



**EFESME**

**Smart SMEs in the Smart Cities**

**Smart Elevator Systems in Smart Buildings**

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## Global urbanization today

- Nowadays, on the global population of 7.3 billion, about 50% lives in urban habitat.
- In 2050, 66% to 70% of the global population will probably live in cities.
- That is an absolute increase of some 2.5 billion people living in urban habitats in the next 35 years.
- While today the yearly rate of growth of global population is 1.14%, the urban population rate is some 2%.

## Large cities

- Today about 1.000 cities have a population of more than 500.000 people each; together they have about 2 billion inhabitants, as to say 27% of global population and 55% of urban population.
- The rate of growth of the population of large cities is even higher than the one of general urban population.
- 75 cities already have more than 5 million inhabitants each, 500 have more than 1 million.
- The average urban density in the world is 4.400 people/km<sup>2</sup>, that is to say 1.66 million km<sup>2</sup> are already covered by urban space.

## Density and land consumption

- If, as it is likely to be, in 2050 two thirds of urban population shall live in cities with more than 500.000 inhabitants each, we'll have then 4 billion living in, that is an amount double than today.
- If the land consumption shall be somehow limited, as it is advisable and in many cases necessary, we could come to an average urban density of 6000/7000/8000 people per km<sup>2</sup> in the world.
- Today there are records of 43.400 (Dhaka) or 32.400 (Mumbai) persons per km<sup>2</sup>.

## Vertical buildings

- In such conditions, there is right now the need of further vertical development of buildings in the cities.
- Today, some 3.800 buildings in the world are higher than 150 meters (skyscrapers).
- From the same sources (*Emporis.com* and *Skyscrapers.com* – with some personal integrations), we know that not less than 235.000 buildings in the world are taller than 35 meters.
- It is likely to be, being these tall buildings mostly in large cities, that the increase of their population will come in an at least proportional increase of tall buildings.

## Lifts in tall buildings

- Modern tall buildings, of course, are served by lifts.
- Now, it may be assumed that more than 1 million lifts are serving those 235.000 tall buildings (around 6.5/7% of the total number of lifts in service in the world).
- In large cities, the infrastructures for transporting people and goods have a huge impact and costs (in terms also of energy and environmental effects), and in part this is due to the vertical transport system.

## Better to transport information than people

- It is possible that a picture of a 2050 city shall be that residential (tall) buildings and work (tall) buildings will be closer than now for the common citizen, at least referring to how is now designed a common Western town.
- But Hong Kong already gives now an idea of such future: more than 7 million living and working close each other in a small area, in buildings of which 409 are skyscrapers higher than 150 meters, and 7.760 are tall buildings, served by some 53.000 lifts, about 75% of the total number of lifts of the city.

## Residential tall buildings

- Initially, tall buildings were mostly designated for office use or hotels.
- Now, 16% of the skyscrapers are for residential use only and about 30% of the total space of skyscrapers is residential (including those for mixed use), and these rates will be increasing.
- Today more than 100 million people are living in tall buildings, which represent not less than 5% of the large cities population. It is likely that this figure will increase considerably.



## Lift as a means of transport

- Of course, lifts have always been a means of transport of people and/or goods.
- But in many cases, there is still a sensation, or a fact, that this means of transport is something just private, in single private buildings.
- In the future smart cities, the lifts shall be something like a common integrated system of private/public means of transportation.

## Maybe, not only vertical

- Lifts maybe shall not move only vertically like they do now, but also horizontally, or also in a sloping way of course. It also might be that they will be integrated within more complex systems of mixed public/private transport in any direction.
- As the urban population will increase, many lifts shall be faster and larger, although comfortable and probably some of them shall travel like trains do in a single well.

## Integration of systems

- This evolution will need more capability of integration of transport systems, which means the need of using common and open technologies.
- We all know that standardized protocols of communication are already largely used in building automation and that they should be adopted also in a lift technology which shall be integrated with other technologies within buildings and in the general urban environment, like several technologies already do now.

## Sharing

- The best, or maybe the only, way to waste less energy and to reduce the environmental impact of large cities and to make them smart, is to share any information we can.
- For instance, the more we know about the users of the system, the less useless travels the lift shall make.
- The more we communicate to the users and to the technical teams, the more we may save in terms of energy, time and money, making the vertical transportation system effective and reliable.

## Competition and cooperation

- A good economical and social environment needs competition to work well, but the future hopefully shall not be just a jungle, thus some technological cooperation shall be a must.
- Lifting systems shall be reliable, simple to maintain and repair, user-friendly, ready to work in every condition, including emergency, which is a serious problem when the architecture of the city is mostly vertical.

## Just mega-tall buildings?

- Today, mega-tall buildings, more than 600 meters high, are just 3 in the world and super-tall ones (more than 300 meters high) are also rare.
- Skyscrapers are just less than 2% of the total amount of tall buildings in the world and countries like Brazil, Israel, Russia have many medium-tall buildings, mainly for residential use.
- Mega and super-tall buildings are built because of a real need, or mainly for reasons of prestige? Or land speculation? Will the future be that of medium-tall buildings?

## Emergencies in tall buildings

- Regardless of other characteristics of the building itself, in case of fire, earthquake, or terrorist attack, a critical point is the chance of evacuation of people living or working in the same place.
- Specially after 11/9, designers have started to require some performances to the vertical transport system which are not easy to assure, even if efforts have been made in that direction.
- In general, it shall be preferable to limit the height of tall buildings to what is reasonable to assure safe evacuation of people in a short time.

## The role of the SMEs

- In this view, SMEs will not mean necessary “the past”, as their flexibility instead is part of the future.
- Particularly, small or large components makers are a necessary part of the lift industry and they will probably stay there in any future.
- Installation independent teams, once well trained, will also be an important part of the scene.
- Maintenance companies, also well trained, are necessary for a competitive market, and will give an important contribution to industry in the technologically open market of the future.



## The role of the associations and federations

- The future smart cities will need both standardization and flexibility from the lift industry.
- A “competitive cooperation” between the large and the small/medium enterprises shall be a good solution to assure to the market the best mix of both.
- And cooperation between associations and international federations will give at each level (domestic markets and international ones) the chance of a fruitful dialogue with political and social counterparties.



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