

2008 A Bumper Year for Skyscrapers, Although the Future Remains Uncertain.....

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Abstract

The year 2008 will long be remembered as the start of an economic crisis that has gripped the entire globe – a year that may also have brought to an abrupt end the worldwide construction boom of the past decade that has seen ever-denser cities containing ever-taller buildings proposed from Madrid to the Middle East, from Shanghai to San Francisco. As financial shock waves have reverberated around the world, high-profile tall building projects in virtually all skyscraper cities have been cancelled, delayed, or put on hold in response to the precarious global economic conditions. The question that everyone is now asking – is this the end of the tall ambitions of places such as Moscow, Chicago or Dubai for the short-mid term future?

The correlation between tall buildings and economic recession is not a new one. In 1999 the economist Andrew Lawrence created the 'Skyscraper Index'¹ showing how almost all of the world's tallest buildings throughout history have reached completion virtually simultaneously with the onset of a major economic recession. Using the research and criteria of the Council on Tall Buildings and Urban Habitat (CTBUH), and specifically their annual 'Ten Tallest Buildings Completed Annually' and projected 'Tallest 20 in 2020' research, this paper seeks to examine further the link between skyscrapers and economic cycles, and suggest how the current economic crisis will affect tall building developments in the next decade or so.

The Current: The Ten Tallest Buildings Completed in 2008

Against the backdrop of global economic crisis, 2008 has witnessed probably the most successful year of skyscraper construction ever, with more – and taller – skyscrapers constructed globally within a single year than at any other time. The CTBUH 'Ten Tallest Buildings Completed in 2008' research² (see Figure 1), indicates that the average height of these tallest ten constructed in 2008 was 319 meters / 1048 feet, some 31 meters above the previous highest average of 288 meters / 944 feet (set in 1998 with completion of the two 452 meter-tall Petronas Towers). That constitutes some 676 floors of new construction amongst these ten buildings alone, and has added in a single year four supertall buildings to an existing global super-tall stock of only 38 supertalls³.

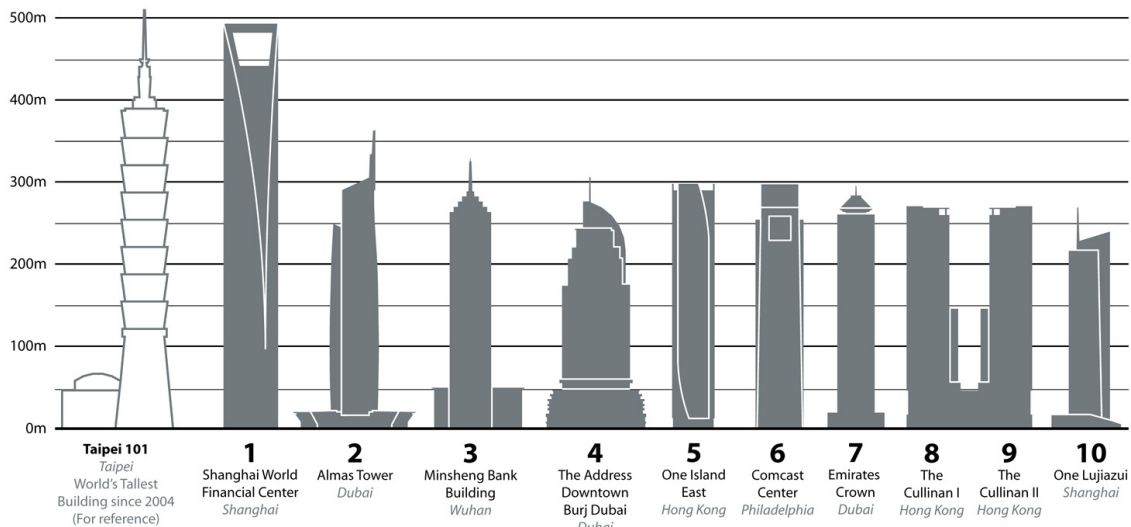


Figure 1: The Ten Tallest Buildings Completed in 2008 (Copyright CTBUH).

¹ Lawrence, Andrew (1999). *The Skyscraper Index: Faulty Towers*. Property Report. Dresdner Kleinwort Wasserstein Research, January 15, 1999.

² As always, strict criteria influences the putting together of this list; buildings are only eligible if they are considered 'completed' - that is, if they fulfil all three of the following criteria; 1) topped out structurally and architecturally, 2) fully-clad, 3) open for business, or at least partially occupied.

³ Note: It is interesting that this is the first time that the average height of the ten tallest buildings constructed in a year has risen above the 300-meter mark, which is the threshold for a super-tall building as defined by the CTBUH.

Geographically the Tallest Ten Buildings Completed in 2008 reinforces what is becoming a well known doctrine in the tall building world – namely that Asia and the Middle East are the current center of high-rise construction globally. There are now more tall buildings in Asia than in North America, and of the ten tallest buildings on the 2008 list, six are located in Asia (all in China) and three in the Middle East (all in Dubai). Only the Comcast Center in Philadelphia, at number six on the list, is located in North America. In fact one has to go back to 1991, with the completion of the Key Tower in Cleveland, to find the last time a building in North America topped the ‘Ten Tallest Completed’ list. This shift in skyscraper construction location has occurred at a staggering pace; as recently as 1990, 80% of the 100 Tallest Buildings in the World were located in North America. By 2010, just two decades later, this figure will have decreased to just 22%.

If we put the 2008 figures this in the context of previous and upcoming years (see *Figure 2*), we can see confirmed the incontestable fact that the tallest buildings in the world have been getting taller each decade, and this is set to continue certainly in 2009 with the expected completion of the next ‘World’s Tallest Building’ – the Burj Dubai. At over 800 meters / 2700 feet in height, the Burj Dubai will be approximately 60% taller than the world’s current tallest building – the 509 metre high Taipei 101 in Taiwan.

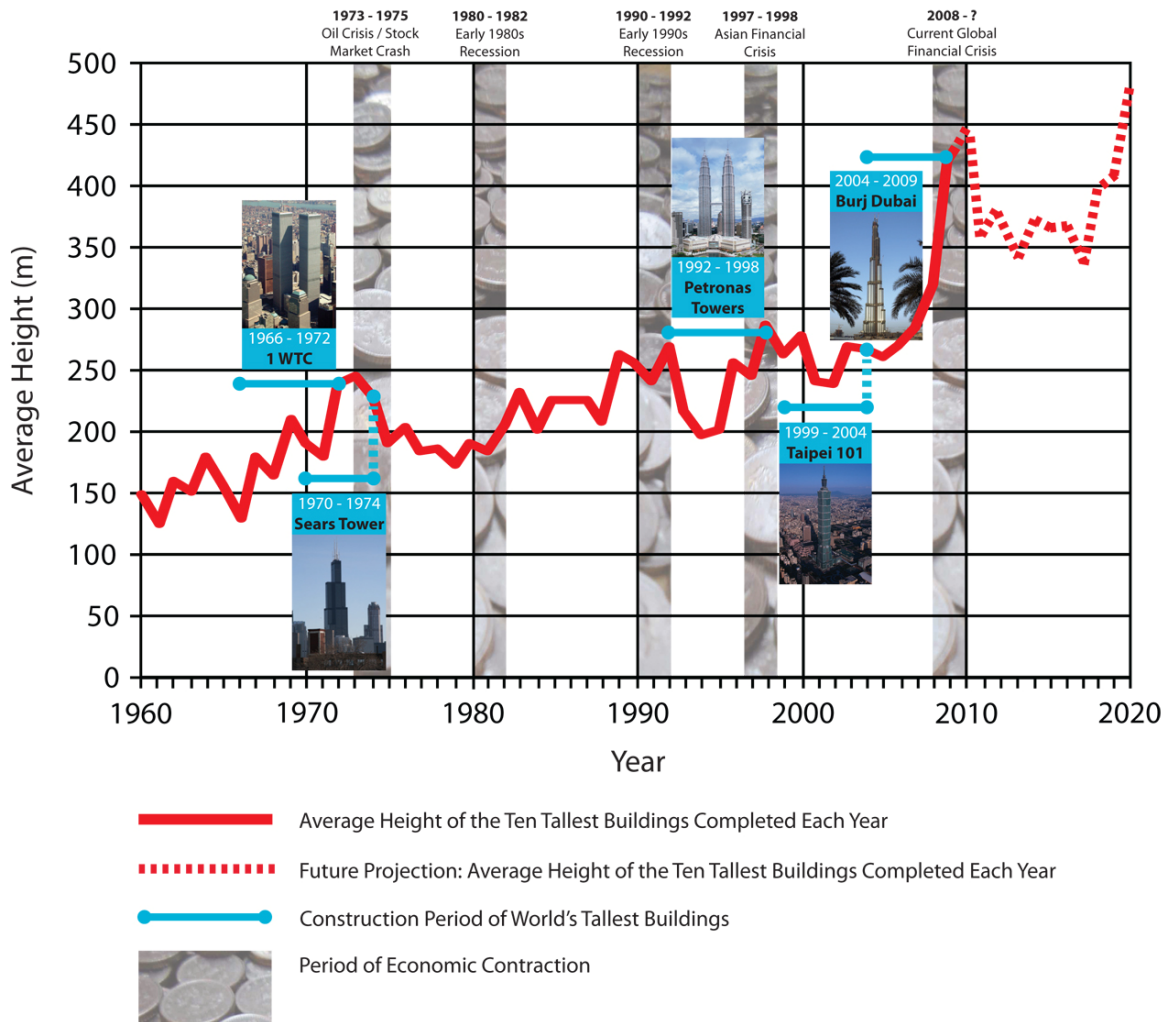


Figure 2: The Average Height of The Ten Tallest Buildings Completed in Years 1960 – 2020, also showing the construction of the World’s Tallest Buildings and periods of major economic downturn (Copyright CTBUH).

However, how can this be, in a world of global bailouts, failing banks and rising unemployment? How can we have such discrepancy between on the one hand the stark realities of economic bust now evident, and on the other hand the delivery of these very visual products of economic boom? Well, given that any tall building project – and certainly any supertall building – takes often 5-10 years to come to fruition from the initial concept of the project, it is perhaps not surprising that there is this mis-match between idea and delivery. Tall buildings – like many large, intensive developments – are inextricably linked to the confidence inspired by a buoyant market i.e. they are often conceived at the height of a market. Given, as history shows, that unbridled economic prosperity beyond a certain period of time without slowdown is highly unlikely, it is virtually inevitable then that many of these projects – conceived at the height of the market – will be delivered at the trough of a market, or at least in a time of economic slowdown.

Andrew Lawrence's 1999 paper "*The Skyscraper Index: Faulty Towers*"¹ certainly suggest this, and goes into some detail to correlate the relationship between the world's tallest buildings and economic cycles throughout history. The history of the world's tallest buildings contains many such examples: the 1908 Singer Building New York and the Panic of 1907; the 1929-31 completions of 40 Wall Street, Chrysler Building and Empire State Building, New York and the Great Depression of the 1930's; or the 1972-74 completions of the World Trade Center New York and Sears Tower Chicago and the 1970's oil crises / stagflation, to name but three. This correlation certainly seems compelling at a time when the world's next tallest building – the Burj Dubai – is nearing completion and the next two years are being hailed as the most successful in tall building history in pure height terms, whilst the global economy slips further into recession.

Not all is perhaps as clear as Lawrence's Skyscraper Index may suggest however, beyond this obvious correlation between the timing of tall building projects and confidence in the market. As Thornton shows in his follow-up paper on '*Skyscrapers and Business Cycles*'⁴, Lawrence's Index has failed to correlate some of the world's tallest building completions with major recessions. For example there was no major economic recession after the completion of the 1913 Woolworth Building, New York, or the 2004 Taipei 101 Tower Taiwan, to name but two. Further, there have been many major recessions that were not predicted by any world's tallest buildings at all, for example the 1920-21, 1937-38 and 1980-81 economic downturns. In fact if one were being cynical, as *Figure 2* shows, there has hardly been a time in the last 16 years when a world's tallest building wasn't under construction⁵, giving any enterprising economist the opportunity to correlate the construction of super-tall buildings with economic downturns.

Despite this, detailed examination of the information shown in *Figure 2* indicates that there clearly are connections between 'tallest' building construction and financial markets, as Lawrence suggests, and this graph thus supports predictions for the short term future. As the graph shows, completion of the world's tallest building tends to be followed shortly afterwards by both an economic recession and, consequently, a drop in the average height of the ten tallest buildings completed in the years following. The lag period between peak and trough in this tallest and shortest average ten buildings height over the past 50 years appears to be six years at longest (in the case of the 1970's oil crises and ensuing stagflation), two years at shortest (in the case of the early 1990's recession), and approximately four years on average.

This repeating trend certainly looks set to continue in the next few years. We can say with some certainty what the average height of the ten tallest building completed in the next two years will be (as indicated on the *Figure 2* graph), since all these projects are already significantly under construction on site⁶. Amazingly, against the backdrop of the Burj Dubai being completed in 2009, we expect to see a further increase in average height in the year following, largely due to the expected completion of 14 supertall towers in the Middle East in 2010, including the Mekkah Clock Royal Tower (577 meters) Dubai Towers Doha (437 meters), and Princess Tower, Dubai (414 meters). The average height of The Ten Tallest Buildings Completed in 2009 will thus be well in excess of 400 meters, with the figure for 2010 predicted to be even greater. Projections also show that in those two years alone some 42 supertall buildings will

⁴ Thornton, Mark (2005). *Skyscrapers and Business Cycles*. The Quarterly Journal of Austrian Economics. Vol. 8, No.1, Spring 2005. pp. 51-74.

⁵ This holds true since construction began on the Petronas Towers, Kuala Lumpur, in 1992, completing in 1998, with construction on Taipei 101 Taiwan starting in 1999 and completing in 2004, and Burj Dubai starting construction in 2004 to be completed in 2009. The only year in the past 16 years when a 'world's tallest building' wasn't under construction, was 1999.

⁶ It should be noted however that an advanced construction status on site is by no means a guarantee that the building will be completed. The Ryugyong Hotel in Pyongyang, for example, was topped out in 1992 at 330m tall (if it were completed now, it would be the 22nd tallest building in the world), but remained on-hold until recently when construction is rumored to have resumed. It is fair to say, however, that of the towers expected to be complete in 2009-10, such is the scale of their financial investment to date that they have reached an economic momentum far beyond the point of no return for those financially backing the project.

be completed, an amazing figure when compared to the current stock of only 38 supertall buildings completed to date (See *Figure 3*).

However, after the completion of these mostly Dubai-based supertalls, and as evidenced in the repeating trend indicated in *Figure 2*, we expect to see an almost certain drop in the average height of the ten tallest in 2011, that may last several years. It is difficult to predict with any certainty what will happen after that but, again, history indicates that the world will come out of recession and, as it does so, confidence in the construction market will return and with it, the average height of the tallest ten buildings annually will grow.

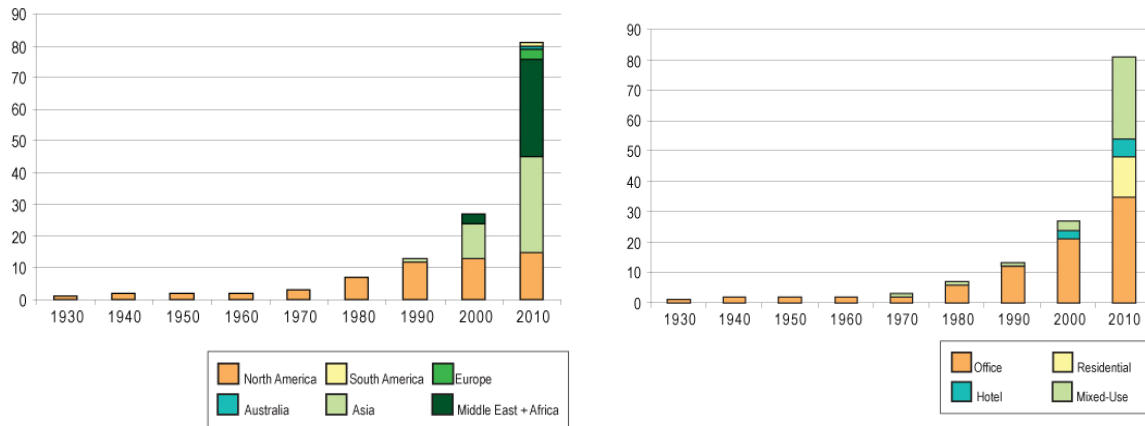


Figure 3: Total number of Supertall Buildings in the World by Region (left) and Usage (right) (Copyright CTBUH).

The Future: The Tallest 20 in 2020

Extrapolating into the future then, it is difficult to predict what will be the tallest buildings in the world in a decade or so from now. Each year the CTBUH produces research on the predicted '*Tallest 20 Buildings in 2020*' (see *Figure 4*), based on *real*⁷ projects in development at the time. The most startling feature of this year's list is that it predicts that, in little more than a decade, the world's current tallest building – the Taipei 101 – will actually be the 20th tallest building in the world, whilst other iconic supertall buildings such as the Petronas, Sears and Empire State Towers (the latter of which has been in the Tallest Ten Buildings for over 70 years) do not even make the list.

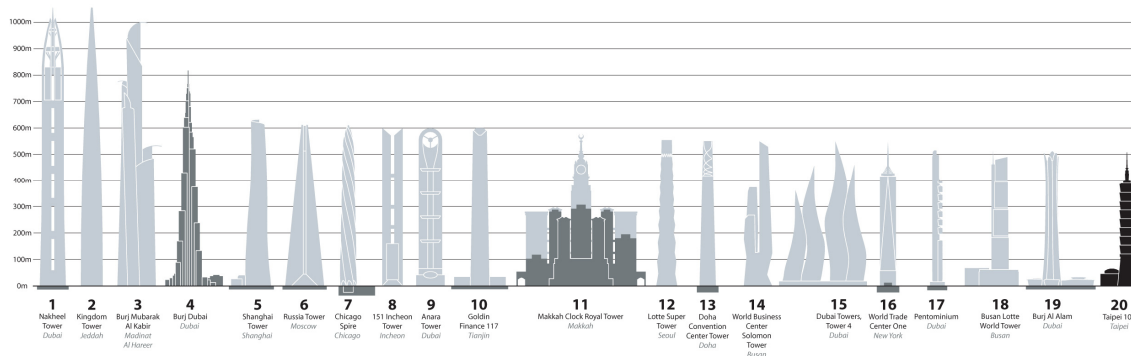


Figure 4: The Tallest 20 in 2020 (Copyright CTBUH)

⁷ The Criteria for inclusion in the 'Tallest 20 in 2020' list are that the building must be either: a) completed, b) under construction, or c) considered real proposals. A 'real' proposed tall building can be considered such if it fulfils all of the following criteria: a) Has a specific site, b) Has a developer / financier who own the building site, c) Has a full professional design team who are in the process of progressing the design beyond the conceptual stage, d) Has a dialogue with the local planning authorities with a view to obtaining full legal permission for construction, and (e) Has a full intention to progress the building to construction and completion. Furthermore the research only considers projects that are within the public domain – there may well be other proposed buildings that would make the 2020 list, but are for client / project confidentiality reasons not yet publicised. Due to the current economic climate, some buildings on this list may have slowed construction / development pace or have been put 'on hold' recently. The current intention, however, is that all projects on the list will be completed, though that may change in the coming months / years.

Geographically and programmatically too this list also provokes interest. Twenty years ago, if you had predicted the next world's tallest building, it could be confidently assumed that it would be located in North America, be of steel construction and of office function. Today almost the exact opposite is true – the world's tallest proposals are more likely to be located in Asia / Middle East, be of concrete construction, and house residential or mixed-use functions. Certainly the Tallest 20 in 2020 reinforces this idea; of the buildings shown, ten will be in the Middle East (including the tallest four), seven in Asia, two in North America and one in Europe. In terms of building function, fourteen will be mixed-use, with only three accommodating solely office functions (see *Figure 5*).

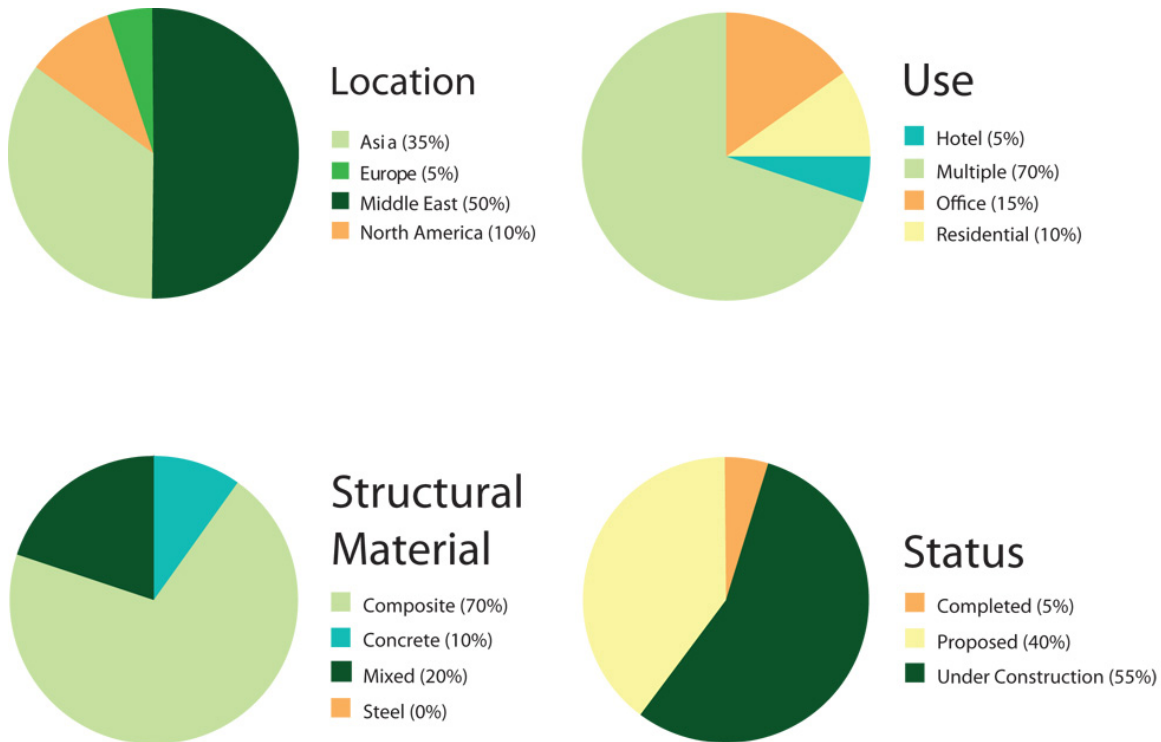


Figure 5: The Tallest 20 in 2020 – Statistics (Copyright CTBUH).

Similarly we are seeing shifts in the status of these projects, and their relationships to the political, cultural and socio-economic environments in which they exist. This is perhaps best examined in the titles of the projects themselves. Whereas historically these projects were titled to project the prowess of the corporations behind them – Sears, Chrysler or Petronas – now they are titled to reflect the city or country in which they exist – the Burj Dubai, Shanghai Tower or the Chicago Spire. In fact of the 20 buildings projected to be the world's tallest in 2020, ten are in some way named after the city or country in which they are located. The latest generation of mega-tall buildings seem to be being used to represent and promote the vitality of a city or country to a global audience; signposting advanced first-world status and increasing city competitiveness on a global stage.

However, given the trends discussed previously and the recent announcements of 'on hold' status for several buildings on the 2020 list, it is perhaps unlikely that all towers on this list will become a built reality. Given the research in this paper overall, the following predictions can be made with perhaps a degree of certainty:

1. Several of the towers on the 2020 list will not advance to construction on site, and thus eventual completion.
2. Over the coming decade and beyond, other supertall buildings – that would most likely be eligible for inclusion on the Tallest 20 in 2020 list – will be proposed as the world comes out of recession.
3. The height of these supertalls will continue to push the threshold for tallest recognition (be it 'world's tallest' or 'USA's tallest' or 'Asia's tallest', etc), further pushing up both the height of the World's Tallest Building and the average height of the ten tallest buildings completed each year.

4. Based on projects currently under construction and the affect of the economy on all projects, the Burj Dubai will likely remain 'The World's Tallest Building' for at least a decade.
5. The world's current tallest building – Taipei 101 at 509 metres / 1670 feet, will likely be pushed down the list towards the 20th position as shown in the current prediction, and probably drop off the list of twenty tallest buildings during the 2020's / 2030's.
6. Based on historical trends and current ambitions, it is likely that a kilometre-high tower will be achieved sometime in the 2020's.

Footnote: A Comforting Case Study for the Future?

Topping the 'The Ten Tallest Buildings Completed in 2008' list is the Shanghai World Financial Center (SWFC) in Shanghai, China (see *Figure 6*). Although an interesting building in both height and design terms itself (at 492 meters / 1614 feet and 101 stories, it now holds the record for the World's Tallest Building in two of the four CTBUH height categories; 'height to top of roof' and 'highest occupied floor'), it is also an interesting case study in realization that may offer some solace to many of the developers and professionals involved in the projects on the 2020 list and other tall building proposals around the world.



Figure 6: Shanghai World Financial Center – The Tallest Building Completed in 2008 (Copyright Mori Building Co., Ltd.)

Historically the world will probably view the SWFC as an important marker in the history of the skyscraper, especially in comparison to its direct neighbour the Jin Mao tower. Both exist side by side on the Pudong skyline in Shanghai and both were conceived within a few years of each other in the early 1990's. Jin Mao was inspired by what has been described as a 'Literal Cultural Symbolist' design approach whereas SWFC took a more 'Abstract Cultural Symbolist' design approach⁸. Jin Mao was designed and built by Skidmore Owings and Merrill whilst the SWFC was designed and built by Kohn Pederson Fox architects – between them perhaps the most prolific of skyscraper architects of the past few decades and certainly two firms who enjoy a healthy high-rise rivalry.

However, whereas the Jin Mao tower was constructed in a relatively typical construction period of about five years, completing in 1999 (and then crowned as the Tallest Building in China and 4th tallest building in the world), the SWFC became stalled with both economic and political problems, so that it eventually took some 11 years to come to fruition, finally joining the high-rise world as a complete building in 2008.

There must have been many times during this 11 year period when soothsayers doubted that the building would become a reality and yet here it is – the world's second tallest building in architectural height terms and an incredible project all round. To

those developers, architects and engineers currently looking at an uncertain economic future and wondering whether their tall buildings will advance to fruition, perhaps this building can offer some comfort.

In addition, to those considering the possibility of a super-tall building somewhere around the world then, given the trends discussed in this paper, perhaps the best time to conceive and start a skyscraper project is at the height of a recession, i.e. now (access to capital funding notwithstanding). Not only is the project then likely to be completed / delivered towards the peak of an upturning market, it will also benefit during construction from the lower labor and material prices typical of an economic contraction. Despite this perhaps obvious statement however, given the state of the current economic market worldwide, it would clearly take a very brave, well-funded organization to embark on such a super-tall building as we have seen in recent years. Perhaps we are seeing the end of supertall construction – for a while.....

For more information see www.ctbuh.org

⁸ For more on the design approaches of both these, and other, tall buildings, see Wood, Antony (2004). *New Paradigms in High Rise Design*. CTBUH Conference, Seoul. October 10 - 13, 2004. pp.229 - 236