tsenso Case Study

Project Name: tsenso
FIWARE Accelerator: FInish
Grant Funding: April 2015 – March 2016
Level of Grant funding secured: €125,000
Target Sector: Agrifood

Company: Logistics Matthias Brunner
Country: Germany
Web: www.tsenso.com
Contact person: Dr Matthias Brunner
Email: info@tsenso.com

Vision and Market Need

tsenso is an easy to use temperature monitoring solution specially designed for logistics applications. It aims to provide a flexible sensor system to track temperature sensitive deliveries in real time, that it is both easy to handle and cost effective. The objective of such an affordable solution is to improve the flexibility of food delivery while reducing waste.

tsenso provides a complete monitoring solution with smart predictions and early warnings, designed for all kinds of transported foods ranging in temperature from -25°C to 70°C. The sensor is small, lightweight (<50g), water resistant and has a battery life of over one year.
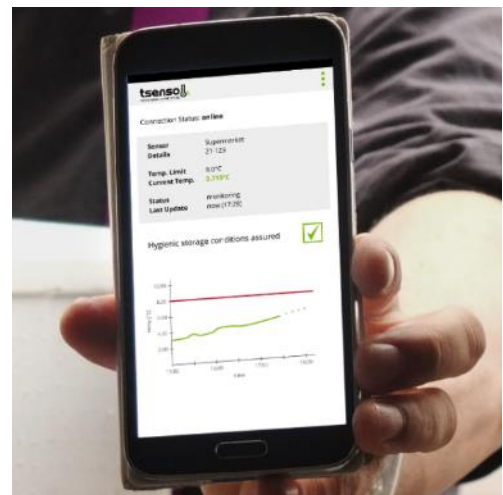

Diagram 1: tsenso sensor

Diagram 2: tsenso app

The Bluetooth sensor can be either integrated into the transport box or container or can be manually added together with the cargo. It accompanies the cargo throughout the transportation cycle and monitors the temperature data from inside the box to the outside, up to a range of up to 15 m using Bluetooth low energy. The tsenso smartphone app receives the data and will automatically notify the driver when the temperature of the stored items is likely to go outside the optimal temperature range.

The sensor continuously transmits temperature values to the cloud via a mobile app, giving real-time information about the cargo. In the event that the delivery driver is not in range, the sensor stores the data and triggers an automatic upload upon reconnection, with no manual interaction needed.

To protect sensitive cargo even better, tsenso offers an additional feature: the temperature prediction. An intelligent algorithm calculates the probable evolution of the cargo

temperature and predicts the remaining time before the cargo will reach its temperature limit.

There is an increased need to deliver food directly to consumers' homes and the market opportunity relates to temperature sensitive foods. In 2010 a Dialego AG Study suggested that 22% of UK residents already buy food online. The A.T. Kearney study highlighted the cost saving potential of central warehouse based food delivery and a market growth potential of 20% for the coming years[2]. The market opportunity identified relates to the growing ecommerce food industry, small and medium-sized enterprises in the food sector (e.g., catering services, food delivery services, restaurants) and the pharmaceutical sector, which has to monitor very temperature sensitive goods. tsenso's European market potential includes online food shopping[1+2] (€500 million per annum, CAGR 17%), local food delivery[3] (€200 million, CAGR > 5%). In principle, tsenso is equally suited for pharmaceutical long distance shipping, especially into 3rd world regions with a €200 million market volume. Due to the high certification effort and long entry times, this market potential will be operationalised at a later stage. In parallel, market research was also carried by engaging with supply chain stakeholders at relevant conferences and industry events (November 2014 – Present).

Target Market and Revenue Streams

tsenso's primary target market is the food industry, where strict temperature regulations apply. Our clients include organisations involved in food delivery (e.g., ecommerce, local retail with delivery services, regional producers), gastronomy (e.g., catering services and restaurants). The initial target market is Germany, but during 2016 tsenso will also start to engage with prospective customers in Central and Eastern Europe.

Revenue streams are based on selling and renting hardware (sensors) as well as software customisation based on specific client requirements and prediction features (initial calibration and cost per prediction). Sensor subscriptions can be paid annually at a cost of €60 per sensor or monthly at a cost of €5.50 per sensor per month, with a minimum 12 month rental period.

Competitive Positioning

Direct competitors include sensor providers, (e.g. freshtemp, ebro, Sensitech, berlinger, LocusTraxx).

Company	Data Tech	Logistics optimized	Cloud solution	Real-time	av. cost/ month
tsenso	BLE	Food	Full	World-wide	€ 5,-[4]
Sensitech	GSM	Pharma	No	World-wide	€ 15,-
berlinger	USB	Pharma	No	No	€ 10.-

---

[1] http://www.handelsdaten.de/lebensmittelhandel/entwicklung-der-umsatzanteile-im-deutschen-lebensmittelhandel-nach
[2] Online-Food-Retailing: Ein Markt im Aufschwung. Mirko Warschun et al, A.T. Kearney GmbH, 2013
[3] http://www.dehoga-bundesverband.de/zahlen-fakten/anzahl-der-unternehmen/
[4] Yearly subscription

ebro	RFID	No	No	Local	€ 8,-[3]
freshtemp	RFID	No	Full	Local	€ 15,-
LocusTraxx	GSM	Pharma	Partial	World- wide	€ 28,-[5]

Indirect competitors include cloud platform providers such as relayr or business process software such as SAP or Bluemix, which could integrate monitoring services in their portfolio, independent of the hardware manufacturer.

tsenso is well positioned in the growing B2B2C segment. The tsenso value proposition is based on providing:

- a very easy to use and cost effective temperature monitoring system, which can be easily integrated into existing logistics systems
- real time temperature monitoring with automated documentation and prediction feature, which reduces both manual checking and spoiled food
- an integrated task and fleet management system for regional deliveries for smaller customers (optional) to increase vehicle occupancy, flexibility, punctuality and customer satisfaction

The tsenso Unique Selling Proposition is that it is more flexible as a result of infrastructure independence, it is more reliable due to the ability to collect redundant data easily, is very cost effective and offers prediction functionality to send warning messages. It provides a real-time sensor and logger, which is fully functional worldwide without Wi-Fi or RFID infrastructure

Enabling Technology

tsenso leverages an Internet-of-Things approach to the logistic process. Using modern web technologies such as customized web sockets and direct data injection, fast data exchange and excellent data consistency is assured.

The tsenso sensing module uses state-of-the-art, large volume components. In the longer term, we plan to develop a long-range solution for large scale warehouses and container harbours, using the brand-new LoRaWan technology.
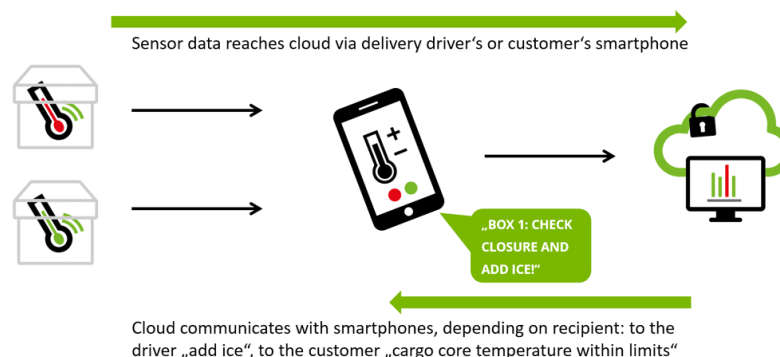

Diagram 3: tsenso functional diagram

---

[5] For 6 week rental

The cloud provided access to tools using the FIWARE Generic Enablers (GE) and leverages the following enablers:

- *Orion ContextBroker GE* is used to register and store inputs from the sensors such as temperature and deliver updates

- *Cygnus and rush* is used as the storage and publishing of the context data as it uses the subscription/notification feature of Orion

- *Keyrock* is used for Identity Management and *Wilma* for security

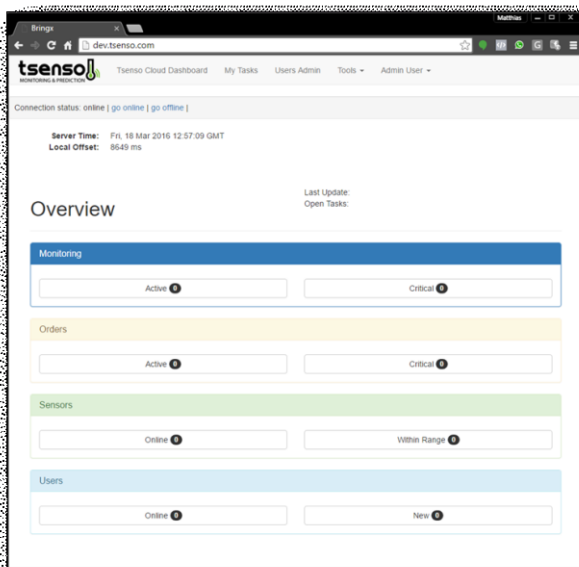Diagrams 4 and 5 below provide insights into the dashboard and report generation:
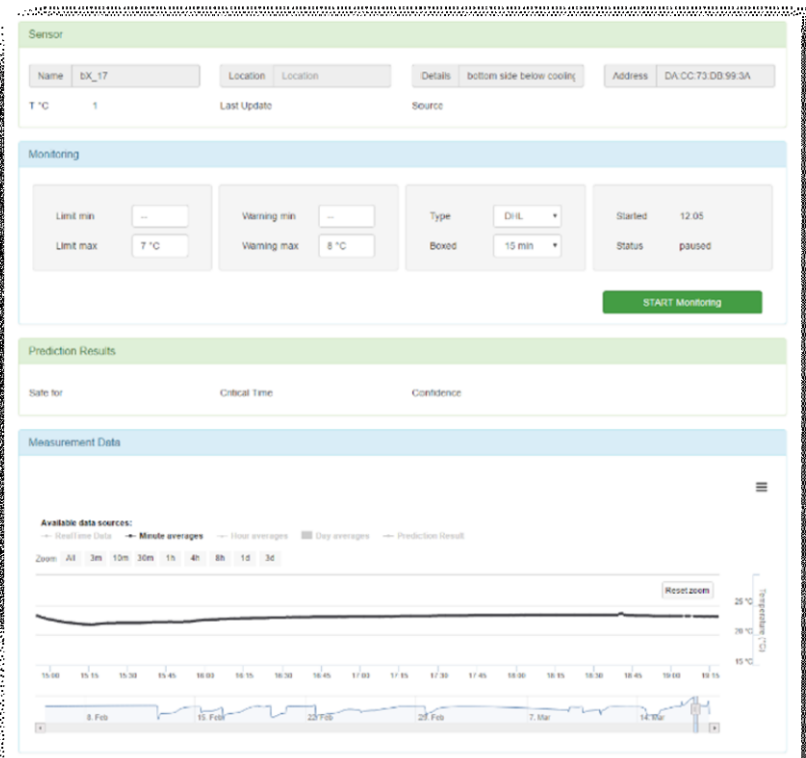

Diagram 4: tsenso dashboard

Diagram 5: Generating automated reports

Progress to Date

Logistics Matthias Brunner commenced activities in 2014. In March 2015 Logistics Matthias Brunner secured a FIWARE Grant under the FInish Accelerator as part of the FI-PPP Phase 3 Programme to develop the tsenso application.

Over the past 12 months the tsenso solution has been developed on top of an existing logistical framework which Logistics Matthias Brunner had previously developed. The product will be launched during April 2016.

To date, product development has been funded from internal resources combined with the FIWARE Grant. Logistics Matthias Brunner is currently raising €100,000 in seed funding to enhance the product and invest in marketing and sales.

During Fruit Logistica in February 2016, tsenso secured the FInish Future Award 2016.