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QUISPER AND DEVELOPMENT OF A PERSONALISED NUTRITION COMMUNITY

KEYWORDS: Personalised nutrition, community, digital platform, scientific validation, start-ups.

ABSTRACT

The abundance of online personalised nutrition services, and the integration of artificial intelligence in wearables and apps as elements of these services, are part of the global trend for personalisation. With respect to diet, however, most of these resources lack scientific rigour, which can potentially diminish consumer trust and compliance. The non-for profit Quisper® Association aims to provide scientifically validated personalised nutrition resources to third parties delivering personalised diet and health services to consumers, as a way of improving the quality of this advice. Formation of an independent Quisper Scientific Advisory Board (QuiSAB), and the creation of a personalised nutrition community around Quisper®, are amongst the crucial steps taken to develop and support more science-based personalised nutrition resources and advice.

INTRODUCTION

The term 'personalisation' is defined as 'making something suitable for the needs of a particular person' (1). This concept has been used and applied widely to new ideas, products, and services in recent years. Start-ups have incorporated this idea to improve sales, as a marketing strategy for branding and advertising, and to improve consumer satisfaction. According to the Precision Consumer 2030 report (2), when an item is designed specifically based on individuals' data, consumer behaviour and engagement shift with these products or services. Thus, it is not surprising that personalisation has reached other sectors, like health (personalised medicine) and, more recently, nutrition. Sequencing the human genome boosted opportunities for personalised nutrition by integrating genetic information to profile nutritional requirements. Currently, the personalised nutrition market is estimated to be worth around \$11bn globally (3). However, a lack of consensus around a definition for personalised nutrition has confused consumers (4), which could have a negative impact on trust, uptake and compliance with commercial services.

Several definitions of personalised nutrition have been published in an attempt to achieve a consensus. For example, Ordovás et al. (5) described personalised nutrition as an approach that 'uses information on individual(sic) characteristics to develop targeted nutritional advice, products or services' while others claim it 'assists individuals in achieving a lasting dietary behaviour change that is beneficial for health' (6). Perhaps one of the most accurate descriptions of personalised nutrition was defined by the ILSI-North America 2018 Panel that suggested personalised nutrition 'uses individual-specific information, founded in evidence-based science, to promote

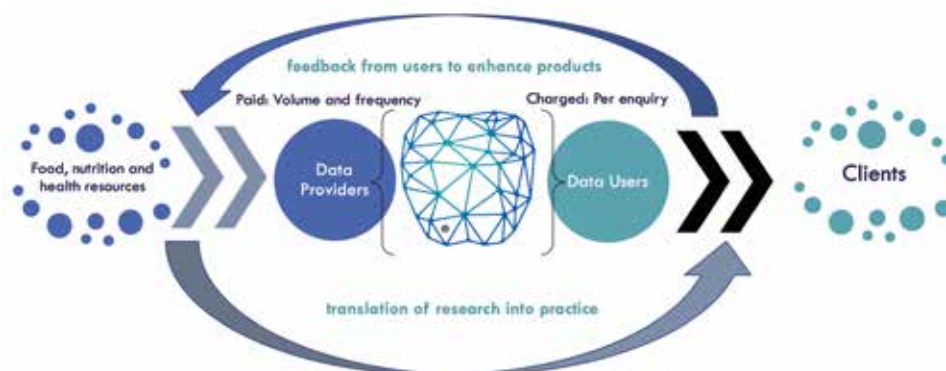


Figure 1. Operational description of the Quisper server platform (QSP).

dietary behaviour change that may result in measurable health benefits' (4).

Ultimately, regardless of an exact definition, if the scientific community is to help ensure personalised nutrition is trustworthy then any advice must be based on robust scientific evidence. This aim is at the heart of Quisper® ASBL (Quisper® Trademark number EU014508841), which is developing a federated server platform (QSP) supporting delivery of scientifically validated personalised nutrition advice to consumers by commercial third parties (7). The ideas behind Quisper ASBL/ QSP originated from two EU-funded projects (QuaLiFY (8) and Food4Me (9)), and was developed further during Quality Information Services and Dietary Advice for Personalized Nutrition in Europe (2018 - ID18064 & 2019 - ID19075), funded by EIT Food (10), the innovation community on Food of the European Institute of Innovation and Technology (EIT).

QUISPER BUSINESS MODEL

QSP is managed by a non-for-profit association (Quisper ASBL) established in Brussels (Belgium), the main functions of which are to 1) administer QSP and resources

offered via it, and 2) coordinate scientific validation of said resources (data, knowledge, tools and services), which is achieved through an independent scientific advisory board (QuiSAB). QSP is a virtual federated environment through which providers (e.g. research institutes, universities, companies including SMEs) that have developed food, nutrition, and/or health resources can provide access for users (i.e. SMEs, independent dietitians and nutritionists, personal trainers, etc.). Whilst the financial model is still in development, it is envisaged that users will be charged a small fee per unit whilst providers are paid according to volumes and frequencies of use, with Quisper receiving a small handling fee from both to cover operational costs (see Figure 1).

Quisper's business strategy focuses on a business-to-business (B2B) approach to support delivery of personalised nutrition advice by commercial third parties that are also responsible for collection and storage of clients' personal data. This is particularly important to overcome transnational boundaries since, even within the European Union and despite the advent of GDPR,

national regulations underlying privacy and personal data, and transfer of such information particularly if clinical in nature, are different amongst Member States.

A key element of the business model is independent validation of each resource. QuiSAB was established at the end of 2019 including five renowned researchers in the fields of molecular nutrition, physiology, personalised nutrition, nutrigenetics, and nutrigenomics. QuiSAB members are responsible for assessing resources that want to be linked to QSP and those that lack sufficient rigor will be re-evaluated once more evidence becomes available. The longer-term aim is to publish criteria against which resources can be evaluated, ensuring transparency in Quisper processes; the difficulty in achieving this goal lies in the diversity of resources and how they are assessed.

USE CASES – LESSONS LEARNED

During 2019, the EIT Food-funded Quisper project developed use cases with small and medium enterprises (SMEs) to help showcase QSP: one of the problems in getting QSP established has not been a lack of interest or enthusiasm, but a reluctance to commit financial resources without existing functionalities to explore. Thus, the first step was to find SMEs that wanted to collaborate and shared a common vision with respect to personalised nutrition. Two SMEs were identified, namely myDNAhealth (11), a UK-based, award-winning, nutritional genomics and epigenetics company improving wellbeing through in-depth lifestyle and DNA analysis, and P4H (12), a Spanish spinout, belonging to Universidad Autónoma de Madrid and IMDEA Alimentación, bringing scientific discoveries in nutrition, lifestyle and health to society. However, neither had the financial resources to undertake the agreed work. Instead, additional funding for the technical developments was obtained through INCluSilver Project (13), which aims to support collaborations generating and validating innovative ideas in the field of personalised nutrition for the Silver Economy (i.e. economic activity and consumer expenditure related to citizens over 50 years of age) and have great potential to reach the market. INCluSilver

funding was vital in converting the concept into QSP functionalities, and more of this kind of flexible, low-bureaucracy funding is needed to develop and test diet and health products in a semi-commercial setting.

Inevitably, the technical aspects of both use cases (see Figures 2&3) proved to be more complex than anticipated, but these initiatives were tested successfully with healthy, free-living elderly populations in UK and Spain, and are available for exploitation via QSP. Implementation of these use cases was important for Quisper, not least because both were completed on time (within six months) and to budget, despite the technical challenges, but because the outputs showcase QSP functionality and interoperability within the personalised nutrition environment (14).

A third use case was also developed where web-services for a personalised dietary advice app, eNutri app, developed by the University of Reading (UK), were linked to QSP. eNutri was created during Food4Me (Grant Agreement No. 265494), but it was further developed within the Quisper EIT Food-funded project (eNutri app 2.0), including new food portion libraries, an updated and validated Diet Quality Score (DQS), a food preference model, based on 12 food attributes (e.g. sweet, spicy, crunchy, etc), and, finally, an algorithm integrating the DQS and preference model to provide personal recommendations. eNutri app was also translated into German and both were tested in intervention studies in Germany and the UK during the second half of 2019 (15).

CREATION OF A PERSONALISED NUTRITION COMMUNITY – FIRST STEPS

An important element of the Quisper concept is creation of a user community involving users and providers as well as other stakeholders, e.g. policy-makers, clients of personalised nutrition services (consumers) and the food industry (manufacturing in Europe is still largely SME-based (ca. 92-97%)) and retailers, such as SODEXO, a French food services and facilities management company. Facilitating relationships around personalised nutrition will help promote mutual understanding and achieve better uniformity and reliability of personalised nutrition



Figure 2. myDNAhealth use case. A set of questionnaires on lifestyle was linked to QSP and it was accessed via an e-coach app named VICI, also developed by myDNAhealth and connected to QSP.



Figure 3. P4H use case. An algorithm on healthy ageing that provides a customized report based on genetic information (23 SNPs on healthy ageing) and dietary food intake was made available through QSP.

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services in its many and varied forms, based on scientifically validated resources, which should also help reinforce consumer trust.

Engaging with SMEs has instigated the community building process, with several stakeholders joining a one-day personalised nutrition symposium (19th June 2019) in Brussels (BE). The event was organised by EuroFIR AISBL (16) and attended by more than 70 representatives from industry, academia, NGOs, government entities, and SMEs interested in personalised nutrition and potential applications. A personalised nutrition workshop, hosted by shiftN ((17) BE) and Quadram Institute Bioscience ((18) UK), took place the following day (20th June 2019), and a smaller group (20 participants) considered how QSP might underpin their research or commercial activities and evolve to do this better. Recommendations from that workshop are now being pursued as part of the Quisper ASBL/ QSP business model. Importantly, however, these events formed the basis for the Quisper Personalised Nutrition Community, and it is hoped that some or all will collaborate with Quisper ASBL/ QSP and one another to advance scientifically validated personalised nutrition services.

Currently, Quisper ASBL/ QSP is engaging with a clinical study analysing the impact of personalised nutrition advice on the food-related behaviours of individuals with diabetes (Type 2); this will provide insight into the functionality of QSP in a clinical environment. Quisper ASBL/ QSP is also part of a new EIT Food-funded project PERSFO (PERSONALISED and connected FOOD service providers, ID 20291), which aims to provide personalised nutrition advice in the workplace, giving the opportunity to integrate and test QSP services on an existing commercial platform, and exploit behavioural changing approaches in canteens (i.e. nudging, manipulating the choice architecture to change eating behaviours in a predictable way without forbidding any options or significantly changing economic incentives). Involvement of SODEXO not only facilitate access to workplaces but, if successful, potentially a gateway to millions of workers globally (19).

Whilst the commercial and membership aspects are still being finalised, Quisper ASBL/ QSP is involved in other activities that will enable further development, including Food Nutrition Security Cloud (FNS-Cloud,

Grant Agreement No. 863059) and the proposed Food, Nutrition and Health Research Infrastructure. Quisper ASBL will continue to engage start-ups and SMEs with personalised nutrition services to increase the numbers of QSP resources and seek additional funding opportunities to support these. To maintain the vision of scientific excellence, QuiSAB members also remain engaged, offering feedback and advice, so the first services can be evaluated formally during 2020, and a transparent framework for assessment published.

CONCLUSIONS

Personalisation of nutrition advice has been shown to have greater and longer-lasting impact on modifying food-related behaviours than a one-size-fits all approach, although it is unclear whether it is the one-to-one interaction or the advice that is the more important factor in these changes. Regardless, provision of scientifically validated resources underpinning the advice is fundamental to assure consumer trust. Quisper ASBL/ QSP aims to be a major provider of scientifically validated resources for those delivering personalised nutrition advice to consumers whether one-to-one or in the work place, for example, and irrespective of whether the advice is formulated based on phenotype, food preferences or genotypes; there are about 20 genes known to have a direct relationship with food/ food components, intakes, and disease risk. Certainly, amongst personalised nutrition actors, and results from the EIT Food-funded Quisper project, have provided enough evidence of the need for and relevance of QSP in the existing and developing business ecosystem. Thus, in the short-term (2020-2022), Quisper ASBL is concentrating on developing further QSP functionalities and consolidating relationships with the wider personalised nutrition community.

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