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Nell'attuale scenario economico e sociale si è affermata l'esigenza di orientare i sistemi di produzione e gli stili di consumo verso nuovi modelli virtuosi di gestione in cui l'innovazione, la qualità e la sostenibilità rappresentano elementi fondanti per la creazione di strategie sapienti e lungimiranti capaci di creare un valore "sostenibile" per tutti gli attori della "rete della vita".

Tale sfida rappresenta un tema ampiamente dibattuto nell'ambito delle Scienze Merceologiche e, in particolare, durante il XXIX Congresso Nazionale di Scienze Merceologiche dove sono stati coniugati contributi teorici con esperienze pratiche in un'ottica di valorizzazione delle conoscenze.

Il congresso ha rappresentato un'occasione di confronto, di condivisione e di approfondimento di percorsi di sviluppo su tematiche fortemente focalizzate sui seguenti aspetti:

- Industria 4.0, analizzata attraverso i binomi di innovazione e imprenditorialità, innovazione, start-up e spin-off, tecnologia e innovazione gestionale, ricerca e trasferimento tecnologico;
- Qualità 4.0, intesa come qualità di sistema e di prodotto e sistemi di gestione per la qualità;
- Sostenibilità e Corporate Social Responsibility, che prende in esame l'analisi del ciclo di vita, i sistemi di gestione per l'ambiente, i metodi e gli strumenti di ecologia industriale, fino al concetto di economia circolare.

Benedetta Esposito è borsista di ricerca presso il Dipartimento di Scienze Aziendali Management and Innovation Systems dell'Università degli Studi di Salerno e cultore della materia in Scienze Merceologiche. I suoi interessi di ricerca sono nell'ambito della Corporate Social Responsibility e della Circular Economy nel settore agroalimentare.

Ornella Malandrino, professore ordinario di Scienze Merceologiche, Direttrice dell'Osservatorio Interdipartimentale per gli Studi di Genere e le Pari Opportunità dell'Università degli Studi di Salerno e Delegata del Rettore all'Orientamento. La sua attività scientifica si focalizza prevalentemente sulla CSR e sulla relazione tra i vari sistemi e strumenti di gestione delle differenti dimensioni della qualità.

Maria Rosaria Sessa, PhD in Management & Information Technology e docente a contratto dell'insegnamento di Gestione Controllo della Qualità dei Servizi Turistici presso il Dipartimento di Scienze Aziendali – Management & Innovation Systems dell'Università degli Studi di Salerno.

I suoi principali interessi di ricerca sono: sviluppo di sistemi di gestione della qualità e dell'ambiente, responsabilità sociale delle imprese, strumenti di valutazione ambientale e certificazione delle competenze.

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SAFETY AND QUALITY UNCERTAINTIES IN FOOD IMPORT AND CONSUMPTION: THE CASE OF SIN- GAPORE.

di

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Abstract (in inglese)

The city-state of Singapore, a rich and highly urbanized country, has exponentially developed its economy in recent decades, driven mainly by financial services, manufacturing and tourism. As the country is highly dependent on food imports, it therefore presents unique challenges in terms of food safety and microbial quality. In these terms, its laws also focus on ensuring a constant foreign supply of food and agricultural products that are safe for the population and beyond. Despite the efforts of the Singapore Ministry of Health, in collaboration with other authorities, which actively collaborate to promote safety, food-borne diseases continue to be a serious public health problem.

This paper contains a preliminary analysis of the city-state of Singapore, outlining its profile mainly in the food field. After an initial survey of the most imported and consumed food products, we analyse the causes that have seen an increase of food contamination and food poisoning, with a view to what may be the possible solutions proposed by the Singaporean authorities. The paper concludes with an analysis of future food scenario, with indication of the potential investments that can be made, especially with increasingly sustainable solutions, according to a different and continuous evolution of the population.

Keywords: Food commodities; agri-food trade; Quality management system; Food safety

Introduction

Singapore is the world's first city-state-island that relies mainly on food imports, and therefore presents unique challenges in terms of food safety and microbial quality. In order to minimise the risk of contamination and food poisoning, the Singapore Ministry of Health, actively collaborates with the Food and Veterinary Authority and the National Environment Agency to promote food safety. As regards to the enforcement of food standards and regulations by and in the city-state of Singapore, they play an important role in the city's climate of innovation, as they lay the foundations for the development of new products and the adoption of new technologies and can also facilitate market access. The standards describe the specifications and procedures in the manufacture of products and in the provision of services, in order to guarantee quality and reliability and improve acceptance and market access (Singapore Food Agency, 2018). The Singaporean Government has always sought to ensure a constant and sufficient supply of healthy and quality food from a large number of countries. With the exception of rice, there are no quantitative restrictions on imports and exports nor controls on sales on the internal market of agricultural products. However, Singapore maintains a system of strict sanitary and phytosanitary requirements (Vasko L., 2018).

Again, the main diffused standard is the international recognized ISO 22000, which is here implemented by the Singapore Standards Council, which facilitates the development, promotion and revision of standards and technical references in Singapore. This work is carried out through partnerships with industry, academia and government organisations within the National Standardisation Programme managed by Enterprise Singapore, the government agency that supports the development of companies, especially in the field of innovation and internationalization. Along with ISO 22000, there is a large diffusion of the global BRC packaging standard, which ensures that the materials used are safe for consumers. Following the growth of private labels in the food distribution sector, the British Retail Consortium (BRC) has developed a set of standards for the application of good practice in the production, packaging, distribution and sale of food and beverages. This is an internationally recognised standard within the Global Food Safety Initiative (GFSI). The purpose of the BRC standard is to provide a common basis for the assessment of companies supplying packaging to food and non-food companies. The Singapore Food and Veterinary Authority (AVA) has a very active approach to safeguarding public health by establishing and applying food safety standards for all food imported from the retail production point in a continuous monitoring exercise, monitoring and implementation

of programmes. More, government is working on a constant education to food managers and consumers on proper handling and accurate cooking of food, to prevent the risk of food-borne diseases (AVA, 2018).

1. Materials and methods

In this paper we make a review of official governmental reports and database in order to analyse the main causes that have seen an increase in cases of food contamination and food poisoning in Singapore. The paper concludes with an analysis of the future food scenario, in order to introduce sustainable solutions, according to a different and continuous evolution of the population and its needs at the global level.

2. Results and discussion

Since 2009, in Singapore 2.056 food warnings have been reported. In particular:

Table 1. Source: authors from data AVA

Year	N. of food warnings
2009	136
2010	96
2011	179
2012	80
2013	125
2014	73
2015	101
2016	111
2017	115
2018	164
2019 (Sept.)	97

To these features, some cases of suspension of the license for the operators must be added, resulting in a number of 113 suspensions, of which: 3 in 2017, 36 in 2018 and 74 in 2019 (Singapore Trade Statistics, 2019). In the last two

years, food alerts and revoked licences have risen sharply compared to previous years. It is natural to wonder how it is possible that, despite the various technologies specialized in the control of food products, and especially in the control of imports into the country, there is still a high number of cases of poor food hygiene and/or bacterial contamination in food businesses in the city (Singapore Food Agency, 2018).

Generally, when a case of bacterial contamination is detected, the Ministry of Health investigates the causes and suspend the licenses of the operators involved. In fact, all food operators working in the suspended premises are required to take the basic food hygiene course again before they can resume working in contact with food. The official person/s responsible of the suspended activity shall also be required to attend and pass the course of food hygiene officer again, before returning to work and to solve non conformities emerged during the inspection of the authorities.

The most recent case of food infection was between July and August 2019. The infection was caused by *Salmonella typhi* bacteria which is transmitted through the consumption of food or water contaminated by the faeces and urine of patients or carriers. On the possible motivations of the continuous spread of such infections, the Ministry of Health specifies two possible scenarios: the first hypothesis, which concerns the possibility that the cases are local, converges on the fact that restaurants are therefore working in a way that is not in line with or does not follow the hygienic standards necessary to carry out this activity. The second hypothesis is posed, instead, in the case of imports from abroad, and that could therefore mean that the Singaporeans ignore the risks they can run when travelling, and that must be instructed (Singapore Food Agency, 2018).

From October to December 2018, 79 cases of food poisoning were reported (AVA, 2019). In some cases, these were outbreaks of *salmonellosis* of unusual severity from highly contaminated food, due to poor personal hygiene and food handling practices which have led to contamination of the ready-to-eat food and the environment itself. It was also confirmed that the operator of a commercial establishment had unregistered food managers and prepared food outside the authorised premises. In other cases, a number of possible pathogens commonly found in human faeces samples including *Clostridium perfringens* and enteropathogenic *Escherichia coli* have been reported, with also high probability of poor hygiene and bad habits in the kitchen, including improper storage of knives and bad household chores. In others, on the other hand, a lack of food professionalism has been identified, with a lack of adequate segregation between raw food and ready-to-eat food

in the same compartment as the chiller, as well as a lack of hand washing facilities and adequate precautions to avoid insect infestation.

The Minister confirmed that the National Environmental Agency (NEA) had taken severe action against food business operators who had infringed the law. With a view to improving food safety, the Singapore Food Agency (SFA) has set itself the objective of pursuing three major strategies, called continuing to import most of the food needed, but trying to diversify “import sources”, growing more locally (“grow Local”) and at the same time focus on the growth of aquaculture (“grow Overseas”). The SFA intends also to work closely with all interested parties on the farm at the table, from Farm-To-Fork network, thanks to which, according to some estimates, local production will reduce Singapore’s dependence on imports and mitigate the impact of supply disruptions abroad. The Singapore Food Agency has set itself the objective of achieving “30 by 30, that is to be able to produce locally 30% of the nutritional needs of Singapore by 2030. In particular, the “grow Local” strategy focuses on supporting farms on Singaporean soil, especially family farms, to innovate and increase productivity. However, this is an ambitious increase over current production of around 7% (Government of Singapore, 2019). In order to achieve this objective, it is necessary for the whole agri-food industry to adopt new solutions that can increase productivity, setting up new schemes and models that can be applied to research and development.

In such a case, an analysis is needed that highlights the many strengths of the city-state, together with those of weakness, that highlights the opportunities that a country like Singapore can seize, going to counter the possible threats. Table 2 shows SWOT analysis (Strengths – Weaknesses – Opportunities – Threats) of Singapore.

Close cooperation between the government and the private sector is therefore essential to ensure that food resources meet safety standards, and at the same time encourage the work of local production. Such collaboration is found above all in the maintenance of the low operating costs in a position to being able, as an example, that the street vendors have the possibility to manage own activities in feasible way. There are more and more people, especially young people, who do not want to enter the trade, as Singapore registers very high rents and operating costs, not facilitating the market. What public-private cooperation policies can work on, for example, is thinking of acting directly on purchases to reduce costs, such as buying bulk essential ingredients such as salt, sugar, oil and sauces, thus encouraging new business figures to start and/or continue the agri-food trade.

Table 2. Source: authors

<p>STRENGTHS</p> <ul style="list-style-type: none"> - Rich economy - High level of GDP per capita - Increased consumption capacity - Easy to open an activity - Ideal environment for international companies - Good corporate environment - Encouraging diversity and culture - Open economy, strong governance for economic and financial centre in Asia - Main tourist destination in Asia - Popular for business travel 	<p>WEAKNESSES</p> <ul style="list-style-type: none"> - Small nation – lack of physical space - Limited resources –lack of raw materials - High government involvement - Highly fragmented market due to language segmentation - Limited natural environment
<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> - Emerging markets and expansion abroad - Innovation and technology to maximise food - Education of young people on prudent food consumption practices 	<p>THREATS</p> <ul style="list-style-type: none"> - Other Asian markets are growing - Supply chain not complete - Increase in sea level - Overcrowding

3. Conclusions and future perspectives

For Singapore, among the possible scenarios more sustainable and compatible with the trend of population and resources, there is the feeling of moving more and more towards urban agriculture. Singapore is one of the most developed metropolises from the point of view of construction, and perhaps for this reason, was born here the first vertical farm “low carbon with hydraulic transmission”. It is called “Sky greens Farm” and is 5 to 10 times larger than traditional farms. This farm apply environmentally friendly urban solutions for the production of safe and fresh vegetables, using minimum land resources, as water and energy. The products grown in a controlled environment are collected daily to be immediately available to consumers (Centre for Liveable City, 2018). In the future, a more integrated system at urban level will combine the role of vertical farms together with forest urban ecosystem (Urban solutions, 2019). Synergies at urban level will include also the water cycle, in a water-wise cities inspired by circularity (Borsacchi et.al,

2019). Main pillars are the definition of a shared vision among stakeholders and policy makers, the strong commitments of city governors, the increase of knowledge, capacities and awareness among citizens.

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