Knowledge comes with experience as IoT pioneers the journeys of tomorrow

IoT has suffered from the growing pains that many new technological innovations experience. Frequently projects have found it hard to scale up from the proof of concept or pilot stages into fully-mature, commercial services and products. To overcome complex customisations and the business, cultural and technological transformation challenges that are the foundation of successful IoT deployments, organisations need partners who have specific IoT knowledge to help them scale and eradicate the barriers to success. Andreas Wolter, the vice president of sales for Europe at Bosch Global Software Technologies tells IoT Now that this knowledge comes with experience and IoT innovators from companies of all sizes should seek out experienced collaborators to drive mass-scale commercial success

IoT Now: Bosch is an extremely well-known brand across multiple industries. What is the company's strategy for IoT and the specific role of Bosch SDS within that strategy?

Andreas Wolter: Bosch started the IoT journey quite early in 2008. We follow the principle of building new innovative products based on sensors, software and services. As part of the overall strategy the Bosch IoT Suite was developed, always with the intention to build or enable open IoT ecosystems. This not only allows Bosch to generate revenue from selling physical products such as washing machines but also facilitates recurring annual revenue from value-added services. Driving and using open standards and open source technologies was a crucial requirement right from the beginning.

Bosch Software and Digital Solutions (SDS) plays a pivotal role in this strategy. It is a part of [Bosch] Global Software Technologies (BGSW) and serves as the external market-facing entity. SDS offers a product and service portfolio that addresses market needs not only for IoT solutions but also in the broader context of developing connected products and services based on the Digital Thread. Additionally, SDS assists customers on their journey towards digital transformation and sustainability. We also have access to the larger Bosch portfolio which allows us to offer complete and holistic solutions for many different vertical markets. ▶

Andreas Wolter
Bosch Global Software Technologies

IoT Now: One of the barriers to massive IoT has been the relatively widespread failure of pilot projects and proof-of-concepts to scale up. How can the challenges of gaining scale be addressed and what do you see as the key reasons behind projects stalling and failing to scale up?

AW: Many IoT solutions are either built from scratch or on very generic IoT platforms which requires a huge amount of customisations. This drives development costs to a significant extent. While this may not pose an immediate issue for pilot projects or proof-of-concepts (PoCs), scaling up IoT solutions brings about additional costs, encompassing not only development but also infrastructure and operations. This can become a critical hurdle, especially when starting with low volumes.

We have also witnessed many failed PoCs and pilots where, for example, the technical complexity has simply been underestimated. Reasons for this can be trying to achieve too much too fast, a lack of the necessary in-house skills or choosing the wrong partners.

In my opinion, one of the most significant challenges in scaling up IoT solutions is the business model. Transitioning from a focus on pure hardware revenue to an annual recurring revenue model, where hardware costs are subsidised through services, poses substantial upfront expenses, with the return on investment (ROI) materialising at a later stage. How organisations navigate this transition is crucial for enterprises of all sizes.

IoT Now: Is the challenge primarily rooted in technological limitations, or are there underlying organisational, operational and cultural factors that must be addressed to facilitate the transition from pilot projects to widespread, commercially successful success stories?

Building innovative IoT solutions can be quite complex, requiring a deep understanding of what's technically feasible, as well as the associated costs and efforts

AW: From my perspective, technical limitations are among the least significant factors contributing to this challenge. It's more a matter of experience and the availability of necessary skills. Building innovative IoT solutions can be quite complex, requiring a deep understanding of what's technically feasible, as well as the associated costs and efforts. This knowledge comes with experience. Transitioning IoT proof of concepts or pilot projects to the scaling phase cannot be treated as a side project alongside one's daily responsibilities.

Shifting from the sale of purely physical products to IoT solutions impacts various facets of a company, including sales, marketing, development and support, necessitating significant organisational, operational and even cultural changes. This requires excellent change management to bring everybody on board. This will not happen overnight. Here again experience is crucial to make this happen.

IoT Now: What does Bosch SDS do differently here to support your customers in scaling effectively and successfully?

AW: What sets us apart from the competition is our comprehensive approach. We not only offer proven products and solutions that have been successfully utilised within the Bosch Group on numerous occasions. We also have diverse and deep digital engineering capabilities in terms of experience, skills for example embedded software, cloud technologies, security and more. Plus, we have the capacity and infrastructure to bring digital products and services to life, providing continuous support throughout the entire product lifecycle. This includes activities such as hardware design, verification, validation and global product certification.

With a track record of more than 250 IoT projects, including the development of market-leading products like Bosch Smart Home, our customers can have confidence in benefiting from the extensive experience we have gathered over the years and avoid all the above-mentioned traps and challenges.

In addition to this, we recognise the importance of setting up offshore and nearshore development centres as a central component of our digital engineering offering. This strategic approach not only addresses talent shortages but also ensures the rapid and efficient delivery of innovative IoT solutions at an attractive cost.

For further insights you can have a look to our case study on Offshore Development Centres, which is on page 22 in this magazine. We are not offering pure technical solutions and services, but we also support our customers in developing and implementing their go-to-market strategies to ensure successful scaling up.

IoT Now: Please could you share some examples of projects where this approach has delivered results?

AW: With the Bosch IoT Suite we connect as of today more than 15 million devices. I would like to highlight one of my favorite examples. **Daimler** is using the Bosch IoT Suite for Firmware over the air updates in passenger cars as part of its Vehicle Backend Infrastructure. It plays a key role in creating, running, monitoring and adapting the update process. With up to 100 electronic control units per vehicle you can imagine the complexity of such a solution.

Another remarkable example involves **Variowell**, a sleeptech vendor and a valued Bosch SDS customer. Variowell offers Pepaminto, a sleeptech device in the form of a mattress topper that enhances thermal comfort in different zones. This innovative topper is controlled through a dedicated watch app. Bosch SDS provided extensive support to Variowell right from the initial stages of product development. This support included designing the hardware printed circuit board (PCB) of the controller connected to the mattress topper. Additionally, we developed embedded software for the controller and created the app for the **Apple** Watch.

We are very proud that Pepaminto has won the CES Innovation Award 2023 for Digital Health and our contributions played a pivotal role in achieving this recognition. Furthermore, we are currently providing ongoing support to Variowell as it embarks on the journey of scaling up its business.

In another significant initiative, we are collaborating with a European tyre manufacturer in its endeavour to create advanced intelligent connected tyres for trucks. These tyres transcend traditional measurements like temperature and pressure by incorporating additional data from the vehicle and utilising artificial intelligence (AI). This approach enables precise predictions of tyre health, wear and tear and expected lifespan. The outcomes include increased vehicle uptime, significant cost reductions, for example reduced fuel consumption, enhanced safety and improved sustainability. ▶

Fleet owners can now proactively plan their tyre maintenance based on real-time field data, moving away from preventive maintenance and adopting predictive maintenance. The solution is currently undergoing real-life testing in Europe, with plans for a commercial rollout in early 2024. We are literally pioneering the journeys of tomorrow.

IoT Now: In what ways do you expect to see the IoT industry develop in the nearer future and over the coming 2-3 years?

AW: Over the past 12 months, we've witnessed a consolidation among players in the IoT industry, with even major vendors withdrawing. We expect that this consolidation trend will continue in the years to come.

Furthermore, owing to evolving legal requirements in Europe and the United States, there is currently a significant demand for firmware and software updates over-the-air so called FOTA and SOTA solutions. Every electronic product will have to support firmware/software update capabilities to do security patches as well as for providing new device features. This demand is expected to continue growing and will prompt the development of more efficient methods for globally deploying software update campaigns.

Digital Thread is yet another trend we are seeing. With the Digital Thread you create consistency, collaboration, and alignment across all functions in the company. It seeks to break down organisational silos, ensuring full traceability of information throughout the product journey. This, in turn, leads to data-driven decision-making processes, streamlined engineering changes, reduced time to market, and increased revenue from aftersales services.

Furthermore, we expect notable advancements in artificial intelligence, including generative AI. These innovations will not only improve predictive and prescriptive maintenance but also make the development and support of new products more efficient. The Bosch Group has the objective to integrate artificial intelligence into all solutions and products, or use it in their development and production, by 2025. In this context, Bosch SDS offers AIShield, a product designed to protect AI models from threats. This safeguard is crucial for customer trust and acceptance.

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Connected device revolution unleashes offshore development's full business potential

In an era defined by rapid technological evolution especially for constantly growing and changing digital ecosystems, businesses face an ever growing need to stay agile, innovative, and competitive. CIOs globally also face budget reductions that not only impact product development, but also all aspects of operations and support. In this pursuit of excellence, the successful implementation of offshore development centres (ODC) has emerged as a transformative strategy. An ODC is a remote office located in another country, equipped with the necessary personnel and infrastructure for software development. These centres provide not only development resources but also handle recruitment, administration, infrastructure and more

To get the benefits outlined above, enterprises don't always need to establish and operate an offshore centre themselves. Specialised service providers can support enterprises in setting up ODCs. Such partners would be critical to the ODC's success, because the enterprise would be venturing into unfamiliar territory, it would heavily rely on the partner's advice, recommendations and hard-earned experience. As a result, it is critical to identify the appropriate ODC partner. Some key considerations for selecting the right ODC partner are:

Examine the vendor's portfolio - A portfolio acts as an evidence of claims made and results achieved. Due diligence must be undertaken on the availability of talent pools, intellectual property, and historical projects that match the unique project requirements.

Customer feedback - Third-party evaluations and client testimonials might provide insight into what to expect from an ODC service provider.

Legal experience - Ascertain that the chosen partner meets the legal requirements for establishing an ODC and has the legal authority to operate an ODC in the desired country.

The **Bosch Group** has established ODCs for its own purposes already 25 years ago and employs today more than 38,000 engineers in countries ▶

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like India, Vietnam and Mexico. Nearly every Bosch product is supported with contributions from offshore locations.

Bosch Software and Digital Solutions (SDS) runs ODCs for external customers. This case study describes how it successfully utilised the ODC model to help a multinational producer of industrial sensors and solutions enhance its product ecosystem and engineering capabilities.

The requirement

The client, a producer of industrial sensors and sensor-based solutions, aimed to create a connected product ecosystem. From the specific customer perspective, this ecosystem will achieve three elementary objectives. These goals included differentiation from competitors, increased customer value and establishing end-to-end product engineering support. However, they faced challenges in terms of expertise, resources and global implementation.

The approach

Bosch SDS addressed the client´s needs with a holistic solution backed by the Bosch IoT Suite. This solution aimed to create a managed service for a global rollout, generate insights and enhance the client´s products. The ODC model was a key component for providing the customer solution, involving project managers, scrum masters, developers, architects, and various specialists. The ODC team possessed diverse skills such as embedded software deployment, gateway administration, cloud management, IoT platform management, edge computing expertise, DevOps, validation and quality engineering. To ensure seamless collaboration, a two-way team structure was established, granting the client full visibility into development efforts and project control.

The outcome

With this approach, Bosch SDS devised a comprehensive solution, strategically utilising an ODC model and hereby added value to the client's business:

- **Managed Service Setup:** Bosch established a managed service, spanning Europe and China, using the ODC Methodology
- **IoT Platform Integration:** Customer devices were seamlessly integrated into the Bosch IoT Suite, facilitating effective data collection and data analysis
- **User Access and Dashboards:** Bosch provided user access to the IoT Platform for multiple tenants and created role-based dashboards for enhanced data visualisation and control
- **Data Management and Insights:** A data management service was implemented, enabling downloadable statistics and insights for informed decision-making.
- **Commercial Rollout Recommendations:** Bosch offered valuable recommendations for commercial rollouts and improvements, aiding the client´s strategic planning.
- **Knowledge Management:** A knowledge management system was established by retaining core talent with expertise in the developed components. This ensured continuity and accelerated development.

Benefits

The benefits of ODCs are manifold. The obvious benefits are faster access to engineers with the required skillset for project or product development execution. Offshore development centers are in many cases located in low-cost countries which helps enterprises to manage their development and operations costs appropriately. With the support of Bosch SDS the customer gained the following additional benefits.

- **Enhanced differentiation:** The connected ecosystem empowered the customer to differentiate their products, adding a competitive edge in the market.
- **Increased customer value:** The seamless integration of the devices into the IoT Suite enabled better insights, contributing to enhanced customer value and satisfaction.
- **Global rollout success:** The managed service and ODC methodology facilitated the global rollout of the connected ecosystem, ensuring consistent implementation across regions.
- **Informed decision making:** Insights from the data management service empowered the client with data driven insights for strategic decision making.

Bosch SDS's approach of utilising an ODC, coupled with the Bosch IoT Suite, effectively addressed the client's challenges and needs. By creating a connected product ecosystem, enhancing customer value, and providing skilled resources through the ODC model, the client achieved their objectives while remaining competitive in a rapidly evolving market.

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