

Small devices for Big data – business driven smart technologies to collect data on consumer behaviour

Haris Hondo¹, Erik Kaunisto¹, Kwabena Titi Ofei²,
Bent Egberg Mikkelsen² & Sophie Hieke³

¹*Agrifood and Bioscience unit, RISE Research Institutes of Sweden, Gothenburg, Sweden.* ²*Department of Clinical Medicine, Aalborg University Copenhagen, Denmark.* ³*German Institute of Food Technologies, Quakenbrück, Germany*

Keywords: ICT, Devices, Big Food Data, Business Generated Data, Research Infrastructure

Introduction: There is growing interest in consumer health related to food, behaviour and lifestyle determinants. At the same time, digitalisation of societies creates new sets of data on consumers. A major driving force in the paradigm shift towards a digital consumer society is the continuous ICT developments that enable a future data sharing economy, where consumers are donating their data, thus making it available for food business analysts, marketing researchers and scientists. Business intelligence & analytics (BI&A) has gone through an evolution process and huge amounts of consumer data is now collected and analysed. The methodologies for data collection and analysis are based on the different smart IC technologies that have transformed the way goods are purchased, extending beyond just transactions. Similarly, from a scientific perspective, it is reasonable to assume that similar ICT solutions may play an important role in the understanding of public health issues.

The study was carried out as part of the RICHFIELDS project aimed at designing a future European research infrastructure (RI) for innovative research on healthy food choices, preparation and consumption of EU-citizens and their respective relationships with socio- economic factors. The project, funded by the H2020 program is seeking to develop state-of- the-art RI that combines knowledge of consumer behaviour and food intake in one data platform.

Aim: The aim of the study was to investigate what are the existing devices and other smart technologies used by businesses to capture data on consumer behaviour related

to food purchasing. The study focused both on hardware devices used as tools for data capture as well as software technologies used for storing, managing, analysing and linking data. The ICT tools presented in this study provide a relevant framework for the interaction between businesses as data providers and the RICHFIELDS platform.

Methods: For this purpose, interviews were conducted with four organisations, two from Denmark and Sweden respectively, with the aim of extracting information related to potential ICT solutions used in data collection. The organisations were selected through purposive sampling with the aim of covering a wider range of businesses collecting food purchasing data. Both private and public enterprises were interviewed using a semi-structured interview guideline. Data collected from the interviews was analysed using QSR Nvivo 11 following the six thematic analysis phases proposed by Braun and Clarke (2006).

The study was complemented by an additional literature review on ICT solutions as seen from the retail and marketing organisation perspective, the two organisation types that were considered as ICT intensive during the sampling. Initially the review was conducted through general google search using previously identified key search terms and was subsequently narrowed down to specific devices and technologies. The information about the devices and technologies were then collected from relevant organization's website, data sheets and press releases.

Results: From the interview data it was concluded that the most common devices used for capturing consumer data related to food purchasing was barcode scanners. Several types of technologies were used for scanning barcodes including mobile phones with barcode reader applications, self-scanners and point-of-sale scanning equipment. Another important technology for data gathering that was identified during the interview was web based questionnaires. Different technologies were used for data management, most notably SQL and Oracle based solutions. Microsoft Excel was used in two cases for data visualisation.

Each ICT solution identified during the literature review was mapped according to five attributes: 1) Type of technology, 2) Data capturing technology, 3) Devices facilitating data capture, 4) Type of data collected, 5) Examples of technology. The most important types of technologies identified were point-of-sale technologies, e-commerce and m-commerce technologies, social media use, consumer location sensing technologies and automated voice and face recognition. The results show that there is a growing focus on mobile and online technologies for data gathering in combination with traditional scanning technologies, such as barcode and NFC-tag scanning applications

for smartphones. In addition to that, new movement of sensor technologies, including the iBeacon are emerging and becoming more important.

Discussion: The results of the interviews and literature study show that ICT landscape is changing fast, driven by increased connectivity of devices, increased amount of mobile devices used by consumers and cheaper and better sensors. The software for analysing data are becoming increasingly sophisticated to include multiple data sources such as data from video, WiFi, Bluetooth, traditional Point-of-sale systems, mobile applications and management systems. A proposed RI should therefore be flexible enough to be able to handle the dynamic ICT environment. The RICHFIELDS platform should be able to facilitate data exchange from current as well as new and unexpected data source.

