

DATASHEET

Operational Smart CAPEX



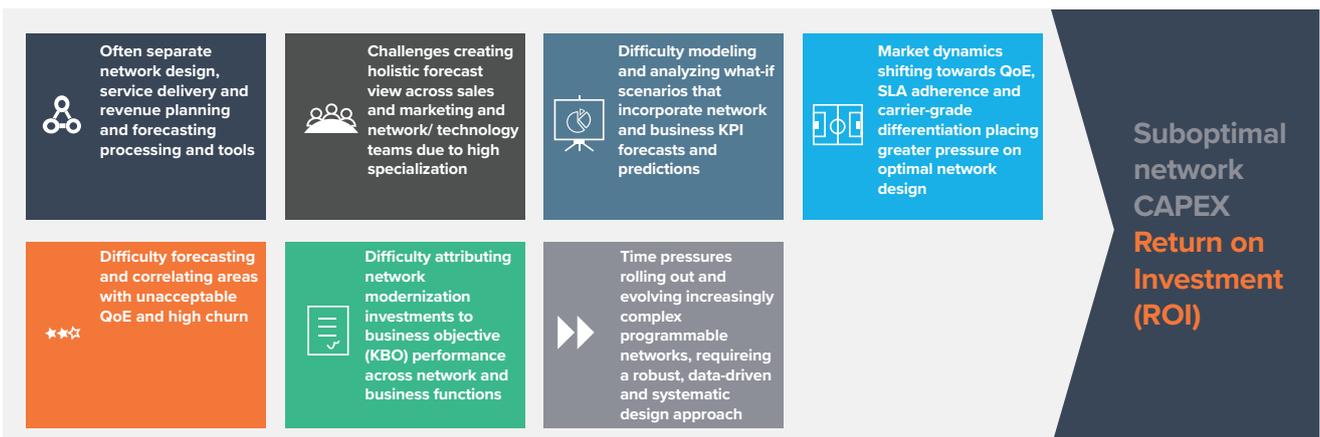
The need for a Smart CAPEX allocation process

Communications service providers (CSPs) are undergoing a phase of rapid change in how they design and deploy network infrastructure to deliver upon ever-increasing complexity of demands from a broadening range of customer segments, spurred by transition to 5G and network cloudification. Increasing mobile services demand and 5G have led to an explosion in traffic growth that implies increased network capacity & resource performance requirements. This is coupled with the trend towards higher radio network densification and further accelerated by the allocation of higher spectrum frequencies. This is creating cost pressures, which when combined with flat or declining ARPU for traditional network connectivity services, raises the importance of precisely targeted network investments, in areas with the highest potential for sustainable revenue growth and optimal ROI.

The maturity of the CAPEX allocation process today may differ from one CSP to another. The main and common challenges in this process however, are described in the diagram below.

A UNIFIED PLATFORM THAT OPTIMIZES PLANNING FOR BUSINESS OUTCOMES

Infovista's Smart CAPEX solution effectively addresses the challenges shown above by combining and analyzing business-oriented data, such as churn, cost and revenue, with network-oriented data, such as coverage, throughput, latency and reliability, into a single KPI modeling and forecasting capability. This extends from the initial planning and roll-out of network capacity ('greenfield' roll-outs), into the targeted densification and expansion of existing network capacity ('operational Smart CAPEX allocation').



Operational Smart CAPEX allocation incorporates live data from network operations systems, such as customer experience monitoring, application performance monitoring and network resource monitoring systems, for timely, accurate and proactive planning decision support.

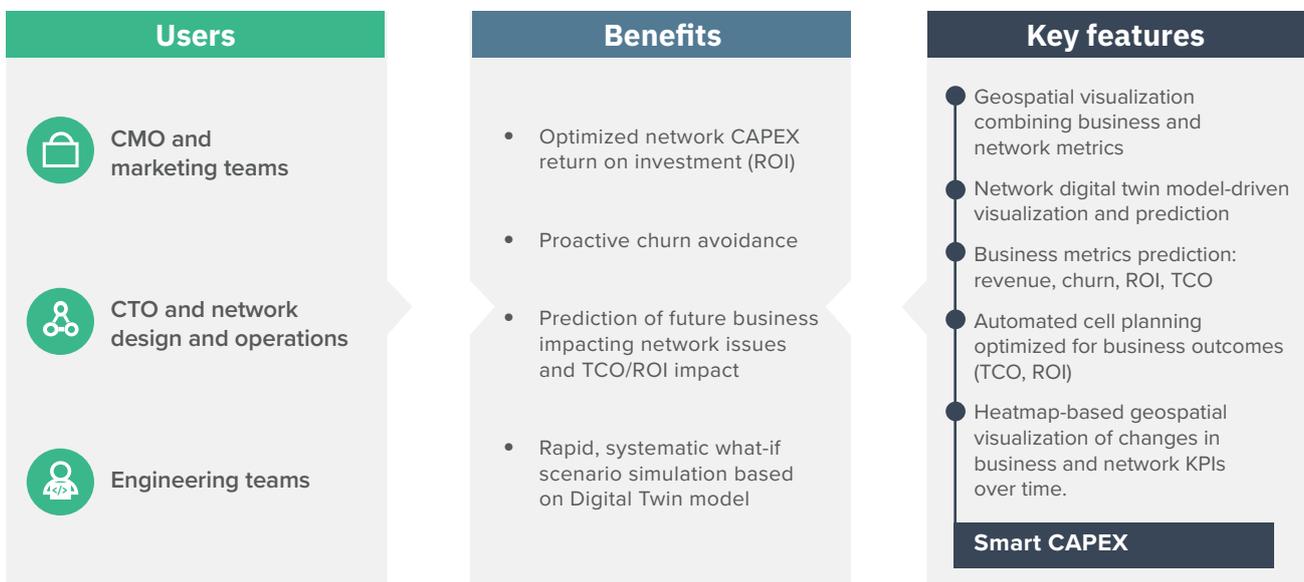
As a whole, Infovista’s Smart CAPEX solution enhances the mobile CSP’s ability to optimize and accelerate the ROI of its CAPEX investments, in the following ways:

- By accelerating the CAPEX allocation decision-making process and therefore time-to-market, providing a data-driven basis on which to build consistent investment business cases, faster and with a greater degree of accuracy
- By identifying more revenue growth and cost optimization opportunities, based on a data-driven assessment of the correlation between end user performance, and business outcomes including churn additional revenue potential
- By enhancing business agility, providing a common platform from which network and business teams can gain a common perspective of the impact of network characteristics (throughput, coverage, capacity) on business outcomes. In this way the solution supports the move towards a more agile, integrated operating model (sometimes referred to as ‘NetDevOps’ or ‘Network Development and Operations’)

- By providing highly granular visibility of regional network capacity utilization and bottlenecks, both current and future, enabling the execution of regionalized sales and marketing efforts that monetize available network capacity without creating congestion issues (or enabling the proactive resolution of these issues before they impact customers)

The business benefits of Infovista Smart CAPEX

Infovista’s Smart CAPEX solution provides enhanced predictive accuracy of business KPIs, including TCO, Incremental Revenue, Churn and ROI, alongside typical planning KPIs such as coverage, capacity and throughput. This is achieved using Infovista’s geospatial Digital Twin model based on live network data (OSS, L3, probe data), enabling the simulation of different ‘what-if’ scenarios and the associated predicted traffic, network resource performance and quality of experience outcomes. The automated modeling and prediction capability combines total cost of ownership (TCO) outcomes with revenue outcomes, thereby identifying the distribution of return on investment (ROI) potential across geographical areas.



Smart CAPEX has broad applicability and benefits across a range of stakeholders in the network operator organization. Primarily, it provides senior stakeholders, including the CTO and CMO organizations, with richer data-driven geospatial visibility of network and business KPIs on which to make decisions, such as how to prioritize the allocation of budget in different areas, or how to target high churn risk areas in the network which exist today or will arise in the future. The capability of future QoE degradation and churn hotspots detection plays a critical role in proactive churn minimization and customer retention programs, and therefore has a direct impact on the organization’s overall profitability by reducing and optimizing customer acquisition and retention costs, while increasing subscriber Lifetime Value.

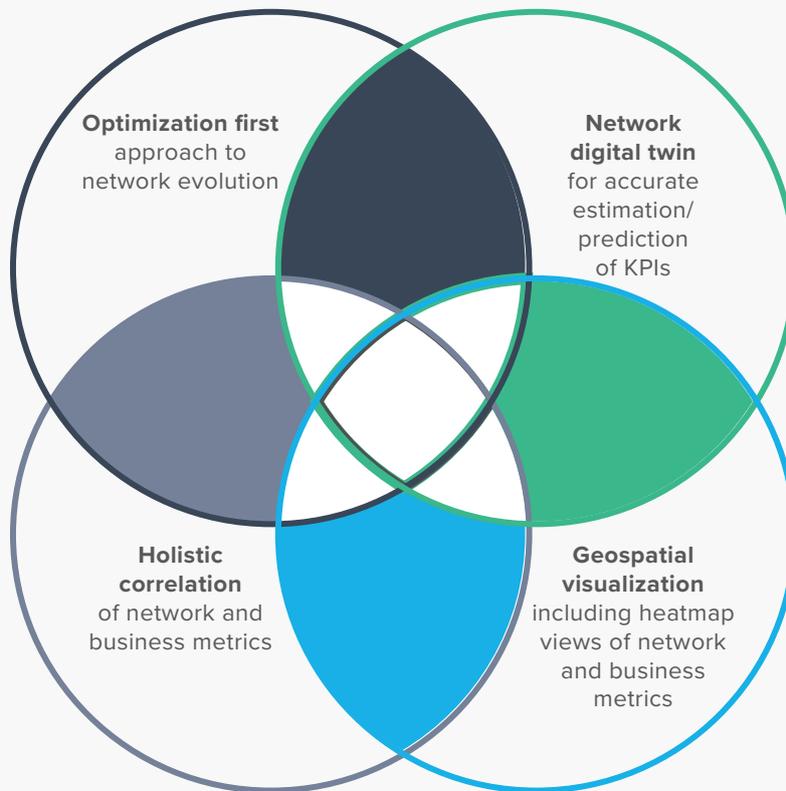
Smart CAPEX also supports engineering and network planning teams to optimize their efforts in radio network evolution plans creation for densification and expansion including multiple what-if scenarios simulation. It leverages fully automated business-driven planning algorithms along with rich geospatial views that provide ‘at-a-glance’ information about the current and predicted network performance, areas and hotspots with poor QoE or capacity bottlenecks. The solution also automates the estimation of the business impact of current and future network problems such as performance bottlenecks and coverage issues in monetary terms, and provides a data-driven basis on which to identify network expansion and densification investments that address these problem areas while minimizing TCO and optimizing ROI.

Stakeholder	Business challenge	Smart CAPEX solution benefits
CMO	How to deliver and maintain optimal customer experience and satisfaction, consistently even as network demand and business expands, while optimizing profitability?	The solution provides geospatial visibility of end user QoE today and in the future. Poor QoE hotspots identified in the network are correlated to Churn risk and revenue potential in geospatial heatmap form.
	What are the Churn hotspots today and in the future?	The solution provides visibility of current and future hotspots of high Churn risk as well as the estimation of the associated incremental revenue loss by considering the number of users located there and their estimated LTV (lifetime value).
	Where are we losing (will be losing) revenue due to Churn?	The revenue potential heatmap inputs support TCO modeling and ROI prediction. The outcome of this is network evolution recommendations prioritized by ROI and Churn Impact.
	What is the prioritized action plan with maximized impact on Churn reduction?	The solution provides map views showing areas of current and future QoE degradation with an indication of ROI for these areas.
	Where are the areas with the best ROI potential?	A special module of the solution provides a heatmap that represents underutilized capacity in the network today and in the future. This information can be used to plan promotional offers or new services on a regional basis.
	Where are the areas with spare capacity, where we can offer additional services?	Using ML modeling, the solution provides a clear understanding of the capacity profile of each cell in the network, calculates the time to congestion and proposes the amount of additional capacity required to resolve and avoid these problems.
CTO	Where does my network have capacity bottlenecks today and where will they be in the future?	The solution identifies poor QoE areas caused by congestion and low spectral efficiency, notifies planning teams and provides network expansion and optimization recommendations.
	Where are the hotspots impacting Churn?	Using different revenue models, the solution provides a mechanism to correlate variations in QoE and network congestion to variations in revenue potential.
	How does service quality correlate with financial metrics?	The solution provides a number of options to automatically simulate network behavior considering various input conditions.
	How can I simulate different what-if scenarios rapidly and with minimal manual effort?	The solution provides a per-site capacity expansion schedule with the objective of adding enough capacity in the right places at the right time with the best ROI.
	How can I optimize the cost of modernizing and expanding the network?	The solution provides a per-site capacity expansion schedule with the objective of adding enough capacity in the right places at the right time with the best ROI.

KEY DIFFERENTIATORS OF INFOVISTA'S SMART CAPEX SOLUTION

Infovista's Smart CAPEX solution has the following main differentiators:

- **An 'optimization first' approach:** As an independent software vendor with extensive expertise in network planning, testing, deployment, operations and monetization solutions, Infovista has built its Smart CAPEX solution purely with the objective of supporting the optimization of network ROI. As such the solution enables operators to identify the where and how existing network resources and capacity can be optimized first, before identifying where and how investments in new resources and capacity would be required.
- The solution **combines network and business metrics**, with ML-based network and business KPI modeling that enables the correlation and identification of the impact on network investments on business outcomes and metrics.
- **The network digital twin** that powers the solution enables accurate prediction of the current and future state of the network, services and customer experience.
- **Geospatial visualization** of engineering and business metrics including QoE, churn probability, revenue potential and ROI support a precise understanding of current and future problems in the network and estimate solutions to fix that.



Key features of Infovista’s Smart CAPEX solution

The primary objective of Smart CAPEX is to enable a shift in focus in network evolution planning, from network KPIs to business KPIs. Smart CAPEX supports this by combining live network and traffic data to deliver actionable business insights based on accurate views of business performance, both current and future. This section highlights the main functionalities and deliverables in the Smart CAPEX solution that support this objective, including:

- **Geospatial heatmaps:** visualizations of current and predicted business KPIs in the form of heatmaps that users can view at various levels of granularity, from the national level down to the cell-site and ‘pixel’ level. The KPIs include: QoE, Churn risk, Revenue, TCO and ROI
- **Digital twin modeling:** A model that replicates the live physical network alongside population density and traffic demand
- **Focus area detection:** The identification of both current and predicted geographic areas with problems resulting from insufficient capacity, including insufficient capacity and coverage; insufficient or rapidly declining QoE; rapid capacity demand growth; and low spectral efficiency
- **TCO and ROI modeling:** The configuration of equipment and associated costs, alongside maintenance overhead data to accurately estimate the overall TCO implication of different planning decisions, to support the identification of the most cost-efficient cell layouts
- **ROI Optimization:** Leveraging the Potential Revenue heatmap and TCO modeling capabilities, Smart CAPEX solution identifies the areas with healthy ROI and visualize that in various formats including ROI heatmaps and network upgrade schedule priorities by ROI

DIGITAL TWIN MODELING

The Digital Twin engine replicates the operator’s traffic, network and business context under one virtual umbrella. It ingests live network data, financial and business inputs (data about a range of business topics such as customer value, equipment costs, competitive activities and others) and additional data precalculated in the tool.

In combination with advanced ML algorithms, the Digital Twin generates geospatial predictions of key network and business KPIs to support the Smart CAPEX analytics workflow.

The Digital Twin supports the visualization of engineering and business metrics in a geospatial view, showing current and predicted conditions. Below is an example of service Quality of Experience (QoE) degradation hotspots for today and in the future.

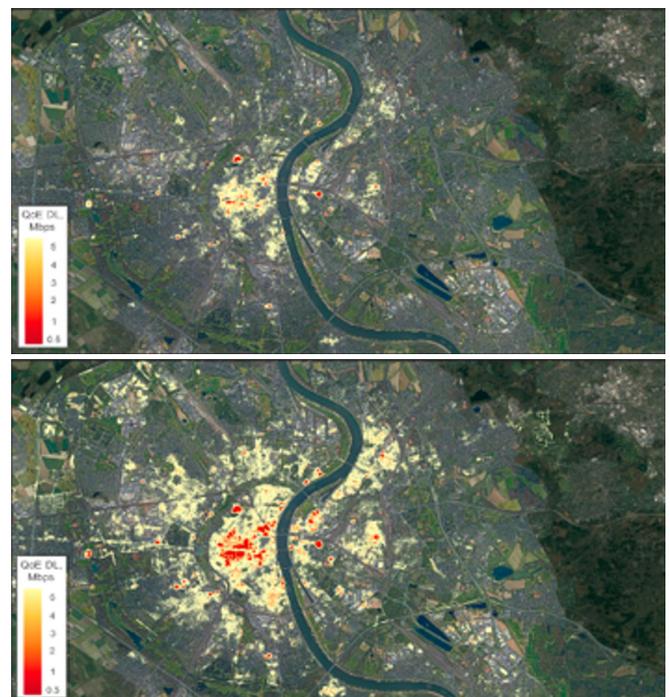


Figure 1 – An example of a QoE degradation heatmap showing current QoE (top), and predicted QoE (bottom)

FOCUS AREAS DETECTION

Leveraging the digital twin, it is possible to simulate various traffic and network configuration scenarios using different input conditions (what-if scenarios). These precise geospatial simulations highlight potential problems in the network today and in the future, including:

Engineering metrics:

- Air interface bottlenecks
- QoE heatmap
- Areas with low spectral efficiency
- Areas with poor coverage areas
- Areas with high or rapidly increasing capacity demand

Business metrics:

- Traffic demand heatmap
- QoE degradation heatmap
- Churn probability heatmap
- Additional (incremental) revenue potential heatmap
- ROI Heatmap
- Spare capacity heatmap

REVENUE HEATMAP

The Smart CAPEX solution uses a range of different revenue models to produce the revenue heatmap. The revenue heatmap provides a view of revenue from two perspectives down to the pixel level of granularity:

- **Addressed revenue heatmap:** a geospatial representation of actual revenue as attributed to regional demand. It supports drill-down from regional down to cell and pixel level. The addressed revenue heatmap is calculated using business variables including regional subscriber density, ARPU and QoE.



Figure 2 – An example of an addressed revenue heatmap

- **Current and predicted potential revenue heatmaps** are dynamically created with geospatial representations of the amount of potential (additional) revenue that exists across particular regions, based on live network data processed in the digital twin module. Potential revenue is a function of technical and business variables, including capacity, regional subscriber density, churn probability caused by poor end-user QoE and subscriber lifetime value.

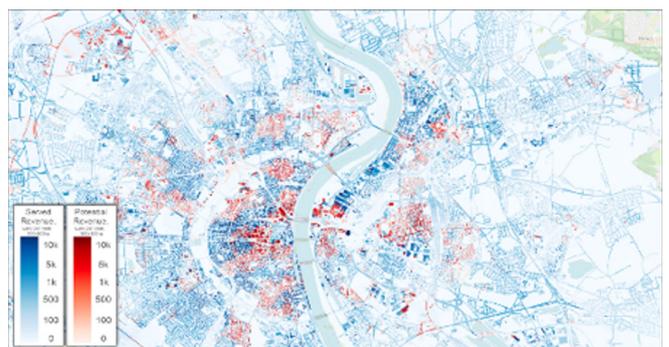


Figure 3 – An example of a potential revenue heatmap

This heatmap provides a predicted view of revenue potential across different time horizons and can be used in different CAPEX investment scenarios, including the scenario in which no network densifications or expansions are completed.

TCO MODELING AND OPTIMIZATION

Considering the additional revenue heatmap as the input for the TCO modeling stage, Smart CAPEX can estimate the optimal planning solution to resolve a given technical or business problem in such a way that optimizes predicted revenue, ROI and NPV.

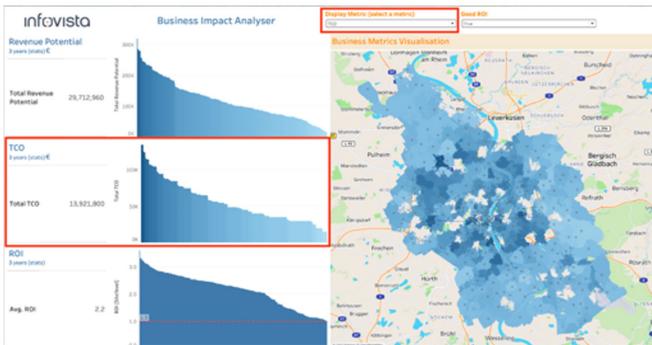


Figure 4 – An example TCO heatmap

ROI HEATMAPS

Combining potential revenue and optimal TCO as described above, Smart CAPEX provides ROI reports and heatmaps. These heatmaps can be created for different scenarios and for different time horizons, providing the CxO with an at-a-glance view of the geographic regions where investments in the network have the highest impact. Below is an example of an ROI heatmap.

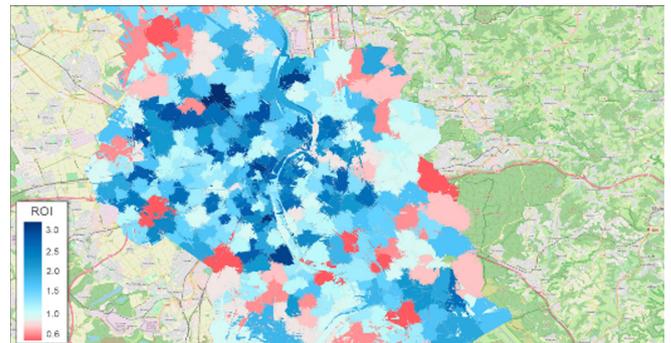


Figure 5 – An example of an ROI heatmap



About Infovista

Infovista is the global leader in network lifecycle automation (NLA) for the next-gen networks era. With its unique NLA approach, Infovista allows communications service providers (CSPs) and enterprises to improve their network performance and customer experience, optimize their productivity, and reduce their costs, while maximizing return on their investments. Spanning the entire network lifecycle, Infovista's products and solutions leverage an open, integrated, cloud-native portfolio that automates tasks, flows, analytics, and decisions to the greatest extent possible. More than 1,500 customers, including 400 Mobile Network Operators, around the world rely on Infovista to plan, design, deploy, test, operate, support, optimize, evolve, report on and monetize their networks.



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