Competition, innovation and growth

Stockholm-based companies describe the importance of access to an operator-neutral fibre infrastructure

Stockholm in March 2017

STOKAB

Contents

1. Summary

This report has been produced by Provins for Stokab, the City of Stockholm's IT infrastructure company. Stokab's task is to provide a competition-neutral fibre infrastructure in the Stockholm region. The aim of the report is to allow a number of companies in various industries to describe the following:

- What access to fibre-based broadband with the high capacity fibre provides means to them and their business.

- The impacts on a market where there is an operator-neutral market actor that is active only on the wholesale level.

A summary of the interviews follows, interspersed with quotations from a selection of the respondents.

Fosters competition and growth
Overall, the interviews illustrate several advantages that access to fibre-based competition-neutral IT infrastructure provides. Several of the interviewed companies, all based in Stockholm, emphasize the fact that unlimited access to dark fibre on equal terms fosters competition and growth. This is most clearly expressed by the interviewed operators/service providers.

> *"Unlimited access to dark fibre from market actors that sell it to all on the same terms is utterly critical to our business. The municipal networks make it possible for us to compete successfully."*
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> *" Dark fibre can be likened to a highway that you fill with the traffic you choose. The more who are given access, the better it will be for long-term social development. That is why we are convinced that publicly owned networks are a prerequisite for broadband expansion and stability"*
>
> Jon Karlung, CEO and founder, Bahnhof

These companies also emphasize how access to dark fibre has been crucial to achieving Stockholm's leading position in digital infrastructure, which has - among else - given the city four competing 4G operators.

> *"The current widespread use of mobile telephony and wireless services that require significant bandwidth would hardly have been possible without an extensive fibre-optic access network. This was obvious in connection with the expansion of the 4G network and will be even more so going into the roll-out of 5G."*
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> *"Our experiences with the municipal networks have been good - providing dark fibre is their core business and they are often customer-oriented."*
>
> Carl-Johan Rydén, Head of Regulatory & Security, Tele2 Sverige AB

Access to dark fibre generates new services and businesses

Service providers also describe how new services emerge and are used when dark fibre is available, in areas including security and monitoring, but also entertainment. This shows that it is not a particular application that drives the need for access to high-speed networks that enable superfast broadband connections. Demand is instead being driven by access to dark fibre and the opportunities it provides. The "killer application" is thus the fibre network itself.

"Without Stokab, we wouldn't have a business - Stockholm's open network built the platform for the company."

"The open fibre infrastructure works like an incubator that nurtures new companies and business establishments in Stockholm"

Daniel Persson, CEO and founder, Fiber Direkt

Access to fibre infrastructure is critical to long-term and efficient economic growth and competition, but also to innovation, according to the respondents.

"Access to dark fibre has made it possible to create more complex services with a mix of links, various wireless networks and internet access. Few other cities are capable of offering this today."

Andreas Langell, CEO Mobile Links Europé

"There is already an existing infrastructure in Stockholm for new services that does not require companies to make major investments in technology. You can start delivering new and demanding apps or services the very day you get a good idea."

Daniel Persson, CEO and founder, Fiber Direkt

"We have many international customers and suppliers. Distance is not measured in kilometres; it is measured in milliseconds. A tech company needs bright people and good infrastructure to grow."

Alexander Sandström, CEO, and founder, Skovik

"Klarna will only be able to achieve its goal of becoming the world leader in payment solutions with the secure, efficient and fast data communication provided by fibre connections. It is critical to us that our communications can occur with the highest possible reliability and speed. Without access to a robust fibre infrastructure in the form of a fine-mesh network, the powerful growth we are after would be impossible. Nor would we enjoy the international competitiveness we have today."

Erik Engellau-Nilsson, VP Communications Klarna

Fibre provides better control of security

Fibre is also a must for customers with high demands when it comes to bandwidth and, not least importantly, security.

"We need the reliability and the high bandwidth that our own fibre ring network gives us. And because we have complete control over the dark fibre, we also avoid costly firewall solutions. The long distances between terminals and data centres also make the fibre solution essential."

Gunnar Olsson, IT Coordinator, PostNord

"The modern connected cash system and payment technology must perform flawlessly and with the shortest possible waiting time to keep customers happy. At the same time, services like high-resolution CCTV are putting ever-higher demands on bandwidth. This can only be realised with fibre."

Michael Duffy, CEO, Excedo Networks

Environmental gains through reduced travel

Business customers also bring up a bundle of other advantages, environmental benefits not least among them. Thanks to the opportunity that fibre gives to work away from the office and hold training sessions and meetings online, the environmental impact of travel can be reduced.

"Thanks to fibre, we can offer better customer support. We can also offer our employees the option to work from home to an extent that was not possible with ADSL. We currently have offices in several locations in Stockholm and manage our internal communications with the help of fibre. Without access to fibre, we would have been forced to travel between the various offices, which would have been impossible considering the traffic situation in Stockholm."

Lars Bengtson, CEO, Fructus

The following also shows how business customers' own customers have high demands for constant accessibility and high data speeds, which only a fibre connection can deliver.

"Webhallen is dependent upon the fast, stable connection that fibre is superior in delivering. Not only for connecting all our stores, but our server hall as well. Growth in our customer base is also dependent upon how many of our customers are reached by a good connection, which works best when the fibre reaches as close to the customer as possible."

Marcus Hambraeus, Lead System Administrator, Webhallen Sverige

"No one would locate their enterprise in our premises if we did not have fast, effective and stable fibre-connections, because accessibility is critical to their business."

"We worked for the first five or six years (out of our 15 years in business) with ADSL, but every time one of the individual creatives here with us experiences sluggishness in the network, we come one step closer to losing a client."

Rolf Fällström, Block Stockholm

"We are a small agency network and live in various places. One of us in Ängelholm, one in Stockholm and one in Mariehamn (Åland, Finland). It is important that we all have fast and stable access to the same cloud-based administration and backup."

"Since the company shares digital material in the cloud, we have to have the speed fibre gives us to benefit from that. The fibre connection also gives us better opportunities to work from home, which enhances our quality of life."

Christophe Jourdan, CEO, Coller, Andersson & Jourdan

Direct customers and service providers also emphasize how only a fibre connection provides the capacity and security they require. For those with high demands for bandwidth and redundancy, fibre is indispensable.

Expanding access to operator neutral fibre infrastructure also in all Europe is important

For some of the respondents, the fact that the network is owned and operated by a public sector undertaking is an important aspect for ensuring the infrastructure remains open. Public ownership guarantees operational longevity that is hard for the market to match.

Several of the respondents point out that their growth and value propositions are being held back by the lack of a corresponding infrastructure in other European countries.

"From a growth perspective, an open and neutral fibre infrastructure and equally open access to the mobile infrastructure are essential to businesses like us that offer streaming services."

"It is important that there is also a guarantor on the EU level for access comparable to that in Sweden."

Henrik Toremark, Head of Public Affairs, MTG

"If there was access to dark fibre in the rest of Europe comparable to that in Stockholm, we would grow at once and would drive the same price reductions and wider selection of services that we have in Sweden.

In this respect, it would be very positive if the EU Commission could contribute."

Jon Karlung, CEO and founder, Bahnhof.

"We would love to expand further in Sweden and Europe, but right now, there are no other places that can offer an infrastructure equivalent to that in Stockholm. No one would be happier than me if something like Stokab's open and operator-neutral fibre network were available throughout Europe."

Daniel Persson, CEO and founder, Fiber Direkt

The report shows that access to an operator-neutral fibre infrastructure provided by a market actor that is active only on the wholesale level is critical to business development and competitiveness. Access to fibre also fosters organizational development and provides clear environmental advantages.

This applies to small, medium-sized and large companies that are given the opportunity to establish their businesses and develop their services. Access to fibre makes the entire business sector more competitive - regardless of where the company is located.

2. Introduction

The fibre infrastructure in Stockholm is extensive and accessible by households, businesses and public operations. Almost 100 percent of businesses and more than 90 percent of households can get access to a fibre connection that enables delivery of superfast broadband, i.e. 1 Gbit or more.

Stockholm currently has a strong advantage over other international cities in the form of an existing, open and operator-neutral fibre network. Via Stokab, Stockholm can offer a dense fibre infrastructure to all on equal terms, which fosters competition, new business establishments and freedom of choice in telecom and data services. An already extensive fibre network, which Stokab is continuously building upon - with no public funding and on market terms.

Access to dark fibre is developing the region
Stokab's task is to build, maintain and lease connections in a passive fibre network. The objective is to enhance conditions for IT development and positive growth in the Stockholm region.

At present, buildings with 90 percent of the households in Stockholm have fibre connections, meaning that virtually all multi-family dwellings are connected with a multi-fibre solution to Stokab's network, that is, with two fibres per household/apartment. The commercial properties in the business areas in the outskirts of the city were connected to the network in 2016. During the first half of 2017, commercial properties in the city centre will also be connected with a multi-fibre solution, that is, two fibres per company.

A dual fibre household/business connection paves the way for competition and new, innovative services where several different service providers can deliver services to both properties and households/businesses on equal terms. It also enables services where communication must be dedicated and reliable, such as the remote healthcare of the future, including features such as streaming video.

Low threshold for etsablishment
Stokab only offers access to a passive dark fibre network, which makes the market entry threshold low for new firms, operators and service providers that want to establish their business in the city. In Stockholm, operators do not have to invest in their own networks because they can rent the connections they need to deliver their services. In practice, this becomes a way of sharing the costs of infrastructure. Because the network is owned and rented by a neutral, long-term market actor, there is no risk of becoming dependent upon a competitor that has the power to influence prices as well as the design of the network in its own interests.

As a result, Stokab currently has more than 100 operators and service providers as customers and more than 800 other business customers in sectors including banking and financial services, energy, transport, building supply and retail chains and property. The City of Stockholm and the Stockholm County Council are also Stokab customers. Four 4G operators have established their businesses all over Stockholm on the strength of access to operator-neutral fibre provided by Stokab. This is unique in the world. Stockholm was also the first city in the world to launch 4G. The expansion of 5G on the same stable foundation is now in planning.

The Stokab model has created an environment of progress and innovation that stimulates demand for new services and innovations. The aim of this report is to allow a number of firms in various industries to describe what access to fibre-based broadband with the high capacity fibre provides means to them and their business.

3. Interviews

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Bahnhof AB

Net sales: Approx. kSEK 650,755 (2015)

Employees: Approx. 150 (2015)

Business: Bahnhof offers internet services to consumers, businesses and tenant-owned housing associations in Stockholm, Göteborg, Malmö, Umeå, Borlänge, Lisbon and Kiev.

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"Unlimited access to dark fibre is critical to our business."

Access to an open and operator-neutral fibre network is business critical for internet operator Bahnhof. CEO Jon Karlung also believes that the network should have a public owner to prevent unfair competition.

"Unlimited access to dark fibre from market actors that sell to all on the same terms is utterly critical to our business. The municipal networks make it possible for us to compete successfully," says Jon Karlung, CEO and founder of Bahnhof.

Open dark fibre fosters competition
He believes good access to open dark fibre is the explanation behind the superior access to broadband that is unique to Sweden.

"We need access to a parallel infrastructure of both dark fibre and capacity services. Bahnhof buys both as needed, but without dark fibre we would be dependent upon others that might be competing with us for the end customer's business. That would create an extremely problematic situation for us."
That is why he believes it is important that networks are operated on competition-neutral terms.

"Dark fibre can be likened to a highway that you fill with the traffic you choose. The more who are given access, the better it will be for long-term social development. That is why we are convinced that publicly owned networks are a prerequisite for broadband expansion and stability," says Karlung.

Longevity is a must
Karlung believes public ownership guarantees longevity in network operation.

"We are dependent upon long-term commitment, which is why we see a danger in ownership of the fibre networks by private companies, which might be sold or change the direction of their business."

Stockholm and Sweden are unique when it comes to the structure of municipal networks with a model that creates the conditions for both competition and innovation.

"If there was access to dark fibre in the rest of Europe comparable to that in Stockholm, we would grow at once and would drive the same price reductions and wider selection of services that we have in Sweden," says Karlung. He believes that development is being held back by opposition among the major European telecoms companies.

"It would be very positive if the EU Commission could help in this respect, but we also have to safeguard our leading model in Sweden."

Open fibre essential to mobile telephony

Tele2, the second-largest mobile operator in Sweden, stresses the importance of access to open, competition-neutral dark fibre for its own business as well as the mobile network operator Net4Mobility, its joint venture with Telenor. Tele2 would prefer to use open fibre networks to meet future demands for increased bandwidth to mobile devices.

"Access to fibre is very important for connecting our base stations, and being able to rent dark fibre on the best terms possible means a great deal to us," says Carl-Johan Rydén, Head of Regulatory & Security, Tele2 Sverige AB.

5G requires an expansive fibre network
According to Rydén, the current widespread use of mobile telephony and wireless services that require significant bandwidth would hardly have been possible without an extensive fibre-optic access network.

"That was obvious in connection with the expansion of the 4G network and will be even more so going into the roll-out of 5G. That is going to further increase the need."

When it comes to the choice of connection to mobile masts and stations, the company prefers the open municipal networks.

"Our experiences with the municipal networks have been good - providing dark fibre is their core business and they are often customer-oriented. Stokab, Stockholm's municipal dark fibre company, is a good example: they are professional and try to find good solutions for operators."

Continued expansion important
He goes on to say that building your own access fibre is not the preferred choice for Tele2.

"Laying access fibre is not our core business. In most cases, that is something others can do better," says Rydén.

Continued expansion of the open networks is important to Tele2 because it improves market competition.

"PTS, the regulatory agency in charge, has determined that competition in the dark fibre market is unsatisfactory. That issue can and should be dealt with partly through continued regulation and partly through continued expansion by multiple dark fibre suppliers, including municipal networks."

Stockholm's open fibre network - a new business generator

Fiber Direkt is a relatively young operator founded on the strength of access to Stockholm's open and operator-neutral fibre network. The company is dedicated to giving premium customers access to a fibre infrastructure with unsurpassed capacity and reliability.

"Without Stokab, we wouldn't have a business - Stockholm's open network built the platform for the company. We are a small, disruptive service provider that sees the open and operator-neutral fibre network as the next step in the Swedish IT miracle," says CEO and founder Daniel Persson.

Reliability is everything

Fiber Direkt is focused on a narrow niche: truly premium customers that are given access to dual fibre connections to separate networks for optimal redundancy - both with a speed of up to 100 gigabits per second.

"But speed is not the most important thing anymore. Above all, our customers demand capacity, security, high reliability and constant access, which can only be achieved through fibre and fully automated alarm systems," says Persson.

"Our network enables an entirely new generation of business services where the focus is increasingly on security. We can offer security as a function in the network itself, in the form of clustered firewalls. This way, the customer does not have to invest in costly hardware."

Every Fiber Direkt customer gains access to the Stockholm Intranet, which is separated from the internet to provide maximum security when various points or sites, such as offices or workplaces, are networked. It becomes invisible to the internet, the NSA and FRA.

"We can perform over and above what we have promised thanks to the open fibre network Stokab built and our own fast, agile development and automation. We are implementing this change and development on an ongoing basis and it is part of our premium service," says Persson. "Buying an operator service that has to be regularly renegotiated is obsolete."

The infrastructure as incubator

"Stockholm's open fibre infrastructure works like an incubator that nurtures new companies and business establishments in Stockholm," he says.

"There is already an existing infrastructure here for new services that does not require companies to make major investments in technology. You can start delivering new and demanding apps or services the very day you get a good idea. Our network is so fast today that the needle's eye are the fast SSD disks, which must get even faster to keep up with the storage."

The company is eager to expand, but the lack of infrastructure comparable to that in Stockholm is a barrier.

"We would love to expand further in Sweden and Europe, but right now, there are no other places that can offer an infrastructure equivalent to that in Stockholm," says Persson.

"No one would be happier than me if something like Stokab's open and operator-neutral fibre network were available throughout Europe. That would make it possible for us to offer our superfast and secure network services to many more customers."

Unique, comprehensive solutions for businesses ranging from restaurants and nightclubs to retail shops

Today, restaurants, bars and cafés have high demands for reliability and always-on communication. Powered by access to Stokab's open fibre network, Excedo Networks tailors its solutions to the specific needs of its customers.

The company has specialised in taking comprehensive responsibility for the data communications needs of restaurants and cafés. The company offers a complete communications platform of services to support everything from wireless payment to IP-based CCTV, as well as wireless networks for the establishment's patrons.

"We offer a palette of services tailored to the needs of every customer, which makes our offering unique," says Excedo Networks CEO Michael Duffy.

High standards of reliability demand fibre
"Excedo Networks' customers can choose among everything from virtual firewalls, virtual servers, managed switches and CCTV to lock systems, online backups and email solutions. All with the same high accessibility, 24/7/365," he says.

And the demands are high: the modern connected cash system and payment technology must perform flawlessly and with the shortest possible waiting time to keep customers happy. At the same time, services like high-definition CCTV are putting ever-higher demands on bandwidth.

"This can only be realised with fibre - the era of copper-based communication is over. And it is thanks to the open and neutral fibre-optic network provided by the Stokab model that we can offer high-quality services and 100 percent uptime," says Duffy.

Fibre is a must for high reliability and bandwidth

Thanks to Stokab, PostNord utilises its own fibre ring in Stockholm, with about 30 connections that network its postal terminals and data centres. High demands for bandwidth and the need for redundancy make fibre indispensable.

"We need the reliability and the high bandwidth that our own fibre ring network gives us," says Gunnar Olsson, IT Coordinator at PostNord. "And because we have complete control over the dark fibre, we also avoid costly firewall solutions. The dark fibre solution we have chosen enables simple redundancy. The long distances between terminals and data centres also make the fibre solution a must."

"We retain the freedom to select the type of equipment and the connection speed that suits our needs. This gives us the perfect opportunity to transmit massive amounts of information," says Olsson.

"The solution is transparent and protocol-independent, which gives us the option to choose what traffic we want to send over the connection."

Stokab delivers optimal bandwidth
The alternative to dark fibre from Stokab would be to purchase equivalent solutions from other suppliers. "But," he says, "far from all of them can guarantee the high bandwidth of at least 10 gigabytes per second that the company requires.

"Due to our tremendous needs for bandwidth, we use fibre for several different services, both internal and external. Our customer service platform, which must always be accessible, is one of the more demanding," says Olsson.

"Access to fibre has been critical to Stockholm's leading position."

Henrik Toremark, Head of Public Affairs at MTG, confirms that Stockholm enjoys a leading position in digital infrastructure. And that the company's capacity to deliver its services is dependent upon equal access to the infrastructure.

"It is obvious that the good access to dark fibre has been utterly critical to Stockholm's leading position in digital infrastructure," says Henrik Toremark, Head of Public Affairs at MTG.

This access is a key factor in the ability of content providers like MTG to offer their services to everyone on equal terms.

"Further expansion of the infrastructure aimed at giving everyone equal access is critical. This is something we are working to bring attention to in several different ways."

Open access is a prerequisite for portability
Cross-border portability for content services over the internet is a hot-button issue in this context. The goal is to give consumers who subscribe to content services the option to also use the services when they are abroad.

"We want our customers to be able to enjoy our content even when they are travelling, but the challenge, of course, is that this requires an expansive infrastructure that makes it possible for everyone to compete on equal terms and offer customers the same quality they have at home," says Toremark.

He believes portability highlights the issue of the currently highly variable access to infrastructure in Europe.

"Far from all countries can offer opportunities equivalent to the situation in Sweden," says Toremark. "From a growth perspective, an open and neutral fibre infrastructure and equally open access to the mobile infrastructure are essential to businesses like us that offer streaming services."

Guarantee on the EU level is needed

He points out that several studies have clearly shown that Stockholm's position and offering are much stronger than those of the capital cities of neighboring countries. The open access to fibre infrastructure in Stockholm fosters competition and market growth.

"It is important that there is also a guarantor on the EU level for access comparable to that in Sweden."

However, he does see a danger in how the fibre infrastructure is being expanded in rural areas of Sweden, where in many cases individual houses are connected to an infrastructure without open access to all service providers. This situation both locks consumers in and inhibits healthy competition among providers.

"There is a risk that operators which offer their own content services will impair conditions for others that want to use the infrastructure for similar service offerings," says Toremark.

HD Resources

Net sales: Approx. kSEK 167,554 (2015)

Employees: 35

Business: HD Resources provides high definition television productions from its own studios and on location during events. Focus is on top-tier productions like the Stockholm Marathon, the Eurovision Song Contest and major sporting events.

Fibre in the street simplifies mobile TV productions

Access to fibre-optic communications has made TV production in Stockholm much easier. Camera teams can work much more flexibly here, thanks to the fibre network.

"In Stockholm, we are limited only by proximity to a manhole with a connection to the fibre network. This makes it possible for us to transmit uncompressed audio and video directly from a camera position to our control room," says Christer Larsson, project manager at HD Resources.

The Stockholm Marathon is one of the events that HD Resources has covered since 2008. In the past, the company was dependent upon large vehicles and radio links, even in the city centre. This made productions more costly and less flexible.
Nowadays, the cameras are essentially linked directly to the fibre network, where audio and video are streamed to the company's own control room or that of the relevant TV channel.

"Now both we and our customers, the TV channels, are benefiting from much smoother transmissions, which are also cheaper."

In addition to working with mobile transmissions on location, HD Resources also has large studio premises that are also connected to Stokab's fibre network.

Mobile Links Europe

Net sales: Approx. kSEK 19,518 (2015)

Employees: 7

Business: Mobile Links is one of the leading suppliers of mobile satellite and fibre links in northern Europe for the direct transmission of streaming audio and video.

High-profile events thrives the best in Stockholm

The Mobile Links team works all over the world, but it is their hometown of Stockholm that offers the best conditions. Access to dark fibre enables much cheaper production with better control across the entire technical chain.

Mobile Links makes sure that truly high profile events are linked from production to broadcast. The Nobel Prize Ceremony and Dinner, the Eurovision Song Contest and Champions League broadcasts all rely on the company.

"It is important to us to have as much control as possible over the entire chain. Dark fibre is the optimal choice in that respect, as well as the most economical," says Mobile Links CEO Andreas Langell.

The company thus benefits from the Stokab Eventfiber service, which provides fibre connections used for a brief period.

"Today's high-definition television broadcasts devour bandwidth, since above all you want to be able to transmit uncompressed video from every event. That requires a fibre connection to handle the data streams," he says.

Unique service offering, thanks to fibre
Thanks to the high bandwidth that fibre provides, Mobile Links can also offer additional services such as wireless networks and internet links during events.

"Access to dark fibre has made it possible to create more complex services with a mix of links, various wireless networks and internet access. Few other cities are capable of offering this today," says Andreas Langell.

Fructus

Net sales: Approx. kSEK 19,500 (2016)

Employees: 6

Business: For the past 28 years, Fructus has been selling CAD/CAM software in the Nordic region with focus on control of CNC machines.

Enhanced customer support when fibre reaches Stockholm's business areas

Fructus has more than 500 customers all over the country in the Swedish manufacturing sector. Thanks to fibre connection of its offices, the company can maintain a high level of customer support and offer online training.

The company used to struggle with low transmission capacity, which made it reluctant to provide longer online training programs.

"The aggravation was constant whenever we ran an online training program, due to the shortcomings of the ADSL connection, such as the problems with sound," relates Fructus CEO Lars Bengtson.

Now that Stokab's open fibre network has reached the outskirts of Stockholm, the company can rely on a stable, high-bandwidth connection.

"Thanks to fibre, we can offer better customer support. We can also offer our employees the option to work from home to an extent that was not possible with ADSL", says Bengtson.

"We currently have offices in several locations in Stockholm and manage our internal communications with the help of fibre. Without access to fibre, we would have been forced to travel between the various offices, which would have been impossible considering the traffic situation in Stockholm," says Bengtson.

Fibre drives communicators to the forefront

A good, stable connection is a hygiene factor for every business centre, including Block Stockholm, a specialist provider of office space for digital communicators.

"No one would locate their enterprise in our premises if we did not have fast, effective and stable fibre-connections, because accessibility is critical to their business. Everyone here works creatively to create corporate communications. Full access to digital channels is what makes it possible for us to show our work and thus reach new and old clients," says Rolf Fällström, founder of Block Stockholm.

Speed drives business
New digital channels for improved communication are under constant development today. In many cases, these involve services like streaming audio and video that demand high bandwidth.

"We are continuously improving our efforts to find new and creative solutions for our clients. Those of us who manage client websites and other digital communications simply must have a fast connection to do updates and corrections.
"The creatives at Block Stockholm work with clients, partners and suppliers all over the world. That also demands a stable and reliable IT environment because every minute of downtime can entail a financial loss.

"We worked for the first five or six years (out of our 15 years in business) with ADSL, but every time one of the individual creatives here with us experiences sluggishness in the network, we come one step closer to losing a client," says Fällström.

Fibre connection provides better opportunities for telecommuting

The corporate communications agency Coller, Andersson & Jourdan has three offices that are 700 km away from each other. Without a fibre-based connection, that would simply be impossible.

How has access to fibre-based broadband affected your business and operations?
"It has made our workplace more flexible. We spend less time going to and from meetings because we can take more meetings digitally. We can also deliver material much faster now," says Christophe Jourdan, CEO of Coller, Andersson & Jourdan.

How important has fibre been to your internal operations?
"Very critical. We are a small agency network and live in various places. One in Ängelholm, one in Stockholm and one in Mariehamn. It is important that we all have fast and stable access to the same cloud-based administration and backup," says Jourdan.
"Since the company shares digital material in the cloud, we have to have the speed fibre gives us to benefit from that. The fibre connection also gives us better opportunities to work from home, which enhances our quality of life," he says.

"We also use services like Skype/Facetime to communicate with each other. We have made it an internal requirement that we must not be dependent upon the head office to perform our tasks," says Jourdan.

"Naturally, that involves added costs for the company, but on the other hand improves the quality of our lives quite a bit, and as long as our clients do not feel they are getting poorer service, we are happy with that arrangement."

Skovik

Net sales: Approx. kSEK 4,000 (2016)

Employees: 7

Business: Skovik is a software vendor that automates travel expense accounts for businesses.

"Distance is not measured in kilometres; it is measured in milliseconds."

Skovik's software interprets photographed receipts to automatically enter travel expense accounts in the books. The company was founded in 2013 and is used by hundreds of companies that want to save time for their employees.

Can you provide an example of how access to fibre-based broadband has affected your business?
"Access to fibre is essential to all of our communications and for accessing our data centres, which are spread all over the world," says Alexander Sandström, CEO and co-founder of Skovik.

Does this affect your opportunities to reach new markets?
"We have many international customers and suppliers. Distance is not measured in kilometres; it is measured in milliseconds. A tech company needs bright people and good infrastructure to grow. Fibre provides low latency and fast access to the outside world," says Sandström.
"Copper-based connection (ADSL) would isolate us from the rest of the world."

How important has fibre been to your internal operations?
"Essentially all internal communications are digital, via various online services. We cannot work without a reliable and fast connection," says Sandström.

4. Conclusion

Thanks to Stokab, the City of Stockholm's IT infrastructure company, the region has access to an extensive fibre network that paves the way to service competition, innovation and diversity. Through that Stokab's continuously lays down sufficient fibre and ensures that the network can be expanded, a fundamental infrastructure is being created that, like the streets of the city, is open to everyone to use with the technology of their choice. In addition, the Stokab model has made it possible to avoid repeated, costly and environmentally disruptive excavations of streets and city squares to lay cables and ducts when new firms establish their businesses in the city.

Several studies and the interviews in this document indicate that access to an operator-neutral fibre infrastructure is critical to developing the retail market through competition on equal terms and innovation: the drivers of long-term, efficient growth.

The demand for fibre connections has also proven to exceed all past expectations, especially in the outlying areas of Stockholm. Services are being both created and used here, services that need a fibre connection and the capacities it enables.

Experience also shows that when offered a range of connection speeds, companies want the higher, more reliable speed that only the fibre network can offer. Overall, this shows that you do not have to look for a special application to increase the need for superfast broadband. Instead, demand is being driven by the fibre network and the opportunities it provides. Thus, the "killer application" is actually the network itself.

It is also thanks to the operator-neutral fibre network that Stockholm currently has four competing 4G operators. The neutral platform is now creating the right conditions for Stockholm to also lead the expansion of 5G.

Continued utilization of the Stokab model in future network expansion will also result in the same sustainable, environmentally suitable expansion of the infrastructure of tomorrow as is the case today. This is confirmed by companies in several different sectors, not least importantly those covered in this report. As the expansion continues in the outlying areas of the city, more companies are being given opportunities equal to those in the city centre.

The trend is clear: the more companies that are connected to the operator-neutral fibre network, the bigger the advantages for growth, innovation and social development.