

TURNING SMALL CELLS INTO BIG PROFITS

USING ECONOMIC SIMULATION
TO MAKE THE RIGHT DECISIONS
FOR YOUR MARKET

STRATEGIC WHITE PAPER

With small cells that leverage both cellular and Wi-Fi® technologies, mobile network operators (MNOs) can deliver focused capacity and coverage, offload data from macro networks, and offer innovative new services. But deploying the right combination of small cells technologies and services is crucial for service uptake and return on investment (ROI). This paper outlines a small cells economic simulation process that gives MNOs the insight needed to identify which combination of small cells technologies, applications, and services in which locations offers the greatest potential to generate new revenues.

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USING SMALL CELLS TO TARGET CHALLENGES

For most MNOs, supplementing the macro cellular network with small cells is no longer optional. Today's macro cellular networks were simply not built for the way people are consuming data.

For example, people typically use their voice services wherever, and whenever, regardless of whether they are at home, the office, or on the move. Data services, in contrast, are more challenging to use while in motion. To consume a data service, such as watching a video, the user is more likely to remain in a static location and be fully focused on the service.

In addition, people have fairly similar patterns during the day which dictate when they are free and "immobile". As such, bandwidth demand will rise and fall during the day in a dynamic manner and be greatest in places of congregation, where people will have time to consume these types of services.

These shifts in demand create challenges in the network:

- During busy hours, only about 20 percent of the macro cells carry about 80 percent of the traffic.¹ The congested cells change continuously depending on time of day and geography. Existing networks do not have the flexibility to cost effectively adapt to changes in demand.
- Only about 30 percent of network capacity is consumed when people are outdoors and within good reach of macro network coverage.² Due to the nature of building construction, people often need more capacity to achieve the same quality of experience (QoE) indoors as they do when they are outdoors within reach of the macro network.

Small cells — cellular, Wi-Fi®, or a combination — can be strategically placed in outdoor and indoor locations to cost effectively deliver capacity and coverage that matches user behaviors:

- Solutions on the sides of buildings, stadiums, traffic lights, utility poles, and other physical infrastructure target areas where people congregate outdoors.
- Solutions in homes, offices, shopping malls, and conference centers target indoor areas to improve QoE and offload data from macro networks.

With the small cells economic simulation process developed by Alcatel-Lucent, MNOs can identify which combination of small cells technologies, applications, and services in which locations offer the highest potential to generate new revenues in their market (Figure 1).

¹ According to Alcatel-Lucent Bell Labs research.

² According to Alcatel-Lucent Bell Labs research.

Figure 1. MNOs must identify the right combination of small cells for their market



Category	Targeted Segments
Home Cell	Domestic
Enterprise Cell	Enterprise
Metro Cell Indoor	Shopping malls and indoor locations
Metro Cell Outdoor	City squares, villages, streets

CALCULATING AND EVALUATING SMALL CELLS MARKET POTENTIAL

Simulating the economic potential of small cells is different from creating a business case. An economic simulation is a top-down, market-driven approach that reflects updated results when parameters are changed or entered as new. In contrast, a business case is a bottom-up approach that is relatively static; parameter changes may require additional time and analysis.

An economic simulation helps mitigate market blind spots that could occur if the MNO considered only network requirements and renovation costs. While MNOs have deep experience in the voice services market, the data services market is still comparatively new. An approach that accounts for both market potential and network impact reduces risk and helps ensure return on investment (ROI).

The small cells economic simulation process developed by Alcatel-Lucent utilizes customer lifetime value (CLV) calculations. CLV calculations focus on the present value of subscribers over the lifetime of their contracts. When combined with market adoption models,³ the CLV assessment, by definition, becomes the total future lifetime value of this group of MNO subscribers. This information is extremely important because the total of future lifetime value of a company's subscribers impacts the value of the company.

The small cells economic simulation first calculates the CLV for a specified subscriber profile and small cells service. It considers all relevant cash flows — value creation and value destruction — associated with a subscriber during the contract lifetime and shows the relationship of the cash flows to market segments, handset trends, and additional applications.

Value destruction includes:

- Up-front service deployment costs.
- Costs for subscriber acquisition and retention, service operations, software upgrades, and other related costs.
- Contractual obligations with enterprises or third-party application providers.

³ The Bass diffusion model is a widely used market adoption model for forecasting.

Value creation includes:

- Retailing of the new service following different strategies such as a free loyalty period combined with a one-time fee, monthly fee, or a combination.
- Cost savings in the macro network due to data offloading.
- Additional revenues from increased use of traditional mobile services.
- Churn reduction due to customer experience transformation.
- Market expansion due to peer recommendations, the social environment, or advantages of new services.
- Up-selling of existing contracts due to appealing new services.

While the initial CLV calculations are performed for an individual subscriber, the penetration rates simulated in the second phase of calculations mean the small cells economic simulation is actually identifying the impact of the new service on a particular demographic. MNOs can use this information to determine the gross revenue impact of the new service.

SETTING UP A SMALL CELLS ECONOMIC SIMULATION

The economic simulation includes a detailed description of the parameters used and a baseline of profiles. MNOs can use the baseline profiles included within the simulation, or they can use their own data. The following parameters can be defined:

- Subscriber profile: Consumers (individuals, couples, families), enterprises.
- Environment: Home, enterprises, metro environments, public spaces.
- Technology: Cellular, Wi-Fi, or a combination.
- Application(s): Small cells applications can be defined and combined for specific consumer or enterprise profiles.

Market data based on recent analyst reports is provided to characterize:

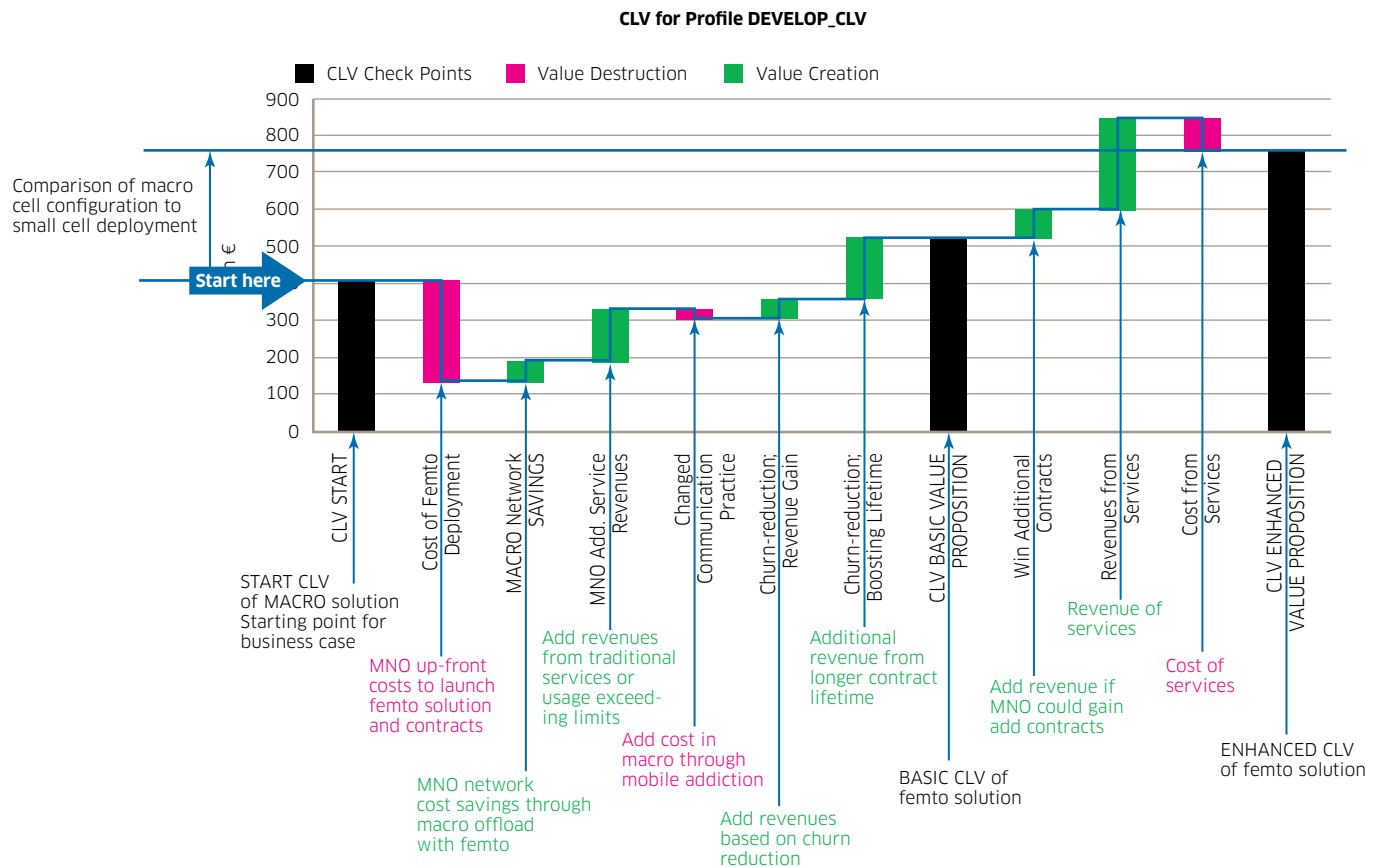
- The expectations and dynamics of the overall market based on the MNO's market share within a specific demographic.
- The split between pre- and post-paid subscribers.
- The share of consumers versus businesses.
- The penetration of mobile data users in particular market segments.

Once a simulation is set up, it can be modified to more closely reflect the MNO's business environment, business strategy, and the current operating environment. Retail possibilities and up-selling of new services can be mixed with different strategies for device subsidies, customer retention, and costs to explore business equilibriums. The simulation can also be adapted to determine the influence of different marketing strategies. Comparing different marketing strategies, including parameter-based sensitivity analysis, allows MNOs to reduce risks by assessing the strengths and weaknesses of their market approach compared to that of the competition.

UNDERSTANDING SIMULATION OUTPUT

The small cells economic simulation uses all of the parameters described above to calculate cumulated cash flows that are discounted on a monthly basis and arranged in groups to form a “waterfall” diagram (Figure 2).

Figure 2. A waterfall diagram illustrates discounted cash flows



The waterfall diagram highlights:

- CLV check points that provide comparisons (black)
- Value destruction factors (red)
- Value creation opportunities (green)

The position of the value destruction and value creation groups from left to right indicates the timing of the impact on CLV. Groups that are positioned to the left in the diagram have an earlier impact on CLV than those positioned to the right. They also have a higher probability of occurring. The size of the bars allows a direct visual comparison among the groups. Sensitivity analysis highlights which parameters have the greatest impact on the simulation (Figure 3).

Figure 3. Sensitivity analysis highlights parameters with the greatest impact

CLV ENHANCED PROPOSITION

Reference + 848,908753950742

Low parameter is -10%, high parameter is +10% of study term

Study Term

Contract Monthly Fee (22,64 €/month)

Low parameter 20,3761 €/ month, High parameter 24,904 €/month

Contract Use of included MB (100%)

Low parameter 90%, high parameter = 110%

Contract Use of included minutes (100%)

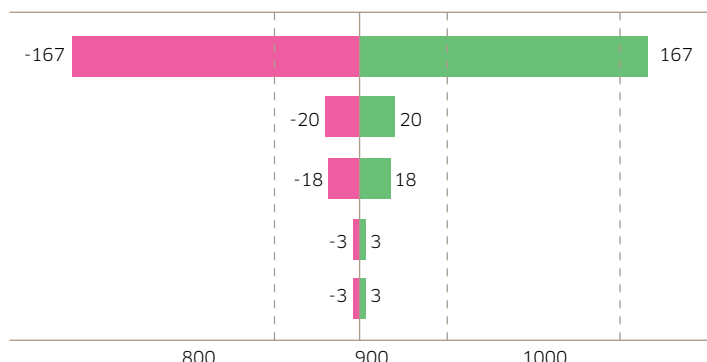
Low parameter 80%, high parameter = 110%

Contract voice minutes included (450)

Low parameter 495 minutes, high parameter 405 minutes

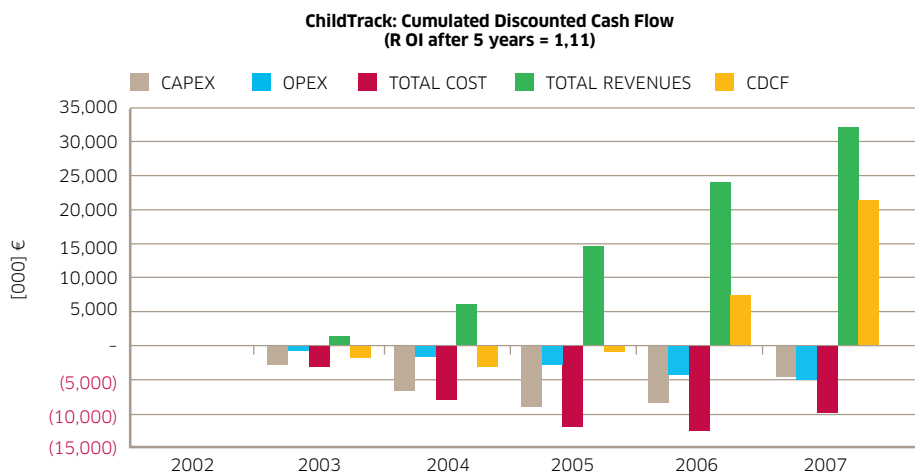
Contract Data Volume included (200MB)

Low parameter 220MB, high parameter 180 MB



To project the cost and revenue parameters on a five-year timeline, a Bass adoption model or an MNO-defined up-take rate for the new service can be included in the waterfall diagram output. MNOs can now understand the cumulative discounted cash flow and the ROI specific to market adoption for a particular service profile. Figure 4 illustrates the simulation output example — including the five-year cumulative discounted cash flows — for a safety-oriented child-minding application.

Figure 4. A five-year cash-flow analysis enhances market understanding



Once MNOs have used CLV analysis to gain insight into their subscribers' average usage patterns in a particular location, tools such as a traffic heat map can be used to precisely target small cells deployments.

DRAWING CONCLUSIONS

The output from the small cells economic simulation can be used to determine the most effective approach to service introduction in the market segment as well as the projected profitability of the service. The following are examples of conclusions Alcatel-Lucent has drawn after providing customers with a small cells economic simulation.

The MNO's opportunities in the consumer market:

- A large or rising market share of prepaid subscribers brings risks and challenges because they are traditionally low spending and low consuming subscribers. Small cells service bundles could help encourage prepaid subscribers to become post-paid subscribers, and stimulate data consumption.
- The small cells offloading capabilities alone very rarely justify the cost of small cells. Assessing the social environment around the small cells deployment could help to maximize offloading and possibly expand subscriber market share.
- Customer experience transformation will help increase revenues.
- Appealing consumer applications are rated very positively and could boost usage of traditional or new mobile services.

The MNO's opportunities in the enterprise market:

- Business subscribers typically consume higher volumes of voice and data, making enterprise markets less risky than consumer markets. Small office, home office (SOHO) and small and medium enterprise (SME) customers are particularly interested in small cells offerings.⁴
- Offload savings alone typically justify the cost of small cells.
- High quality and capacity contribute to customer experience transformation.
- There is a high probability that SME employees will switch from competing providers because they like the capacity and quality improvements small cells bring.
- New applications can increase both traditional and new revenues.

THE ALCATEL-LUCENT SMALL CELLS ADVANTAGE

A small cells economic simulation is just one element in a broad set of small cells solutions and services that Alcatel-Lucent brings to MNOs. We have the methodologies, the portfolio, and the technical experience needed to partner with MNOs from the earliest planning stages through the deployment and go-to-market phases for small cells. Alcatel-Lucent Professional Services can help to design, optimize, and deploy small cell networks. In addition, the Alcatel-Lucent lightRadio Metro Cell Express build-operate-transfer solution combines both small cells and backhaul for a turnkey deployment.

Market and network economics: Alcatel-Lucent brings the ability to look at the economics of small cells from both the market and network perspectives. Our skills include:

- Assessing market opportunities using small cells economic simulation.
- Assessing the net present value (NPV) of the network.
- Preparing financial statements and benchmarks to quantify the efficiency of the network renovation.

⁴In a recent Alcatel-Lucent study, more than 78 percent of small, mid-sized, and large enterprises said they were interested in small cells.

A customized business case: A generic business case is never adequate. Even MNOs in neighboring countries have very different requirements. Alcatel-Lucent ensures that each MNO's small cells business case reflects its own environment, including commercial, operational, regulatory, environmental, and geographic considerations.

Market and technology requirements: Alcatel-Lucent uses proven methodologies and tools to help MNOs align go-to-market timing with growing demand, and network architecture decisions with technology roadmaps.

A complete small cells portfolio: Alcatel-Lucent offers cellular small cell and carrier Wi-Fi solutions for the home, office, and indoor/outdoor public spaces. Solutions for public spaces are based on Alcatel-Lucent Bell Labs' groundbreaking lightRadio™ cube technology. The Alcatel-Lucent small cells portfolio is standards-compliant, extensible, and compatible with existing interfaces and the existing macro network.

Technical expertise: Alcatel-Lucent brings MNOs the technical expertise needed to ensure smooth operations between the macro network and the small cells network. Our skills include:

- Designing and deploying an overlay small cells heterogeneous network (HetNet) that does not destabilize the macro network or any of the services it delivers.
- Testing interference and compensation between the macro layer and the small cells layer to ensure that small cells are optimally located.
- Optimizing signaling traffic between the macro layer and the small cells layer.
- Designing policies and rules for switching between the macro layer and the small cells layer.

Alcatel-Lucent recommends that MNOs begin their move to small cells with a market assessment using small cells economic-based simulation. This allows them to more fully evaluate their small cells opportunities. They can start with simple profiles, a limited amount of data, or even relatively general data. Alcatel-Lucent works with each MNO to extend and tailor the data for the MNO's specific environment. With this approach, the results more accurately reflect the MNO's market opportunities and can be quickly adjusted to reflect an evolving competitive environment.

LOOKING BEYOND NETWORK COSTS

As MNOs continue to evolve their networks to meet rising capacity and coverage needs, moving to HetNets comprised of macro cells and small cells will become increasingly common.

Typically, MNO conversations about new opportunities have focused on the cost of network renovations. With small cells economic-based simulation, MNOs have the market insight needed to look beyond network total cost of ownership (TCO) to also consider the value of new small cells services and the potential for new revenues. This two-sided approach allows MNOs to develop a well-rounded small cells strategy that has a greater likelihood of success.

Alcatel-Lucent partners with MNOs to assess small cells market opportunities as part of an overall suite of small cells solutions and services. Our unique combination of market, technical, and commercial expertise is based on international experience in cellular small cells and carrier Wi-Fi deployments. We tailor our offerings to assist each MNO in following the optimal path to the macro and small cells HetNets needed for a profitable future in their market.

ABBREVIATIONS

CLV	customer lifetime value
HetNet	heterogeneous network
MNO	mobile network operator
NPV	net present value
QoE	quality of experience
ROI	return on investment
SME	small and medium-sized enterprise
SOHO	small office, home office
TCO	total cost of ownership

RESOURCES

Small cells: www.alcatel-lucent.com/small-cells

lightRadio Wi-Fi: www.alcatel-lucent.com/lightradio-wifi

lightRadio: www.alcatel-lucent.com/lightradio

lightRadio Metro Cell Express: www.alcatel-lucent.com/lightradio-metro-cell-express/

LTE: lte.alcatel-lucent.com