



White paper

**Winning the battle for control and
differentiation in the home
broadband network with operations
automation**

May 2018

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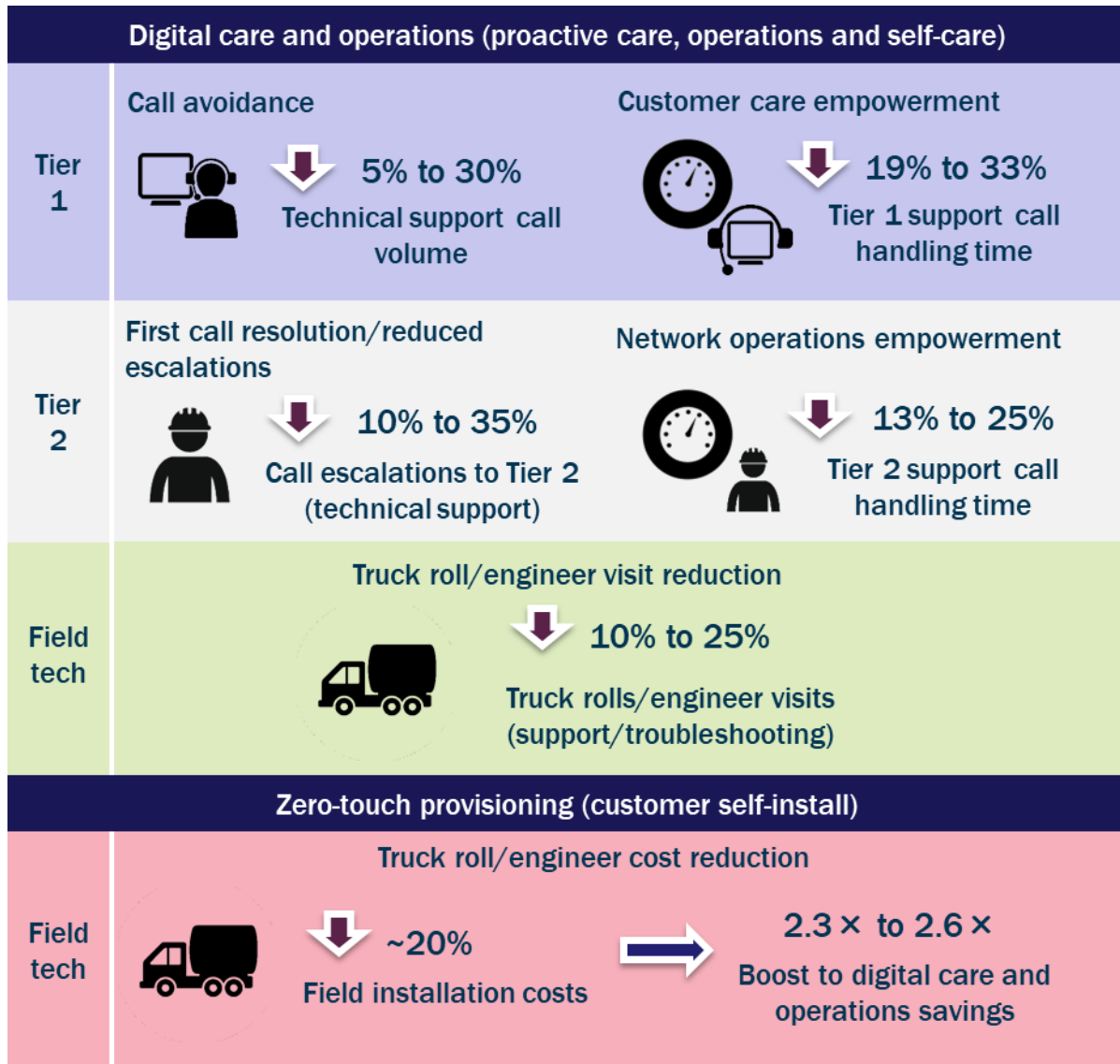
1. Executive summary

The digital home network market is fast emerging as a lucrative opportunity as more and more homes are becoming digital and smart. Consumers are rapidly adopting new cloud-based services enabled by high-speed broadband connectivity (video/music streaming, storage and online gaming). They are using a large variety of connected devices to access these services and to automate their homes using smart Internet of Things (IoT) devices such as smart speaker/AI assistants, smart lighting and home security. There is fierce competition between many different players and ecosystems, including network/connectivity providers, web-scale players and smart home solution providers, to conquer the digital home network market. To differentiate and capture more value in this highly competitive market, fixed broadband operators¹ serving the residential and small office/home office (SOHO) market must start increasing operations automation today to deliver a superior digital home experience and reduce the high operational expenses (opex) stemming from the increasing complexity of the home networks.

This Analysys Mason research and white paper, commissioned by Incognito Software, explores the unique challenges that fixed broadband operators face in the context of the increasing digital transformation of home networks. It also examines how the introduction of operations automation can deliver immediate, tangible operational benefits and improve customer satisfaction and loyalty. Based on operator interviews in emerging and developed markets, this paper provides a quantitative analysis of the operational efficiencies that can be achieved with the implementation of digital care and operations (automated customer care, network operations and home user self-care) and zero-touch provisioning over a three-year period. Figure 1.1 summarizes the key findings of this analysis and Section 3 provides more detail on the financial benefits (total opex savings in USD dollar terms, internal rate of return (IRR) and payback periods) that operators in developed and emerging markets can potentially achieve with operations automation.

¹ Includes fixed wireless service providers

Figure 1.1: Potential benefits of digital care and operations and zero-touch provisioning [Source: Analysys Mason, 2018]



In addition to the operational efficiency benefits illustrated in Figure 1.1, operations automation with digital care and operations and zero-touch provisioning will have an indirect positive impact on customer experience and retention. To capture and measure these improvements, this paper recommends operators introduce the home network experience and the associated experience metrics as part of their customer experience index (CEI) calculation. Analysys Mason research shows that the customer’s experience of customer support is one of the prime determinants of overall customer experience, with a potential CEI weightage of between 20–30%.² An empowered customer care and customer self-care, supported by highly automated backend operational processes, can significantly bolster the CEI score, as discussed in Section 4.

Beyond these immediate operational efficiencies and customer experience improvements, the implementation of digital care and operations and zero-touch provisioning today can pave the way for future proactive and predictive operations underpinned by advanced analytics/artificial intelligence (AI) and virtualization

² For more details on CEI, see <http://www.analysismason.com/Research/Content/Reports/Customer-experience-index-Jan2016-RMA15/>

technologies³ (see Section 5). Operators should start today forming the foundation of the highly automated, software-based network operations, which is essential to seize new 5G and digital service opportunities, building on the readily available operations automation capabilities.

2. Reducing operational costs and improving customer experience are among the top CxO initiatives worldwide

The OECD projects that the global economy will grow by about 3.9% in 2018 and 2019.⁴ In contrast, overall telecoms retail revenue is expected to grow by 1.1% and 0.6% over the next two years, while the fixed telecoms services market will see only a marginal growth of 1% and 0.5% in 2018 and 2019 respectively.⁵ This is illustrated in Figure 2.1.

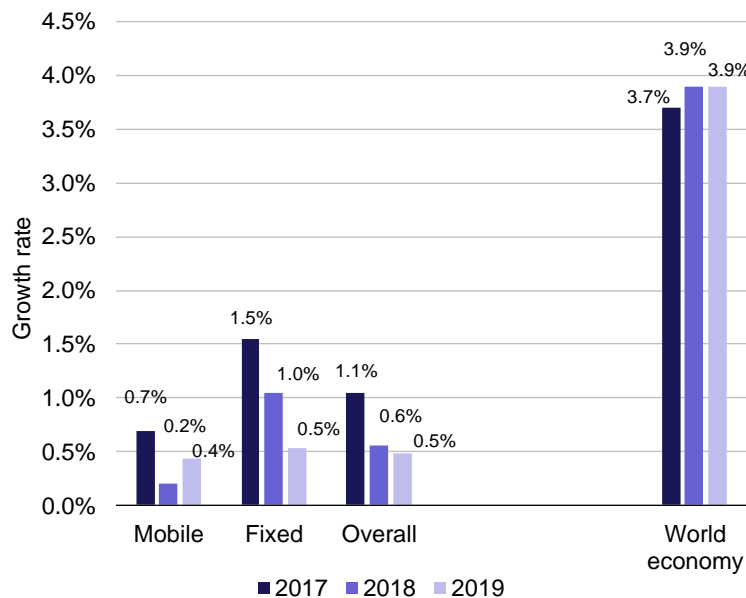


Figure 2.1: Telecoms industry growth rates vs. global economy growth rates [Source: Analysys Mason, OECD, 2018]

Fixed service providers are pressing on with new growth strategies to accelerate revenue, such as accelerating fiber-to-the-home (FTTH) roll-out and launching new digital services such as over the top video. However, many accept that achieving growth in the face of price wars and fierce competition from traditional players as well as alternative service providers will be extremely difficult.

In addition to the top-line growth challenges, the downward trend in average service revenue per user (ASPU), increasing churn to alternative service providers (e.g. cord-cutting in cable/IPTV services) and growing costs of

³ Network function virtualization (NFV), software-defined networking (SDN) and cloud technologies.

⁴ <http://www.oecd.org/eco/outlook/economic-outlook/>

⁵ <http://www.analysismason.com/Research/Content/Regional-forecasts-/Fixed-services-worldwide-RDMBO/>

network traffic and service delivery are major threats facing operators' bottom line. As such, reducing opex is a major strategic imperative for most operators. CxOs face constant pressure to implement initiatives to improve operational efficiency and profitability, for example:

- driving cost out of customer care and network operations
- reducing and if possible, completely avoiding manually intensive tasks such as engineer visits and truck rolls
- significantly reducing the cost of troubleshooting network and service issues
- improving first call resolution (FCR) and introducing new services without adding opex
- reducing contact center training costs.

2.1 Fixed service providers face some unique business challenges

Achieving these operational improvements becomes considerably more challenging due to the increasing complexity of the home network and service environments. A plethora of access network technologies (fiber, copper, Wi-Fi, fixed-wireless with LTE/5G), managed (router, set-top box) and unmanaged devices (Apple TV, Wi-Fi extenders, IoT management) need to be supported. Operators need new-generation device management platforms that can support automated lifecycle management (test, install, configure, monitor, replace/terminate) of these heterogeneous set of devices, especially those providing services over multiple access networks, in order to eliminate the high costs of managing these devices manually and the risks of causing an adverse impact to end customers. Further, new technologies and devices not only require new operational tools such as automated device management. They also require that the operational workforce, customer care and field engineering be trained and up-skilled, so they are fully prepared to install services and troubleshoot service issues without contributing to excessive operational overhead.

2.2 Operational challenges

A simple yet common residential customer complaint is that customers are not able to access the internet. Lack of internet access could be due to a variety of reasons. The complaints could be broadly grouped under the following categories:

- Wi-Fi issues: slow internet speeds caused by a poor Wi-Fi connection, Wi-Fi interference causing poor service quality, misconfigured Wi-Fi extenders, connection drops causing intermittent service disruption
- forgetting Wi-Fi password: continues to be a source of calls to customer care, and could be alleviated with improved subscriber self-care capabilities
- speed complaints: operators do not have tools in place to perform on-demand speed tests when customers call in, and they are also not able to monitor this on an ongoing basis to take proactive measures
- router issues: a malfunctioning router, inaccurate router configuration or wrong security credentials
- device issues: inaccurate configuration, faulty device or outdated firmware
- broader network issues: access network issue in the neighborhood, major outage in the core network.

Operators are usually equipped to identify and resolve the broader core network and access network issues, but often struggle with issues related to the home network environment. The Wi-Fi-related issues mentioned above, for example, could account for as much as 70% of customer complaints, and consequently, could incur significantly high costs to resolve. There are multiple reasons for this, not least of which is that operators do not have full visibility into home networks, largely due to lack of fit for purpose operational tools. As a result, the

front-end customer care teams bear the initial burden of dealing with the high volumes of customer complaints, which could be as high as 8% of the customer base.

Since customer care is only equipped with basic tools and limited technical skills, Tier 1 customer care agents pass through about 60–80% of the complaints to the highly skilled but more expensive engineering, operations and field technician (field tech) departments. Engineers from these departments perform time-consuming ‘swivel-chair’ troubleshooting using multiple tools, logs and manual processes to identify, diagnose and resolve faults. This often leads to expensive truck rolls to the customer premises. The increasing number and variety of managed and unmanaged devices in the home network will only magnify the issue of visibility and exacerbate the scale and complexity of failure scenarios that must be considered.

Operators must take a multi-pronged approach today to address these operational challenges:

- (a) deploy operational tools that are fit for purpose to gain full visibility into the home network
- (b) automate test and diagnostics and troubleshooting processes for the most common service fault scenarios, which could then be either automatically triggered based on pre-configured policies or by a non-technical customer service representative in the contact center
- (c) empower the end customer by making these automations available via the self-care/self-service applications.

Section 3 provides a further quantitative analysis of these approaches and the potential direct operational benefits that operators could achieve, such as:

- opex savings
- call avoidance to the contact center
- improvements in average call handling times in the contact center
- reduction and avoidance of escalations of issues to more expensive operations engineers
- reduction and avoidance of truck rolls.

2.3 Customer-churn-related challenges

Another challenge faced by telecoms service providers in general and by fixed service providers specifically, is that broadband service continues to be viewed as a commodity service by customers. Traditional TV services are at a perennial risk of substitution from internet-based streaming service providers such as Netflix and Amazon Prime. Customers are permanently shifting their allegiance to these alternate service providers that offer content anytime, anywhere and on any device. Customers primarily identify themselves with their device brand and streaming service, and increasingly lack loyalty towards the broadband service provider. Operators counter this phenomenon by ‘buying’ new customers, often luring them from the competition by using discounted offers, which in effect may cost twice or thrice as much as retaining existing customers. Many operators accept that investing in customer retention initiatives may after all be much more effective in the long run, providing them with predictable revenue and profitability, and delivering sustainable business success.

Most operators believe that offering a superior digital customer experience provides a strong basis for competitive differentiation and ultimately results in high customer retention. This raises important questions for fixed operators, such as:

- how do they deliver a seamless and trouble-free home Wi-Fi experience even as home networks continue to increase in complexity?
- how can they provide proactive customer care and address issues before these issues become service and customer impacting?
- how can they offer an online and self-service experience to customers?

It is challenging to measure customer experience from an operational perspective. Outside-in key performance indicators (KPIs) such as the Net Promoter Score (NPS) and voice of the customer (VoC) score provide a good indication of customer perceptions and their propensity to churn. However, an inside-out KPI such as customer experience index (CEI) can provide a more realistic view of the customer experience, and can present actionable insights to improve customer experience in a concrete, step-by-step manner.

The CEI is derived from the different customer journeys and interactions that customers have with the operator, including customer service interactions, online portal experience, service usage experience and mobile self-care experience, among others. Operators must consider introducing the home network experience and the associated experience metrics as part of the CEI calculation. Section 4 provides further analysis of how operators can achieve indirect benefits from operations automation by strengthening the CEI KPI using the home network experience metrics, delivering a differentiated customer experience, and improving customer retention.

3. Automation of the troubleshooting processes in the home network can deliver immediate cost benefits

3.1 Introduction and methodology

Analysys Mason, in collaboration with Incognito Software, carried out a study to examine the business and operational benefits of empowering customer care, network operations teams and the home user in residential fixed broadband service operations with advanced automated troubleshooting and zero-touch, customer self-installation capabilities. The aim was to resolve the challenges discussed in Section 2 of this paper.

For this study, Analysys Mason interviewed several fixed broadband operators from developed and emerging markets and conducted secondary research. During the operator interviews, we collected key operational metrics and financial data to build a three-year cost savings model to quantify the potential efficiency benefits operators can gain from implementing various automation and proactive care capabilities. The key operational capabilities and the benefits are summarized in Figure 3.1.

KPI Improvements	Operations level	Key capabilities
Improved first call resolution (FCR), reduced escalations and faster call handling times	Tier 1 (first line of customer care agents) and Tier 2 (technical support)	<ul style="list-style-type: none"> • remote device management and control (device discovery, activation and service provisioning) • guided, workflow-based troubleshooting for care agents (Tier 1)

Figure 3.1: Overview of the key operational capabilities and the benefits quantified in this study [Source: Analysys Mason, 2018]

Higher call avoidance	Tier 1 agents and consequently Tier 2 and field tech	<ul style="list-style-type: none"> customer self-care application for home network management proactive troubleshooting and resolution of issues
Reduced/avoided truck rolls for support/troubleshooting	Field tech (ongoing support)	<ul style="list-style-type: none"> the capabilities mentioned above reduce/prevent the need for escalations to field tech support
Reduced/avoided truck rolls for installation	Field tech (install)	<ul style="list-style-type: none"> zero-touch provisioning to enable customers to install CPEs without engineer visit/call center help

The potential benefits of zero-touch provisioning are presented separately, as the level of subscriber self-install varies drastically from one operator to another and there are several preconditions for achieving this capability. This is discussed further in Section 3.5.

Key modelling assumptions

Each operator interviewed for this study has already implemented different levels of automation across its customer care and operations. This enabled us to assess the variations in possible improvements and to develop two modelling scenarios: conservative and optimistic. A Tier 1 operator in the developed Asia–Pacific region was the most advanced in terms of operational achievements: it deployed a large set of operational automation and customer care empowerment tools and reported some early success in transforming its operations and organization, which magnified the benefits of these tools. The achievements of this operator, which has been summarized in Figure 3.2 below, has been used as a benchmark for setting the upper limits of cost savings applied to operator models.

Operational KPI	Improvements
Support call volume to call center	50% reduction
Tier 1 – average call handling time	3 mins shorter
Tier 1 to Tier 2 escalations	60% reduction
Tier 2 – average call handling time	4 mins shorter
Truck rolls/field visits (support/troubleshooting)	40% reduction

Figure 3.2: KPI improvements of a Tier 1 operator in the developed Asia–Pacific after a complete, automation-driven transformation of customer care/network operations [Source: Analysys Mason, 2018]

Our research showed that even though these improvements are attainable with transformation projects over a long timeframe, operators can still achieve significant benefits immediately by deploying point solutions today. To quantify these benefits, we calibrated the achievement of the benchmark operator by taking into consideration the feedback and achievements of other interviewed operators, non-confidential information from past projects, and vendor case studies. Section 3.2 discusses these benefits. The subsequent sections analyze the quantitative impact of these benefits on reducing opex.

These operational benefits are modelled for two fixed broadband operator profiles, which are derived from Analysys Mason’s benchmarks and operator interviews and reflect the characteristics of their respective market dynamics (developed and emerging). The initial broadband subscriber base for both operator profiles was assumed to be 3 million.

All cost savings in the model are measured as reductions in labor capacity requirements only for the operational areas that are relevant to home Wi-Fi/CPE technical support (e.g. administrative or information calls and costs are excluded). Moreover, we applied a learning curve factor for these savings as operators will need to train and process changes to fully obtain these benefits.

3.2 Automated troubleshooting and customer care empowerment promises significant opex savings

Our model shows that automation in customer care and network operations can yield significant operational efficiency benefits to fixed broadband operators. These benefits occur due to the implementation of automated remote device management, assisted troubleshooting for Tier 1 customer care agents and customer self-care apps. This is illustrated in Figure 3.3 and explained in more detail in Figure 3.4. These benefits were calculated as a range which should be interpreted as low/conservative and high/optimistic scenarios depending on an operator’s unique operational environment and its ability to adopt automation and put it into practice.

Figure 3.3: Potential operational benefits of digital care and operations (automated troubleshooting, customer care empowerment and self-care) [Source: Analysys Mason, 2018]

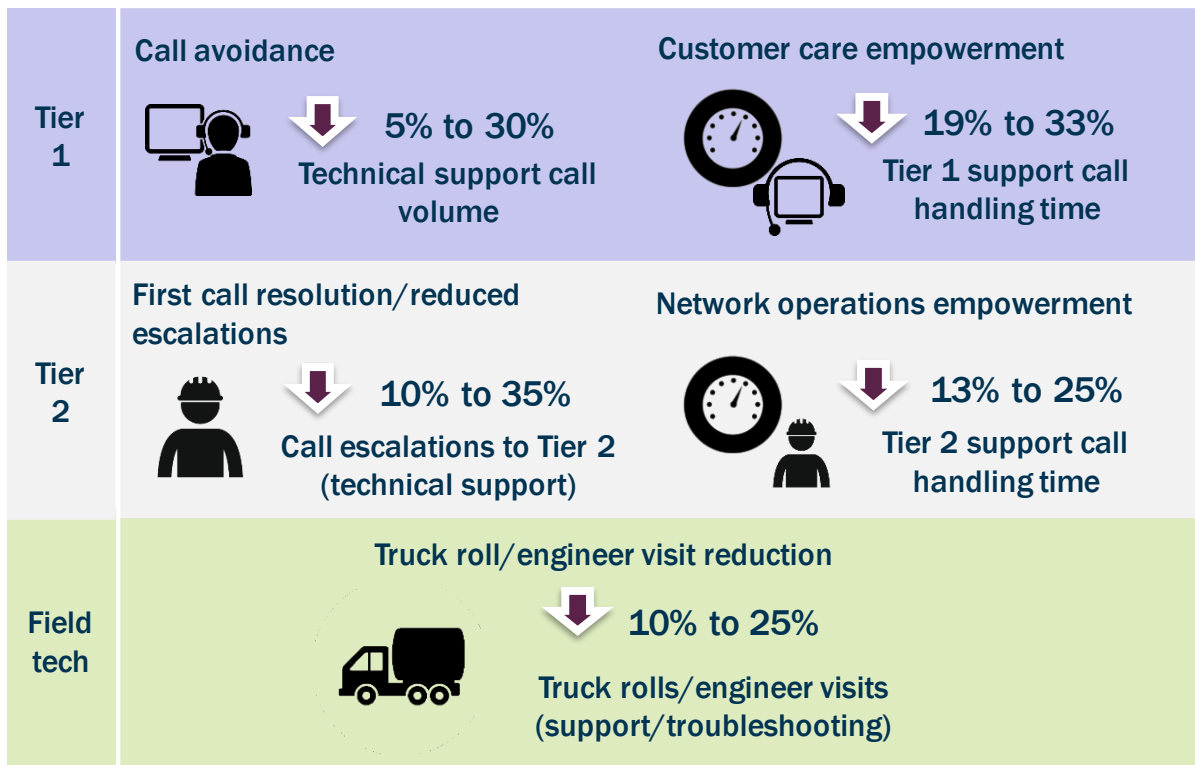


Figure 3.4: Summary of benefits [Source: Analysys Mason, 2018]

Operations level	Rationale
Tier 1	Call avoidance Operators can eliminate between 5% to 30% of customer support calls, which are largely related to simple configuration and outdated firmware issues, through: <ul style="list-style-type: none"> proactive management of CPE (e.g. automated, scheduled firmware updates) self-service portal with user-friendly, easy-to-understand problem resolution processes and configuration options

Operations level	Rationale
Tier 2	<p>Also, avoiding these calls in the first place enables the operator to reduce the volume of escalations to upper support tiers and field visits/truck rolls and increases customer satisfaction</p> <p>Customer care empowerment</p> <p>Tier 1 customer care staff equipped with automated tools and processes that simplify and accelerate troubleshooting can help these agents to:</p> <ul style="list-style-type: none"> • handle issues faster and reduce call handling times by 19% to 33% • increase FCR between 10% to 35%, reducing the need for escalations to higher-cost, technical support Tier 2 level <p>Remote CPE diagnostic and management capabilities can provide faster resolution of problems in the Tier 2 technical level by 13% to 25%</p>
Field tech	<p>Increased call avoidance and having a greater control over CPE management in Tier 1 and Tier 2 levels help operators reduce the number of costly escalations to field tech, resulting in between 10% to 25% reduction in customer visits/truck rolls for customer support and troubleshooting</p>

These improvements yield different but considerable opex saving results for the two operators, over a three-year period and based on 3 million broadband subscriber base:

- developed market operator: opex savings in the range of 20–46%, which translates into a total of USD10.9–25.3 million cost benefits
- emerging market operator: opex savings in the range of 18–45% and USD4.7–11.8 million total cost savings.

These results are discussed in detail in Section 3.3 and Figure 3.4. The major driver for the differences in potential cost savings is the large variations in local labor costs between emerging and developed markets. There are also several other regional factors which emerged from our operator interviews that have an impact on the results. These are:

- **Lower incoming support calls for the emerging market operator:** the emerging market operator we interviewed for this study had a lower incoming support calls volume than the developed market operator. This is partly because the emerging market operator has greenfield, newly built next-generation access (NGA) networks whereas the developed market operator has an older, highly complex network with multiple generations of legacy and next-generation technologies, which is more likely to generate a higher volume of support calls. However, this is slightly counterbalanced by the longer call handling time at Tier 1 level. Nevertheless, this results in higher share of costs (and a higher contribution to opex savings) at Tier 1 level for the developed market operator.
- **Higher call escalations for the emerging market operator:** call escalations from Tier 1 to Tier 2 technical support as well as the call handling times at this level are reported to be much higher in emerging markets. This results in a higher share of Tier 2 in the overall cost base, and potential cost savings for the emerging market operator.
- **Similar share of truck-roll costs for emerging and developed market operators:** although truck rolls/engineer visits are comparatively less expensive in emerging markets, the share of these costs are quite similar for both developed and emerging market operators. The emerging market operator relies more on truck rolls/engineer visits to resolve issues than the developed market operator does, due to lower costs. An operator also noted that it is easier for operators to schedule home visits in emerging markets, where more households live in smaller cities/rural areas as large, extended families. It is therefore more likely that a member of the household would be at home to receive the engineer during home visits. In developed

markets, there is a higher concentration of large cities and smaller households, which can make scheduling visits challenging.

In addition to the benefits illustrated in Figure 3.3 and Figure 3.4, operators can multiply the benefits of the automation between 2.3–2.6 times by achieving zero-touch provisioning with customer self-installation. This is discussed in more detail in Section 3.5.

3.3 Developed market operator: the business case for automation is strong due to the high labor costs

Figure 3.5 summarizes the key subscriber and cost data for the developed market operator profile used in the cost savings model.

Attributes and cost profile	Subscriber and cost parameters
Operator market	Developed market
Subscriber base (initial)	3 million
Subscriber growth (three-year CAGR)	2.96%
Churn rate (monthly)	1.8%
Tier 1 employee salary (annual)	USD20 000
Tier 2 employee salary (annual)	USD40 000
Field tech salary (annual)	USD30 000

Figure 3.5: Developed market operator profile used in the cost savings model [Source: Analysys Mason, 2018]

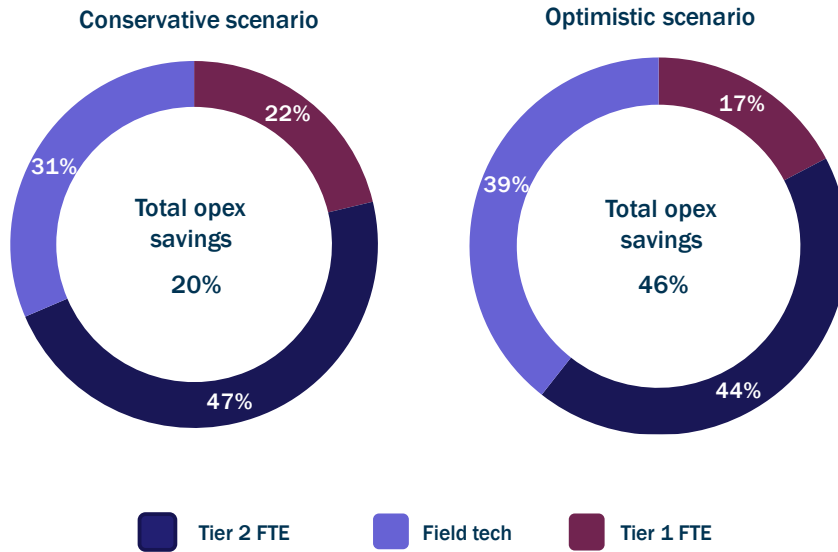
Applying the KPI improvements that can be achieved with automated troubleshooting and customer care empowerment (as discussed in Section 3.2), our model shows that this developed market operator can obtain between USD11–25 million opex savings over a three-year period, assuming that there are 3 million residential broadband customers. This is shown in Figure 3.6 for both a conservative and optimistic scenario.

Total savings over three years	Conservative scenario	Optimistic scenario
Total opex savings (%)	20	46
Total opex savings (USD)	10.9 million	25.3 million

Figure 3.6: Potential opex savings of automated care operations for the developed market operator [Source: Analysys Mason, 2018]

Figure 3.7 provides a breakdown of the savings for the developed market operator as a percentage of contributions from each level of care operations.

Figure 3.7: Breakdown of opex savings by operational level for the developed market operator [Source: Analysys Mason, 2018]



The majority of the opex savings in both scenarios (47% and 44% respectively) originate in the Tier 2 support level, followed by field tech staff and the Tier 1 support level. We found that a significant amount of simple technical issues can be avoided/resolved in the Tier 1 level, thanks to the empowerment of these agents with automated tools. This means that the workload of Tier 2 level, which consists of high-skilled employees (and as such is the most expensive support level in terms of per-unit costs), is reduced significantly. In contrast, the technical issues that are filtered and escalated to Tier 2 support are more complex, and will likely continue to be escalated to the field technicians for truck rolls/home visits at similar level. As a result, the contribution of field tech cost savings is less compared with those from Tier 2.

Using these opex savings and indicative implementation costs, our analysis shows that the developed market operator can potentially achieve a very strong 225% internal rate of return (IRR) in the conservative scenario, with a 1.4 year payback period.

3.4 Emerging market operator: automation can provide a major cost advantage to achieve profitable growth of fixed broadband services

Figure 3.8 summarizes the key subscriber and cost data for the emerging market operator profile used in the cost savings model.

Attributes and cost profile	Subscriber and cost parameters
Operator market	Emerging
Subscriber base (initial)	3 million
Subscriber growth (three-year CAGR)	4.55%
Churn rate (monthly)	2.3%
Tier 1 employee salary (annual)	USD6000
Tier 2 employee salary (annual)	USD15 000
Field tech salary (annual)	USD8000

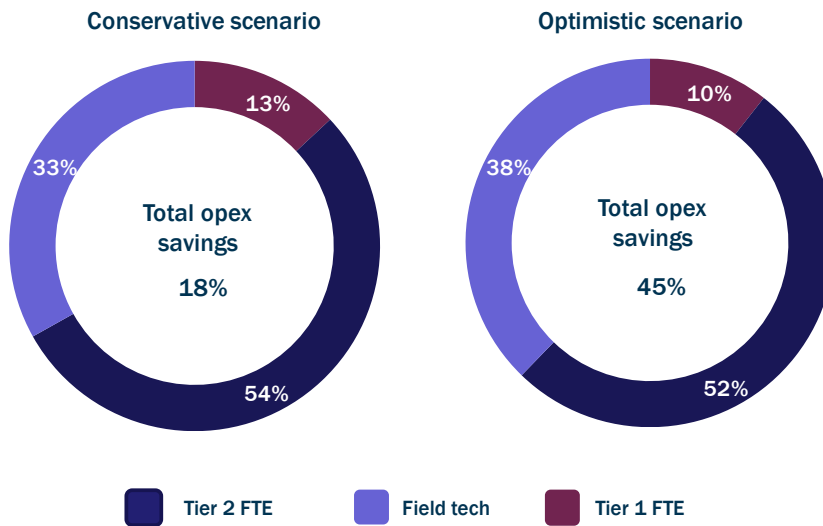
Figure 3.8: Emerging market operator profile used in the cost savings model [Source: Analysys Mason, 2018]

In most emerging markets, the increasing demand for high-speed connectivity and the availability of high-quality video content online will drive a higher growth rate in fixed broadband services than in the developed markets. Automating care operations can help emerging market operators differentiate themselves from the competition. They can do this by increasing service affordability and achieving more sustainable growth by preserving margins in the face of limited ASPU growth and increasing cost pressures (from larger scale of operations, mobile operator competition and regulations). Figure 3.9 provides a summary of these potential savings for an emerging market operator. Figure 3.10 provides a breakdown of the savings as percentage of contributions from each level of care operations.

Total savings over three years	Conservative scenario	Optimistic scenario
Total opex savings (%)	18	45
Total opex savings (USD)	4.7 million	11.8 million

Figure 3.9: Potential opex savings of automated care operations for the emerging market operator [Source: Analysys Mason, 2018]

Figure 3.10: Breakdown of opex savings by operational level for the emerging market operator [Source: Analysys Mason, 2018]



The contributions of each support level to the emerging market operator’s opex savings are similar to those of the developed market operator. However, Tier 2 level savings have a bigger share in the case of the developed market operator. This is due to the higher number of escalations from Tier 1 to Tier 2 in the emerging market operator context, and the longer handling times observed, as discussed in Section 3.2.

Despite the lower savings in absolute (dollar) terms, our model shows that the emerging market operator can achieve a considerable 57% IRR, with a 2.1 year payback period.

3.5 Zero-touch provisioning can provide a significant incremental boost to operational efficiency

The high costs of field technician visits for home broadband installations account for a large share of operators’ operating expenses. In addition to costs, the traditional field installation model can have an adverse impact on

customer experience. Customers want more on-demand service delivery and plug-and-play experience instead of long provisioning times (10–15 days on average from the date of order) and manual installations (up to 2–3 hours). As such, operators aim to automate the service provisioning processes with customer self-installation as much as possible to drive opex down and improve customer satisfaction.

Our interviews revealed that there is a big variation among the operators in the level of automated, customer self-installation provisioning. While more than 75% of installations are customer self-installations in the case of a developed market operator, it is non-existent for an emerging market operator. There are several factors that enable or limit zero-touch, automated service provisioning, such as:

- network type, for example FTTH/P may require more physical installation (e.g. new termination equipment) compared to xDSL and FTTC⁶
- greenfield/brownfield sites (e.g. new line installations)
- CPE technology, for example the use of virtual CPE (vCPE) and universal CPE (uCPE) can enable real time, zero-touch provisioning of network and service capabilities (see Section 5)
- customer preferences (e.g. less tech-savvy or older people may continue to demand technician visits).

Considering these limitations, we modelled a conservative scenario for zero-touch provisioning in both the emerging market operator and developed market operator models as an addition to other automation capabilities discussed in previous sections. Our model shows that even a moderate (~20%) reduction in field installation costs with zero-touch provisioning, where an operator uses remote CPE configuration and custom scripts to automate the provisioning process for the eligible new customer installations, can provide a significant boost (2.3–2.6×) to the business case for the automation for both operator profiles. Figure 3.11 provides a summary of these results.

Figure 3.11: Potential savings of zero-touch provisioning in conservative scenario [Source: Analysys Mason, 2018]

Operator profile (conservative scenario)	Total opex savings without zero-touch provisioning	Zero-touch provisioning savings	Total opex savings	Total opex savings
Developed market operator	USD10.9 million	USD17.1 million	USD28 million	2.6×
Emerging market operator	USD4.7 million	USD6.1 million	USD10.7 million	2.3×

4. Empowered customer care and self-care capabilities can deliver a superior customer experience

4.1 Digital service providers are setting the bar for customer experience

Leading digital service providers such as Amazon and Netflix have raised the bar of customer expectations, especially around customer experience and personalization. Customers are now demanding similar experiences from their operators. This means operators must take a hard look at every customer touchpoint and journey, and

⁶ FTTP: fiber to the premises; FTTC: fiber to the cabinet.

modernize them to reach ‘digital standards’. In other words, they need to offer customers the following capabilities, among others:

- real time and contextual interactions
- personalized treatment
- consistent experience across interaction channels such as customer care, portal or mobile application, and store
- a self-care capability allowing customers to conduct all transactions and interactions without having to walk into a store or call customer care
- proactive redress of service issues, fixing them before service quality is impacted.

It is in this context that the operations automation, empowered customer care and self-care capabilities hold significant strategic value. In addition to the obvious operational benefits presented in Section 3, these capabilities provide some of the key building blocks that will help to deliver a superior customer experience. By exposing the automations to customer care, operators empower the front-line to be considerably more proactive and successful in dealing with customer requests and complaints. Furthermore, by integrating these automations into self-care apps (which is more likely through open northbound application programming interfaces (APIs)), operators can hand the control back to customers and allow them to experience digital automation value first hand. Together, empowered customer care and a customer who is in control raise the prospect of achieving the operators’ corporate goals of delivering a superior customer experience and reducing churn.

4.2 Exceptional customer support KPI performance can bolster the CEI score

Many operators are linking the senior executives’ variable remuneration to the level of improvement in customer experience being delivered to the customers and how it is helping reduce customer churn. Operators are using the CEI to measure the end-to-end customer experience across touchpoints including service experience, quality of customer care interactions, experience during onboarding and service configuration, network and service problem isolation, experience during an engineer visit. To derive the CEI, some sort of weighting is applied to each customer touchpoint or an experience scenario.

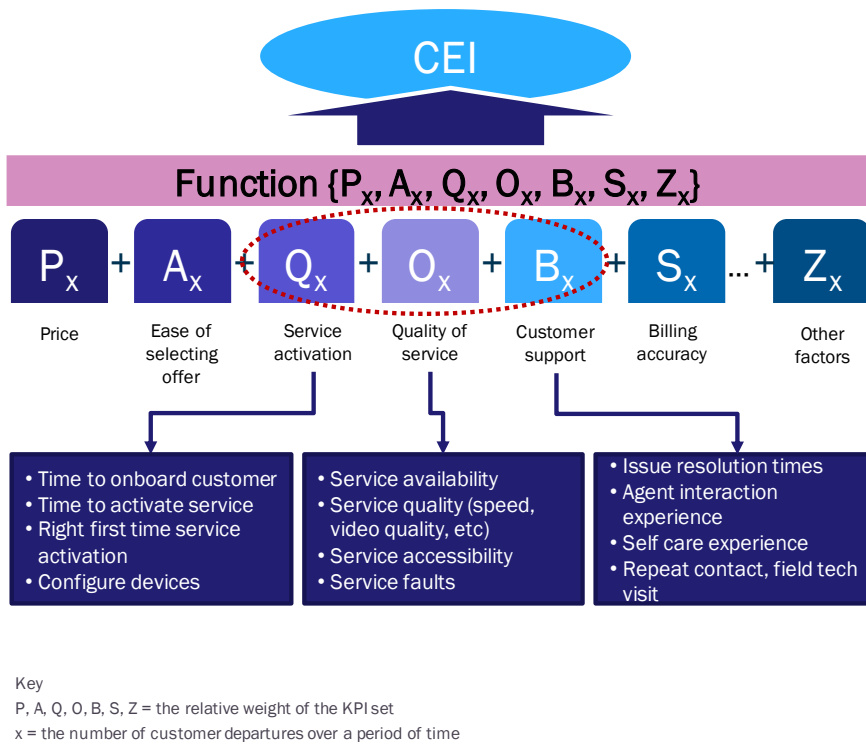


Figure 4.1: Illustrative CEI model [Source: Analysys Mason, 2018]

Figure 4.1 provides an illustration of a CEI model for a fixed service customer that includes some indicative KPI examples. Among other customer experience impacting KPIs, operations use cases are shown grouped together in the ‘service activation’, ‘quality of service’ and ‘customer support’ KPI sets. Examples of these KPIs include ‘time to activate service’, ‘service quality of broadband service or video’ and ‘quality and efficacy of interactions with customer care or self-care experience’.

The weighting for each KPI set could depend on the customer sensitivity towards that KPI and the customers’ propensity to churn due to negative experiences. Operators could even use a historical churn figure associated with that KPI. The design of the CEI model, KPIs and weightings will vary depending on the unique operator, service, customers and operations profiles.

According to Analysys Mason research, the customer’s experience of customer support is one of the prime determinants of overall customer experience, with a potential CEI weightage of between 20–30%. Poor interactions with a care agent, when one is already calling to resolve an issue, can leave a negative impression on customers, dragging down their opinion of the operator. Similarly, a highly intuitive and automated self-care application experience is proven to increase customer satisfaction.

Overall, an empowered customer care and home user self-care, supported by highly automated backend operational processes, can significantly bolster the CEI score, indicating a higher probability that the customer will not churn.

5. Operations automation of the home networks is key to win the battle for control of home

The capabilities discussed in Section 3 and 4 will deliver immediate direct and indirect benefits to operators. It is also important to note, however, that these benefits will be foundational to operationalize some of operators' key future strategic business initiatives. This section will discuss some of these business initiatives, which will be built on the success of these foundational capabilities. We will argue that analytics and AI-powered automation will be the next step for operators in achieving more predictive and proactive operations, and that these operations will be essential to ensure that operators become more competitive and innovative in the new digital home network market.

5.1 Looking ahead – operators' key strategic business initiatives

To counter the competitive threat from traditional and non-traditional service providers, fixed service operators are launching a market offensive with some key strategic initiatives. These initiatives include the delivery of vCPE and white box/uCPE platform-based services, which aim to increase operators' influence in the value chain, own the customer experience and foster application ecosystems. Enabled by the software-based disaggregation of vertically integrated, proprietary devices, these platforms:

- allow real time, zero-touch provisioning of network and service capabilities into the home network environment
- support new revenue generating use cases such as cloud DVR and storage
- simplify and improve the management of customer devices and home networks (e.g. by incorporating embedded agents to monitor and manage the home Wi-Fi networks).

To compete with the video streaming companies, fixed operators are also launching their own branded, over-the-top (OTT) streaming service that could run on any broadband service, even on top of a competitor's broadband service.

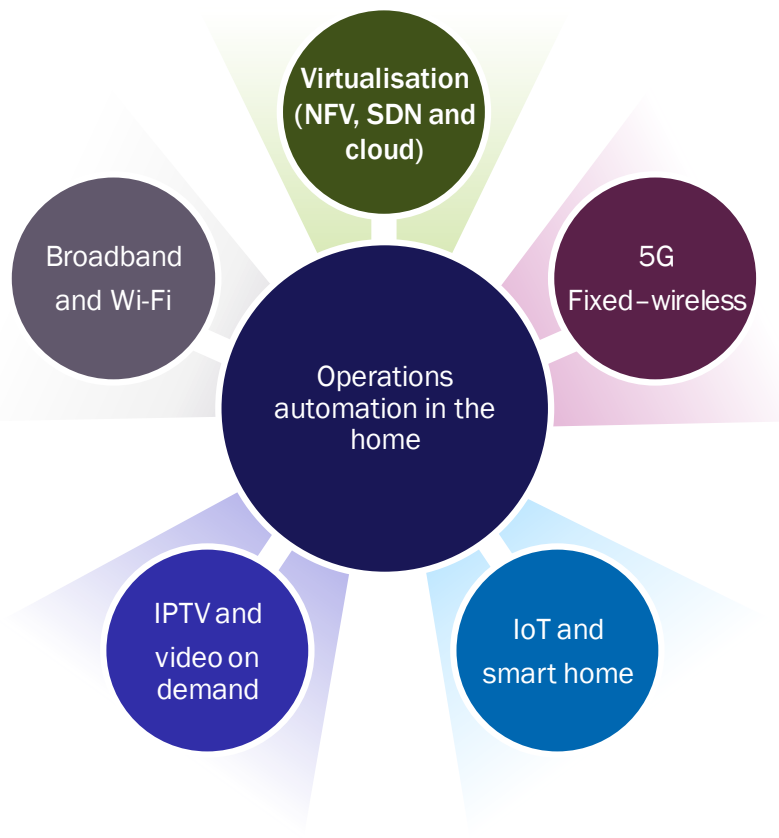


Figure 5.1: Fixed service providers' strategic initiatives requiring operations automation in the home [Source: Analysys Mason, 2018]

As the battle for video supremacy continues, the bigger battle for control of the home network is evolving. Smart home and home automation use cases around IoT/connected devices in the home is expected to explode in the coming years, and competition will emerge from a diverse ecosystem of players including operators, digital companies and a new breed of home automation service providers. Use cases such as connected thermostats, water heaters, smart lighting solutions, smart energy, smart water, and home security are being considered. The success of these smart home initiatives will depend on an extremely robust home broadband and Wi-Fi network.

A new but fast evolving area is 5G, which brings a whole set of new use cases, including a fixed-wireless option to deliver ultra-broadband to homes.

5.2 The pivotal role of analytics and AI in operationalization of strategic initiatives

Together, immediate business priorities and key strategic initiatives will significantly increase the complexity of the home network, making it humanly impossible and highly cost-prohibitive to support and operate by using manual interventions and processes. Manual processes are prone to errors and the risk of performing inaccurate analysis or making an incorrect configuration change is typically high, and could lead to service disruption, lost revenue and customer churn. Our research clearly indicates that operations automation of the home network will not only deliver immediate business benefits but is also going to be essential for the future success of the fixed services business.

As has been discussed in this paper, implementing operations automation today can bring significant savings and enable superior customer experience. However, for the most part, these are reactive approaches. The next frontier for customer differentiation and operational improvements will be enabled by preventing the experience issues in the first place and highlighting the underlying symptoms even before service quality degradation

impacts customer experience. Upon identifying degradation patterns or threshold breaches, automated routines can be triggered to take preventive actions without human intervention.

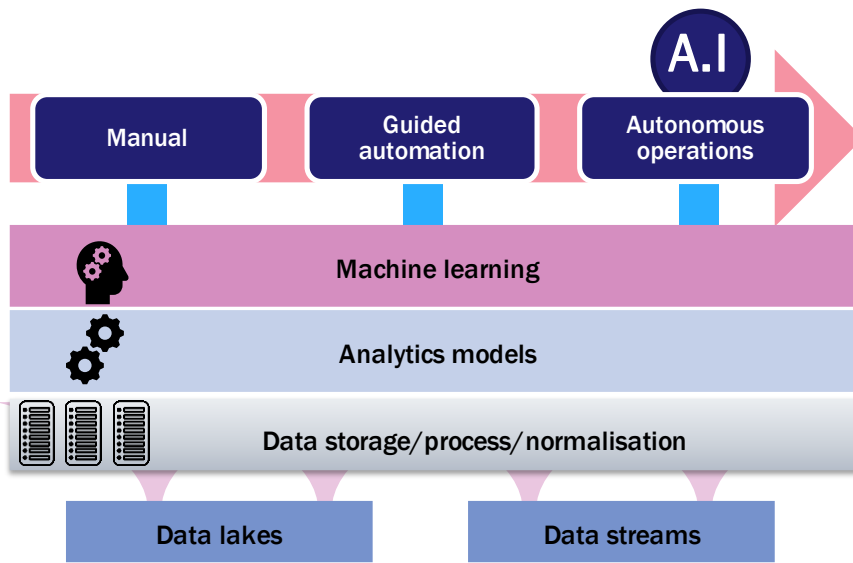


Figure 5.2: Machine learning and AI for operations automation
 [Source: Analysys Mason, 2018]

It is in this context that the advanced analytics capabilities, such as machine learning, come into play. Analytics and machine learning will play a pivotal role in enabling operators to make the leap in delivering proactive care and automated operations. Machine learning augments the analytics models with learning abilities and provides the basic mechanisms for continuously enhancing the intelligence of the model, which can then be used for a wide range of use cases, such as predicting and preventing issues before they occur (e.g. identifying an impending SLA breach or identifying upsell/cross-sell opportunities).

As confidence grows in machine-learning-led automations, unsupervised machine learning models can be gradually introduced to work with automated workflows, taking operators into the realm of AI-led operations. The self-learning and self-calibrating nature of unsupervised learning models constantly tune themselves to increase the accuracy of the operational decisions. The goal of this new operations approach is to realize autonomous operations, with operations persons on standby to deal with exceptions.

However, the industry in general is still in the early stages of this journey. Some advanced operators are leading with proof of concepts and limited deployments. Increasing technology maturity and improving confidence in automations will accelerate adoption of machine learning and AI, but this is likely to be gradual and will occur over the next two to three years.

6. Conclusions and recommendations

The commoditization of broadband services and intense competition from alternative service providers present growth and profitability challenges for fixed service providers. In what is expected to be a slow-growth fixed services market, CxOs are embarking on organization-wide initiatives to increase operational efficiencies and reduce churn to achieve sustainable profitability. One area that can deliver immediate benefits is the operations automation of the home network.

Based on research conducted by Analysys Mason, digital care and operations use cases such as troubleshooting automation for the home network and service issues, proactive customer care, customer self-care and zero touch install initiatives can deliver tangible operational efficiencies in both the customer care and operations departments. Furthermore, the improved customer support KPIs can contribute to enhancing the CEI – a popular metric used to measure customer experience.

Automation of the manually intensive repetitive processes allows operators to free up the valuable time of operations engineers and care agents and reskill them for higher-impact responsibilities. Reskilling could include developing some of the automations using the platform and API capabilities of the operational software.

As home networks become more complex, and strategic initiatives such as virtualization, 5G fixed–wireless and smart homes become more prevalent, it will become increasingly difficult to troubleshoot issues using manual processes. Operators will also face increased competition from broader ecosystem players. It is therefore extremely important for operators to not only differentiate on service innovation but also to offer superior customer experience. Machine learning and AI-enabled operations automation in home networks will be crucial for the success of these initiatives.

New digital care and operations automation solutions are now emerging, and with the right set of holistic tools addressing customer care, network operations and the home user, these solutions will serve to deliver tangible benefits, as demonstrated in this research. Fixed service providers should consider implementing such solutions to address today's business challenges. This could form part of their ongoing initiatives around improving operational efficiencies and delivering superior customer experience, even as they execute on the broader digital transformation strategic initiatives.

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This research and white paper was commissioned by Incognito Software. Analysys Mason does not endorse any of the vendor's products or services.

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Published by Analysys Mason Limited • Bush House • North West Wing • Aldwych • London • WC2B 4PJ • UK
Tel: +44 (0)20 7395 9000 • Email: research@analysysmason.com • www.analysysmason.com/research

Registered in England No. 5177472

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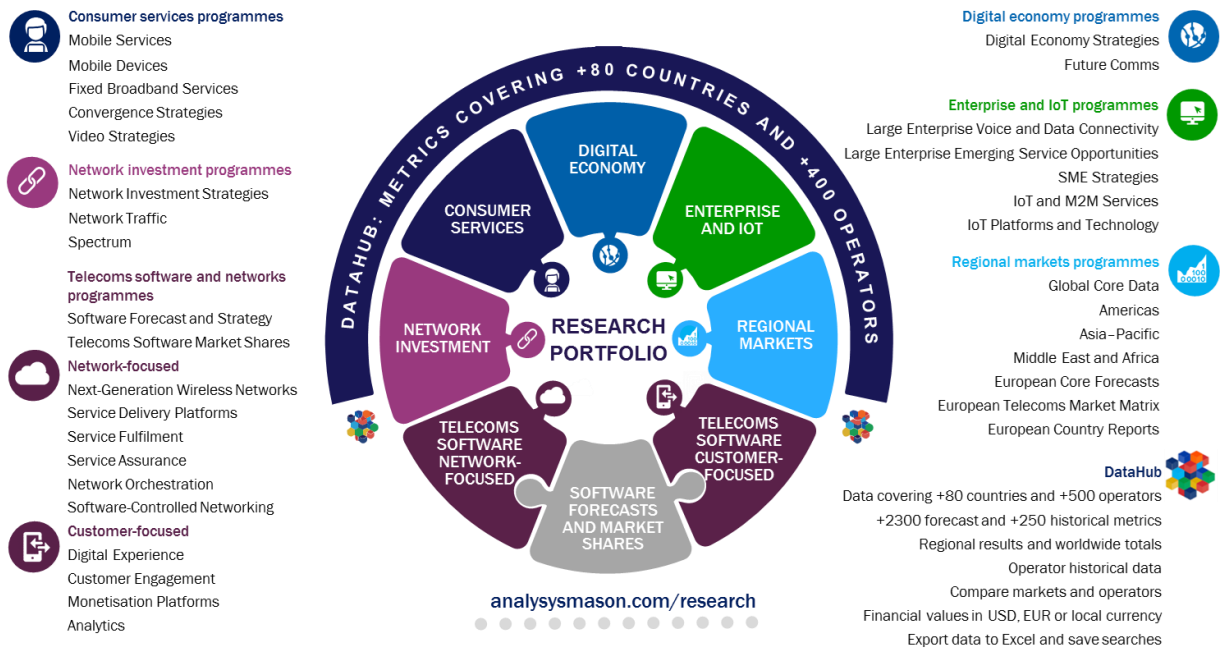
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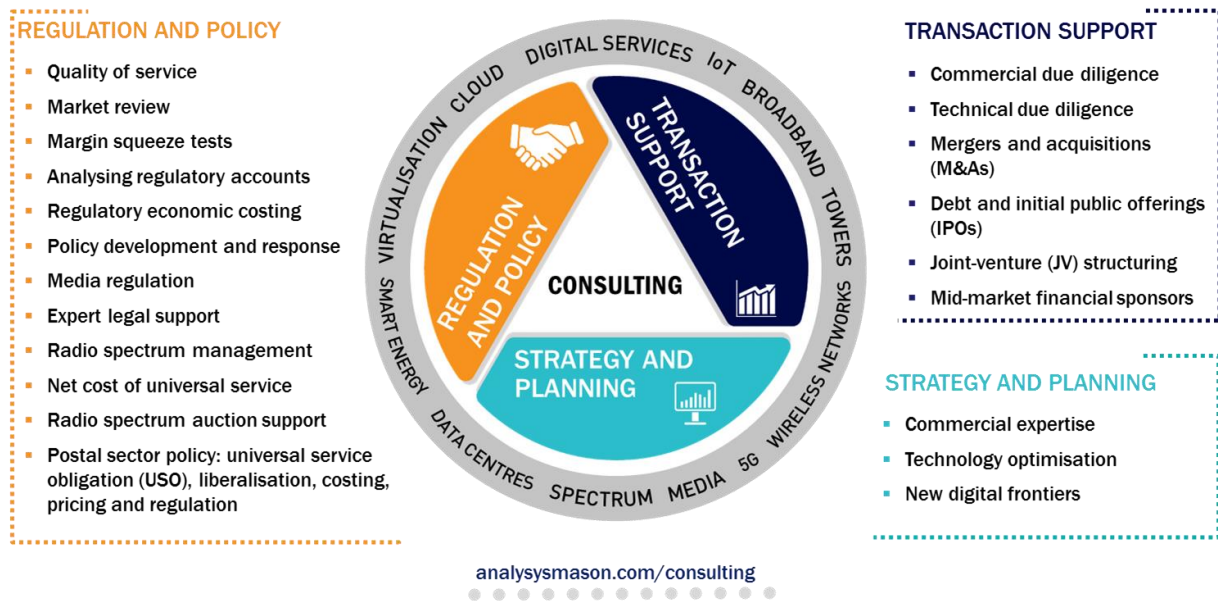
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