Create a smarter environment where information becomes insight

How a seamless network can turn data into intelligence for your smart city or factory

D-Link®

Contents

To be in the know, you need to get in the loop

Always-on connectivity can help turn an urban area into a smart city and an automated factory into a productivity powerhouse. Yet it's only when you create a seamless cycle of connections across your environment that you can collect, analyse and learn from the data being generated.
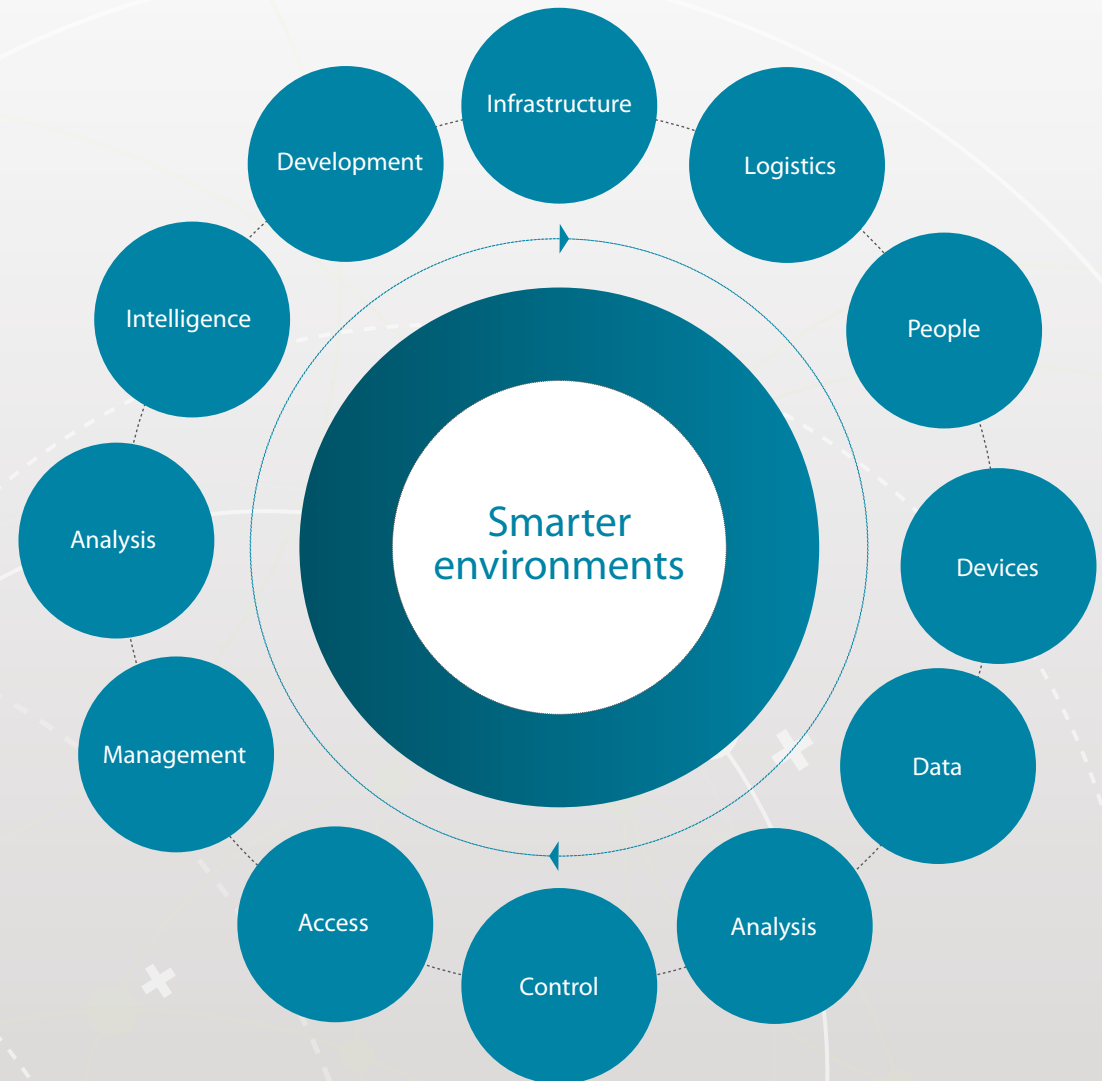
Turning this raw data into valuable intelligence is the foundation of any smart environment, as you can adapt while you evolve – making ongoing improvements that meet multiple challenges. This has huge benefits for the public and employees, allowing you to improve services, increase output, and extend Wi-Fi access.

If you want to create a smarter environment where information becomes insight, this guide will help you get started.

By 2020, an estimated 1.7 megabytes of new information will be created per second for every human on the planet

ITProPortal

The connectivity cycle

Smarter environments

Infrastructure
Logistics
Development
People
Intelligence
Devices
Analysis
Data
Management
Analysis
Access
Control

From video monitoring to better public services

Smart cities are designed to be efficient and effective for everyone. For the public, it's all about having access to high-quality services and an infrastructure that doesn't slow them down or put them at risk. For government, it's the opportunity to monitor, manage and control everything from access routes into the city to public areas and environmental health.

They are all interlinked – so having smarter ways to monitor roads leads to faster awareness and resolution of traffic situations, which helps to reduce congestion and public inconvenience.

The more connected your city, the more responsive you can be. The constant stream of data you generate will give you greater visibility over your city and the challenges you need to address. It's a data-driven future, but only when you turn big data into intelligence can you start to look forward.

Close the loop with video

Video surveillance is the ideal starting point.

On one level, it gives you a constant view of the city environment, so you can monitor situations. On a whole other level, you can use the same data – and extend it – to drive longer-term plans and policies for your smart city.

You need to be able to connect the video feed to the systems where the footage can be stored and analysed. Then, you can start to build a picture of current events and match this data against previous scenarios and influencing factors. This will allow you to identify patterns that will inform key decisions, such as the common causes of incidents, crime hotspots and contributing factors.

If you can predict events, you can prevent them. This is when you begin to create a safe, efficient smart city that meets the needs of its citizens. However, to achieve this, you need to connect your outdoor video surveillance to your internal control centre – using one seamless network that keeps data moving from the edge of your city to the heart of your operations.

One seamless network

- **Extend your view** – add IP network cameras and outdoor wireless access points to improve coverage
- **Maintain data flow** – increase sensors, connections and management points for real-time monitoring, access and control
- **From the edge to the core** – power and connect surveillance cameras from the edge of the city and at critical points to transmit data to the control centre
- **Reduce security loopholes** – create an end-to-end video surveillance system to minimise vulnerabilities

The wider impact of smart city surveillance

First perspective

Video monitoring
Real-time visual data
Intelligent sensors

Second perspective

Monitor roads and public areas
Manage traffic flow

Third perspective

Reduce pollution
Reduce congestion
React to live crime

Fourth perspective

Optimise:
Traffic management
Citizen services
Public safety
Crime prevention
Environmental health

From city-wide access to tailored experiences

For the connected population, Wi-Fi coverage is now an expectation as citizens and remote workers want full-time access to content and services on their mobile devices. We've moved beyond on-premise Wi-Fi hotspots. Today, wireless coverage needs to be universal – providing seamless connectivity in outdoor locations across every town and city.

You can build outdoor wireless into your existing infrastructure or introduce connected elements as part of your smart city initiative. Outdoor wireless access points can be easily be added to powered fixtures, such as street lamps or light fittings, and then extended out to beneath pavements, park benches and other furniture.

Yet, creating a reliable Wi-Fi network also opens up much bigger opportunities for urban development. As well as providing public access to large amounts of data, you can use the same channel to enhance people's experiences and encourage visitors to the area. By turning permission-based data access into intelligence, you can offer targeted services and continually develop your environment around evolving public needs.

Make data flow a two-way street

By creating one seamless network, you can provide uninterrupted outdoor Wi-Fi across your town or city – and personalise information for your connected citizens and visitors. As long as they allow notifications and location data on their devices, you can use the same network to target them with useful messages based on where they are.

This gives you the option to monetise your public Wi-Fi through location-based advertising, share public service announcements about local travel updates and upcoming events, and introduce visitors to nearby places of interest. As the technology develops, people expect this level of targeting to become even more sophisticated and relevant.

To achieve this – and provide endless scope for city development in the digital era – you also need to turn information about people into insight.

By connecting your outdoor wireless to your office systems, you can use the network to understand more about your citizens and visitors. High footfall areas, levels of interest in attractions, patterns of behaviour, feedback – all data streams can be collated and analysed to give you context around individuals, groups and situations. Not only will this allow you to provide more targeted content to the connected population, it will also enable you to continually improve services, attractions and infrastructure into the future.

One seamless network

- **Anywhere access for everyone** – provide data connectivity across large-scale outdoor areas to meet the needs of mobile users and remote workers
- **Improve the lives of citizens** – meet demand for Wi-Fi hotpots in outdoor locations with a high footfall
- **Intelligent from the outside in** – create a smooth infrastructure that connects location-based services to your internal systems for intelligent data analysis
- **Deliver targeted content** – use universal wireless to provide differentiated services and promote tourism, events and activities

The wider impact of universal outdoor wireless

First wave

Wireless connectivity

City-wide access

Remote working

Second wave

Visitor attraction

Digitally engaged consumers

Third wave

Monitor footfall and travel

Monitor interests and behaviours

Location-based advertising and apps

Targeted services

Fourth wave

Optimise:

Smart city WAN

City attractions

Citizen services

Public experiences

Digital information

Urban development

From transparent manufacturing to dynamic output

As factories become more automated, the expectation is that this will lead to a more streamlined and efficient manufacturing process. There's no question that machines and robots have changed the face of industry, due to their capacity for higher volume productivity with precision. However, if there is a lack of transparency between the machines and management systems, there can also be unpredictability.

Connecting the factory to the office is what turns machine data into end-to-end operational visibility. It removes the silos that can exist between different lines, tasks, and processes, helping you to monitor and control the entire production environment.

Creating a live link between your machines, sensors and mobile devices will give you a single view of product and process data. By making this data accessible to relevant systems and staff, you can increase responsiveness and reduce inefficiencies before productivity is affected. This level of awareness and control will have an immediate impact on output – and can also give you the added data intelligence needed to adapt to change.

Predict the future

With factory automation becoming the norm, advanced insight is needed to support growth. Standard communications will need to evolve into real-time information flows that provide timing guarantees for mission-critical applications. Fluctuating market demands will call for increased agility, and greater interconnectivity will be a necessity.
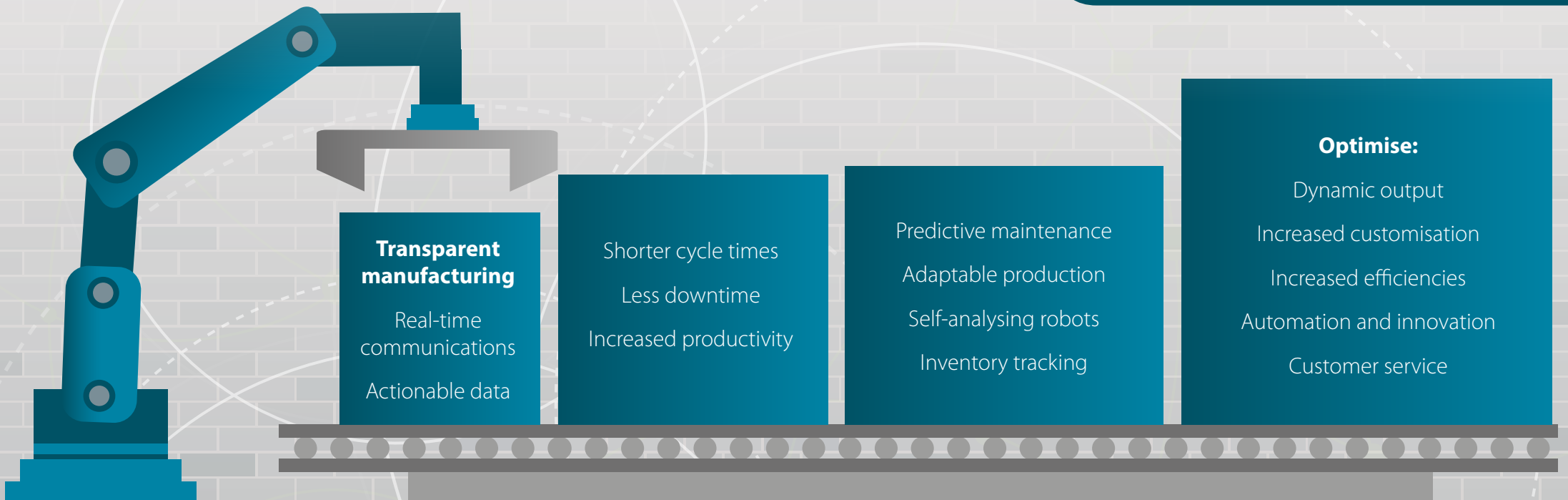
By integrating data from connected operations and systems on one seamless network, you can increase flexibility and adaptability. Analysing machines in line with product orders, maintenance logs, expected production levels and diagnostics

will give you all the information you need to spot trends, make quick changes and predict when actions will be required.

As consumer interests continue to change, there is high demand for more customised products, shorter product lifecycles and fast adaptation. As industrial robots continue to evolve, they will share everything from real-time data and diagnostics to their own capabilities. Using all of the data available to you in a way that meets market needs and fully utilises your automated set-up will lead to a more dynamic output that expands, contracts and adapts as you need it to.

One seamless network

- **Speed of change** – rapidly improve your product and process intelligence, and production capabilities
- **Keep production moving** – avoid single points of failure that lead to downtime, so there's no need to stop machines or production lines
- **Shorten cycle times** – optimise and adapt manufacturing by performing checks and making changes during the production process
- **From the office to the floor** – create a smooth infrastructure that connects processes and logistics to the machines on the factory floor

Transparent manufacturing

Real-time communications

Actionable data

Shorter cycle times

Less downtime

Increased productivity

Predictive maintenance

Adaptable production

Self-analysing robots

Inventory tracking

Optimise:

Dynamic output

Increased customisation

Increased efficiencies

Automation and innovation

Customer service

Predict the future

Unifying your networks and live data streams into one secure, reliable network brings your smart environment together. Your city or factory is connected to your control centre or office – and because they can communicate in real-time, any immediate challenges can be met.

Yet, having this level of visibility goes far beyond short-term goals. Every piece of data is part of a bigger picture that, when analysed, can provide the answer to longer-term initiatives and have a wider impact on your urban or industrial development. With the right connectivity in place, you can turn information into insights and create an environment that's both smart today and even smarter in the future.

Connect with the best

D-Link is the reliable choice for intelligent network connectivity that links every part of your smart environment together – from the outdoor or industrial infrastructure to the management systems in your control centre.

With over 31 years experience in creating network solutions, D-Link offers an extensive range of products, including weather and vandal-proof IP network cameras and outdoor wireless access points.

Build intelligence into your infrastructure

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D-Link Industrial Ethernet switches

- **Reliable in any rugged environment** – industrial-grade and designed to withstand a wide temperature range, vibrations and shock
- **Fast connectivity and high network availability** – exchange data in real-time, even in extreme conditions
- **Continuously monitor and respond** – avoid single points of failure that lead to downtime
- **Connect data to insight** – by bringing disparate networks together, data silos are minimised, so valuable information can be correlated and analysed in real-time

DIS-100G Series Industrial Gigabit Unmanaged Switches for edge deployment	**DIS-300G Series** Industrial Gigabit Managed Switches for aggregation deployment	**DIS-700G Series** Industrial Layer 2+ Gigabit Managed Switch for core deployment
Plug and play; compact size	High performance; compact size	High performance
-40 to 75° operating temperature	-40 to 75° operating temperature	-10 to 65℃ operating temperature
DIN-Rail mounting	DIN-Rail mounting	Rack mounting
5-port	8/12/14-port	24-port SFP + 4-port SFP+
Redundant power inputs	Optional PoE 802.3af/at support	Supports intelligent Quality of Service (QoS)
Optional PoE 802.3af/at support	VLAN support for added security	Optimisation of network traffic

Find out more
eu.dlink.com/industrial

D-Link®

For a smarter, more connected future