



# Ultra-efficiency for Communication Service Providers Are you ready for 2050?

In 2050, Communication Service Providers (CSPs) will need to be ultra-efficient. Are you ready? The CSP of the future will need to serve a worldwide population of 9.1 billion. It will need to process and carry a proportion of more than 200 trillion minutes of voice traffic free. It will need to develop, process, distribute and support many advanced applications such as interactive remote video and biometry. It will have to be an integral part of a sustainable ecosystem. What actions are you prepared to take to be ready for the future?

**Solved.**

Nokia Siemens Networks Consulting

Inspired thinking,  
innovative solutions

Today there are approximately 600 CSPs worldwide, serving around 57% of the current population of approximately 6 billion people and carrying about 10 trillion voice minutes annually.

The predominant application is voice carried across fixed copper PSTN networks and mobile networks. There is growth in integrated applications around diverse content such as video, media, information and voice – but these are not yet truly integrated by application, device or network. There are some reactionary efforts to be 'green' under pressure from environmentalists, but this has yet to be engrained in the business culture of many CSPs.

We have analyzed over 200 wireless CSPs which account for 90% of total worldwide revenues and from our analysis have found no current leaders in efficiency. None of these CSPs are highly efficient.

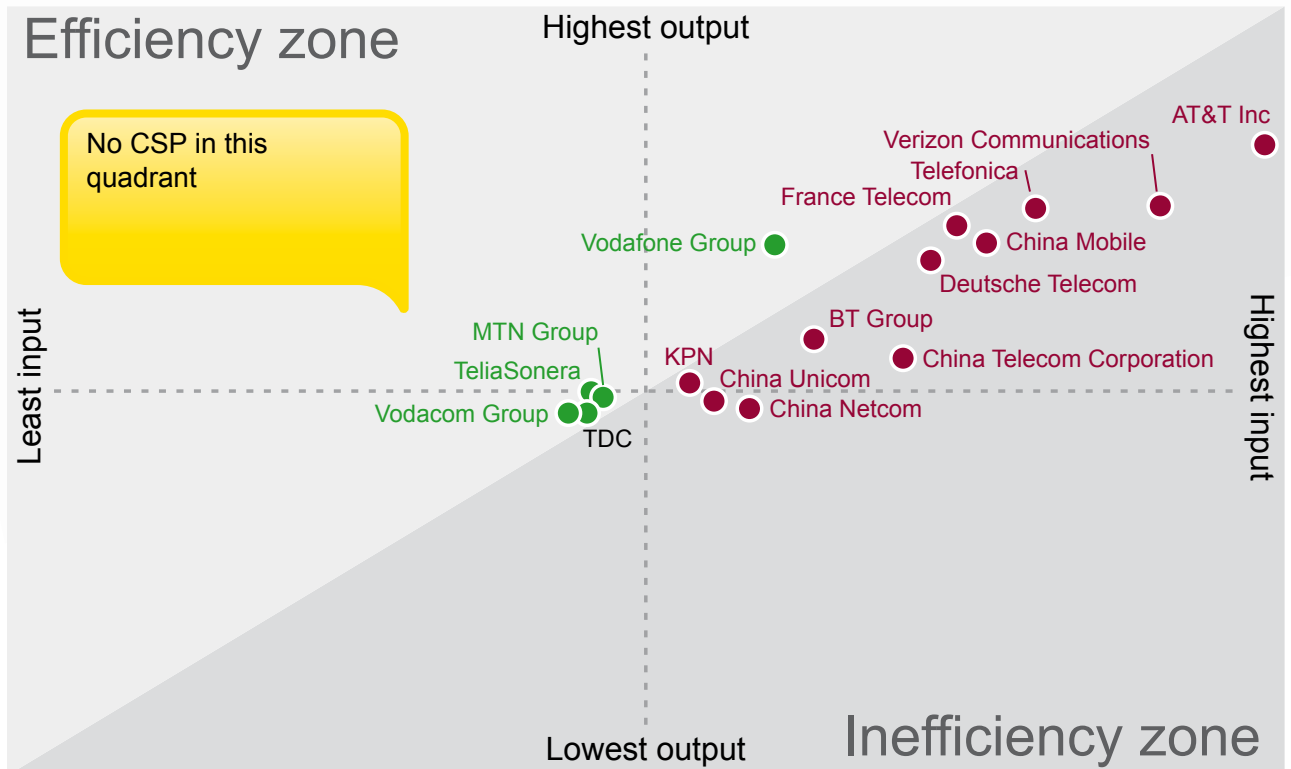
The definition we have used for this calculation is the 'optimum use of input to get the desired outputs'. For this analysis our inputs are: OPEX, CAPEX and headcount and our outputs: revenue, operating profit and EBITDA.

By 2050 the challenge will be to serve close to 100% of the population of 9.1 billion globally. These people will expect - at minimum - a voice application which by our calculations will generate above 200 trillion minutes of traffic annually. We expect a greater proliferation of advanced applications driven by new technologies and these will include more biometric sensory applications and more remote

interactive video applications. These applications will enable the CSP to substitute non-digital business activities into its business model and by consequence, will become a tremendous opportunity for CSPs to expand and enclose industries outside their current scope. We also expect that full integration into a sustainable environmental ecosystem will be necessary.

We predict that current strategies for efficiency will not be enough to sustain a CSP in such a future. The current management efforts to trim 10% here and tweak 10% there and minimal efforts in recycling will not be enough for a leader in the future. Major efforts will need to be made towards ultra-efficiency.

Figure 1. How efficient are current CSPs? Sample set of CSPs



# Responding to the world of Communications in 2050

**Future gains in efficiency are made across businesses and not just within businesses**

Creating an entwined **collaborative business ecosystem** with vertically and horizontally integrated entities will deliver massive efficiency gains. In the future we will see horizontal partnerships and previously competing CSPs merging to become mega-CSPs. These mega-CSPs will in turn form vertical partnerships with customer clusters, vendors and suppliers. Each partnership will generate significant scale efficiencies. **Previous efficiency**

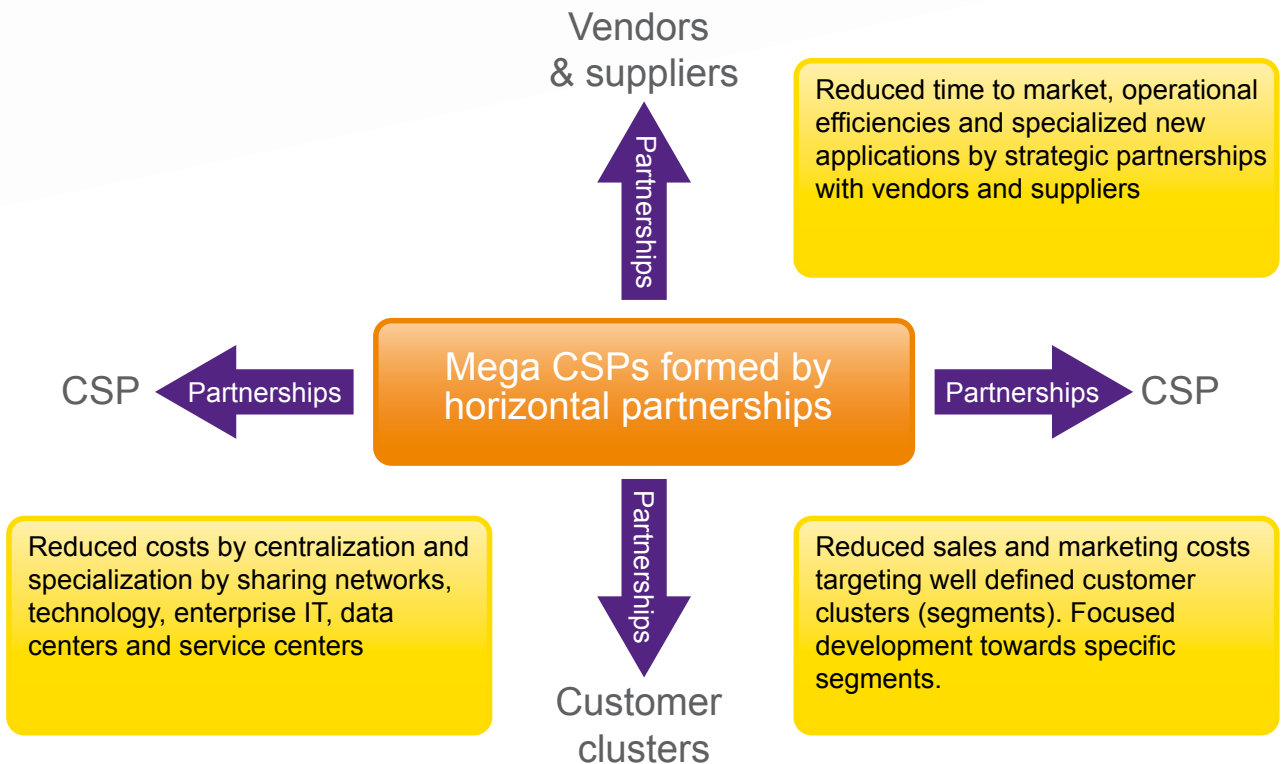
**gains considered only functional improvements within business entities. In the future, gains will be made across business entities.**

Horizontal partnerships between CSPs will provide the infrastructure and operating fabric to serve the 9.1 billion customers with anywhere, anytime and any device communication. Basic voice communication will be available to all globally as a result of these integrated networks and operations now being able to carry above

200 trillion minutes of voice traffic annually.

Horizontal partnerships will share facilities such as networks, technologies, enterprise IT, datacenters and shared service centers for non-core activities such as finance, HR and procurement. Massive efficiency gains will be made by reducing duplicate networks and build out, by leveraging available infrastructure and capacity, reducing leased line costs and combining infrastructure assets. Expensive termination and

Figure 2. Collaborative business ecosystem with vertically and horizontally integrated entities



inter-carrier charges will diminish and redundant assets can be sold or redeployed. Channels to market will be simplified and advanced applications will benefit from lower costs of joint production. Duplication of skills and workforce will be reduced through centralization and specialization efforts.

This paradigm shift is already occurring in some isolated pockets of the industry, such as network sharing for mobile operators. As this concept is further applied we would expect efficiency gains outstripping the 30-40% expected from such initiatives today.

Vertical partnerships, with targeted customer clusters, will significantly reduce sales and marketing costs and time-to-market for products and services by at least a third of current performance.

Predefined channels will provide an instant route to market, reducing the need to identify and capture specific customers or segments. Customer clusters will drive developments with the CSPs so that new products are developed that are fit for purpose immediately. There will be minimal wasted development time and significantly improved quality of investment.

Vertical partnerships with targeted vendors and suppliers will significantly reduce the development and deployment times for infrastructure and advanced new applications. Predefined relationships with strategic suppliers will lock-in research and

development efforts to reduce cycle times for new technical requirements. Similarly, predefined relationships with real-time interfaces to strategic suppliers will lock-in the process for infrastructure and operational capacity upgrades. Advanced new applications will be created by partnerships with highly specialized application developers. This would be a major paradigm shift in the industry, where currently CSPs expect to develop many of their own applications. This efficiency improvement will benefit many industries outside the telecommunications industry.

#### **Streamline business decisions not just business processes**

In the future, the effort to convert investment to revenue will be much reduced. Business decisions will be supported by significant technology developments with execution of those decisions efficiently delivered by superior processes.

#### **Nanotechnology and bio (molecular) computing will provide significantly increased processing power to support the huge amount of processing required by a CSP to run and operate its business.**

These DNA computers have the potential to surpass the speed and power of existing silicon computers because they can perform many calculations in parallel and pack a vast number of components into a tiny space. We predict that the majority of business processes by 2050 will not only be automated but will also involve the use of **bio-computers and, combined with artificial**

#### **intelligence (AI), will make fundamental business decisions quicker, more accurately and more efficiently.**

We believe the first application of AI will be in operating the network. The self-healing network will be capable of using intelligence in the network to recognize that a fault is about to happen or has happened. The intelligence will direct resources to fix that fault automatically without any human intervention. This can be an automatic software fix or instructions to a robot to make physical adjustments. The network will automatically recognize it has a problem and heal itself. **Artificial intelligence diagnostics (AID) are already being considered in the field of automotive engineering** to identify engine faults and in the aircraft industry to assist with diagnosis and maintenance of military aircraft. AID is also being considered for medical diagnosis and treatment selection.

We expect that by automating business decisions, the efficiency gains will far outstrip the typical 30% gains expected just from automating business processes.

#### **Live green, don't just think green**

By 2050 it is expected that natural resources will be significantly diminished and will command a high price. Additionally, output of waste materials, if not properly controlled by then, will become a massive burden on the environment with a tremendous impact on nature. Today the western world is consuming resources at a rate the planet

cannot support: Europeans are consuming at approximately 2.6x the planets resources and the US approaching 5x.

Recycling and re-use of materials will no longer be optional, but a necessity to manage cost of production with the spiraling cost of raw materials. Today most of the raw metals that can be economically extracted have been. Furthermore the design of product, systems and networks will need to be optimized to utilize the minimum amount of material. We foresee that in 2050 recycling would be a normal activity and a fully automated part of the design cycle rather than an additional activity which it is today.

Operators will be increasingly green over the years due to their efforts in saving on power and materials. Already there is increasing focus

on using less power for technical equipment used by the CSPs and by 2050 we expect lower emissions due to energy saved per physical unit in relation to the processing power compared to today. The CSP industry could become a main driver for chip industry evolution as their demands for data processing increases. We will see continuous progress in manufacturing smaller and more effective chips.

But in addition to the silicon based chip evolution, we believe there will also be a revolutionary path to increase chip processing power and efficiency by utilizing biological materials, light and nanotechnology. Lower emissions will also be achieved by utilizing available resources more efficiently, through grid computing for example. Sustainable energy sources like solar panels or lightning energy

will be used increasingly to keep costs down in running equipment, such as base stations for example. Electricity grids will become more intelligent and would eventually inter-lock with CSPs. Even though there is already an extensive search for green energy sources like wave energy and fusion, such sources are unlikely to make specific CSPs more efficient.

Lower emissions of toxic gases and waste materials will be mandated with clean energy sources now the requirement. Again, products, systems and networks will be designed specifically to utilize the minimum amount of energy to generate the optimum, desired output. Many organizations today are taking steps to reduce their CO2 and other toxic gas output dramatically. By up to 90% by 2050 in some cases.

## Looking forward from today's business

In order to maintain and build leadership for the future, today's Communication Service Provider needs to drive the coming changes through the following actions:

- Further develop partnerships within and beyond the communications industry to expand their business scope and improve cross-business efficiency; eventually completely reshaping their business models
- Develop parallel thinking and strategies towards non-digital industries to provide substitution revenue streams
- Drive development of artificial intelligence - applied to business decisions initially - by targeting initiatives in network operations
- Ensure that green initiatives are at the top of the CxO's agenda (avoiding them could seriously jeopardize the appeal of the business to end-users)

# Meet the consultants



Do you want to increase  
your efficiency?

Visit [www.nokiasiemensnetworks.com/consulting](http://www.nokiasiemensnetworks.com/consulting)