

Infrastructure, Technology & Investment Trends: Which Global Gateways are best placed to lead into the Digital World?

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A Brief Introduction



About DCD

- DatacenterDynamics is a full service B2B information provider focusing on data center industry, headquartered in UK.
- DCD provides a unique series of events tailored specifically to deliver enhanced knowledge and networking opportunities to professionals that design, build and operate data centres. Every year 49 established annual conferences are held in key business cities across the world.
- In 2013, over 30,000 senior data center professionals attended a DCD event, creating the most powerful forum in the industry today.



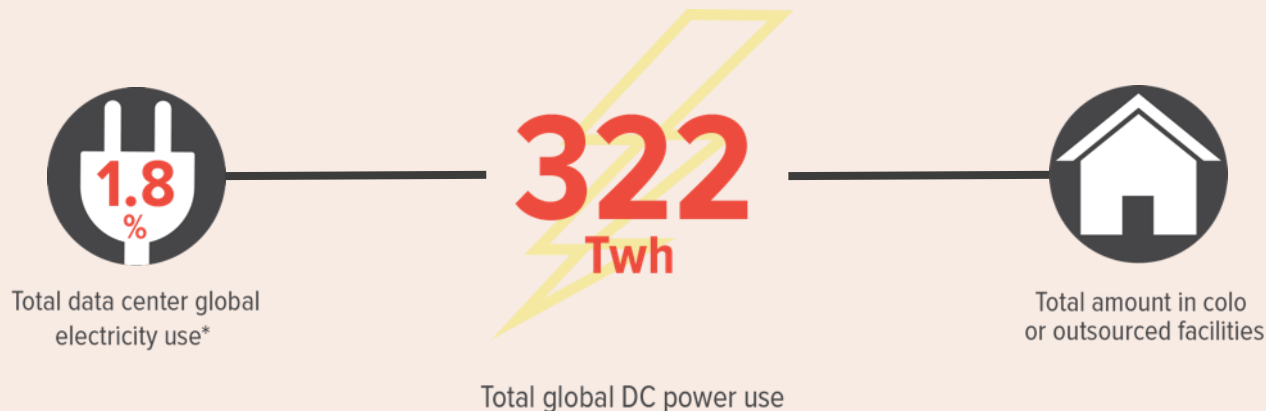
About me

- Global CTO and Board Director of DCD
- Originally a network and facilities engineer, with over 15 years' experience in Asia, across the Americas and Europe.
- Has served in senior management roles for Dimension Data UK, Nortel Networks, Nippon Suisan International, China's National Center for Industry and Technology.
- He holds two masters' degrees.

DCD Intelligence launched in 2012

DCD Intelligence conducts market research and analysis in partnership with the data center industry.

We offers reporting and analytic services that are designed to inform and help enterprises make decisions within the data center industry. In addition to producing regional and technology reports, we also offer bespoke research services.



Information presented here (mostly) taken from the 2011-2013 DCD Global Census

- *It provides statistically valid snapshots of the scope and direction of the global data center industry, and key findings are shared with the community.*
- *Collects information from ALL sides of the industry and makes that information available back to the industry.*
- *It enables comparisons between markets to track individual market developments and forecasting.*
- *It brings the industry together to help raise money for charity*



2011

2012

2013

Today's Presentation

1.

The realities of the new digital world

2.

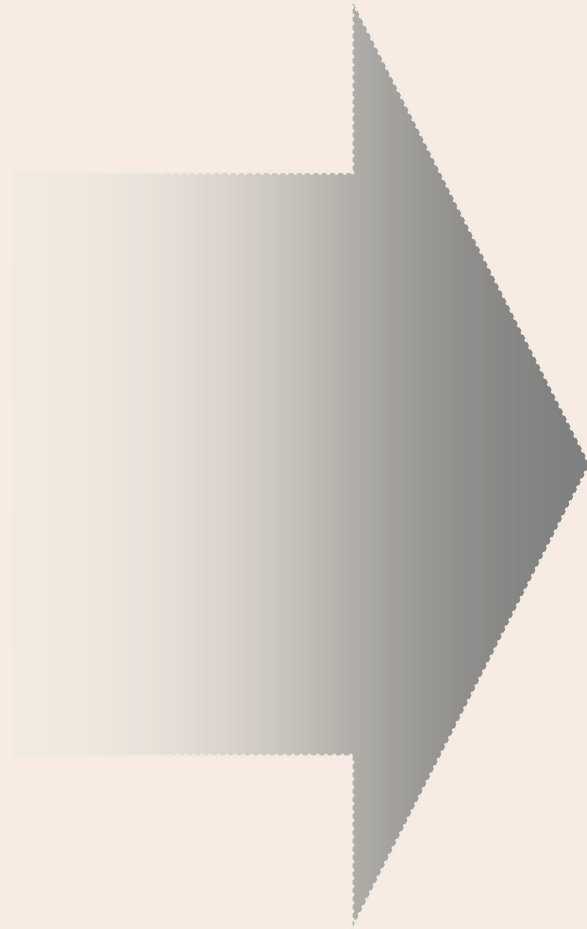
Data center technologies & the investment community

3.

Location, location, location: Hong Kong in the Asia Pacific & the world

4.

Anticipating future trends: Keys to the Gateway



The realities of the new digital world

Global growth drivers

800 million laptops/ tablets

1.3 billion smart phones

Only 2-3% of US money is physical (2013)

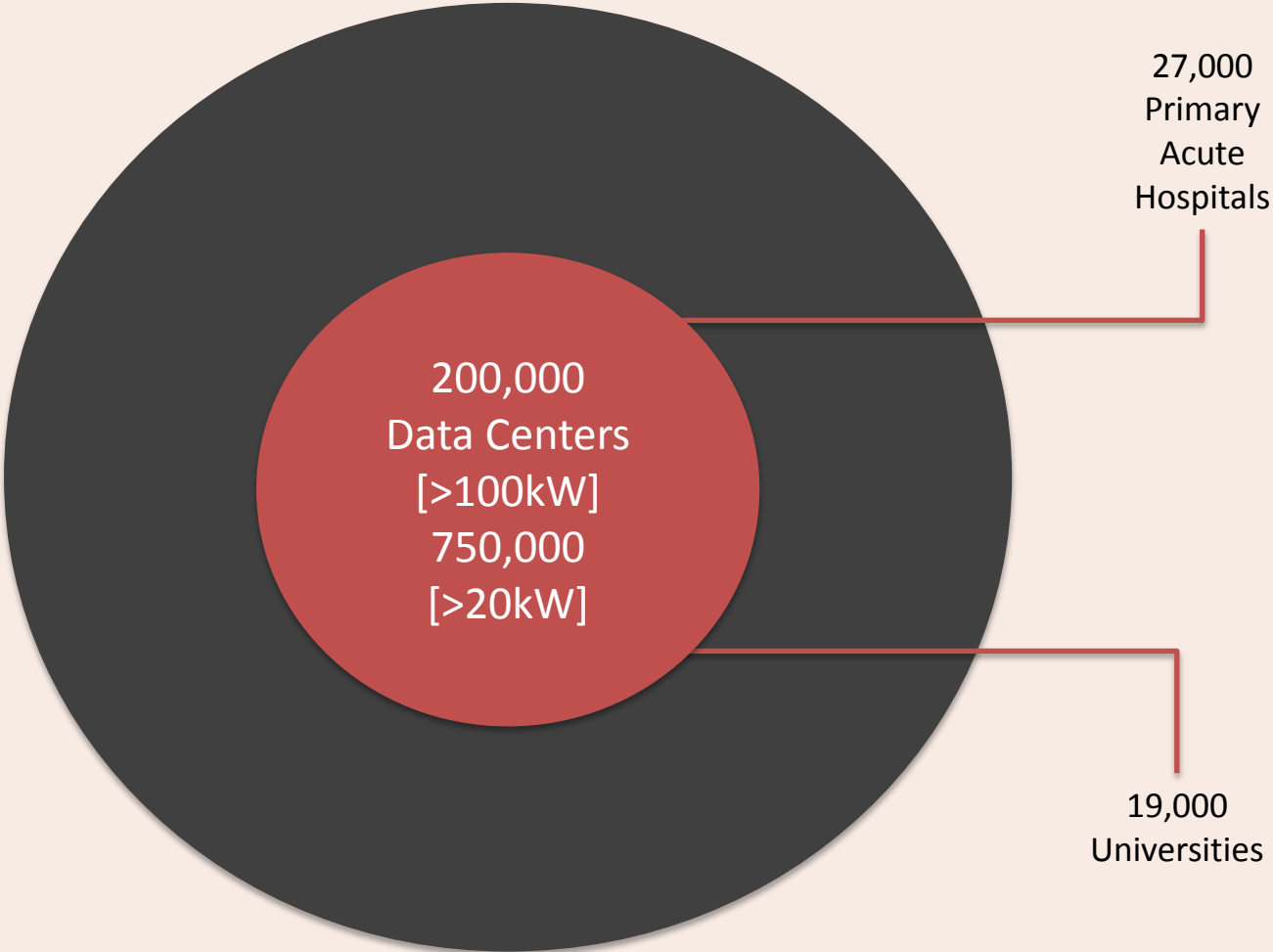
100 million servers (2011 UC Berkeley)

767 million active websites (Netcraft, October 2013)

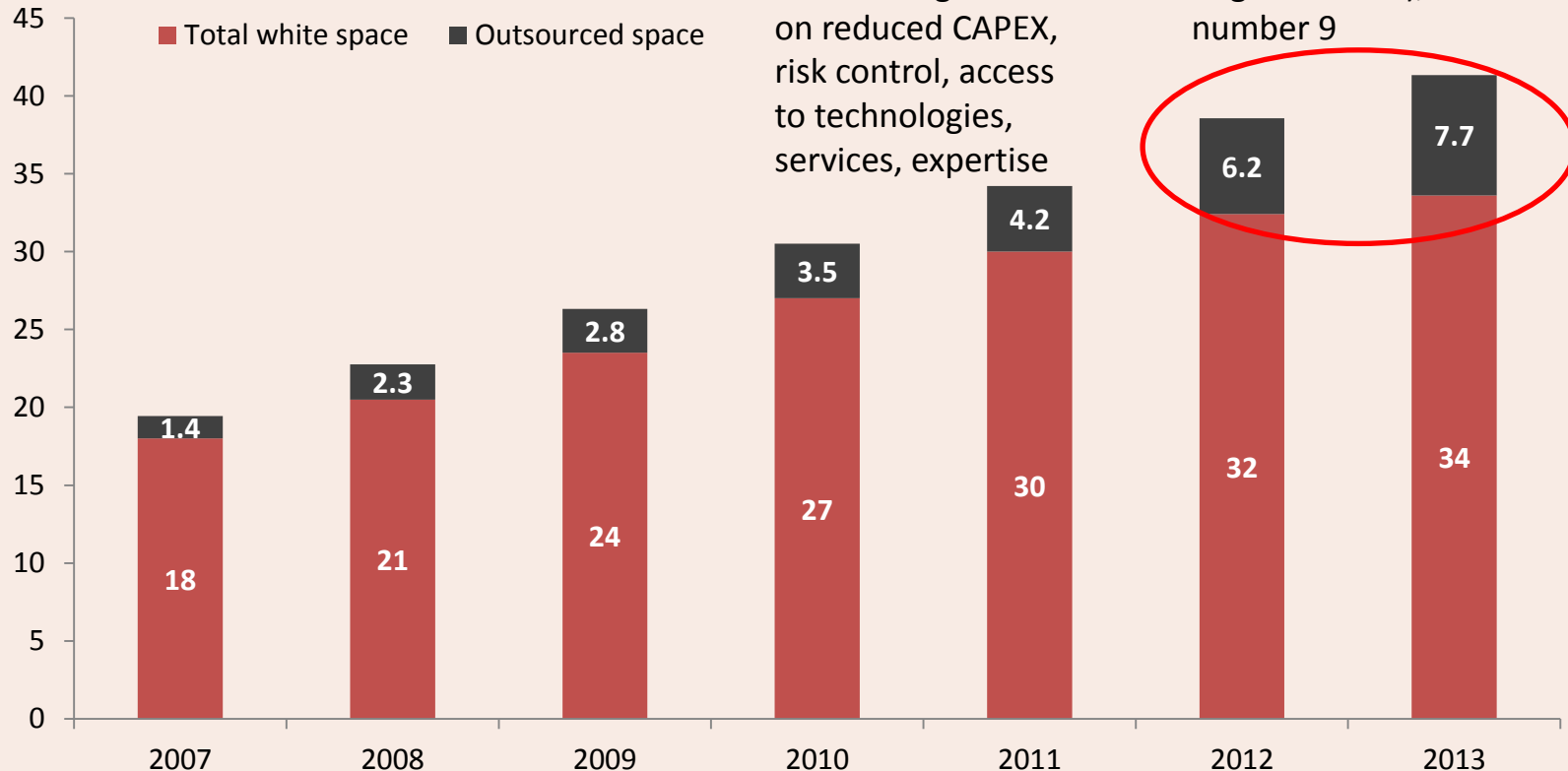
1.15 billion Facebook users (June 2013)



The Global Profile: data centers continue to represent a sizeable and growing global industry



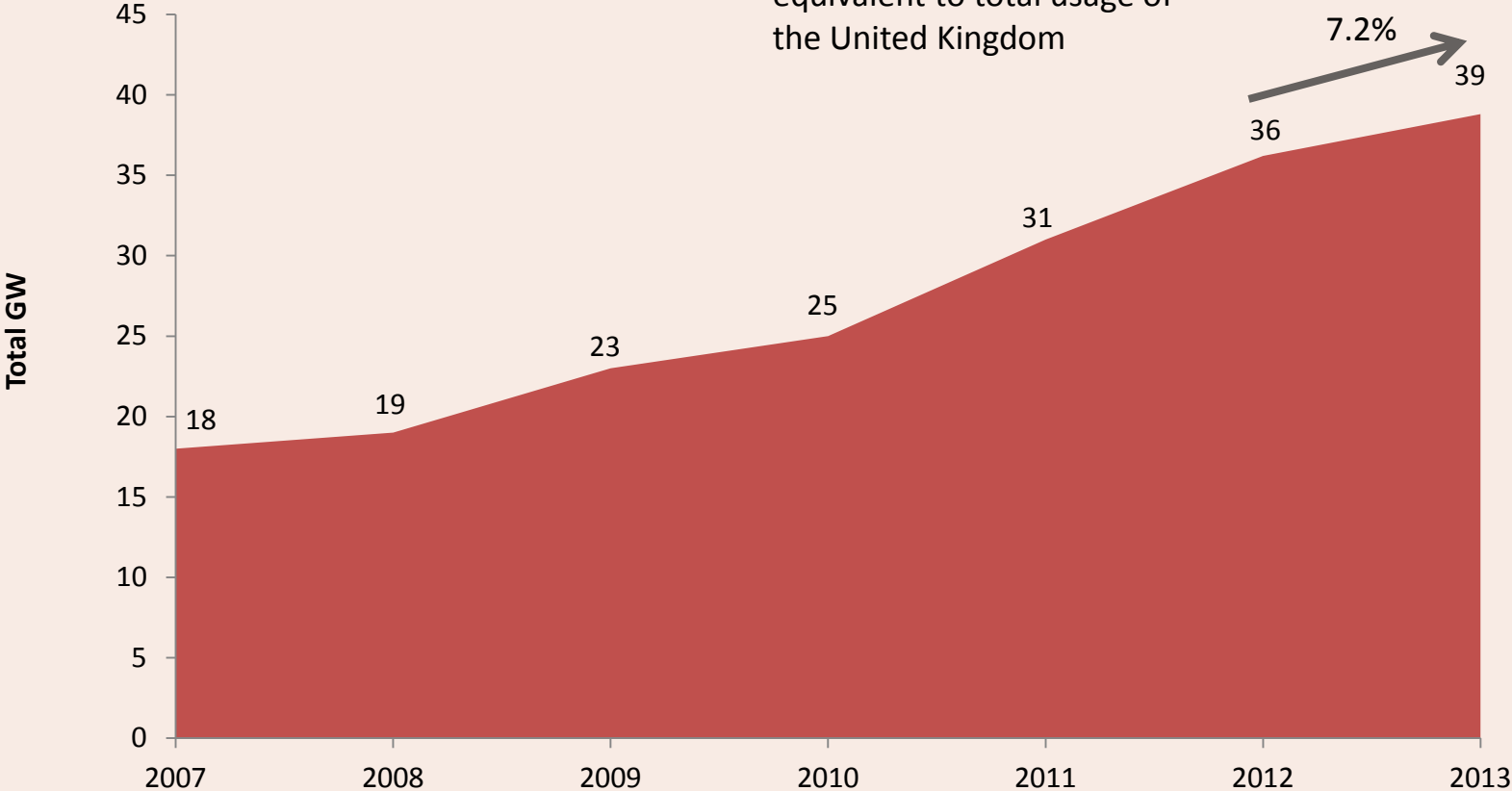
Global Trends: Growth in Data Center Inhouse & Outsourced Space



Source: DCD Intelligence

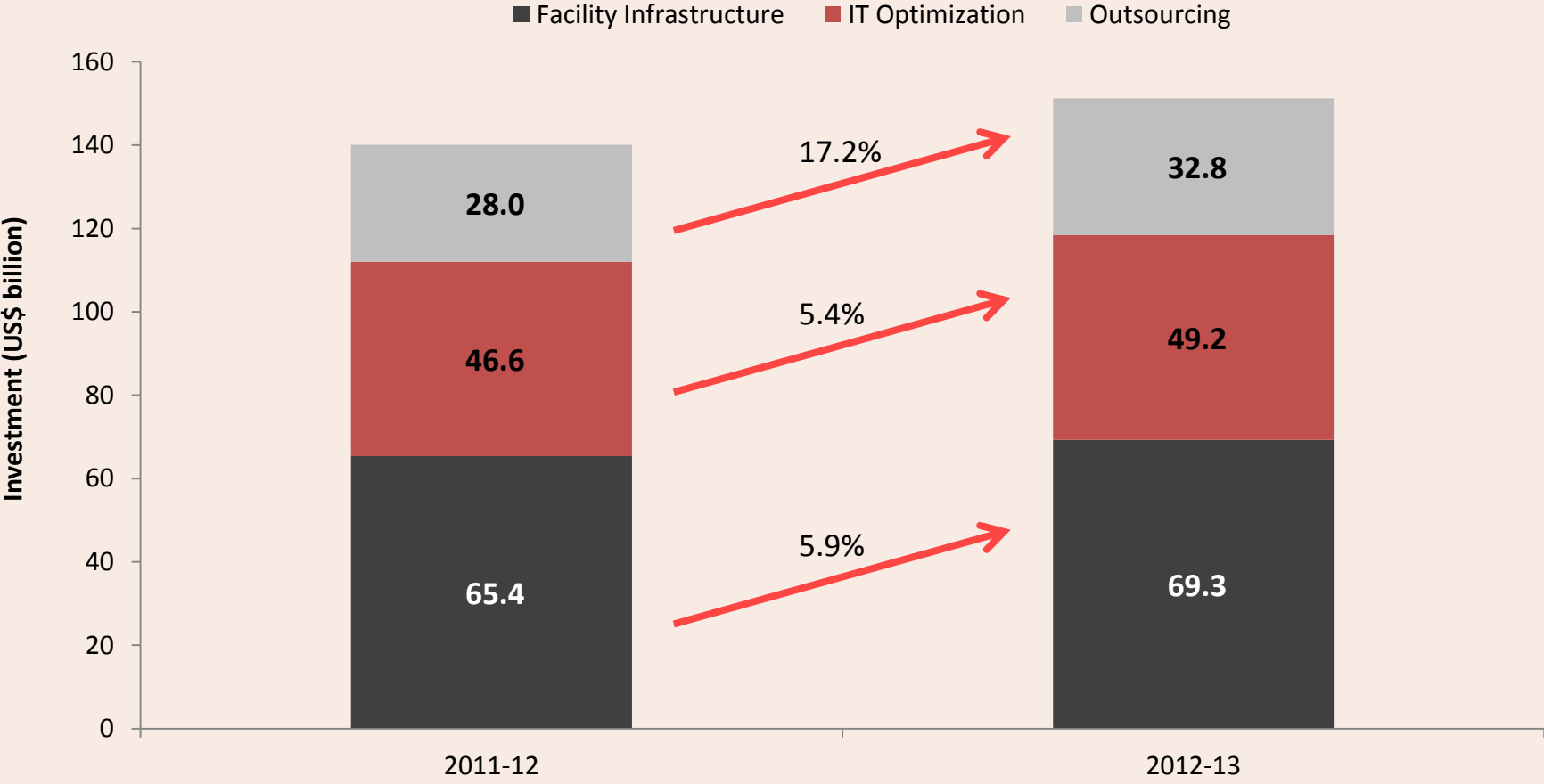
Power Consumption continues to rise

While rate of increase is now moderating , total electricity consumption is still equivalent to total usage of the United Kingdom



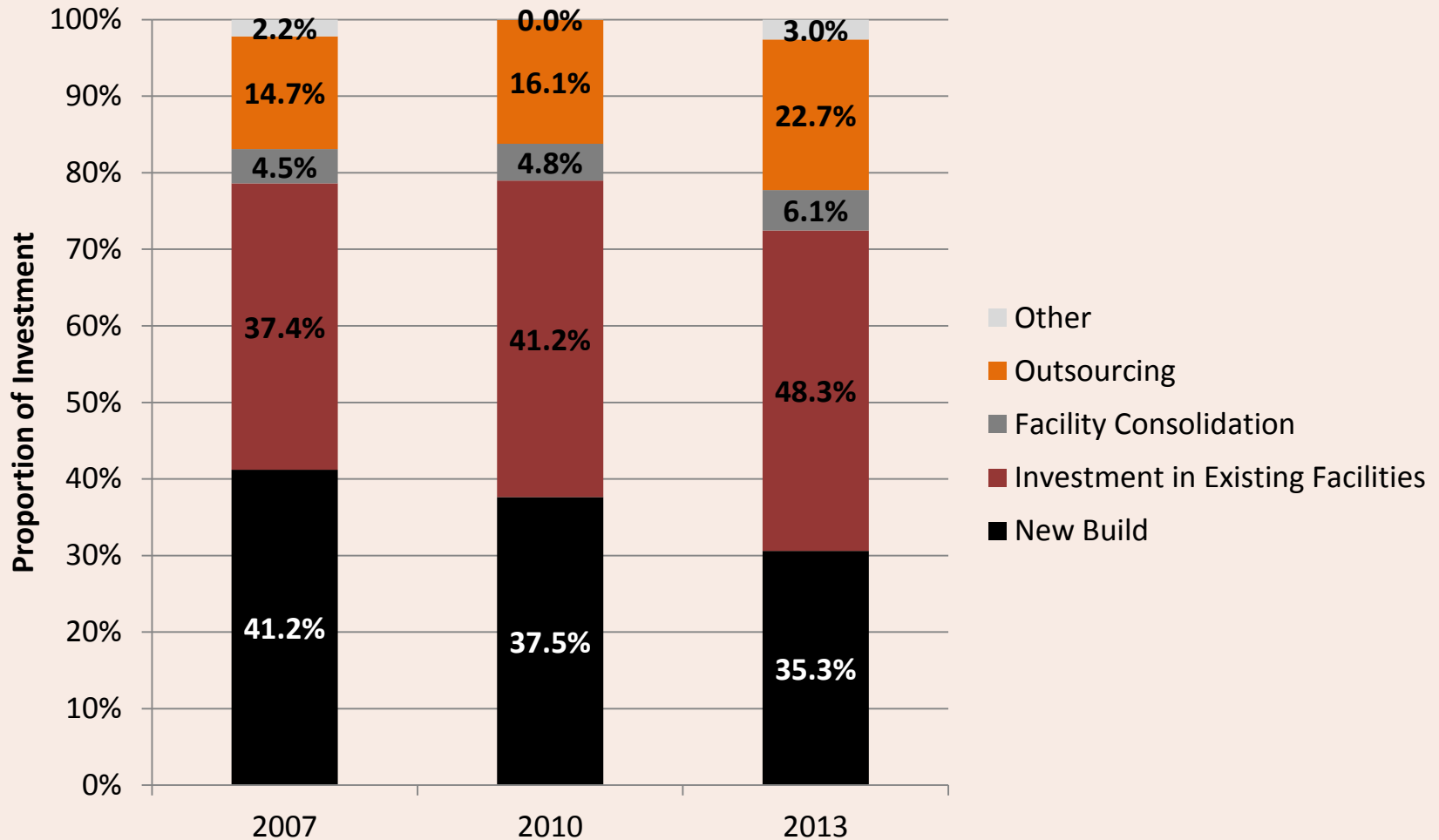
Source: DCD Intelligence

To pay for this has required a continuing increase in investment (to around US\$ 150 billion)



Source: DCD Intelligence

The weight of investment has shifted towards work on existing facilities & outsourcing as data center industry matures

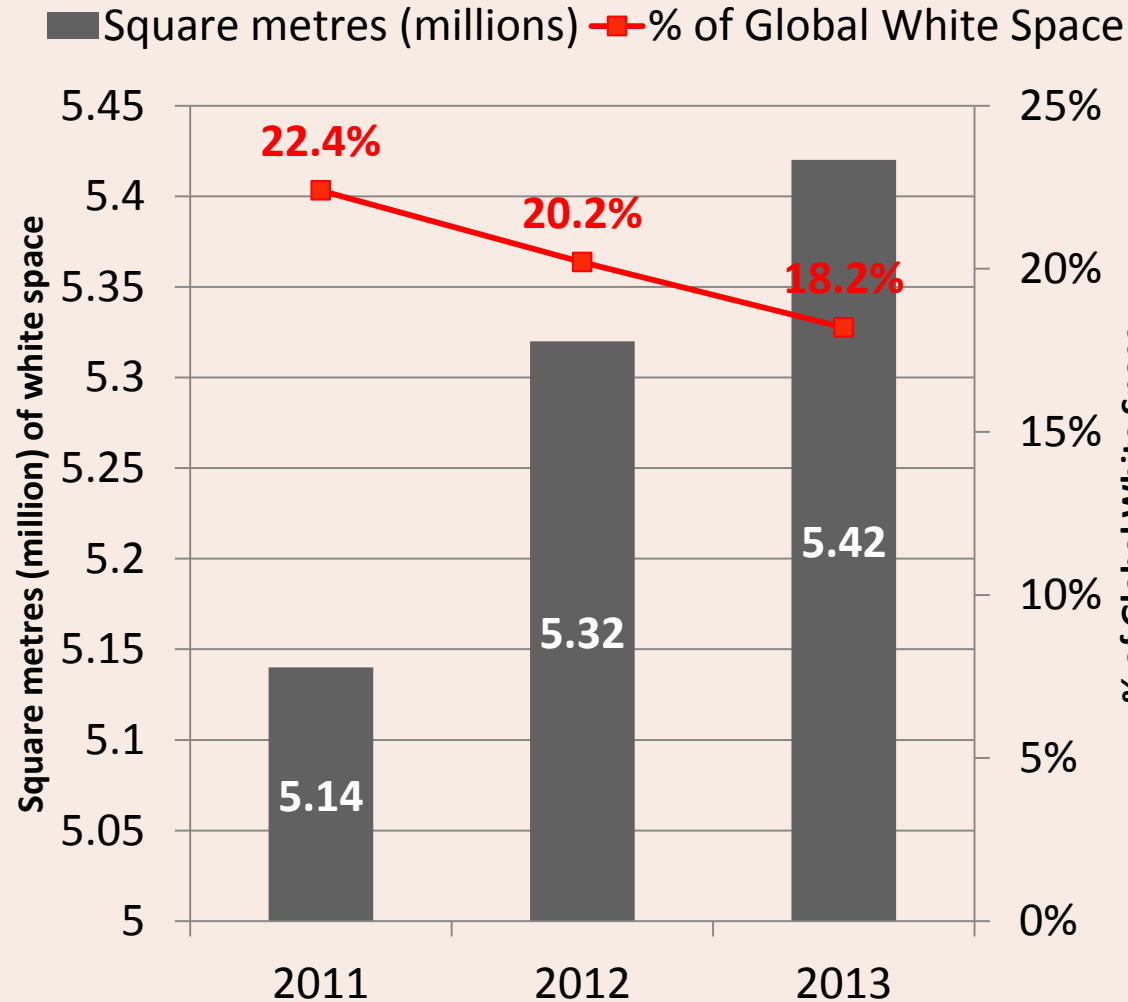


Source: DCD Intelligence



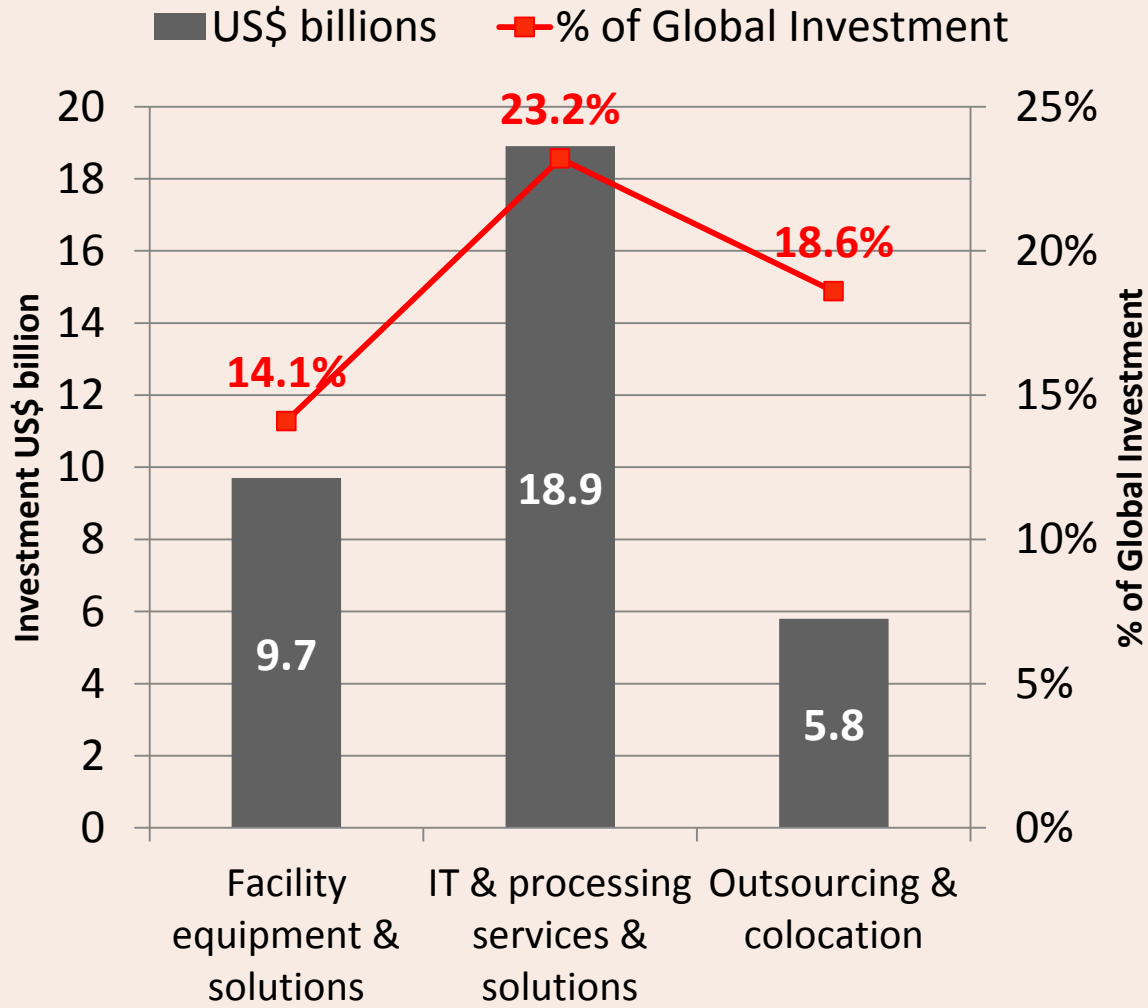
**Data center
technologies & the
financial/investment
community**

Profile of the Finance Industry: White Space



- The largest end-user sector globally
- Larger than all but one national market (USA)
- A higher than average rack power density & lower space per rack has braked space increase
- Growth in other sectors has led to relative decline – in 2007, finance represented 30% of space
- 25% of space is now outsourced
- Estimated 55%-60% of space is retail finance, 20% is insurance, 10% is commercial/ investment banking and 10% is financial services.

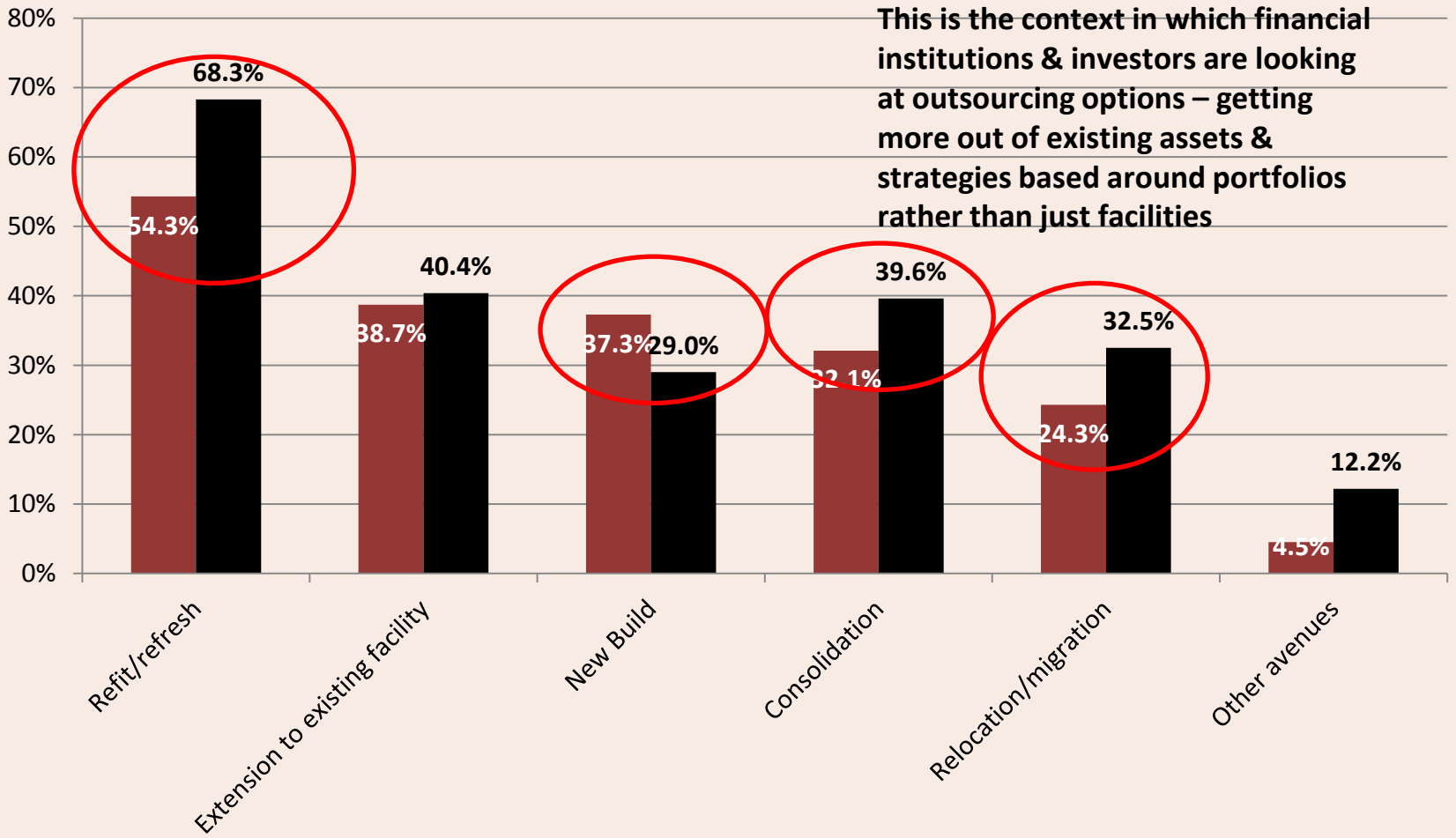
Profile of the Finance Industry: Investment in 2012/13



- The highest investing end-user sector globally
- Lower than average investment in facility due to investment shift to IT solutions, virtualisations, outsourcing services.

Which in-house investment projects have the financial & investment community invested in 2012/13?: % Sample Organisations

■ Global ■ Financial sectors



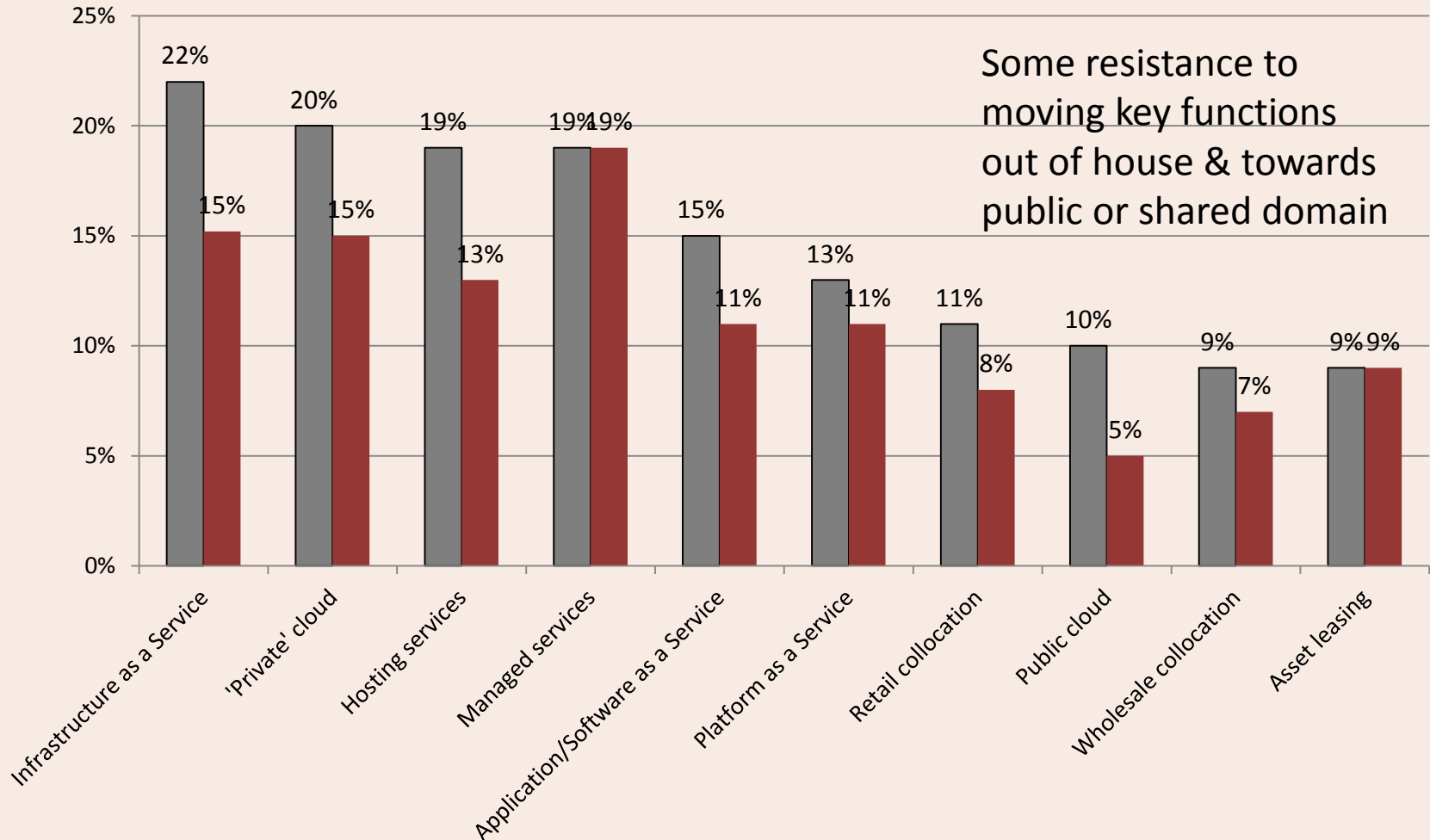
This is the context in which financial institutions & investors are looking at outsourcing options – getting more out of existing assets & strategies based around portfolios rather than just facilities

Deployment of Outsourcing Strategies & Services

2012/13: Financial Sectors vs Global Averages

% Sample Nomination: Multiple Responses Possible

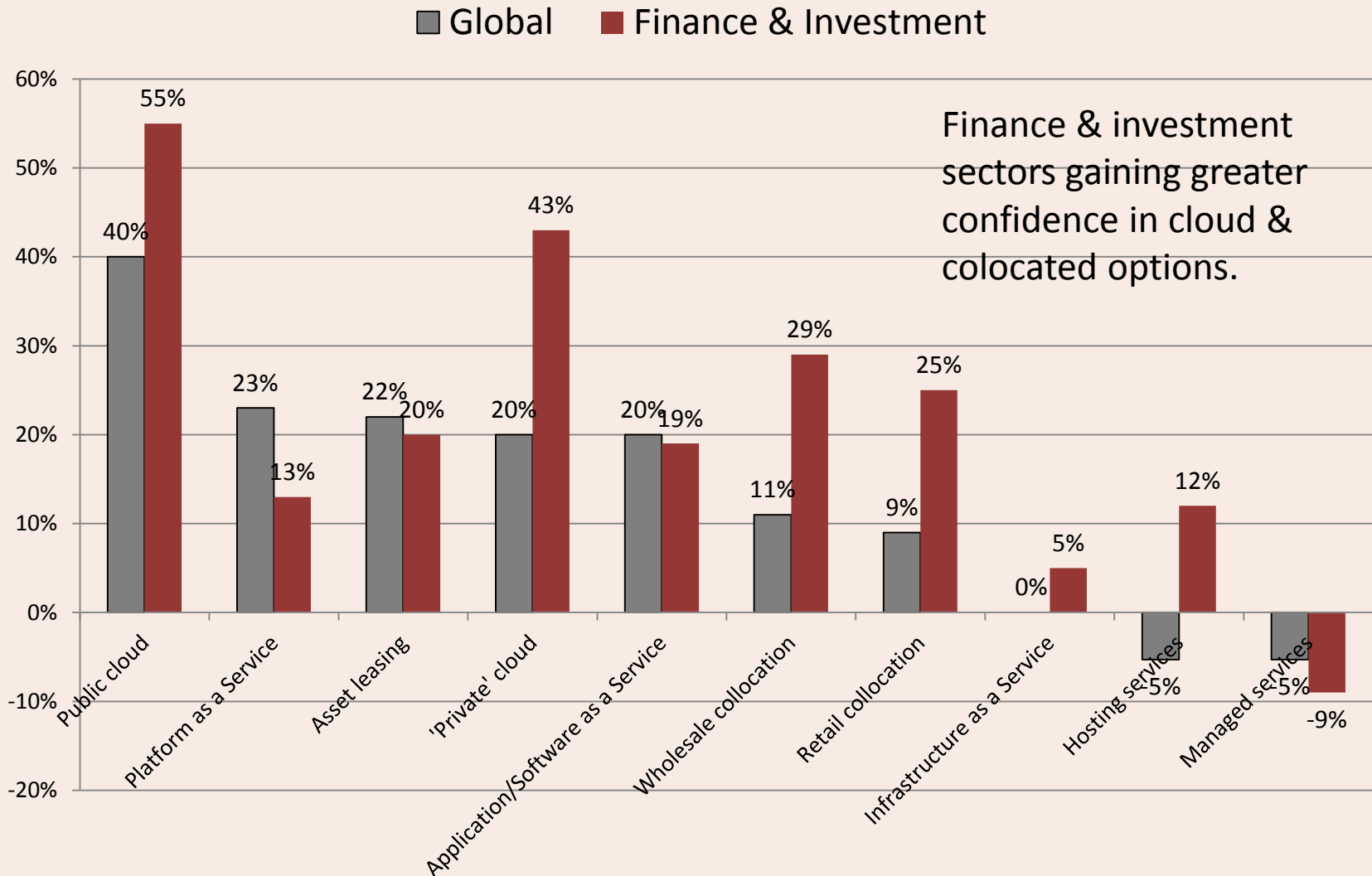
■ Global ■ Finance & Investment



Deployment of Outsourcing Strategies & Services

% Increase from 2013 into 2014:

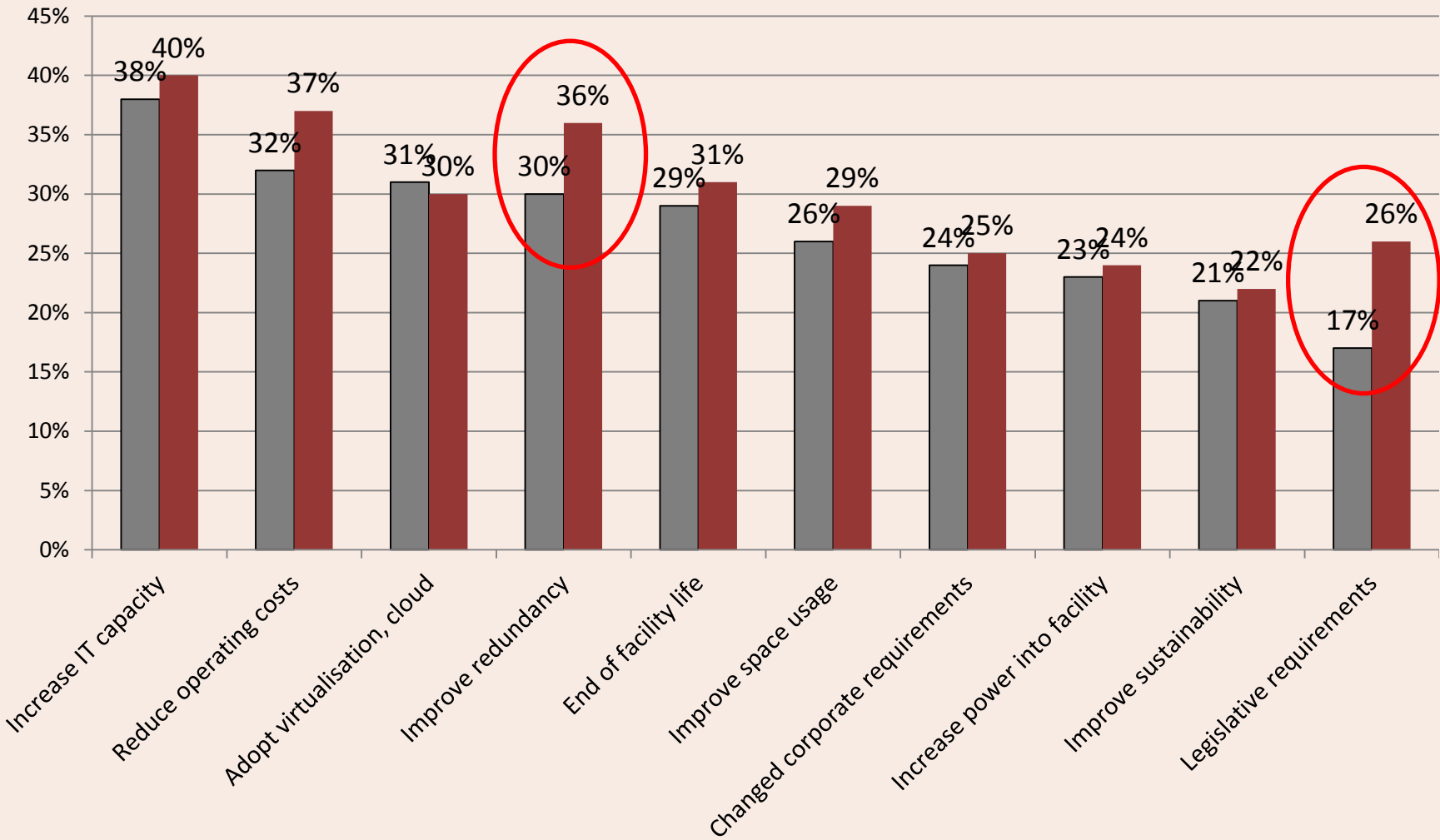
Sample Nomination: Multiple Responses Possible



What has driven investment in 2012/13?: Financial sectors vs Global averages

% Sample Nomination: Multiple Responses Possible

■ Global ■ Finance & Investment



IT & associated property stocks also have a growing & direct financial impact beyond technology sector

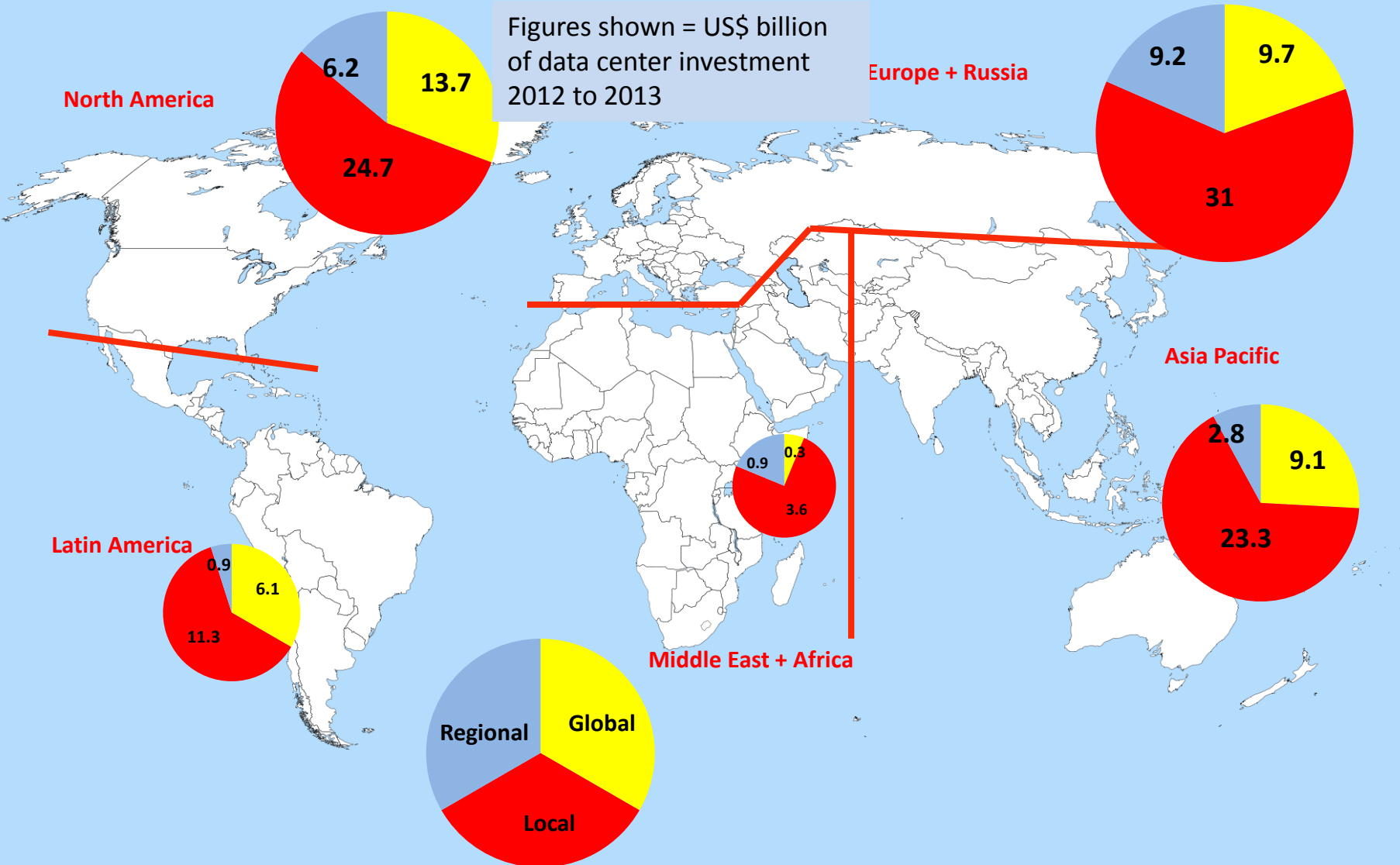


| PRICE | SHARE | CODE | STOCK NAME | PRICE | SHARE | CODE |
|-------|--------|------|-----------------|-------|--------|------|
| 0.35 | 480000 | 9585 | 建行德銀七零三A | 0.35 | 480000 | 9585 |
| 8.20 | 1800 | 1888 | 建國交通建設 | 8.20 | 1800 | 1888 |
| 4.18 | 400000 | 939 | 建設銀行 | 4.18 | 400000 | 939 |
| 6.20 | 50000 | 1800 | 中國交通建設 | 6.20 | 50000 | 1800 |
| 6.21 | 5000 | 1800 | 中國交通建設 | 6.21 | 5000 | 1800 |
| 0.185 | 80000 | 4953 | 和黃法巴七零一購 | 0.185 | 80000 | 4953 |
| 6.20 | 5000 | 1800 | 中國交通建設 | 6.20 | 5000 | 1800 |
| 6.21 | 10000 | 1800 | 中國交通建設 | 6.21 | 10000 | 1800 |
| 0.285 | 50000 | 9586 | 海油麥銀七零一購 | 0.285 | 50000 | 9586 |
| 33.05 | 1000 | 2318 | 中國平安 | 33.05 | 1000 | 2318 |
| 12.52 | 18000 | 45 | 大酒店 | 12.52 | 18000 | 45 |
| 4.00 | 44000 | 2868 | 首創置業 | 4.00 | 44000 | 2868 |
| | | | DB-CCB @EC0703A | | | |
| | | | CHINA COMM CONS | | | |
| | | | CCB | | | |
| | | | CHINA COMM CONS | | | |
| | | | CHINA COMM CONS | | | |
| | | | BP-HWL @EC0701 | | | |
| | | | CHINA COMM CONS | | | |
| | | | CHINA COMM CONS | | | |
| | | | MB-CN00C@EC0701 | | | |
| | | | PING AN | | | |
| | | | HK&S HOTELS | | | |
| | | | BJ CAPITAL LAND | | | |

期貨 HSI FUTURES 現月 CURRENT MONTH 買入

While majority of investment is 'market - local' US\$ 59 billion is crossing national boundaries

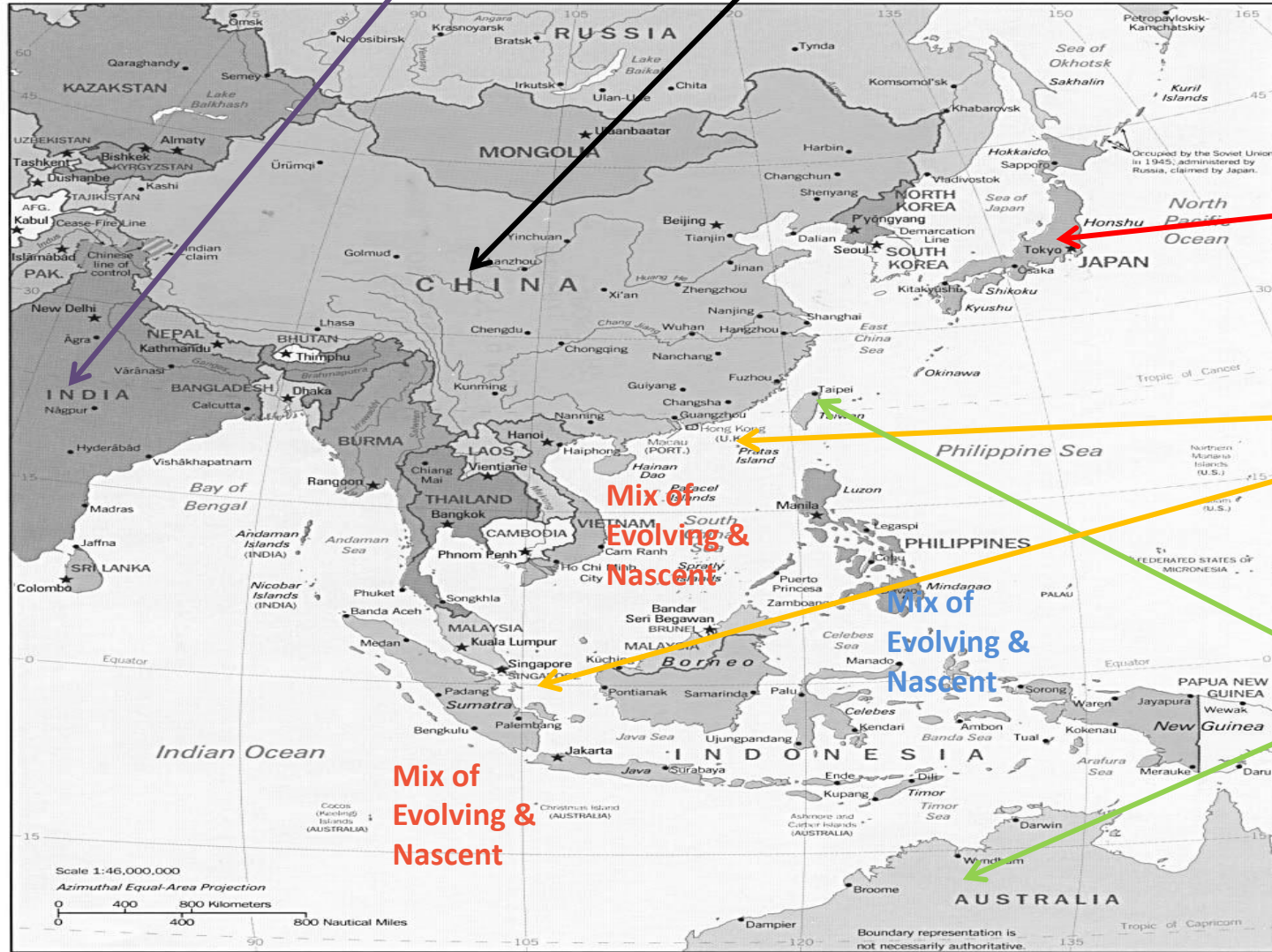
Figures shown = US\$ billion
of data center investment
2012 to 2013





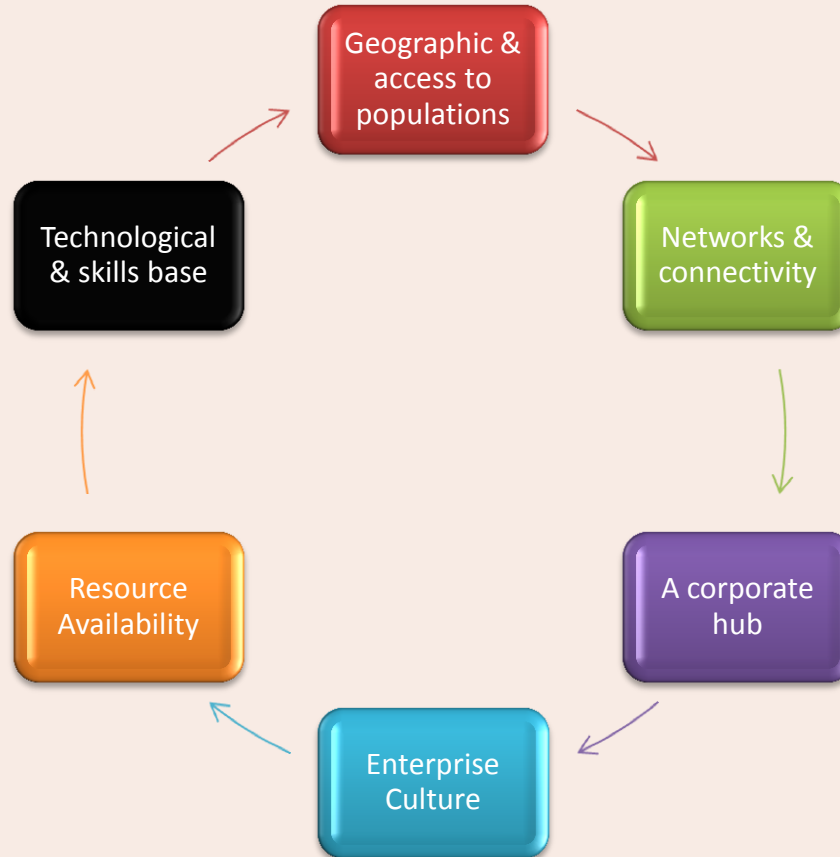
Location, location, location: Hong Kong in Asia Pacific & the World

East Asia



A Hub Market is based on the Intersection of a Number of Factors

Hubs create & support each other e.g. Financial, corporate, transport & technological hubs reinforce one another



The siting of a number of data centers in close proximity to each other does not create a 'hub'

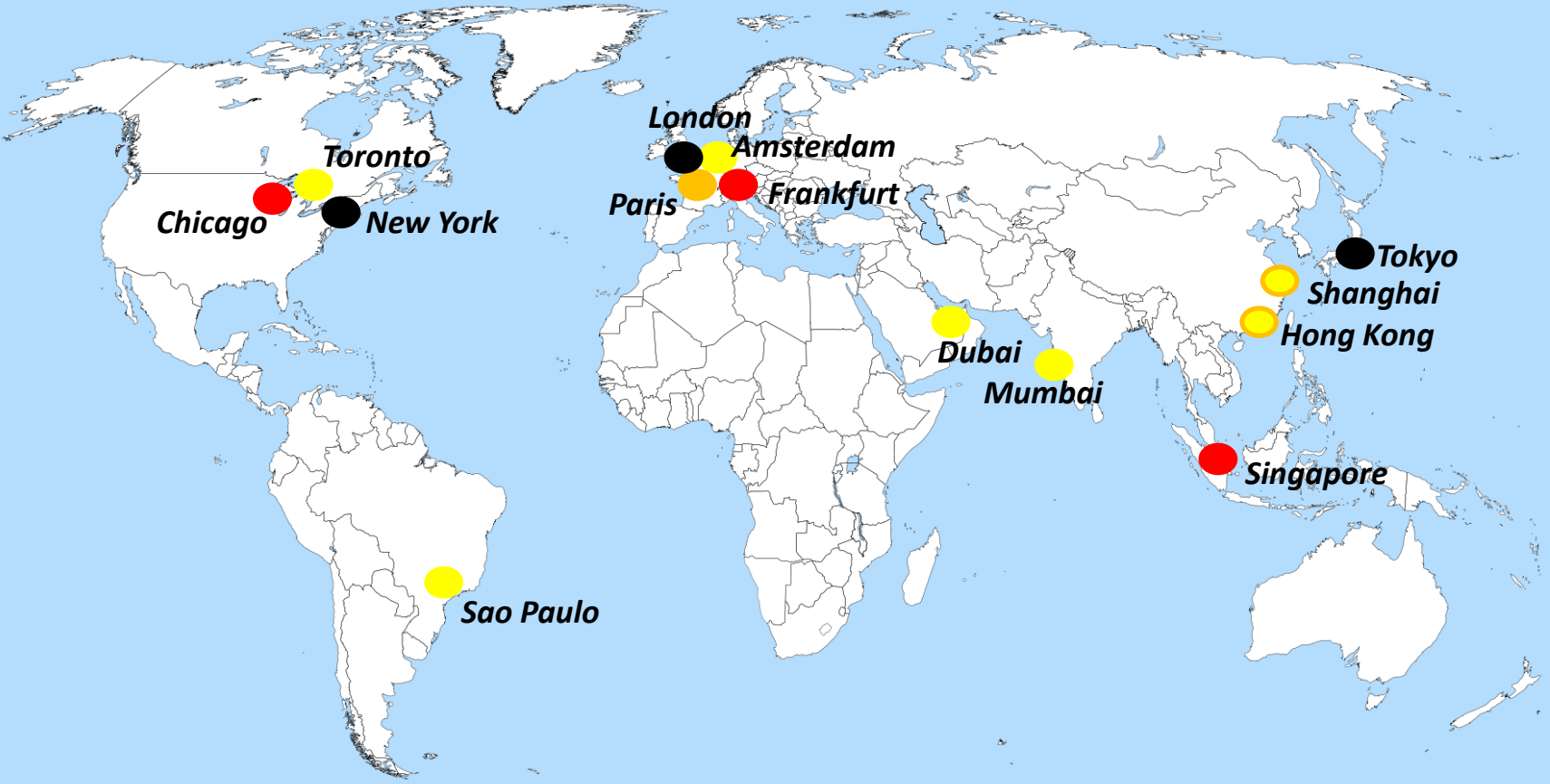
Asset facts: Key data center metrics in Hong Kong 2011 to 2014

| Parameter | 2011 | 2012 | 2013 | 2014(e) | Unit |
|-------------------|---------|---------|---------|---------|---------------|
| White space | 275,000 | 300,000 | 315,000 | 345,000 | Square metres |
| Racks | 55,000 | 60,000 | 65,000 | 80,000 | Number |
| Power consumption | 285,000 | 320,000 | 310,000 | 360,000 | kW |

Investment facts: growth continues

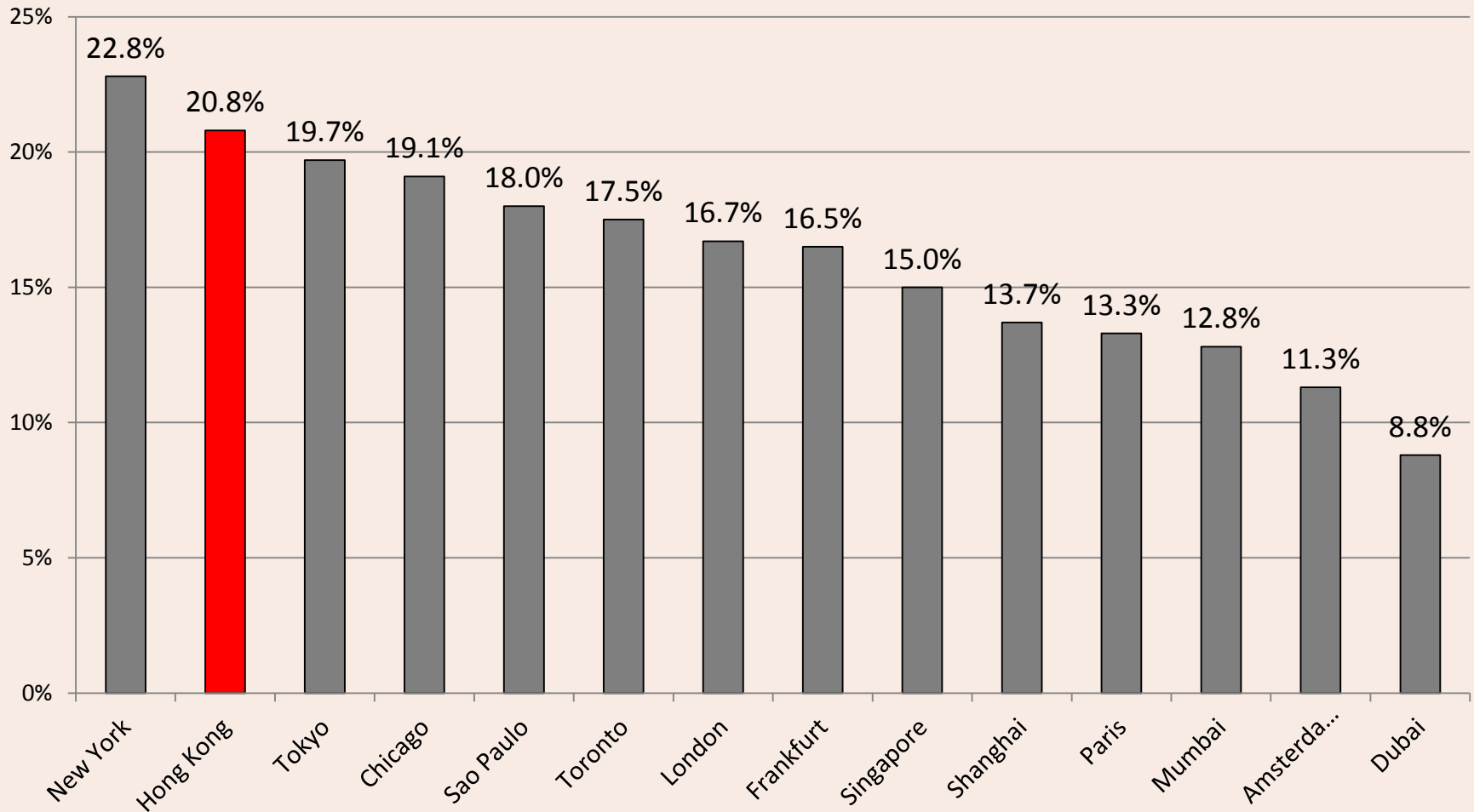
| Investment | E.g. | 2011/2012 | 2012/2013 | 2013/2014 (projected) |
|--------------------------------------|--|-------------------|-------------------|--------------------------|
| Facility infrastructure | Power, cooling, monitoring, DCIM etc. | \$ 500 m | \$ 520 m | \$ 560 m |
| IT optimisation services & solutions | Virtualisations, storage, systems upgrades, high performance computing, etc. | \$ 410 m | \$ 440 m | \$ 460 m |
| Outsourcing services | Hosting, cloud, colocation, managed services, 'aaS' services | \$ 280 m | \$ 300 m | \$ 325 m |
| <i>Total</i> | | <i>\$ 1.19 bn</i> | <i>\$ 1.26 bn</i> | <i>\$ 1.35 bn</i> |

Hong Kong 'competes' globally in terms of all factors that create & maintain its hub status



Hub City Profile Information 2013:

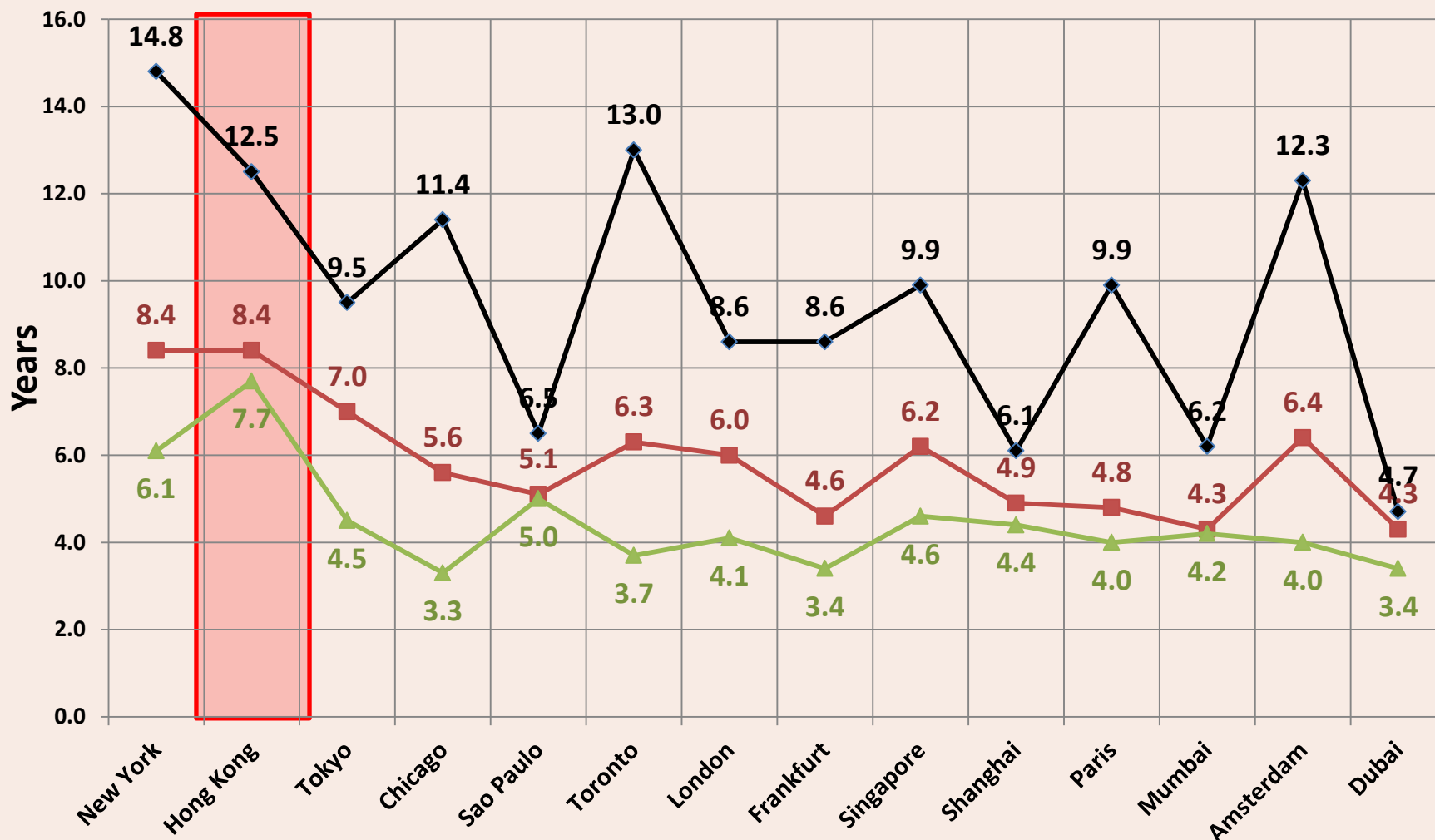
% Racks denser than 10 kW/rack (IT + Non-IT)



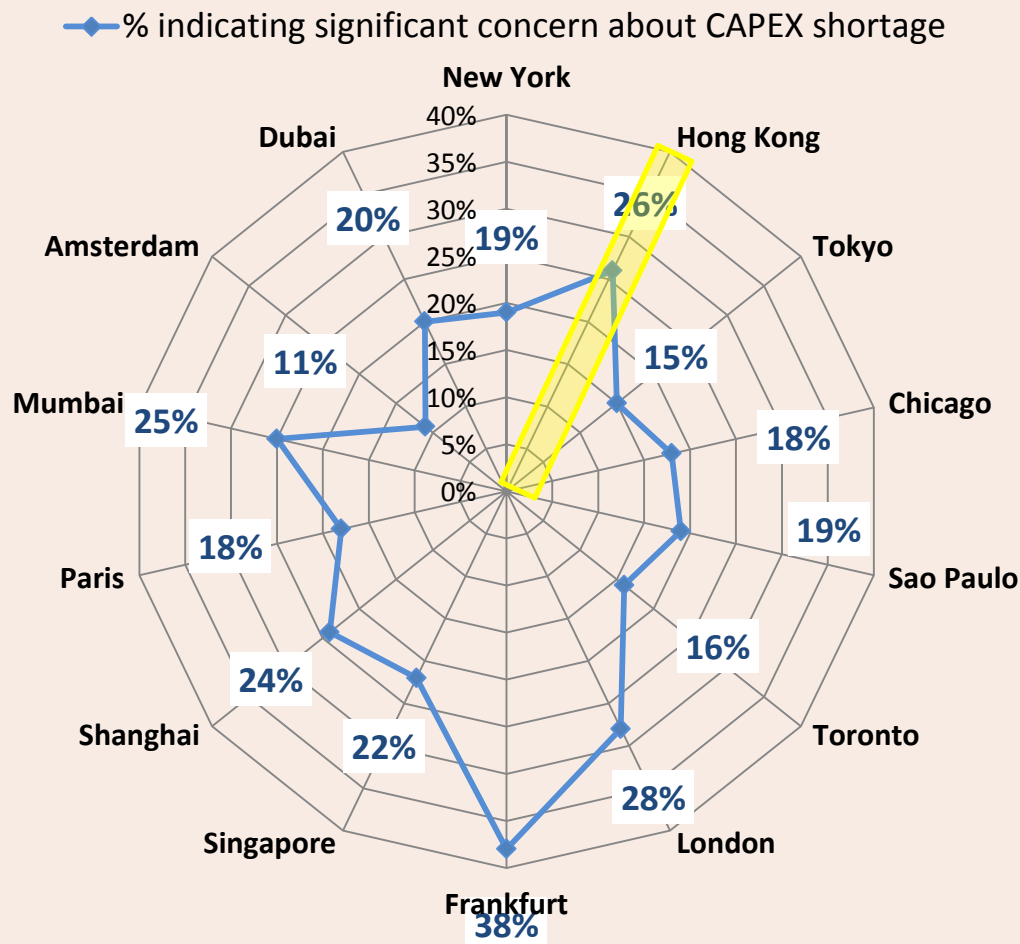
Hub City Profile Information 2013:

Average sample ages of shell/building, facility equipment, IT & networks

◆ Shell/building ■ Facility equipment ▲ IT & networks

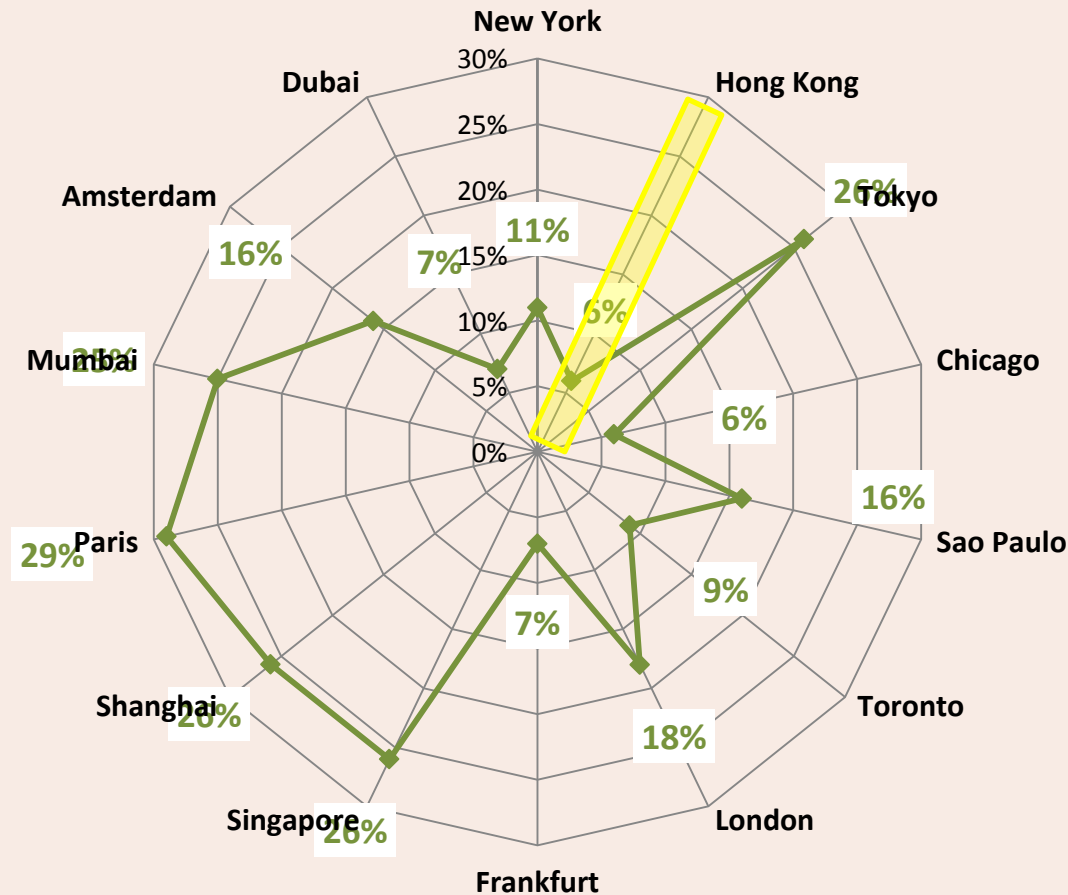


Hub City Concerns about Availability of Capital: % Fearing that shortage of capital will have significant on their operation over the next 12 to 18 months

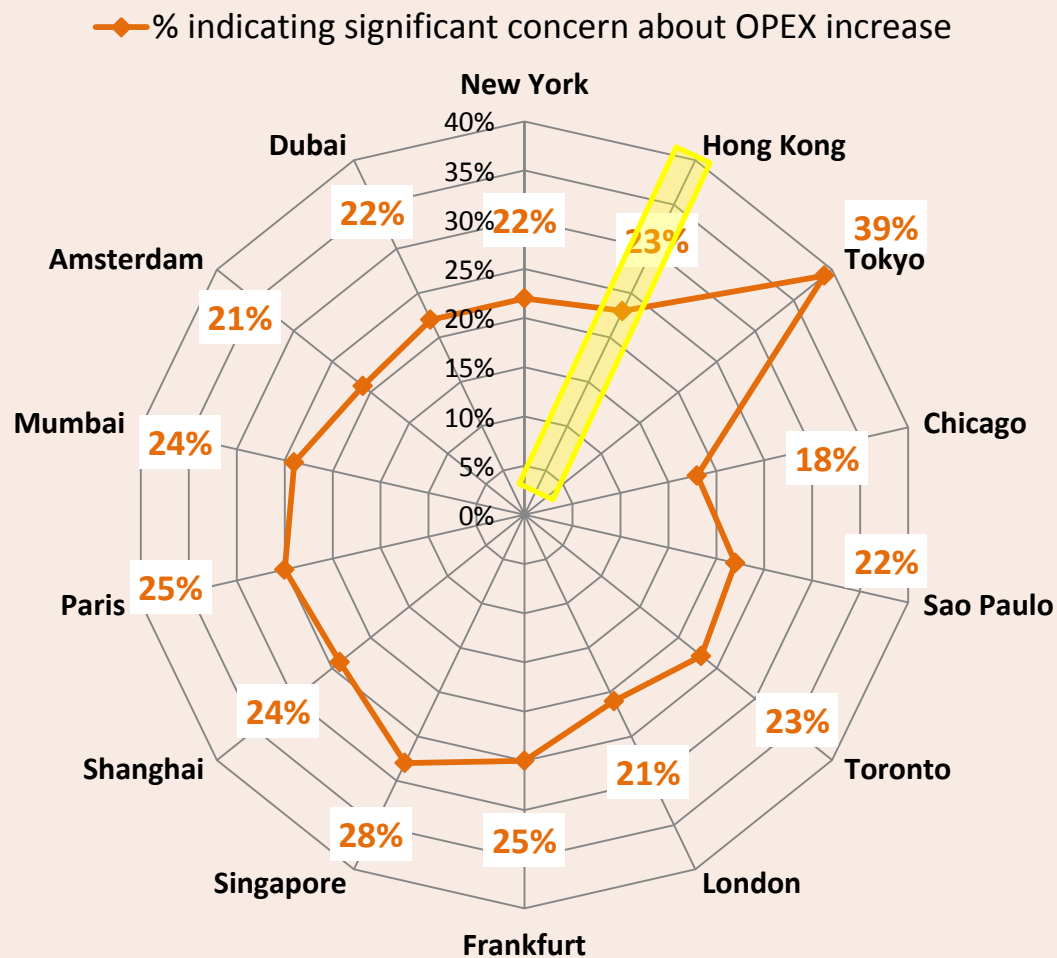


Hub City Concerns about Power Availability: % Fearing that Power Black-outs/Brown-outs will have significant on their operation over the next 12 to 18 months

◆ % indicating significant concern about black-outs/brown-outs

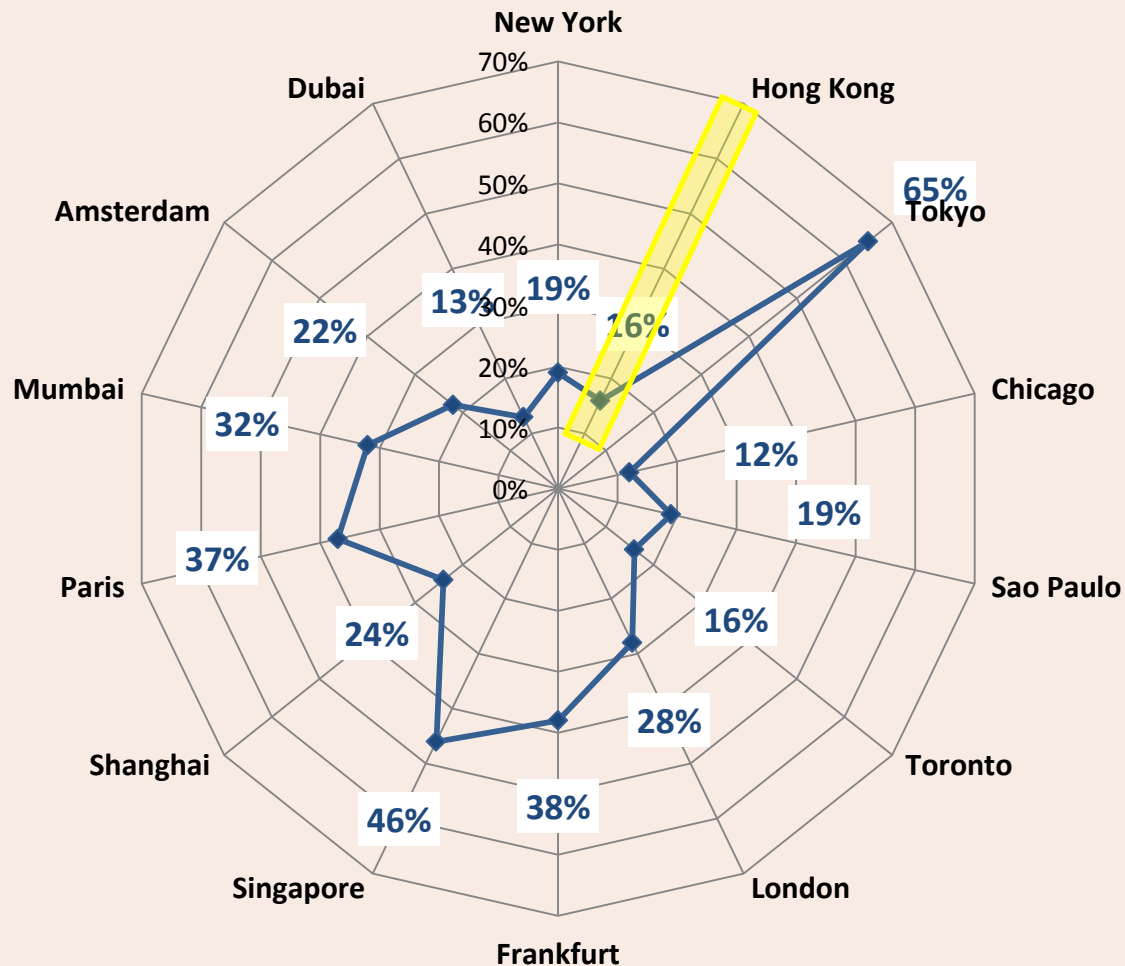


Hub City Concerns about Increasing OPEX: % Fearing that increasing OPEX will have significant on their operation over the next 12 to 18 months



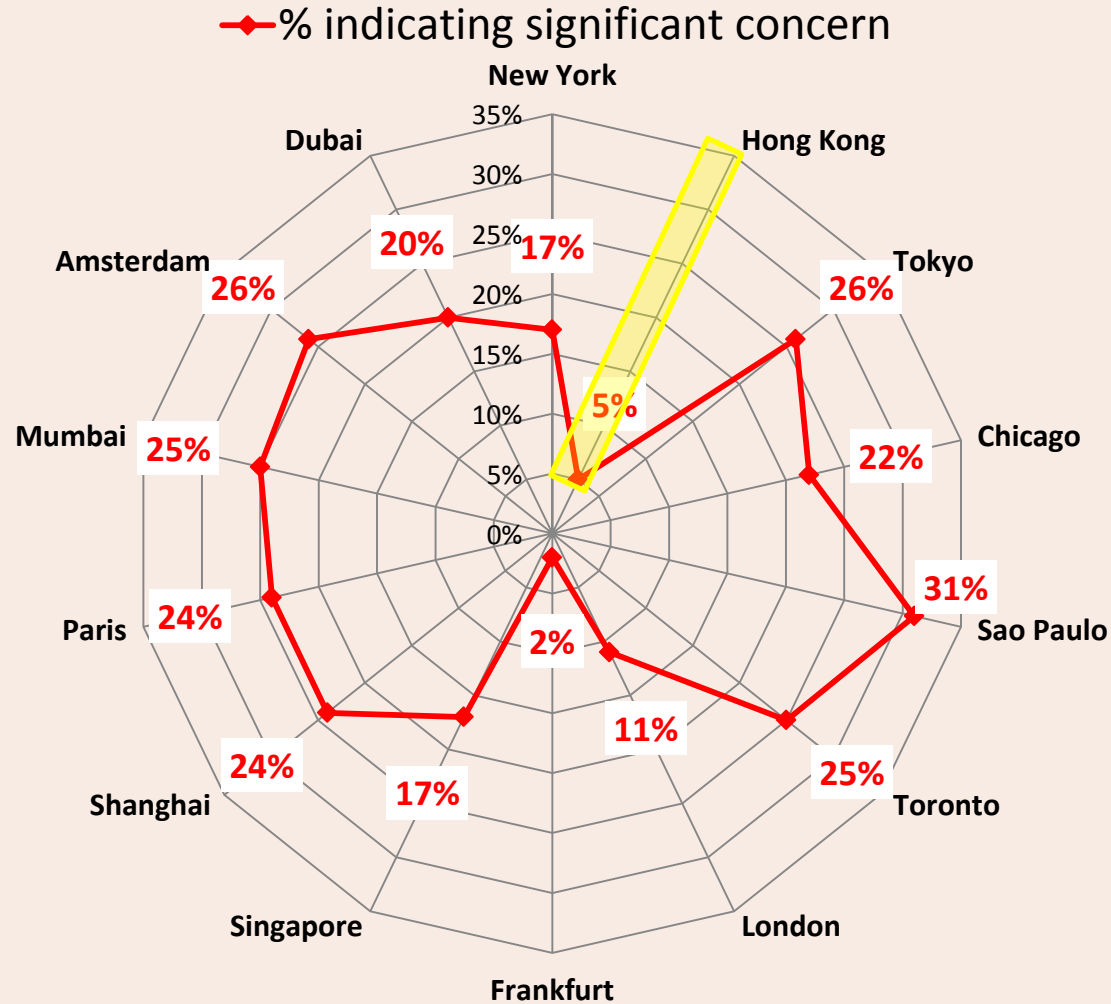
Hub City Concerns about Power Costs: % Fearing that Power Costs will have significant on their operation over the next 12 to 18 months

◆ % indicating significant concern about power costs



Hub City Concerns about Skills:

% Fearing that Skills Shortage will have significant on their operation over the next 12 to 18 months





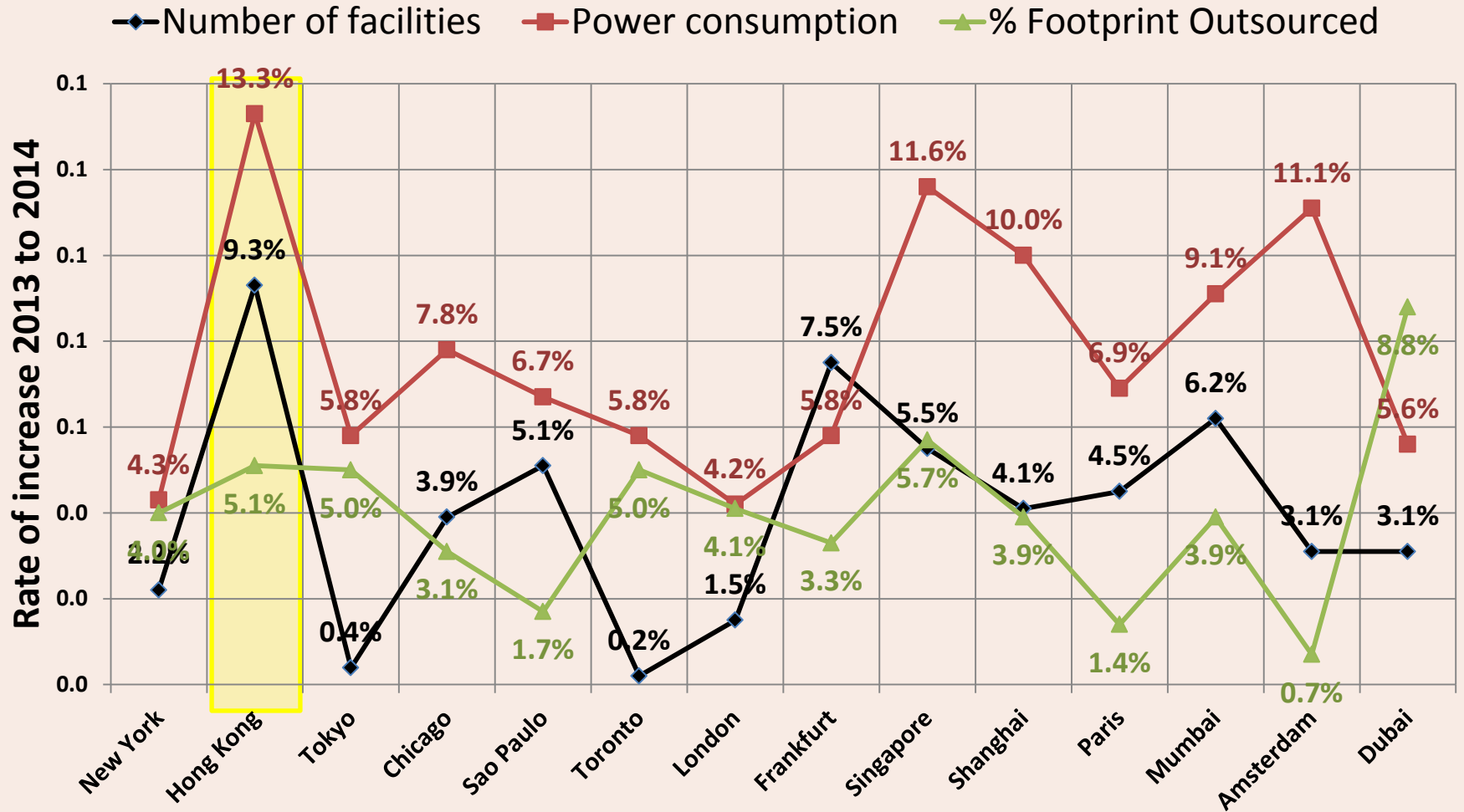
Anticipating Future Trends: Keys to the Gateway

The keys to the future are based on:

- The health of the hub in all aspects. An exchange does not operate in isolation.
- Global & more local trends in finance, investment & technology. Technology as the key that has unlocked a Pandora's Box.
- Trends in 'competitive' markets in particular the technological & trading development of the PRC.

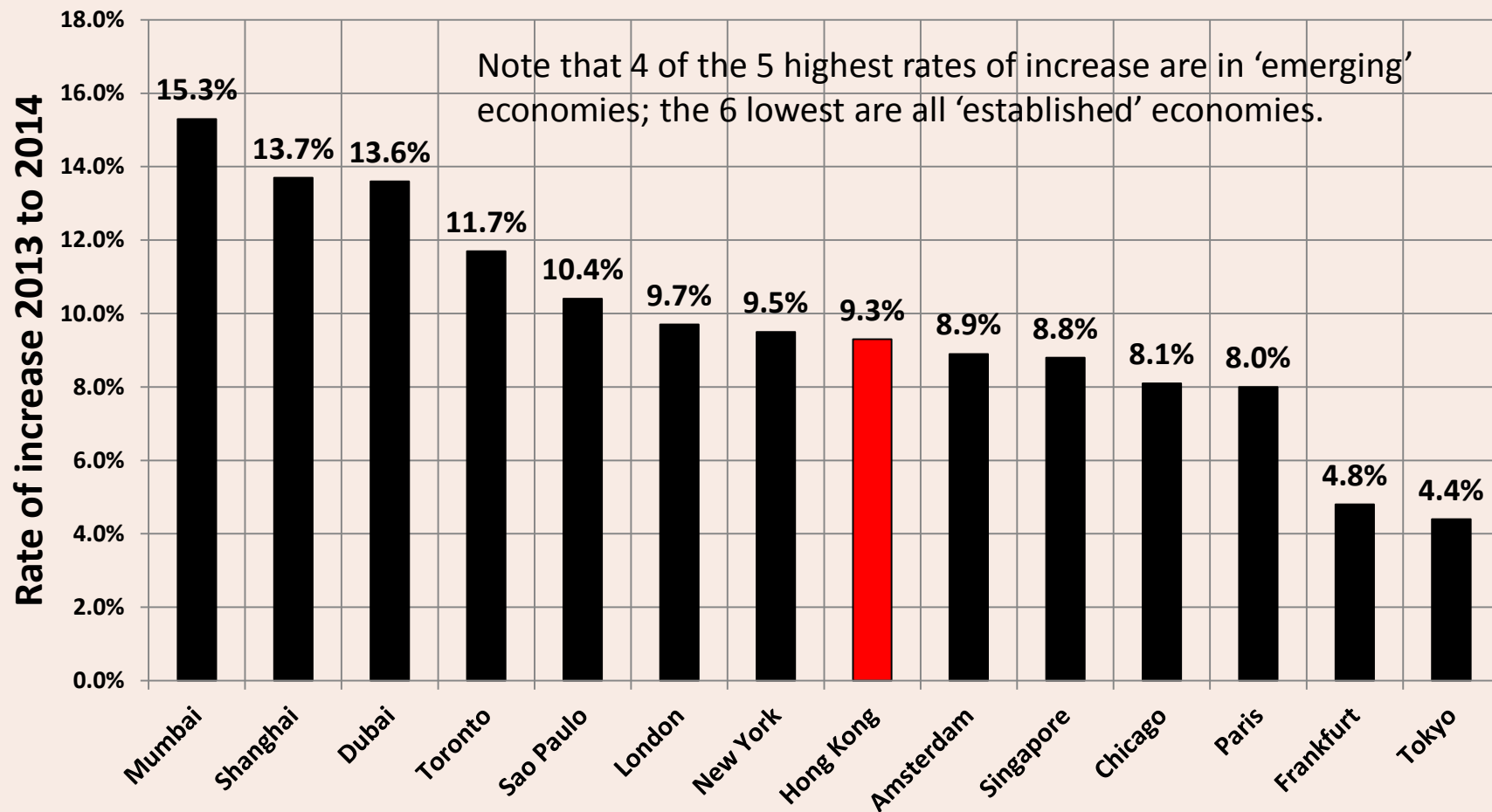
After a couple of years of 'mature' growth levels, Hong Kong will now start to move ahead faster:

Numbers of facilities, total power consumption & % footprint outsourced



Hub City Projected Increase into 2014: Hong Kong's increased rate of investment will increase by almost 10%

Estimated total investment into data centers



Global Trends ... Buddy, can you crypt a dime?

- **Who's driving - the technology or the user?**
- The evolution of 'virtual' trading & investment platforms has created game-changing opportunities but also game-changing risks.
- The problems of monitoring & regulating trading activity, and being able to plan against technology-attributable crisis – 'Flash Crash', 'August 1st Incident'.
- Technology has also enabled a new generation of online banks and the entry of financial service/credit providers into the market. It has also enabled virtual/cryptographic currencies & exchange mechanisms.

Global Trends ... Buddy, can you crypt a dime?

- **Who's driving - the technology or the user?**
- The line between the virtual & the physical is being re-written. Any currency, transaction, exchange is like a language – it only exists based on implicit acceptance of shared values. Technology may disrupt more than older technologies.
- Future & more complex cloud & software-sourced derivations and the capabilities of technology to develop & shape algorithmic trading will raise these stakes further.
- All major colocation operators offer financial market specialists as they attempt to move up the service chain.
- All the fastest growing exchanges are in emerging economies – Hong Kong is well-placed given its status as gateway into China
- Importance to Hong Kong & to HKEx of decisions in PRC in terms of technological development & location, economic (& currency) liberalisation policies, policy in regard to credit and the credit industry, the balance between centralisation & innovation.



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