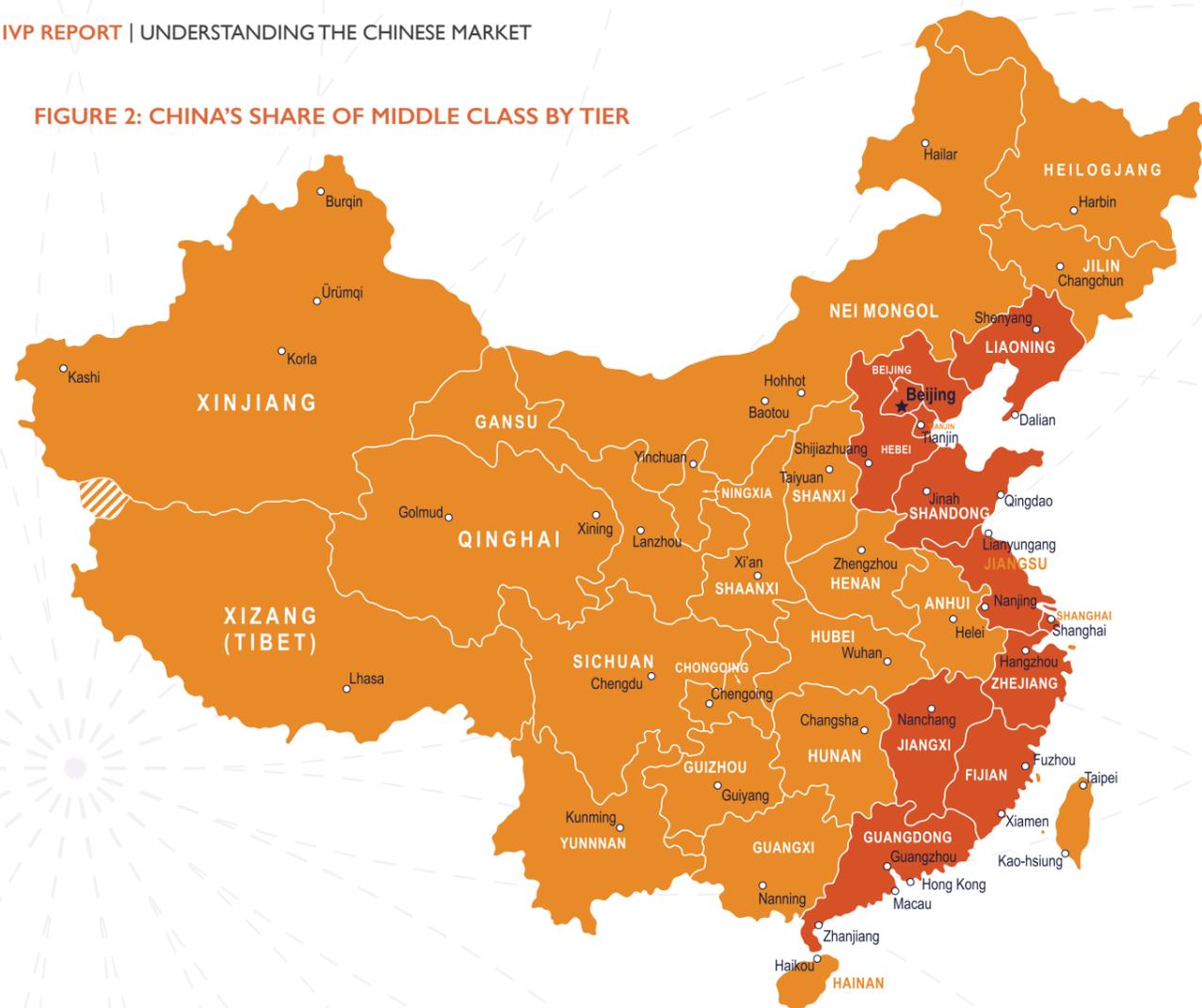
income levels across all age groups⁷.

To differentiate among Chinese households on the basis of their income levels, we use poor, middle class, and rich. From now till 2030, around 40% of Chinese urban households will move out of the poor / low middle class into the middle class and some into the rich groups.

Growth is concentrated in the smaller periphery cities (tier 3 and 4) around the well-known cores. The share of the middle class by geography is displayed in figure 1 which confirms the weight we attach to the methodology of cores and their peripheries. For ornamentals this implies that attention to government planning for urban green space in and around these growth clusters will really take off in the decade to come.

1 UN DESA, World Bank
 2 Yougang Chen, Fang Gong, here comes the modern Chinese consumer
 3 World Bank
 4 UN, World Bank
 5 monthly income between ¥13,500 and ¥20,000 Rmb
 6 Brookings Institution
 7 Income classes are defined as follows: Poor is €500 or less, mainstream middle is €500-1,750, upper middle is between €1,750-€2,600, and rich over €2,600 per month.

FIGURE 2: CHINA'S SHARE OF MIDDLE CLASS BY TIER



URBANISATION OF THE GROUP

Today, 54% of China's working-age population lives in large cities; by 2030, that share is expected to have risen to 72%⁸.

To give an idea of the scale of the presence of individuals of working age in China's cities, consider that 18.4 million people in this category live in Shanghai alone and that 16.6 million live in Beijing. Yet the highest shares of these consumers will not be in these cities but in cities like Dongguan, Foshan, Guangzhou, Shenzhen and other manufacturing powerhouses in the centre and the south of China.

Manufacturing offers a great many jobs in these cities. In Dongguan and Shenzhen (both just north of Hong Kong), almost 88 percent of the entire urban population in each of these cities is of working age. This trend is

not only caused by slowing organic growth or increasing economic and social pressures like cost of living, or quality of life in the cores they are close to, but also by municipal government policies.

The coastal cores of Beijing and Shanghai both have deployed policies to control their population. Our research figures, for instance, suggest that the population of Shanghai will grow to around 35 million by 2030, but the local government has the ambition to control that growth to a maximum of 25 million to enhance liveability and economic performance⁹.

FAMILY STRUCTURE

China's one-child policy has had a significant effect on traditional family structures, leading to a shortage of younger relatives to take care of a rising number of old people.

The one-child policy has led the country to have big gender gaps, as parents often preferred male babies. This means that by 2020, there will be 30 million unmarried men in China. And in 2055, about 15% of men in China won't be married when they are 50.

This policy has also had a significant effect on per capita consumption up to the age of 29 which is higher in China than in other countries. Parents of an only child have more resources to devote to that single child.

Similar to observations in the developed world, this group is marrying and having children later. In China there are more factors at play; both social and economic reasons are behind delayed marriage. The fact that the Chinese are spending longer in education appears to be one reason: they are marrying later. Also, improvements in women's social

and economic status has an impact on marriage behaviour. The traditional practice in China, that women tend to marry men of higher social status, means that women are waiting for those men to reach a certain level of wealth when they can meet their consumption aspirations. Another factor associated with later marriage is the soaring cost of housing in cities. A survey¹⁰ found that 92% of women indicated that a stable income is required for marriage and 70% indicated that they would only marry a man if he owned a house.

CHINA'S OWN MIGRANT WORKERS

Despite the promising outlook for this group at the present time, the situation is very different for a particular segment. Currently, for many people in this class finding work opportunities

means a move away from home. An overwhelming share of China's working population are migrant workers. An estimated 200 million people in China have migrated away from their hometowns to find employment. Consequently, research estimates that about 100 million children are left without their parents. A lot of them are staying with their grandparents, and even 4% of children in their teenage years are living alone¹¹.

The societal impact must be significant but sits out of the scope of this research. We find this relevant to mention because it influences the way people in this large working class live.

The majority live in 1-person households and often in company dormitories. They tend to save as much as they can to send home to their families, thus financially feeding the peripheric economies.

BUYING BEHAVIOUR

Surveys show that emotional benefit, personalisation, better service and experience and convenience have become important motivations for younger working-age consumers in China. These consumers are increasingly motivated by the personal enjoyment of spending their hard-earned cash and are more likely than previous groups to see such consumption as a way of rewarding themselves. On November 11 (Singles Day in China and a major nationwide shopping event) online marketplace Alibaba reported sales of over €18 billion in 2017¹², a record for a single day anywhere in the world.

8 UN ESA, World Bank
9 City of Shanghai, Shanghai Master Plan 2017-2035
10 Chinese Ministry of Civil Affairs
11 IKEA study 2015
12 Alibaba

CHINA'S CITY TIER SYSTEM

There is no official definition for the city classification of tiers and a variety of different methods for classification are used such as: Gross Domestic Product (GDP), political administration, population size, development of services, infrastructure, cosmopolitan nature, retail sales etc. However, it is generally considered that there are four tiers with different consumer behaviours, income levels and business opportunities.

Generally, each city is first classified by GDP. China's cities range from €290 trillion to minor cities with GDP under €17 billion:

- Tier 1: > €300 billion
 - Tier 2: between €68–299 billion
 - Tier 3: €18–67 billion
 - Tier 4: <€18 billion
- Secondly four levels of political administration are applied:
- Tier 1: cities directly controlled by central government
 - Tier 2: provincial capital cities and sub-provincial capital cities
 - Tier 3: prefecture capital cities
 - Tier 4: county-level cities

Note that the special administrative regions of Hong Kong and Macau

are not classified within the tier system, they are described as special economic zones.

A third indicator – population size is applied to determine the tier bracket. The core city and urban areas surrounding the main city are considered as one metropolitan area by population:

- Tier 1: > 15 million people
- Tier 2: 3–15 million people
- Tier 3: 150,000–3 million people
- Tier 4: <150,000 people.



2 | CHINA



13 Alibaba Research

People of working age in China want to spend money in stores that offer superior service and a better customer experience. These consumers care about quality and are willing to spend more on branded products with a high brand value exposing high quality. A search for convenience is another priority that is emerging, and it is an important consideration for companies seeking to serve this group of consumers.

This group would be prepared to spend more money if that would save time when buying a product or receiving a service¹³.

Successful companies are well connected in the social network, called "Guanxiwang". This is an informal network tracking the reputations of individuals and companies as a whole and is considered to be a key element for conducting business and building a consumer brand. Especially foreign entrants should be aware of the importance of building a reputation in this network.

Consumer habits for food shopping in particular are largely local and deeply entrenched in society and culture. Supply-side factors such as informality and public policy play a key role in determining what types of formats will attract shoppers.

New foreign entrants face great challenges to compete against dynamic local players, especially if they lack a deep understanding of their target markets. This is evident in the failure of most multinational grocery retailers when they wanted to expand to emerging markets like China and India. The expectation was that in every country the retail landscape would eventually consist of a combination of modern formats: full-line supermarkets, hypermarkets, convenience stores, and discounters.

These assumptions have been proven wrong. Traditional trade in China has proven remarkably resilient to their entry and hardly suffered at all.

ECONOMIC GEOGRAPHY

Economic growth soared in the last few decades mainly due to the country's increasing integration into the global economy and the government's support for economic activity. However, this economic model that has lifted hundreds of millions out of poverty and fueled the country's astonishing economic and social development has also brought many challenges. Severe economic imbalances, mounting environmental issues, rising economic inequality and an aging population are the key questions to tackle in the near future in order to ensure the country's sustainability. The Chinese economy experienced astonishing growth in the last few decades that catapulted the country to become the world's second largest economy. In 1978 –

when China started the programme of economic reforms—the country ranked ninth in nominal GDP with 180 billion euros. Now it has jumped to second place with a nominal GDP nearly 11 trillion euros.

Nearly 80 percent of the Chinese economy has concentrated over time in three coastal development areas. Evidence shows that the economic growth will be driven by the rising middle class which tends to concentrate in the peripheries of these cores and in fast-growing inland cities like Chengdu, Chongqing and Wuhan.

CHINA'S SPECIAL ECONOMIC ZONES

Special Economic Zones (SEZs) of the People's Republic of China are located in mainland China. The government of the People's Republic of China gives SEZs special (more free market-oriented) economic policies and flexible governmental measures. This allows SEZs to utilize an economic management system that is more conducive to doing global business than in the rest of mainland China.

MAIN OBSERVATIONS:

- 1 China's Urban Billion; the group of the working population aged 15 to 59, and of which approximately 521 million live in urban areas, will increase by nearly 20% to over 628 million urban workers in 2030. Impressive numbers, but the real growth will be in the doubling of the per capita spending.
- 2 Growth occurs mainly in the peripheries and inland cities, encouraged by government policies to control the population in the coastal cores of Beijing and Shanghai.
- 2 From now till 2030, around 40% of Chinese urban households will move out of the poor / low middle class

into the middle class and some into the rich groups.

- 3 The middle class will be the engine for growth;
- 4 Increasing population density and the soaring cost of living is affecting the liveability in cities
- 5 In China's cities the cost of living is increasing enormously and house prices are surging.

LIVING SPACE

Propelled by China's urban housing reform, average living space in urban areas has increased to 33 sqm. The country average of a 1 bedroom apartment lies at a purchase cost of 7,000 euros per sqm, or a rental value 955 euros per sqm per year.

This policy was also accompanied by increasingly unaffordable housing prices and an unsatisfied housing demand for many groups. In particular, vulnerable groups like the 200 million migrant workers and the young university graduates have been affected. Inherent to the growing population, cities witness an increasing pressure on housing, infrastructure and services which can negatively affect their liveability. Government bodies are working across all lines to deploy policies to enhance liveability.

WORKSPACE

Plants are at home in offices; from tech companies like Alibaba to industrial giants and western companies opening offices in China., caused by the importance of flowers in business.

Feng Shui is a strong driver of this application to bring good spirits upon the business. Plant and flowers species as well as colors are carefully selected.

WORK CULTURE

For many people, finding work opportunities means a move away

from home. More than 200 million people in China are migrant workers. Due to this, about 200 million children are left without their parents – a lot of them with their grandparents, but around 4% are living alone. In most cases, the parents only see their children once a year – during the Chinese New Year.

Continued urbanisation of China will follow the concentrated growth patterns with the rise of a number of 'super cities' and metropolitan clusters following the 'hub and spoke' regional structure. The 'super-cities' are the tier 1 and a few tier 2A cities, with a populations of 20 million or more. Under the 'hub and spoke' regional structure, clusters of medium sized and small cities develop around larger ones. In the coming decade, this will have significant implications on infrastructure investment, resource allocation and regional economic division of labour.

URBAN GREEN IN CHINA

City parks in China increased significantly with a turning point occurring around the year 2000. Up until the end of 2014, there were 13,074 city parks totaling 367,962 ha with a national average of 0,29 parks per 10,000 residents, 8.26m2 of park per capita and 2.00% of parkland as a percentage of urban area. However, there is still a large gap compared to the established American and Japanese city park systems, and only 5.4% of people aged above 20 access city parks for physical activity. The low number of parks per 10,000 residents brings up the issue of the accessibility to physical activity areas that public parks provide.

On one hand, the leading province Guangdong and its mega-cities Shenzhen and Dongguan had park indicators comparable to the United States and Japan. On the other hand,

there were still five cities with no city parks and many cities with extremely low park indicators. In China, few city governments have realised the tremendous economic benefits of direct property tax revenue, and the importance of city parks for the health and well being, which tend to reduce public spending on health care.

Research has investigated the maintenance costs of public green

space in Beijing and found that the increase in property tax revenue received by the city as a result of enhanced property value around the green space amounted €370 million annually. The annual maintenance cost incurred by the over 18,000 ha of green space was just over €200 million. In Beijing, annual maintenance cost average €1.20 per sqm per year. Source Zhang et al 2012.



Source: Kai Wang, Jianjun Liu, The Spatiotemporal Trend of City Parks in Mainland China between 1981 and 2014: Implications for the Promotion of Leisure Time Physical Activity and Planning, 2017



2 | SHANGHAI YANGTZE RIVER DELTA

ECONOMIC GEOGRAPHY

China's Yangtze River Delta Region is a thriving sector of mainland China and lies at the heart of China's rise to global economic prominence. With this rise comes a vast array of new opportunities for foreign businesses to cash in on China's deep wealth and opportunity. The region is composed of three major areas: the Municipality of Shanghai, Zhejiang Province and Jiangsu Province and they are home to six major booming cities of the region: Shanghai, Nanjing, Hangzhou, Suzhou, Ningbo, and Wuxi. The total area covers 210,700 square kilometers, nearly the same as the United Kingdom. It is considered to be the world's sixth largest economic centre.

In order to manage rapid population growth and resource and environment restrictions, the government of the core city Shanghai plans to control permanent population within 25 million people by 2020, and set a

population size of around 25 million people as the goal for permanent population regulation by 2035. The total amount of land made available for further construction till 2035 will not exceed 3,200 square kilometers. Shanghai will define a development strategy to further improve population development quality and to optimise population structure and distribution.

This implies that the government would need to control the anticipated growth of UN DESA of 5 million people. It also confirms the research findings that the peripheries will be home to the growth to come.

URBAN GREEN

Currently at 3.58 sqm per capita or 2.8% of the land area. Shanghai Greenery and Public Sanitation Bureau plans to build 1,200 hectares of new green space in 2018. Of which 540 hectares of new parks will be focused primarily in the outer districts and also encompass the Huangpu riverside and the Hongqiao commercial area.

In all, 20 new parks will be added, bringing the city's total to 240. In the coming years, green spaces will be further developed to include more than 210 kilometers of green corridors along the Huangpu and Outer Ring Road and a 1,000 meter-long shelter forest on the north side of the G15 Highway in southern Shanghai's Jinshan district. In the face of global climate change and development bottlenecks due to environmental and resource constraints, Shanghai is committed to becoming a more adaptable and resilient eco-city as well as a benchmark for international megacities in terms of green, low-carbon and sustainable development, by developing pilot spaces and infrastructures.

The ambition for 2035 is very clear:

- Ecological land will account for at least 60% of the total land area;
- Forest coverage will be 23%
- Park green space will be up to 13 square meters per capita.

SHANGHAI YANGTZE RIVER DELTA



COST OF LIVING COMPARED TO BEIJING:

+23%

COST OF LIVING COMPARED TO THE NATIONAL AVERAGE:

+42%

PUBLIC GREENSPACE PER INHABITANT:

3.57 SQM
(2.62 SQM NATIONAL)

TOTAL URBAN GREEN SPACE:

41,246 HA.

ORNAMENTALS SPENDING PER CAPITA:

€76.70

DIFFERENCE TO CHINA NATIONAL AVERAGE CAPITA SPENDING:

+63%

SUMMARY	2017	2030	CAGR	Total growth
National average per capita spending	€28	€58		
Target area adjusted annual capita spend on flowers and plants	€40	€131	16%	224%
Target area adjusted annual capita spend on major life events (services)	€11	€22	7.5%	105%
Target area adjusted annual capita spend garden or outdoor space	€14	€29	7.3%	102%
Target area annual public spending per capita on city parks and urban green	€11	€4	8%	112%
Total annual per capita spending on ornamentals in target area (public spend not ppp adjusted)	€77	€206	12%	168%
Market value target area adjusted only middle and upper class segment flowers and plants	€3,235,500,969	€11,767,432,712	18.8%	264%
Market value target area adjusted only middle and upper class garden and outdoor space	€128,841,484	€509,454,170	21.1%	295%
Market value annual city spending on urban green (public funds)	€1,296,318,652	€2,748,195,544	8%	112%
Total market value ornamentals in target area	€4,660,661,107	€15,025,082,427	15.9%	222%
Value share of the target area in total ornamentals market of China	11.65%	17.72%		
Difference to national average capita spend	63%	72%		

- The national average per capita spending is based on the China Flower Association (CFA) and Ministry of Agriculture (MOA) report on the total farmgate value plus imports minus exports. To calculate the retail value we estimated the multiplier on 2.
- In the target area we adjusted the retail value with the general cost of living correction for food and fresh produce.
- We found that specific segments in ornamentals are based on price rather than product. When calculating a market value downstream from farmgate value, such services would be omitted. We identified two main service types; the event market addressing major life events and the installation and maintenance of private and public green space.
- In this area the per capita spending on outdoor greenspace is very limited to other major markets in North America and Europe. For one, the majority of our prime target group dwells in housing with a small unit size and often no outdoor space at all. The figure is based on an assumption for a number of plants that can be kept outdoors in window sills, patio's or balconies.
- The public spending on green space consists of two components; the maintenance costs for city parks which are €1.20 per sqm annually, and the replacement and new installation of urban green-space of €100,000 per hectare. The life time is set at 30 years and increase in additional space is non-linear to population growth, but adjusted for government policies for healthier, greener cities which also have proven to provide a revenue model for a city.



3 | HONG KONG PEARL RIVER DELTA

ECONOMIC GEOGRAPHY

The Greater Pearl River Delta (PRD) region consists of nine cities in the Pearl River Delta of Guangdong Province plus the Hong Kong Special Administrative Region and Macao Special Administrative Region. The PRD region is the southern pillar of the three Chinese coastal growth clusters. In the middle is the Yangtze River Delta region, which includes Shanghai. To the north is the Beijing-Tianjin-Bohai corridor. Taken together, these three clusters account for 21 percent of China's population and just under 40 percent of its GDP.

The PRD region has the lowest population of the three, but the highest income per capita and forms an important link between China and global supply chains. It gains a distinct advantage from the free-trade, low-tax and highly globalised cities of Hong Kong and Macao—which are special administrative regions of China under its “one country, two systems” principle.

Another major asset is Shenzhen, a highly innovative “special economic zone” boasting a dynamic capital market and a

tradition of experimentation with private-sector-driven job creation and integration into global supply chains.

LIVING SPACE

The area is booming in all factors and while there is a very high demand for property, there is also a very high supply. In general prices are extremely high and space extremely small. In 2017 the average price of a new home in down town was €1.5 million and developers built 10,000 units mainly of middle to small sized apartments of less than €1 million, and the average price was driven up by the segment of the €10 million plus category. The average size continues to shrink in 2013 it was at 95 sqm and in 2017 down to 57 sqm. The studio segment of 10-20 sqm is booming at a sales of €100-200K. The average cost of a one bedroom apartment in down town Hong Kong lies at an average purchase cost of €23,000 euro per sqm, or €14,400 per sqm in the peripheries. The rental value down town is €1,800 per sqm or €1,100 outside the centre. For the peripheries like Guangzhou, the average cost of a one bedroom apartment in the urban areas lies at an average purchase cost of

€5,000 per sqm, or €2,200 per sqm in the peripheries. The rental value down town is €500 per sqm or €320 outside the centre. Guangzhou faces land shortage as well as shortages of public resources and it is estimated that the city's population will push past 18 million by 2020 without some sort of population control in effect to reduce the number of low skilled workers and bring in more qualified people. Guangzhou's natural birth rate has remained around 6.2% per year for many years, and the growth in the area has been primarily due to migrants from nearby provinces and cities. The number of migrants in Guangzhou increases by around 300,000 each year. According to the Guangzhou Academy of Social Sciences the city is almost at its maximum capacity of just 15 million, which means the city is facing a great strain, mostly due to a high population of unregistered people. This means that Guangzhou is growing too fast for its infrastructure and public services, so its population should begin to stabilize somewhat if the government enacts the population controls it is attempting. It will still remain one of the largest cities in China, and one of 8 cities in the country with a population of 10 million.

HONG KONG PEARL RIVER DELTA



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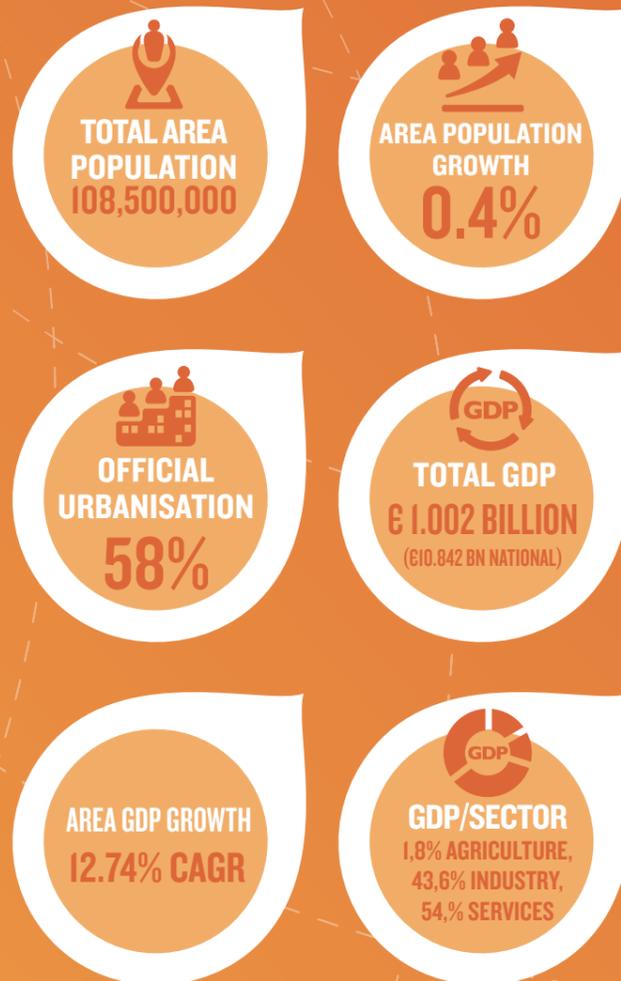
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CITIES WITHIN PEARL RIVER DELTA

- Guangzhou
- Shenzhen
- Zhuhai
- Foshan
- Huizhou
- Dongguan
- Zhongshan
- Jiangmen
- Zhaoqing

SUMMARY	2017	2030	CAGR	Total growth
National average per capita spending	€28	€58		
Target area adjusted annual capita spend on flowers and plants	€48	€134	12.70%	178%
Target area adjusted annual capita spend on major life events (services)	€10	€22	7.5%	105%
Target area adjusted annual capita spend garden or outdoor space	€17	€31	5.90%	83%
Target area annual public spending per capita on city parks and urban green	€14	€29	8%	112%
Total annual per capita spending on ornamentals in target area (public spend not ppp adjusted)	€90	€217	10.10%	141%
Market value target area adjusted only middle and upper class segment flowers and plants	€5,289,787,508	€11,585,266,356	8.5%	119%
Market value target area adjusted only middle and upper class garden and outdoor space	€453,808,916	€1,110,705,153	10.30%	145%
Market value annual city spending on urban green (public funds)	€1,502,054,780	€3,184,356,133	8%	112%
Total market value ornamentals in target area	€7,245,651,204	€15,880,327,643	8.50%	119%
Value share of the target area in total ornamentals market of China	18.11%	18.73%		
Difference to national average capita spend	68%	73%		

- The national average per capita spending is based on the China Flower Association (CFA) and Ministry of Agriculture (MOA) report on the total farmgate value plus imports minus exports. To calculate the retail value we estimated the multiplier on 2.
- In the target area we adjusted the retail value with the general cost of living correction for food and fresh produce.
- We found that specific segments in ornamentals are based on price rather than product. When calculating a market value downstream from farmgate value, such services would be omitted. We identified two main service types; the event market addressing major life events and the installation and maintenance of private and public green space.
- In this area the per capita spending on outdoor greenspace is very limited to other major markets in North America and Europe. For one, the majority of our prime target group dwells in housing with a small unit size and often no outdoor space at all. The figure is based on an assumption for a number of plants that can be kept outdoors in window sills, patio's or balconies.
- The public spending on green space consists of two components; the maintenance costs for city parks which are €1.20 per sqm annually, and the replacement and new installation of urban green space of €100,000 per hectare. The life time is set at 30 years and increase in additional space is non-linear to population growth, but adjusted for government policies for healthier, greener cities which also have proven to provide a revenue model for a city.



4 | BEIJING

THE CAPITAL BOHIA REGION

ECONOMIC GEOGRAPHY

China's National Development and Reform Commission approved a railway plan which will further integrate the cities of Beijing and Tianjin and parts of Hebei province into a sprawling megaregion dubbed Jing-Jin-Ji. One Core: Beijing. The "first responsibility" of coordinated development will be to alleviate Beijing's congestion by removing the economic activities that are not crucial to its operations as the nation's capital.

TWO CITIES: BEIJING-TIANJIN

The authorities deem these cities as the "twin engines" of region-wide development. Three main corridors for industrial development and urbanisation that form Jingjin-Ji's geographic backbone. The Beijing-Tianjin axis runs east-to-west, the Beijing-Baoding Shijiazhuang axis runs through Hebei's south-west – and the Beijing-Tangshan-Qinhuangdao axis

runs through Hebei's north-east.

Four Zones: these comprise a central zone around Beijing to provide coordinating functions; an eastern zone around Tianjin's Binhai port area for development support; a southern zone for greenfield development; and a north-west zone for ecological conservation. The government has set a population limit for Beijing, declaring the city's population should not exceed 23 million by 2020. Beijing had a population of 22.8 million in 2016. Officials also want to reduce the population by 15% compared with 2014 levels. To help achieve this goal, authorities said in April that some government agencies, state-owned companies and other "non-core" functions of the Chinese capital would be moved to a newly created city about 100 kilometres south of Beijing. A date for when those offices will have to move has not been set, but Beijing officials have already begun reshaping the city's population. The development strategy aims to strategically cluster cities that are in proximity to each other together by interlinking them infrastructurally, economically – and, to a certain extent,

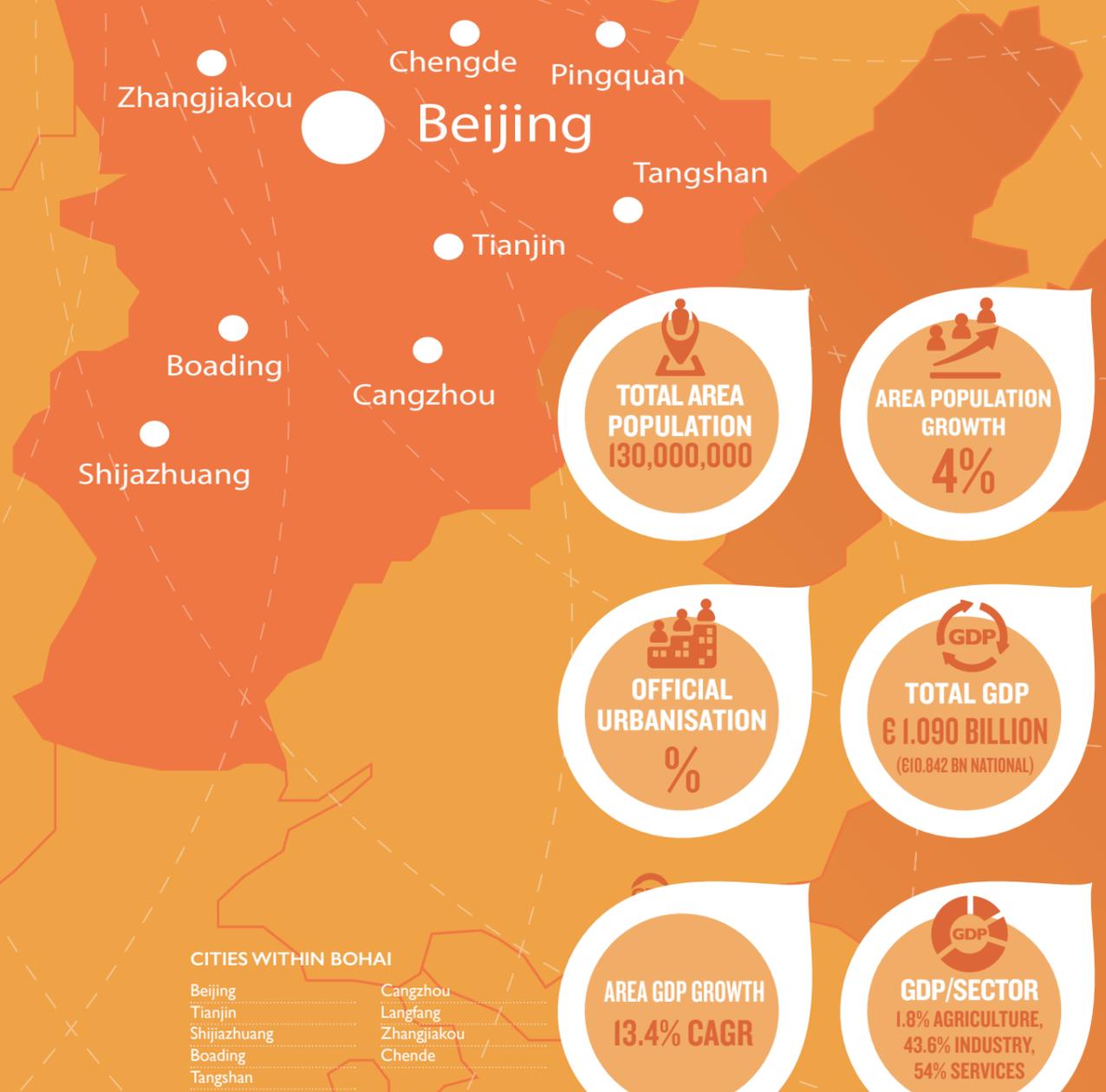
politically. The idea behind this is that further integration will allow entire regions of cities to function as singular urban organisms that can be better administered, planned, and economically developed.

URBAN GREEN

Currently at 88.4 sqm per capita. Beijing as a city has a relatively large amount of green spaces, at 88 square meters per inhabitant, which is well above the index average of 39 square meters per inhabitant. Beijing's results for green spaces and population density partly reflects the way the government draws its boundaries and includes natural forest reserves around the city.

However the surrounding cities bring down the average to an extreme. The large infrastructure development to interconnect the periphery cities and integrate into one main mega city, will definitely include vast areas of urban green. We could not find documentation on that, so that increase is not reflected in the numbers.

BEIJING THE CAPITAL BOHAI REGION



CITIES WITHIN BOHAI

- Beijing
- Tianjin
- Shijiazhuang
- Boading
- Tangshan
- Cangzhou
- Langfang
- Zhangjiakou
- Chende

TOTAL AREA POPULATION
130,000,000

AREA POPULATION GROWTH
4%

OFFICIAL URBANISATION
%

TOTAL GDP
€ 1.090 BILLION
(€10.842 BN NATIONAL)

AREA GDP GROWTH
13.4% CAGR

GDP/SECTOR
1.8% AGRICULTURE,
43.6% INDUSTRY,
54% SERVICES

COST OF LIVING COMPARED TO BEIJING:

0%

COST OF LIVING COMPARED TO THE NATIONAL AVERAGE:

+39%

PUBLIC GREENSPACE PER INHABITANT:

4.69 SQM
(2.62 SQM NATIONAL)

TOTAL URBAN GREEN SPACE:

60,922 HA.

ORNAMENTALS SPENDING PER CAPITA:

€79,96

DIFFERENCE TO CHINA NATIONAL AVERAGE CAPITA SPENDING:

+64%

SUMMARY	2017	2030	CAGR	Total growth
National average per capita spending	€29	€58		
Target area adjusted annual capita spend on flowers and plants	€45	€127	13.10%	184%
Target area adjusted annual capita spend on major life events (services)	€11	€22	7.5%	105%
Target area adjusted annual capita spend garden or outdoor space	€16	€29	5.90%	83%
Target area annual public spending per capita on city parks and urban green	€9	€18	8%	112%
Total annual per capita spending on ornamentals in target area (public spend not ppp adjusted)	€80	€197	10.40%	146%
Market value target area adjusted only middle and upper class segment flowers and plants	€3,987,704,053	€19,115,175,281	27.1%	379%
Market value target area adjusted only middle and upper class garden and outdoor space	€338,284,984	€1,663,834,805	28%	392%
Market value annual city spending on urban green (public funds)	€1,120,558,653	€2,375,584,345	8%	112%
Total market value ornamentals in target area	€5,446,547,691	€23,154,594,432	23.2%	325%
Value share of the target area in total ornamentals market of China	13.62%	27.30%		
Difference to national average capita spend	64%	70%		

- The national average per capita spending is based on the China Flower Association (CFA) and Ministry of Agriculture (MOA) report on the total farmgate value plus imports minus exports. To calculate the retail value we estimated the multiplier on 2.
- In the target area we adjusted the retail value with the general cost of living correction for food and fresh produce
- We found that specific segments in ornamentals are based on price rather than product. When calculating a market value downstream from farmgate value, such services would be omitted. We identified two main service types; the event market addressing major life events and the installation and maintenance of private and public green space.
- In this area the per capita spending on outdoor greenspace is very limited to other major markets in North America and Europe. For one, the majority of our prime target group dwells in housing with a small unit size and often no outdoor space at all. The figure is based on an assumption for a number of plants that can be kept outdoors in window sills, patio's or balconies.
- The public spending on green space consists of two components; the maintenance costs for city parks which are €1.20 per sqm annually, and the replacement and new installation of urban green space of €100,000 per hectare. The life time is set at 30 years and increase in additional space is non-linear to population growth, but adjusted for government policies for healthier, greener cities which also have proven to provide a revenue model for a city.



5 | CHENGDU-CHONGQING THE WEST TRIANGLE

ECONOMIC GEOGRAPHY

From Shanghai upstream the Yangtze, the inland powerhouse Chongqing and Chengdu can be found. It has an economy larger and growing faster than Shanghai. Chongqing's double-digit growth remains the highest in China. It is one giant construction site whose industrial base remains concentrated

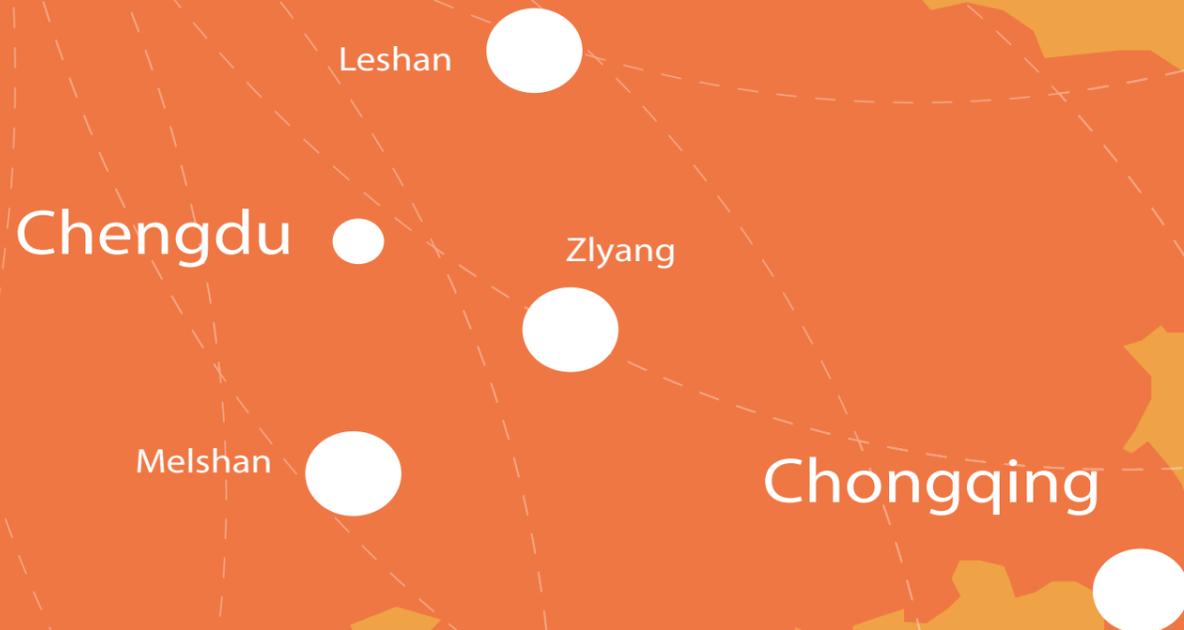
in steel and autos. Chongqing is one of 5 national central cities of China and sits in Southwest China. The area has a huge population of migrant workers, many of whom live in the city for less than 6 months of the year. Like much of China, Chongqing has a demographics problem.

While the workforce has been fueled by economic growth in the area for

the last few decades, the effects of the one-child policy is taking a toll. The workforce is shrinking, but the elderly population is growing exponentially.

As one analyst put it, China may become the first large country to grow old before rich.

CHENGDU-CHONGQING THE WEST TRIANGLE



TOTAL AREA POPULATION
118,000,000

OFFICIAL URBANISATION
%

TOTAL GDP
€700 BILLION
(€10.842 BN NATIONAL)

AREA POPULATION GROWTH
1%

AREA GDP GROWTH
13% CAGR

GDP/SECTOR
-

COST OF LIVING COMPARED TO BEIJING:

-20%

COST OF LIVING COMPARED TO THE NATIONAL AVERAGE:

+39%

PUBLIC GREENSPACE PER INHABITANT:

2.17 SQM
(2.62 SQM NATIONAL)

TOTAL URBAN GREEN SPACE:

25,589 HA.

ORNAMENTALS SPENDING PER CAPITA:

€54.64

DIFFERENCE TO CHINA NATIONAL AVERAGE CAPITA SPENDING:

+48%

2030 ORNAMENTALS SPENDING INCREASE 197%

SUMMARY	2017	2030	CAGR	Total growth
National average per capita spending	€29	€58		
Target area adjusted annual capita spend on flowers and plants	€30	€108	18.8%	263%
Target area adjusted annual capita spend on major life events (services)	€8	€16	7.2%	100%
Target area adjusted annual capita spend garden or outdoor space	€10	€24	9.6%	134%
Target area annual public spending per capita on city parks and urban green	€6	€13	8%	112%
Total annual per capita spending on ornamentals in target area (public spend not ppp adjusted)	€55	€162	14.1%	197%
Market value target area adjusted only middle and upper class segment flowers and plants	€2,460,603,840	€10,784,032,589	24.2%	338%
Market value target area adjusted only middle and upper class garden and outdoor space	€204,107,230	€937,603,635	25.7%	359%
Market value annual city spending on urban green (public funds)	€725,021,666	€1,537,045,933	8%	112%
Total market value ornamentals in target area	€3,389,732,737	€13,258,682,159	20.8%	291%
Value share of the target area in total ornamental market of China	8.47%	15.64%		
Difference to national average capita spend	48%	64%		

- The national average per capita spending is based on the China Flower Association (CFA) and Ministry of Agriculture (MOA) report on the total farmgate value plus imports minus exports. To calculate the retail value we estimated the multiplier on 2.
- In the target area we adjusted the retail value with the general cost of living correction for food and fresh produce.
- We found that specific segments in ornamentals are based on price rather than product. When calculating a market value downstream from farmgate value, such services would be omitted. We identified two main service types; the event market addressing major life events and the installation and maintenance of private and public green space.
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- The public spending on green space consists of two components; the maintenance costs for city parks which are €1.20 per sqm annually, and the replacement and new installation of urban green space of €100,000 per hectare. The life time is set at 30 years and increase in additional space is non-linear to population growth, but adjusted for government policies for healthier, greener cities which also have proven to provide a revenue model for a city.



9 | DOMESTIC PRODUCTION IN CHINA

Over the past ten years China has seen a sharp increase in demand for ornamental crops. Production is fragmented over the large number of flower growers – 85,406 of which only 15,127 are medium to large sized farms; the remainder being small holdings.

All are feeding into one of the 3,286 regional wholesale markets. Production and trade is not privately organised as it is in other markets. China also has a total of 1,881,153 farmer growers who are small holders that sell direct locally¹⁴.

The farmgate value increased from around €8 billion in 2006 to nearly €20 billion in 2016. In the same period the production area grew at a slightly lower pace doubling to 1,300,000 hectares in 2016.

Although the value of imported ornamentals also grew, the impact is relatively low. In 2016, China reported an import value of nearly €200 million. However, when analysed, the lion's share of that consists of flower

bulbs (sourced from the Netherlands, New Zealand, and Chile) and other starting material, like young plants from the USA and Japan. The share of imported fresh cut flowers is only 10% and originates from the Netherlands, Ecuador and Thailand.

In light of the massive domestic trade figures, the export value of cut flowers from China can be almost ignored at just €8 million in 2016. However, China does have stable growth of around 8% in the export trade of pot plants and foliage greens which stood at €350 million in 2016. This is principally the result of regional trade in South East Asia¹⁵.

ORNAMENTALS DEMAND IN CHINA

Due to the weight and potential global impact of the middle class in China we want to gain insight into the value of the ornamentals this group could represent. To arrive at such a forecast, we will need insights on present behaviour. We could not find any consistent information on consumer

behaviour for ornamentals demand in China.

To fill this gap in data, we conducted a series of qualitative interviews among flower retailers in three channels. In September 2016, a total of 153 interviews were conducted, mainly via telephone. Respondents were randomly selected across major urban areas covered in this research. The interviews were open conversations, covering a series of topics and were conducted by native speakers.

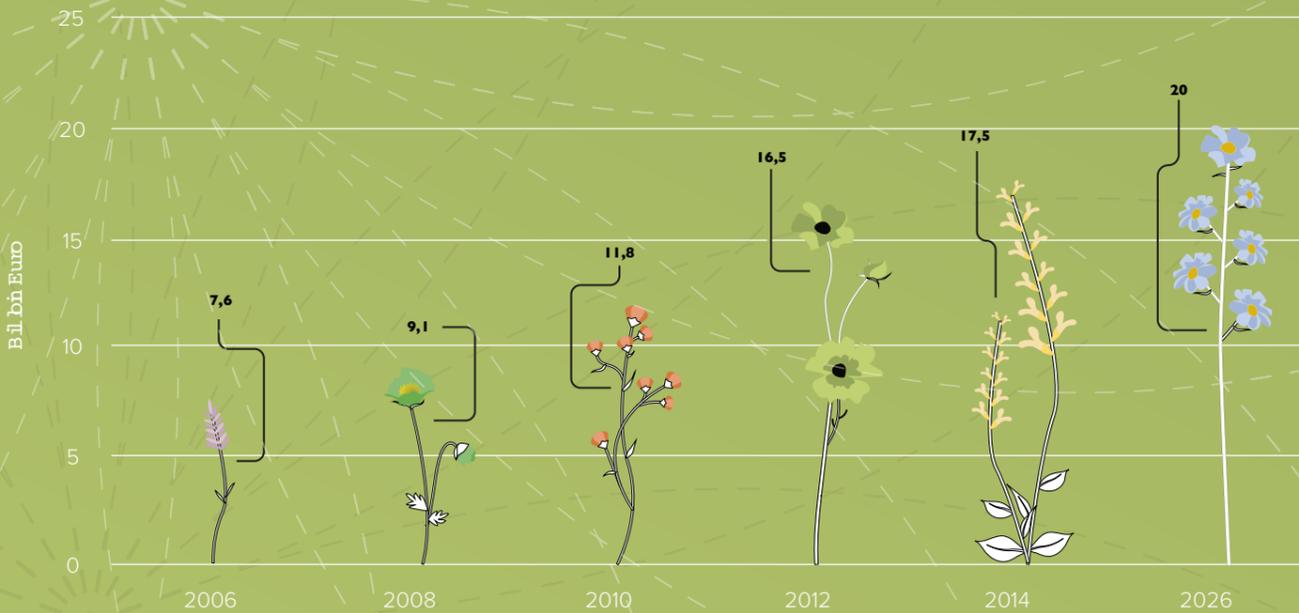
TRADITIONAL FLORISTS

In total, 121 traditional floral retailers (florists) were interviewed. Two categories of questions were asked. One category related to consumer behaviour, and the other focused on how florists see the future for their own businesses. In terms of consumer behaviour, the reported motivation use is gradually changing from the stereotype of gift giving to a mixture of motivations.

¹⁴ Chinese Ministry of Agriculture Statistic Bureau, 2016

¹⁵ Chinese Ministry of Agriculture Statistic Bureau, 2016

Figure 3: Total Farm Gate Value Ornamentals in China in Billion Euros



Source: Chinese Ministry of Agriculture Statistic Bureau

16 AllChinaTech, 2016
17 Tianyi Li
18 Statista

gaining popularity among the young upper middle class. This trend can be observed clearly in tier 1 cities like Shanghai.

Less developed cities lag behind. Customers for florists are mainly between the age of 20 and 40. For the young customers, simple arrangements with light-coloured flowers are preferred as gifts.

Sales around events can be ten times higher than sales on ordinary days. The event with the highest flower sales is Valentine's Day, as long as the date does not conflict with the Spring Festival. In the second category of questions that pertained to their own business, florists revealed they are gradually expanding their businesses and trying various new channels or platforms for selling and advertising. Retailers are diversifying by offering flower workshops, event design and even developing cross-channel concepts by adding a coffee shop or restaurant to their shop. Also, e-commerce is getting more attention. WeChat is popular for advertising and keeping contact with regular customers. Respondents said that problems like poor logistics, low quality and consumer distrust for

online platforms will limit the further growth of online flower sales.

ONLINE RETAILERS

Data provided by Alipay, the number one provider of online payments in China, gives an impression of the online shopping behaviour of Chinese consumers¹⁶.

In 2015, the Alipay users of Shanghai had the highest online spending on goods with an average annual spend of €15,000. Zhejiang had an average of €13,000 per person. Such high rates make it relevant to take a close look at the behaviour of buyers towards ornamentals and the underlying supply chain. The large consolidated platforms were reluctant to co-operate in our research, but we found some 20 online retailers active on Taobao that were open to being interviewed. We learnt the following:

Online orders are generally fulfilled by traditional florists close to the delivery point. These products are sourced from local wholesalers, who in turn buy the flowers mainly from Yunnan Kunming's Dounan Flower Market. There are some retailers that produce flowers, but due to

the fact that they are located in Yunnan province, we suspect they are forward integrated growers with an online shop. One of the most popular online retailers on this platform is RoseOnly. Their popularity cannot only be ascribed to the high-quality product they sell; they have strong marketing with celebrity endorsements and offer unique packaging. Their flowers and arrangements are perceived as luxury gifts, and consumers are willing to pay (extremely) high premiums. Regarding the questions pertaining to the financial information on buying behaviour, nearly all respondents refused to give information. A few gave vague answers and pointed to the fact that the purchasing power differs for the regions, income levels and seasons. We could identify a bandwidth of €13 to €27 for average spend and learned from one respondent that purchases of €500 and more are very common.

Marriage is a major life event, especially in China where the dynamics are unique. Historically, the Chinese have spent big on weddings and currently the average wedding costs a couple around €9,000¹⁷ and

is often co-sponsored by parents of both sides.

Despite the fact that marriage rates are in decline, the rising middle class finds in a wedding the perfect occasion to display their wealth and personal style. To get an understanding of the market value for ornamentals, we interviewed 12 wedding organisations in provinces with the highest numbers of marriages¹⁸.

Respondents usually cooperate with local retailers or even independent floral designers and wholesalers. The amount spent on wedding arrangements by couples is much higher for Beijing than average China, where respondents mention a specific demand for imported flowers, like large roses. The population of respondents is far too small to provide a representative status and outlook on the value of this segment. However, the insights gained illustrate a picture showing that higher spending is concentrated in the large cities and the current generation is spending heavily on pre-wedding photo shoots which are used to announce the wedding. These shoots are often done in sets decorated with flowers. The respondent's bandwidth of average spending varies between €800 and €1,500. The highest average spend was €10,000 as reported by one respondent in Beijing.

CHINA'S SALES CHANNELS FOR ORNAMENTALS

Flowers and plants are still mainly bought through traditional sales channels such as florists, super- and hypermarkets, gas stations, nurseries, agri-product markets and flower markets¹⁹. However, as already outlined, online sales is soaring and flower retailers such as RoseOnly and PandoraFlora are capturing that growth. There are also a large number of flower sellers on Taobao, the largest consumer sales

platform²⁰. Furthermore, in recent years e-retailers have experienced an increasing demand for online fresh agricultural food products such as vegetables, fruits, meat and dairy products²¹. Although fresh food products bought online currently contribute less than 1% to total retail sales, e-commerce operators perceive agricultural products as a highly attractive market. Since there is an increasing demand for fresh products offered online, this might point to opportunities for the online sale of fresh flowers and plants.

Research by Nielsen in 2015 has provided more insight into consumers that are interested in purchasing fresh food products online. The findings showed that young urban consumers of the upper middle class were the most interested in buying fresh products through online retail channels. Unlike the older generations, young consumers prefer shopping and comparing prices online rather than in traditional stores. The average age of the shoppers for fresh produce was 33, they were mostly highly educated (a bachelor degree or higher) and had a household income with an average of €19,000. Although consumers buy fresh products less frequently online than through traditional channels, consumers overall are spending more money on fresh products online. Furthermore, when comparing the results across city tiers, consumers in tier 1 cities are more likely to purchase fresh products through online channels compared to tier 2 cities²². Recently many new entrants have tried to jump into the online market of fresh produce, and many failed. This can largely be ascribed to the lack of standardisation, the high logistical requirements and the perishability of fresh produce. According to HKTDC Research, the average cost for fresh produce sold online in China is twice the average cost for other products due to high storage and transport

costs. Despite the challenges that retailers face, the market share of fresh produce sold online is expected to increase by 60% by 2030 and reach a total value of € 29.6 billion²³. The overall demand for fresh consumer products is growing rapidly and these perishable food products offer an opportunity and a challenge in one.

19 NABSO Kunming, 2010
20 KPMG, 2015
21 HKTDC Research, 2016
22 AC Nielsen, 2015
23 Nielsen

Figure 4: Per Capita Fresh Food Consumption in China in Kg



Source: China Statistical bureau and own calculation¹¹

24 Forecast is based on a linear extrapolation and seems conservative.

Ornamentals can potentially piggy-back on the new network and modalities, but in terms of value it is likely that the perishable food stuffs will have priority over ornamentals. On top of this will be the challenge of maintaining a controlled atmosphere for ornamentals and protecting them from the hazards of a supply chain alongside food products (e.g. ethylene damage from fruit). Are there any cultural aspects here? Do Chinese want to beautify their homes with flowers, do they have space for this? Is it a given that they would follow the West down this route or could other products fill this gap without the necessary marketing etc?

PRIMARY PRODUCTION CHALLENGES TO FEED A GROWING POPULATION

An overwhelming majority of the available arable land is used for producing food in China. The room for China to reduce land used for non-food crop production, in order to produce more food crops is minimal. Volume increase can only be

achieved through yield improvement. Meat consumption is expected to increase strongly as income further increases. However, China's capacity to produce more animal products is stretched. More meat and dairy output will require more feed while China's ability to substantially increase its raw feed output is very limited.

China has managed to produce a large amount of food to meet rising demand from Chinese consumers. Looking into the future, China's ability to provide staple cereal foods, (rice and wheat) from domestic sources is promising. The question is whether China can effectively avoid the further decline of available arable land. The demand for land for non-agricultural use is strong, for example for road construction and urban expansion. The other is whether the Chinese government can effectively boost R&D investment, thus improving crop yields and productivity per hectare. The rising per capita demand for fresh produce is growing steadily. We show this to illustrate a proxy for ornamentals and illustrate a competition for domestic natural resources

to grow produce and ornamentals, as well as competition for logistics capacity.

Figure 5: National Transport and Logistics Corridors



Source: China Ministry of Commerce

CHINA'S SUPPLY CHAIN AND LOGISTICS

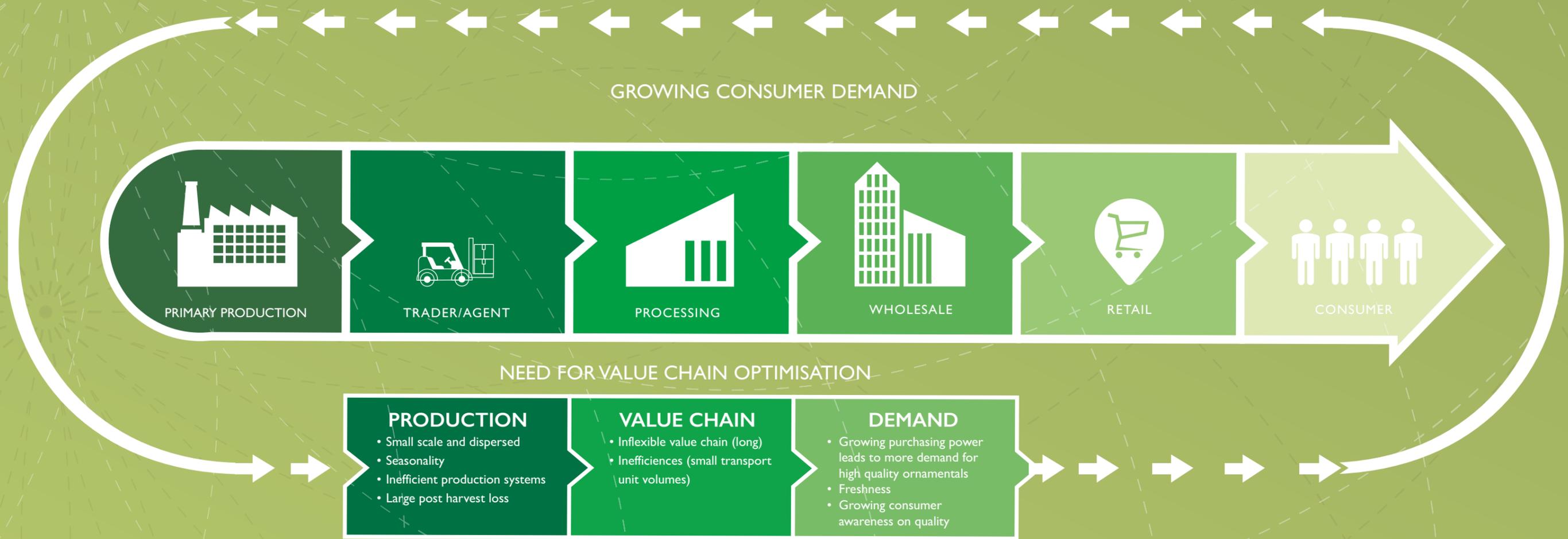
The urbanisation of China will follow concentrated growth patterns with the rise of a number of large urban areas following the core and periphery structure, or in logistic terms the hub-and-spoke model. In the coming decades, this will have significant implications on infrastructure investment needed to interconnect these markets. The below image shows the current back bones which may give the impression that the cities where growth is expected are generally well connected. However, the image

does not show capacity – and that is where the challenges will be not only ornamentals. Despite the national policy arrangements and the execution, demand for logistics capacity seems to outgrow the projected capacity in the various modalities.

In ornamentals, this raises the question is the current supply chain and its players equipped to deal with the increasing pressure? They will have to face the tremendous volume growth in not only product flow, but increasingly in the information flows due to the shift towards online platforms that tend to rely on traditional players for order fulfilment. The value chain will

need to optimise and consider the following; (figure 15)

Figure 6: Value Chain Bottlenecks and Optimisation



Moreover, China's demand hotspots for ornamentals are not within easy reach of the current production centres. We only have production data at a provincial level, but these indicate that there are opportunities for improving the logistics, in particular the transit time, and improvement of the cold chain. Reduction of waste could be a key to satisfying rising demand whilst preserving input resources.

Localising production closer to future demand is not always feasible, but could be an opportunity for specific

propositions such as a hybrid garden centre and nursery operations.

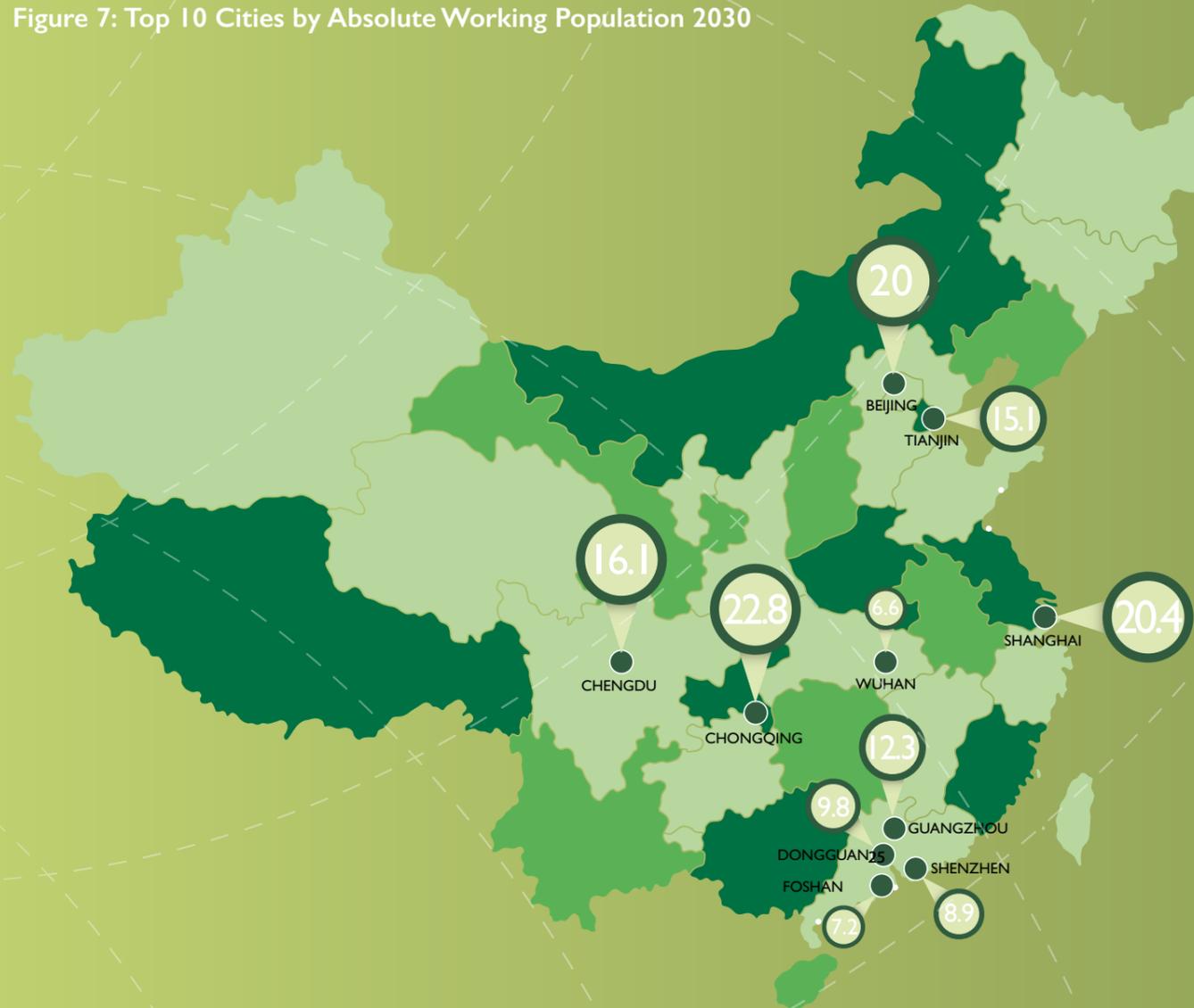
China's industry players and various government bodies are working hard to develop solutions and policies to grow domestic production for the growing domestic demand. Meanwhile, the Chinese market offers ample opportunities for foreign growers and traders to feed that demand.

The presented findings on China's current challenges suggest that the economics of a comparison

between domestic grown flowers, possibly could be less advantageous than foreign grown imports shipped directly to the demand centres.

WORKING AGE BY POPULATION BY 2030 (MILLIONS)

Figure 7: Top 10 Cities by Absolute Working Population 2030



²⁵ Selling prices received by domestic producers for their output. The prices included in the PPI are from the first commercial transaction.

ECONOMICS

Nearly 80 percent of the Chinese economy pivots around three economic cores: Beijing, the Yangtze River Delta (Shanghai) and the Pearl River Delta (Guangzhou and Hong Kong). However, if we look at where the growth of the working class is to be expected, the smaller cities around the cores of these deltas stand out. Three inland cities also attract attention with their growth of the target group: Chengdu, Chongqing, and Wuhan, mainly caused by large numbers of migrant workers.

ORNAMENTALS FORECAST CHINA

Previous research often showed a linear growth for the forecast period. We developed a model which allows for a variety of variables and attributed weights. This is summarised in four scenarios:

1 A simple linear extrapolation based on data of the past farm gate value across all ornamentals growers between 2006 and 2016. Data was obtained via the China Flower Association databases of the Chinese Ministry of Agriculture

2 A growth scenario based on compound annual growth of the industry which is at nearly 22%. Based on the same dataset as in scenario 1.

3 A scenario fully based on the average consumer spending increase over the past 20 year period which is at 12.98%

4 A scenario based on a combination of the above plus a weighted average of both the variables that affect production (such as farm inputs and the producer price index)²⁵

Figure 8: China Ornamentals Farmgate Value Forecast Scenarios in Billion Euro

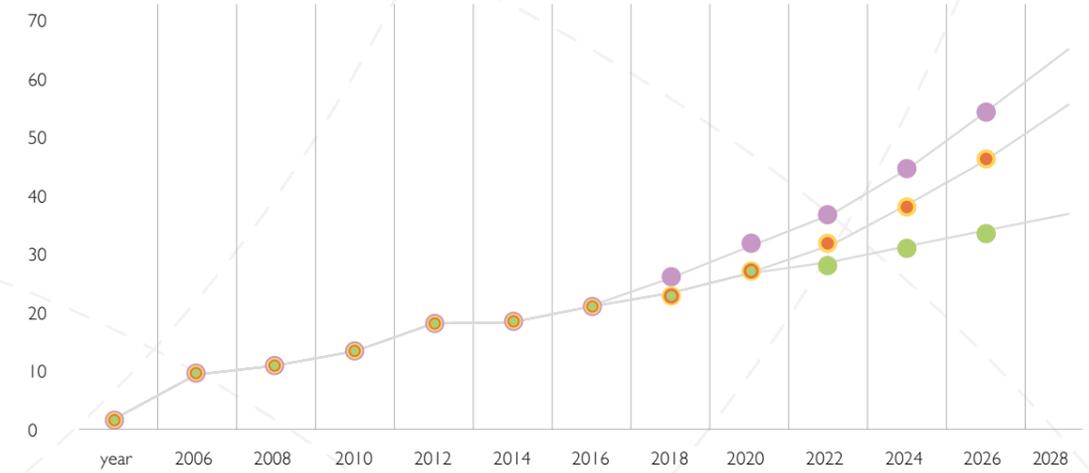
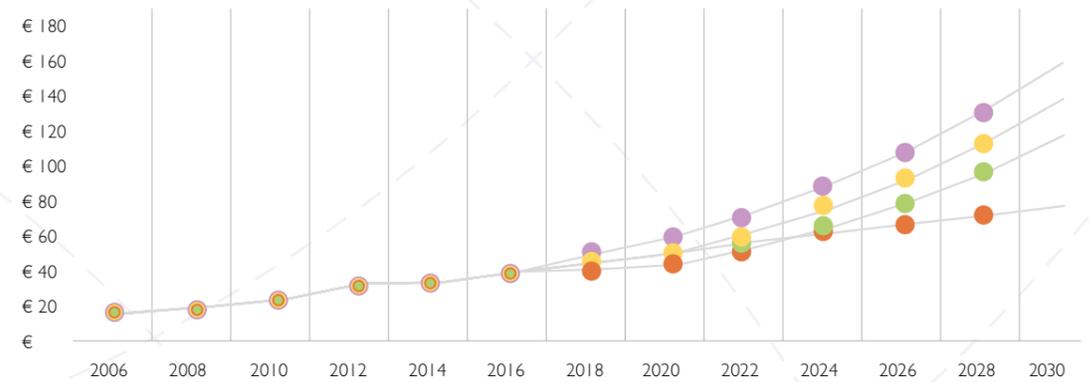


Figure 9: China Ornamentals Retail Value Forecast Scenarios in Bn Euro



- Simple linear extrapolation
- Scenario on overall retail sales across all categories
- Forecast on past ornamentals production growth
- Scenario on weighted variables of production and demand

To summarise the forecast; we are sure of the demand growth in China; the macro and socio-economic factors are heavily researched and frequently updated by global and national institutions. Although developments in the past show a steady direction of growth, the ornamentals industry remains vulnerable to many external variables. Factors out of the industry's control like natural resources, climatic conditions, government policies, consumer behaviour, etc are at play around the development of this sector.

The forecast we have made not include these variables. So, provided that not too many disruptive events occur;

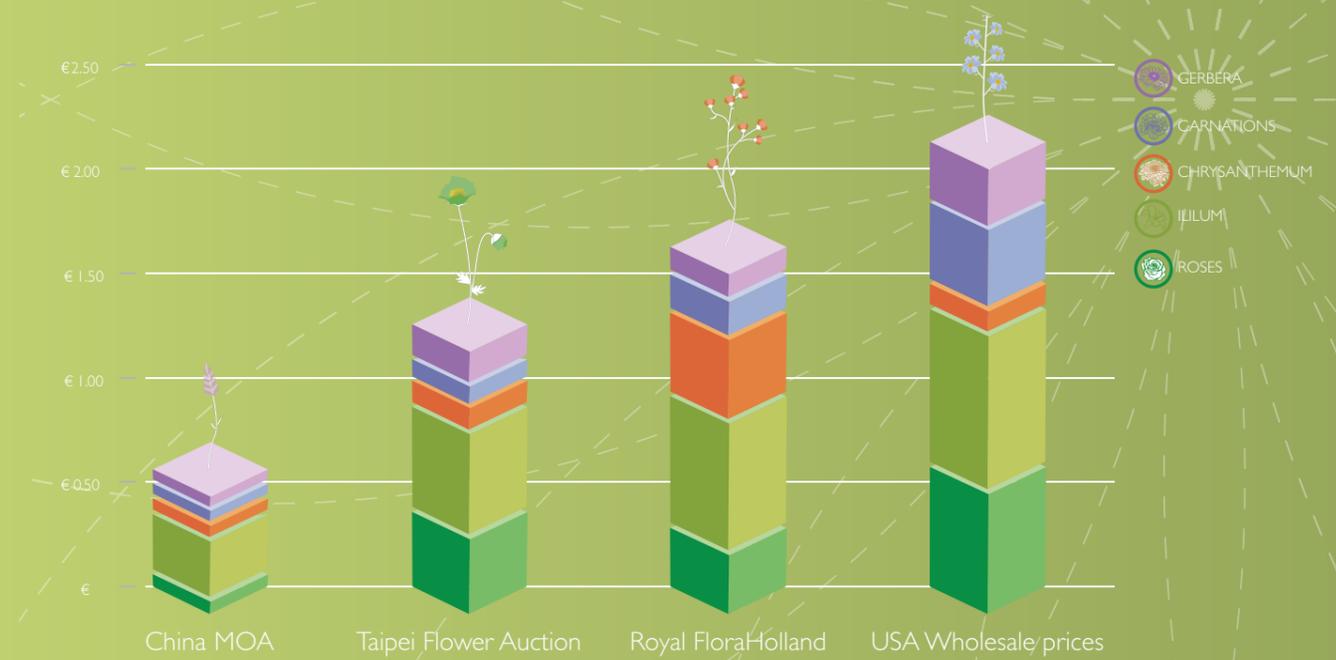
the direction for China's ornamentals industry is clear: by 2030 we expect China to be a super power, if not the leading country in the ornamentals market with a conservative estimate of a retail value in the range of €100 billion²⁶. Most of that demand will be met with domestic grown product.

²⁶ Extrapolated figure of China MOA and MOC reported farm gate values. Extrapolation is based on World Bank long term crude economic growth, and we have adjusted for shifts in socio demographic composition and income development. The figure excludes the service segments and the public spending on city parks



Two women are picking chrysanthemums from Africa, in greenhouses, Luannan, Hebei, China

Figure 10: 2016 Basket Value and Unit Price of top 5 Cut Flowers at wholesale level



Source: China MOA (CHINA Ministry of Agriculture), International Statistics Flowers and Plants 2017 Yearbook (AIPH & Union Fleurs)

The question remains where the supply will come from? Without doubt, China will continue to develop domestic production to be optimally self-sufficient. This will leave a gap between supply and demand due to seasonality, climatic and resource constraints or simply the economics of production. Most of these variables cannot be reliably predicted, so we have taken production economics as a benchmark to assess where supply is likely to come from. We have taken the average 5-year unit values at wholesale level of each of the top 5 cut flowers in a combined basket. This shows a significant difference and illustrates the barriers for global competition with China's domestic production.

In light of the highly competitive advantage on price that local Chinese growers have, addressing the mainstream demand of China with imported ornamentals will be difficult. Based on the Producer Price Index, Chinese growers are likely to retain that advantage throughout the forecast period. For the higher-value and niche products there will be more

opportunity for other countries to export to China. The supply and demand gap is theoretically two-fold as China could further develop into an exporter of ornamentals. This is an ambition of respondents, however other inhibitors like plant breeder's rights, trade agreements, phytosanitary regulations or logistic interconnectedness are important prerequisites to enable a strong export position. This is not developing quickly so we do not expect to see a significant increase in export volume in this forecast period.

SUMMARY ORNAMENTALS IN CHINA'S URBAN CORES

We established that growth is concentrated in the urban working age group and selected the four largest metropolitan clusters for a case study in each area. This is summarised in metro sheets. We use those metro sheets to present

the status quo and forecast on a consistent fashion for Metro Clusters or specific cities around the world.

- The four largest urban areas cover 45 cities with a population of larger than 1 million.
- The total population in these four Metro Clusters is 471 million people (34% of total China) this is projected to grow to 573 million in 2030 (39% of total China)
- Their combined total consumer spending in flowers and plants is €16 billion in 2017 (40% of total China) which is expected to grow to €57.5 billion in 2030
- Additionally, the local governments of these four areas spends €4,6 billion per year on city parks and urban greening, for maintenance as well as new installations and replacement. In 2030 we project this to be €9.8 billion per year.



9 | RETAIL RESEARCH SUMMARY OF THE FLORAL RETAIL SURVEY IN CHINA

CONDUCTED SEPTEMBER 2016

Current research has provided insight into consumer behaviour with regard to floriculture products. We describe the results of the interviews that were conducted and the surveys that were spread. First the results of the physical retailers, the florists, are discussed. Then the findings of the online sellers on Taobao are presented. In the final paragraph, insights from wedding organisations are discussed.

FLORISTS

In this section the findings from the telephone interviews with Chinese floral retailers are presented and analysed. The researchers asked questions about aspects such as customers' age groups, motivations

and preferences for products and the retailers' attitude towards e-commerce and imported flowers. In total 121 retailers were interviewed. They were randomly selected across the major urban areas covered in this research. The interviews were open conversations, covering a series of main topics and have been conducted by native speakers. We found 105 retailers immediately open for an interview by phone and 16 retailers filled in a questionnaire.

As shown in table 5.1, a large proportion of the retailers are located in Jiangsu, Zhejiang and Guangdong provinces. The findings showed that the retailers in Shanghai had very different perceptions with regard to consumption motivations and popular species than the other retailers that

CHINA: LOCATION	NUMBER OF RETAILERS
Shanghai	25
Jiangsu	28
Zhejiang	23
Guangdong	13
Other provinces/cities (Beijing, Fujian, Shanxi, Shanxi, Ningxia, Jilin, Henan)	32

Table 1. Location of Retailers in the Survey

participated in the study. The findings in Shanghai are different from almost all the other cities in China, except for Guangdong province. Unfortunately, retailers in Guangdong province were not very open during the phone interviews.

Figure 11. Age Groups of Customers

100%

80%

5%

42%

10%



As shown in Figure 5.1, the majority of customers are between 20 and 40 years old. The people in the age group of 30 – 40 are in the majority. According to the retailers, this is because flowers are perceived as very decent gifts in China and only senior people, tend to choose to buy expensive bouquets. Although there are signs that the situation is changing with more young people buying for their own consumption, the stereotype is hard to change, especially in less developed areas. In tier 3 cities like Nanchang in Jiangxi Province, expensive bouquets are still the main products. The retailers in that province reported that their target customers are senior people who pursue a higher quality and not young people (below 30) who can hardly afford a gift of 200 RMB (€27).

The following results concerning consumers' preference focus mainly on young consumers (below 30) to better represent future consumption trends. In general, gift giving is the most important motivation and own consumption is becoming more popular among young customers. Also, gift giving for business partners is gradually declining and gift giving for friends and relatives is increasing.

For young people (below 30), gift giving to business partners like clients and superiors is declining, but still has a significant contribution to the total sales volume. As shown in Figure 5.2,

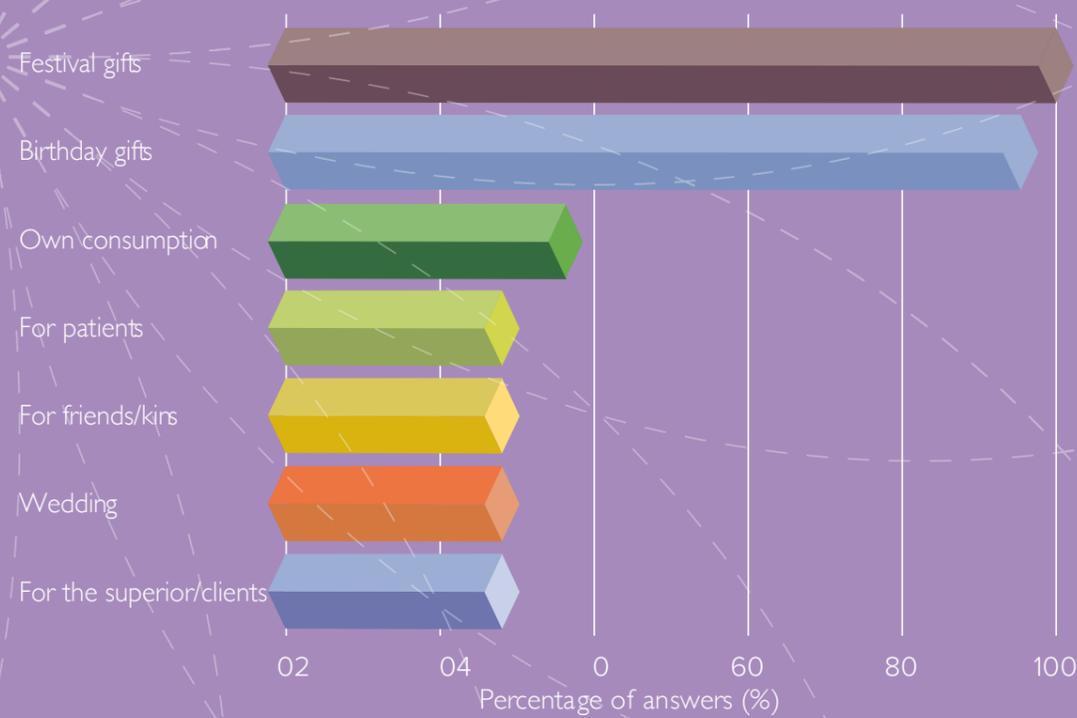
all the retailers recognised that young customers are quite willing to buy flowers for festivals and birthdays. Retailers who profited a lot from gifts for clients reported that in recent years the consumption for this motivation has declined because of the anti-corruption campaign. However, it still has a large market share probably because the price per product for this purpose is much higher compared to motivations like gifts for friends' birthday. It is stated by a retailer in Shanghai that customers will spend about 200 – 300 RMB (€27 – €41) for friends or own consumption and 300 – 800 RMB (€41 – €107) for a business gift. One retailer in Shanghai, said that the profit in a week during the Spring Festival is sometimes equal to the total profit in a year. Also, the impact of policy varies from region to region. One of the retailers said that political situation heavily impacts customers' preference in Beijing while other cities, like Guangdong and Shanghai, are less influenced. An example given by the retailer is that perennial flowers have become a popular choice for gift-giving in recent years due to the anti-corruption campaign. Besides, for many florists their main income depends largely on a business market of companies ordering flowers regularly for office decoration and birthday gifts for employees.

Gift giving for friends and relatives is the most important motivation during festivals. Flowers sell best for Valentine's Day if the date does not conflict with the Spring Festival.

It is reported by 67% of the retailers that the sales for the best-selling festival like Valentine's Day can be ten times as high compared to sales on ordinary days. Sales for Valentine's Day are ranked as the highest by 62% of the retailers. The only reason for Valentine's Day not being ranked as the first place mentioned by retailers, is that the date for Valentine's Day occasionally conflicts with the Spring Festival when large numbers of the young working age leave their work places and return to their hometowns for a family holiday. Besides for Valentine's Day, Qixi Festival and Mother's Day are also important festivals for flower sales.

Buying flowers for own consumption is becoming increasingly popular among young consumers. However, there is a difference between tier 1 cities and other cities. To be specific, the own consumption increases very fast in tier 1 cities like Shanghai while in other cities, even the leading tier 2 city like Hangzhou, this trend is less visible. All the retailers in Shanghai reported that flowers bought for own consumption consist of about 50% of the total sales, while retailers in other regions reported much less sales for this motivation. One retailer in Shanghai, located near office buildings, reported that female office

Figure 12. Young People's (Below 30 Years Old) Main Motivations for Purchasing Cut Flowers



workers are their major customers and most of these customers are buying flowers every week to decorate their desks.

Moreover, there is an emerging trend of florists that do not solely depend on the sales of flowers. Instead, florists increasingly invest in other activities, like a restaurant or a café. A lot of them also offer flower arranging courses. One retailer in Shanghai teaches customers the techniques of embossing dry flowers and lets customers create their own products. Another owner of a flower shop in Hangzhou explicitly said that the flower or plant itself will not bring much profit and the real income comes from services he offers like event design, plant and flower arrangements, and flower workshops.

About 80% of the retailers interviewed sell imported flowers which they source from distributors in Beijing, Shanghai and Guangdong. All of these retailers have an occasional demand for large roses from Latin America or Africa. The reason for

importing from overseas is to get a higher quality. The general opinion is that there is large and fast-growing demand for flowers with a better quality, but that imported flowers are expensive and the quality of local flowers is gradually improving. Most traditional florists retailers do not have a high faith in e-commerce. However, Wechat is very popular for advertising and contacting their regular customers. Most of the contact information of the retailers can be found on www.dianping.com, a website where people give comments and get coupons for goods, which might lead to a biased result of online shopping trends. Even so, all the retailers showed some kind of disapproval of online flower shops in Taobao with the main concern being that of flower quality. Nearly half of them showed keen interests in Wechat as a way of advertising the shop and receiving orders from regular customers.

There are more reasons for this disapproval of e-commerce. The most important reason restricting

the online shops mentioned by the retailers is transportation, which might greatly harm the flowers. The second reason they gave had to do with the inhomogeneity of demand. As analyzed before, flower sales during festivals can be ten times higher than the sales on an ordinary day. Moreover, it is only possible to prepare the bouquets one or two days before the festival due to the shelf-life of flowers. Especially during Qixi Festival, which takes place in July and August, the flowers can only be prepared one day before the festival since they cannot stand the heat. Therefore, half of the retailers also mentioned that one problem online shops is that they might be overloaded during festivals. Another important reason against online shops is the mistrust between retailers and the online platform operators. A third of the retailers reported that some of the online platforms charge too much and ask for the cheapest price regardless of the quality.

In conclusion, two categories of questions were asked. One category of questions was about consumer

behavior. In general, flowers usages are gradually changing from the stereotype of gift giving to a mixture of all kinds of motivations. The gift receivers are changing from the superior and clients to friends and kin. Among all the other motivations, own consumption is gaining popularity among the young upper middle class. This trend can be observed clearly in tier 1 cities like Shanghai. Less developed cities lag behind. Customers for florists are mainly between the age of 20 and 40. For the young customers, simple bouquets with light-colored flowers are preferred as gifts for a friend's birthday and festivals. Festival sales can be ten times higher than sales

on ordinary days. The festival with the highest flower sales is Valentine's Day, as long as the date does not conflict with the Spring Festival. The other category of questions focused on retailers' attitudes and behaviors. In general, florists are gradually expanding their business and trying various platforms for selling and advertising. Retailers are paying more attention to the customer's shopping experience by offering flower arrangement courses, opening theme cafe, etc. Also e-commerce is getting more attention. WeChat is popular for advertising and keeping contact with regular customers. Problems like poor logistics and distrust for

online platforms are the main reasons reported by the retailers that limit the growth of e-commerce.

ONLINE RETAILERS

In a current study, 20 online retailers active on Taobao were interviewed. Questions were asked about the following topics: current trends of online sales; main species sold online; the main consumption age group; popular types of flowers purchased by different age groups of customers; the reason of the purchase, the influence of festivals, the consumption expenditure per time and the source of the flowers that e-retailers are able to sell online.

Figure 13. The Proportion of Online Sales Flower Species, 2016

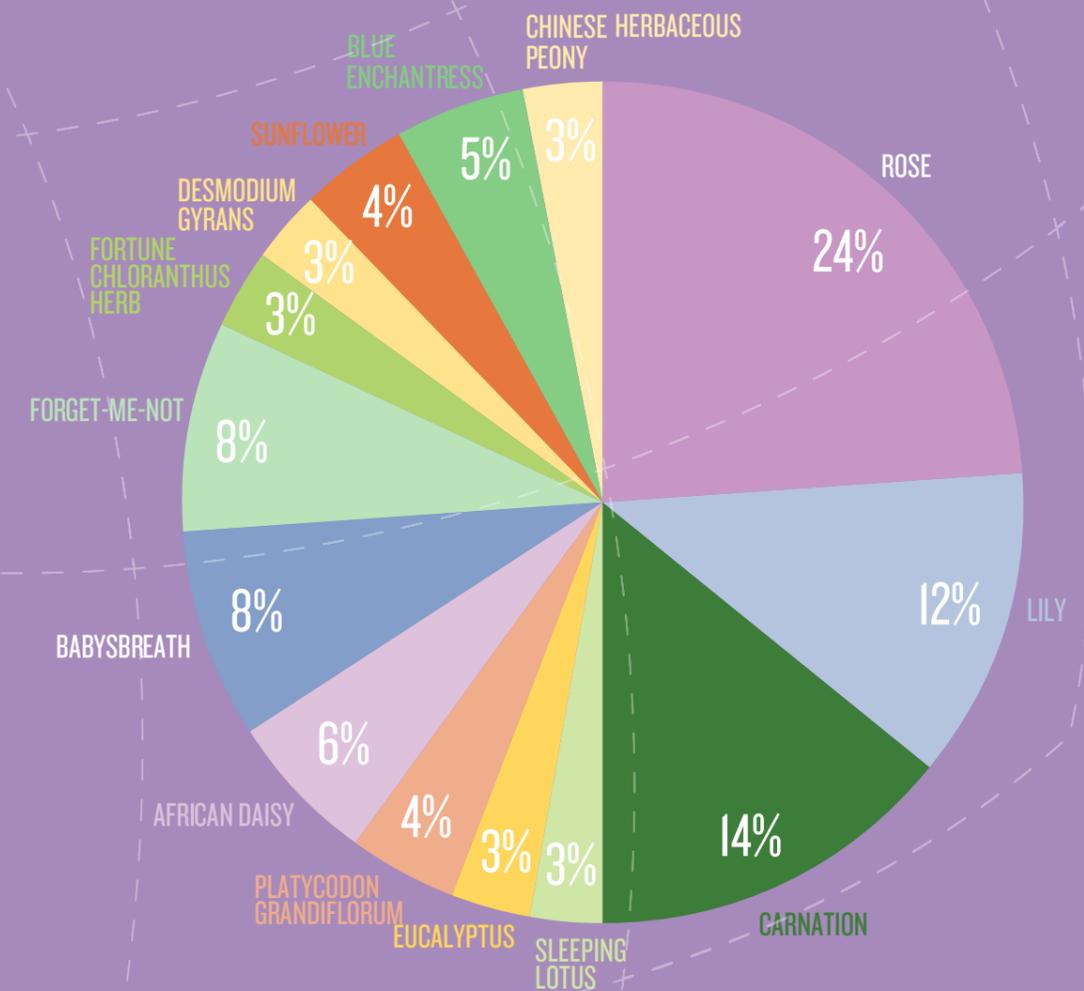


Table 2. Cut flower varieties by consumption purpose

MOTIVATION	THE MOST POPULAR TYPE OF FLOWER FOR THE PARTICULAR MOTIVATION
Go to hospital	Flower & Fruits basket, Lily
Showing love	Rose
Apologise	Rose
Anniversary	Rose
Buddha	Sleeping Lotus
Store Opening Day	Lily, Rose, African Daisy
Mother's Day	Carnation, Rose
Teacher's Day	Carnation
Tree-Planting Day	Carnation, Sunflower
National Day	African Daisy, Sunflower
Valentine Day	Rose

CUT FLOWER INTERVIEWING RESULTS

16 of the 20 participants indicated that online floriculture sales are higher compared to previous years. However, 3 retailers said that increased competition amongst retailers has resulted in decreasing sales. Only one retailer said that the sales level compared to the past was the same. Flower species such as Rose, Lily and Carnation have the highest online sales volume. It is worth mentioning that 16 of the 20 retailers mainly sell roses. Although roses are traditional species that have been sent to others for a long time, nowadays, there are a lot of varieties of roses with different colors and symbolic meanings that match the values of young people. One of the most popular online retailers of roses is RoseOnly. The popularity of RoseOnly can not only be ascribed to the high-quality, but also to factors such as celebrity endorsements and unique packaging. This end-product is perceived as a luxury. Consumers are willing to pay extremely high prices in order to obtain this additional value.

The flower species such as Baby's breath, Forget-me-not, Sleeping Lotus, Sunflower, Blue Enchantress, Eustoma

grandiflorum, Eucalyptus, Desmodium Gyrans and Fortune Chloranthus herb are also very popular. Figure 13 gives an overview of which species were mentioned by the respondents when asked about what is popular among consumers.

With regard to the age groups consuming flowers, the main consumption group are young people (i.e. white-collar workers and students). They prefer rare imported species such as the Chromatic Rose, roses with a rare color and the Tulip. Young male consumers buy roses to show their feelings to their lovers or as a way to make an apology. Young female people mostly buy flowers like the Daisy or the Sunflower for their own consumption in order to improve their mood. In addition, one retailer indicated that young people prefer to buy Lillies since they have a relatively long shelf life.

Another consumption group is middle-aged people. They tend to buy traditional flowers with an intense and pure color such as the red Rose or fragrance species such as the Chinese Herbaceous Peony, the Platycodon Grandiflorum and the Sleeping Lotus. Middle-aged people buy primarily for their business partners or for an anniversary. Despite the fact that

internet is not very popular among old people, one retailer said that old people still make a purchase mainly of the Sleeping Lotus for Buddha.

When considering the role of festivals, all the interviewed retailers said that festivals have a great impact on the sales. They mentioned that Mother's Day and Valentine's Day increase the sales significantly. With regard to Mother's Day, the retailers said that nowadays young people prefer to buy roses instead of carnations for their mothers. On Teacher's Day and Tree-Planting Day carnations and sunflowers are very popular. On National Day, Chinese consumers mainly purchase the African Daisy and the Sunflower.

Moreover, consumers like to send the African Daisy as a gift to friends or colleagues when they celebrate the opening day of their store. Other purchase motivations for buying flowers include celebrating a birthday, decorating an office, decorating a house/dormitory and air purification. Table 2 shows an overview of which varieties of cut flowers are preferred for which consumption purposes.

As far as consumption expenditure is concerned, not all of the retailers were willing to give information about

Table 3. Location of Wedding Companies

LOCATION	NUMBER OF WEDDING AGENCIES
Jiangsu	3
Zhejiang (Hangzhou)	2
Guangdong	1
Other provinces/cities (Bei-jing)	1

this. Retailers gave vague answers when this question was asked, due to the fact that the purchasing power differs heavily for different income levels. A RoseOnly salesperson said that consumers purchasing power ranges from 9 to 999 roses per time.

One retailer shared specific information about the following. People who buy flowers for themselves are willing to spend between €13 to €27 per purchase. Wholesalers purchase large quantities of flowers; on average €405 per batch. Flower shop owners purchase flowers with a worth of €68 to €82 per transaction. Wedding companies spend between €270 and €405 per online purchase. Another question that was asked to the retailers was about the source of the flowers: where do online retailers buy the flowers? Cut flowers sold online are mostly purchased from local wholesalers. All these local wholesalers buy the flowers from Yunnan Kunming's Dounan Flower Market. Some retailers produce flowers themselves and these retailers are located in Yunnan Province.

POT PLANT INTERVIEWING RESULTS

The results of the interviews showed that there is not only an online demand for cut flowers but also for pot plants. According to the retailers, pot plants like Succulent, Scindapsus Aureus and Jonquil are the most popular species. The retailers indicated that the sales of pot plants have

increased in comparison with previous years. However, the sales heavily depend on the season. The retailers mentioned that they experience a noticeable increase in autumn and spring, because of the fact that these seasons provide the best climatic conditions, which help to keep flowers for longer time. Pot plants like Asparagus setaceus, Epipremnum aureum, Jonquil and Succulent are the most popular species among young people. Middle-aged people tend to buy plants with a special name such as Jonquil because it is similar to the pronunciation of longevity in the Chinese language. Apart from Jonquil, Pachira macrocarpa, Bracketplant and Epipremnum aureum are also frequently purchased by middle-aged people. One retailer said that middle-aged people would like to buy pot plants from physical shops instead of online shops. The pot plants sales show a decreasing trend during the weekends or holidays, simply because people hang out with their families and friends and have not much time to shop on the Internet.

The majority of people buy pot plants mainly for self-consumption, since pot plants functions as air purifier and are used for home decoration. Additionally, they give a sense of accomplishment when consumers take care of them. Two of the five retailers are self-production retailers from Guangzhou Province and Shanghai. One retailer said that most pot plants sold online are purchased from Shandong Province or Shanghai, since farmers in these provinces have a

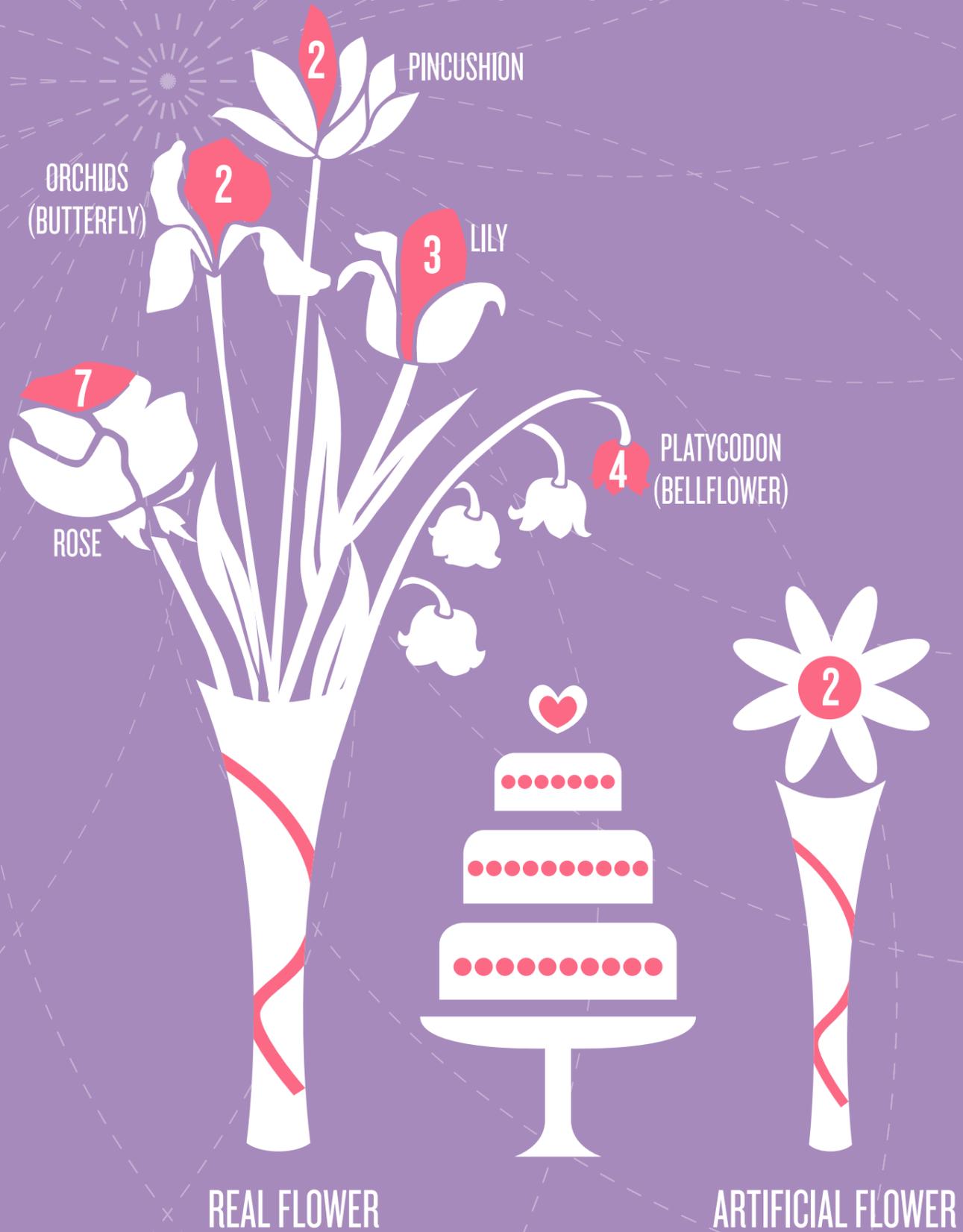
higher production level compared to other provinces.

After interviewing e-commerce retailers, the researchers found that roses play a dominant role in the cut flower market. This doesn't come as a surprise since there are millions of rose species to meet different demands. Nowadays, roses are used in the food industry, the cosmetic industry, the medical industry and the tea industry. Young people are the main consumption group in e-commerce market and therefore e-commerce marketers take young peoples' demands as a priority. According to the survey, young customers prefer rare species with a special color that were used in movies or celebrity weddings. Moreover, there is an increasing demand for self-consumption, especially for pot plants, which can be attributed to the air purification function it fulfills. The fact that buying pot plants for air purification is very popular can be explained by the fact that the level of pollution in the main cities of China (such as Beijing and Shanghai) is incredibly high. Another reason is that consumers like the fact that by buying pot plants they are able to decorate the house for a longer time compared to cut flowers.

WEDDING ORGANISATIONS

Seven qualitative interviews with wedding companies were made in order to discover the demand for flowers used in wedding arrangements.

Figure 14. Popular flower species among wedding companies



Research of these agencies was based on three provinces in China with the largest sales volume of ornamental plants: Jiangsu, Guangdong and Zhejiang in Table 3. Moreover, these provinces belong to the list with the highest numbers of registered marriages in 2014 (Statista, 2014). Standardised open questions were asked about popular flower types, transportation, the amount of spending on wedding arrangements by clients and the type of supplier.

For the question regarding most used flowers for wedding arrangements as Figure 14 shows, several types of flowers were stated within the individual interviews. Roses were mostly mentioned as frequently used flowers by all wedding companies with one exception. Lilies were referred to by three companies.

However, the organisations stated the disadvantage of storing these flowers due to their larger size compared to other flowers. Surprisingly, two interviewed companies from Jiangsu province use a mix of real and fake flowers in order to lower costs. Other frequently mentioned flowers included Tulips, Sunflower, pot plants / trees, Magnolia, Baby's breath (Gypsophila), Grandiflorum, Carnation and Blue Enchantrees.

Regarding responses about suppliers of wedding agencies, two companies use imported flowers. One is focused especially on roses and the international wedding company

in Beijing cooperates with different countries, such as the Netherlands. The import depends on their clients recent demand for specific shapes and colors, especially tulips. The rest of the wedding agencies usually cooperate with local retailers or wholesalers.

Although most companies refused to answer the third question about transportation, two companies mentioned transport by car and by plane. For the last question concerning the clients' expenditure on wedding arrangements the most mentioned amount was between €135 and €1350. One company mentioned €540. The highest amount was found in Beijing, which also confirms our research about wedding trends, where spendings for wedding arrangements can be up to €11,000.

Wedding companies were interviewed in order to provide the insights with regard to consumers buying ornamental crops in China for wedding arrangement. Results show, that wedding agencies use mostly real flowers compared to fake flowers, but several companies combine both options. Roses are the most used real flower for wedding arrangements, followed by Platycodon (bellflower) and Lilies. Interviewed wedding agencies usually cooperate with local retailers or wholesalers. The amount spent on wedding arrangements by clients is much higher for Beijing, where imported flowers are also used, compared to other provinces.

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ORNAIMENTAL HORTICULTURE, A GROWING INDUSTRY?

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