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»» Internet of Things – hype or hope for developing countries?

One Pager

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The Internet of Things (IoT) describes the network of 'intelligent' items that collect data via sensors before analysing it and sharing it within the network. It then typically triggers digital control signals (e.g. the automatic reordering of medicines when stocks dip below a certain level).

The IoT is still in its early stages of development. Experts predict that the technology will trigger a new global innovation cycle, likely to boost world-wide economic growth by between USD 3.9 and 11.1 billion over the next ten years. The main potential impact of IoT will most probably be realized by factories ('Industry 4.0') and cities ('smart cities'). However, to date these developments are mainly occurring in industrialised countries.

Significant scope for IoT in developing countries

The IoT could maximise its comparative benefits in developing countries that often feature lengthy governing and decision-making processes (and sometimes also non-expert interventions in processes). Experts predict that by 2025 approx. 40% of economic added value from IoT will be generated in developing countries and emerging markets (upwards trend). The IoT is not only important for economic growth, but can also make a significant contribution to socially and ecologically sustainable development. However, to date there are only few practical examples from developing countries:

- *Health sector*: In Ghana, networked sensors help improve the supply of vaccines by indicating whether and for how long the cold chain has been interrupted during transport, and whether the vaccine has been rendered unusable.

- *Agricultural sector*: Sensor networks on tea plantations in Sri Lanka constantly analyse the moisture and nutrient content of soils, and thus ensure water and fertiliser are used in an optimal way.

- *Disaster control:* On Indonesia's coasts, sensors continually relay real-time data on ground and water movements to the national warning centre, which can then rapidly issue a tsunami warning to those in danger, if necessary.

But the scope for applying the IoT in developing countries is much broader. Applying the IoT makes particular sense where frequently recurring fact-based decisions have to be taken, and where the speed of (counter) control signals is key. This is the case for example for demand-responsive control of water and energy supply facilities, or optimised traffic control depending on transport load and air quality in cities.

From a development cooperation perspective it makes less sense, however, to employ IoT to replace low-skilled workers with capital-intensive high technology.

Barriers to using IoT in developing countries

However, using IoT is demanding on the framework conditions needed for applying the technology in a proper way. Typical barriers in developing countries are:

- Inadequate infrastructure: Power supply systems have to be stable and reliable, and there has to be assured a high quality exchange of high volumes of data (mostly broadband Internet) between the sensors, control and implementation systems

- Sub-standard privacy: IoT applications collect, analyse and relay

data without the knowledge or agreement of the user, and thus require clear and enforceable privacy laws to prevent abuse and the infringement of personal rights.

- Lacking local IoT expertise: IoT applications have been developed primarily for use in industrialised countries, and therefore need to be adjusted to the special needs of their developing counterparts (due to low demand to date barely attractive from a private sector business point of view)). Furthermore, IoT systems also need regular maintenance, updates and function testing. If the system collapses, it has to be repaired quickly and rebooted (manual emergency regulation is necessary while this occurs).

The future is IoT

To fully leverage the high potential of IoT applications in developing countries, the first step is often to tackle the challenges mentioned above. Energy and basic ICT infrastructure in particular needs to be expanded, privacy improved and local know-how enhanced. Based on this, international development cooperation can support the development of tailored IoT applications and the financing of investments necessary for setting up IoT systems in areas relevant for sustainable economic, social and ecological development. ∎