

Food security across the enterprise: a puzzle, problem or mess for a circular economy?

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2

Abstract

Purpose – The purpose of this paper is to explore the use, applicability and relevance of strategic planning as a process and tool when applied to exploring food security challenges, in the context of existing research on food security and food waste in the food supply chain. The issues associated with robust and resilient food supply chains within a circular economy are increasingly being seen as supportive of creating enhanced levels of food security but the authors argue that this is only sustainable when strategically planned as part of a cross-enterprise, information-rich and complex supply chain. The relevance of the Political, Economic, Social, Technological, Legal and Environmental (PESTLE) strategic planning tool is explored to establish whether it can play a role tackling the complexity of food insecurity (i.e. a lack of food security).

Design/methodology/approach – This is a viewpoint piece therefore as a result, thought, normative literature and supposition are used as a means to ground and orientate the views of the authors.

Findings – The authors identify and conclude that strategic planning tools like PESTLE across enterprises may not be relevant in supporting the reduction of food insecurity. This conclusion is predicated on the heightened level of complexity surrounding the pursuit of food security and the simplistic categorisation of PESTLE factors in a linear fashion that underpin this tool. Rather, the authors' call for the use of strategic planning tools that are able to capture a large number of inter-related factors holistically.

Practical implications – This insight to the inter-related factors that contribute to food insecurity will allow policy developers, decision makers and others to develop their understanding of how strategic planning can support increased levels of food security within a circular economy and across cross-enterprises.

Originality/value – The authors contribute to the literature through a new insight of how normative strategic planning tools need to evolve in a complex, inter-connected world of international business and geo-politics. In doing so, it is expected that this research will motivate others to develop their line of enquiry around uncovering and exploring those inter-relationships connecting PESTLE factors.

Keywords Food security, Circular economy, Food supply chain, Strategic planning, Food waste

Paper type Viewpoint

Introduction

Interventions to provide food security are many, ranging from strategically leasing arable land overseas through to innovative approaches that seek increased levels of produce yield as described by Sinclair *et al.* 2004. The challenges and responses are not uniform and indeed are in many respects polarised, with those in resource-poor countries and some developing nations facing a lack of access to food and/or severe food shortages, right the way through to those in the West suffering increasingly higher levels of obesity (due to excessive over-consumption). The latter clearly represents an oversupply of food manifesting in overindulgence whereas the former is a product of food scarcity resulting ever too often in malnutrition or even starvation. The challenges around the safe and secure access to food as well as its production, supply and recovery are intimately connected with information, resources and policy and national/paranational political strategies (Irani and Sharif, 2016; Sharif and Irani, 2017); the effect of the macro- and meso-economic landscapes



in terms of stability and access to funding; social attitudes to food, nutrition, well-being and food waste (Sharif, 2015); technological innovations in agriculture; legal jurisdiction constraints (including tariffs); and food supply and sustainability within the broader climate change and environmental context. Yet, amongst such complexity, citizens at organisations and even at a national level are left wondering how to navigate through this domain, its complicated interdependencies and ultimate choices. Whilst there are at an organisation(al) or even country level a plethora of strategic planning, such as those evaluated by Webster *et al.* (1989), the question around relevance of application to the idiosyncrasies of securing regional, national and international food security remains a pertinent one that this paper will seek to explore.

Lately, it has been suggested that to frame, understand and even take advantage of the opportunities presented within food supply chains, elements of agri-science, agri-business, agri-technology, agri-entrepreneurship and agri-transformation may also be useful (Sharif and Irani, 2015). Taking these elements as a reference point also and building upon the four interlinking environmental and economic functions as part of the so-called circular economy (Pearce and Turner, 1990), the authors suggest that the wider environment within which food security sits not only provides utility value but also offers itself as a resource and landscape for economic activity whilst being fundamental to sustain life. The underlying premise is that the environment should be seen and used less as a “sink” within which to dispose of used resources, whilst also being carefully managed in order to minimise the use of natural resources for economic value.

Andersen (2007) explains that a circular economy essentially has core elements of (ethical) environmental re-use and recycling of material resources but where at some stage there will be a cut-off point where recycling will become too difficult and burdensome [...]. A circular economy cannot promote recycling in perpetuity (therefore identifying a third characteristic behaviour which is to reduce consumption in the first place).

Noting the above, this paper proposes that there is a real need to understand how the challenges of food security can be met across the enterprise, within a model of a circular economy via taking a perspective on the numerous inter-relationships that inherently exist within each notion. Furthermore, the authors suggest that there is also a pressing need for considered action whether based upon systemic (policy and market) factors or through (individual) behavioural intentions. Given that there also remains to be an uneven balance between resource generation across the West and the East (leading to Malthusian effects of resource loss at the expense of economic growth), there is a natural tendency to consider the food security challenge as a depleting resource situation – the so-called tragedy of the commons problem. However, it has been argued that such problems cannot necessarily be equated to rivalry and excludability – but owe themselves much more to evolutionary biology – and are thus organic and behavioural in nature (Dionisio and Gordo, 2006). Food security requires a consistent and accurate flow of information in a synchronous manner across a complex internal and external supply chain. Therefore, when considering such issues multiple stakeholder agenda(s) need to be included in search of a way forward to sustain the economic access to food and (its) physical availability in a stable manner whilst ensuring the ethical utilisation of food produce. In doing so and noting previous perspectives on the enterprise information (Irani and Sharif, 2016) as well as systemic (Sharif and Irani, 2016) inter-relationships between food security factors, the authors extend these approaches to considering the Political, Economic, Social, Technological, Legal and Environmental (PESTLE) factors.

Edging towards food security means pushing against food waste

Food security is a vast topic that includes and impinges upon and incorporates a range of operating environments, in terms of food supply, services, demand, regulation, health and

information aspects, subsequently recognising that food security is when people have physical, social or economic access to food at all times (FAO, 1996). It is also well recognised that diverse domains such as science and technology, social organisations, policy makers, global macroeconomic markets and the wider biophysical environment impact upon the challenges posed by achieving food security (Nesheim *et al.*, 2015). As such, food security encompasses notions of access (affordability, allocation and preferences); availability (production, distribution and exchange); and utilisation (nutritional value, social value, food safety).

Considering these elements, it can be seen that globalisation has contributed to an ever more sophisticated food supply chain, where food is often grown and transported thousands of miles well before it reaches the final consumer. Typically, the food system or supply chain components can be seen as being broken down into five key elements:

- (1) food production – agriculture through to processing and packaging;
- (2) distribution – storage through to logistics and transportation;
- (3) commerce – economics of food dependent on harvest and demand;
- (4) consumption – availability, use and preservation; and
- (5) disposal – composing, nutritional loss and recycling.

These phases can themselves be sub-divided and are increasingly seen as inter-related, meaning that challenges in one often have a knock-on-effect in others, whilst also producing their own levels of waste or run-off. Consequentially, unit cost is often dependent on seamless efficient and effective processes from farm to fork; otherwise, the consumer may experience changes in cost that have consequential impacts on levels of demand.

A growing hidden contributor to the lack of food security is the illegal growing, harvesting or catching of agriculture, livestock or fisheries. Indeed Anonymous (2016) claims that each year £6.6 billion is made from illicitly traded fish around the world. Indeed, according to EJF (2015, p. 29), illegal fishing in the Asia-Pacific region killed between 3.8 and 8.1 million tonnes of fish. Yet, for such illegal activity to thrive, there needs to be demand, with Pramod *et al.* (2014) explaining that Thailand is a major supplier to the USA, with estimates suggesting that up to 39 per cent of all wild-caught seafood exported to the USA from Thailand was caught illegally.

Concerns around food security are not restricted to developing countries alone; rather, issues around a lack of government policy addressing the preparation of food products, processing, storage, transportation, consumption and disposal are a serious matter regardless of national economic prosperity, political persuasion and/or economic power (Irani and Sharif, 2016). Oxfam Food Index (2014), through their food index, created a means through empirical research to better understand the challenges that people face when sourcing enough of the right food to consume. The Oxfam food index indicates the different challenges that people face when it comes to food consumption. Juxtaposition lies globalisation and complex supply chains that are driven by cost reduction and motivated by greater levels of market share. Yet, notwithstanding such pursuit of streamlined short food supply chains (Renting *et al.*, 2003) that seek to satisfy a growing demand for food delivery, there maintains to be a mountains of waste driven by inefficiencies within the food supply chain (Parfitt *et al.*, 2010) which represents lost nutrition to the consumer.

Food waste, which aligns itself with the utilisation of food aspect identified above, indirectly contributes towards food security and tends to be considered at the consumption stage of the supply chain, yet where there is still inherent “value” in the product and means by which food is provided. Hence while production, supply and access to food is relatively confined to discrete parts of the food supply chain, waste occurs both upstream and downstream in the chain and not only when typically production exceeds supply. It remains

challenging to quantify global levels of food waste, as much remains hidden or not fully disclosed throughout a complex, often global, food supply chain. However, Lundqvist *et al.* (2008) present an interesting typology of food losses and wastage that stretches from field to fork. Yet, visible levels of food waste remain hard to quantify, with concerns stemming from the ethics of waste at one level through to the imbalance of provision that results in malnutrition at another. A commonly quoted estimate of food waste comes from Lundqvist *et al.* (2008, p. 36), who say “A hidden problem behind the food crisis is that as much as half of all food grown is lost or wasted before and after it reaches the consumer”.

Behind such levels of waste lies inherent complexity. Pidd (2004) offers an interesting lens through which to frame rationality and a bounded approach to understanding “real-world” problem. Here, Pidd (2004) argues from a position of not becoming lost in classifying the type of issue where understanding is being drawn. As such, Pidd (2004) notes the real challenges of diverging from situations that defy what Ackoff (1979) describes as situational logic and which can be classified into “puzzles” (applying a known method using established tools and techniques, e.g. annual budgeting processes), “problems” (well-structured situations where the solution approach is non-obvious and non-intuitive, e.g. optimal production planning and control) and “messes” (where the situation is unstructured and there is a high degree of vagueness and variation and it is difficult to define what the key elements to be tackled might be, e.g. geopolitically driven trade negotiations). Here, the authors of this paper proffer that the challenges of food security are fast moving from being problem bound to a mess that is thus not solvable because it is highly unstructured and know where to start questions whether other areas have been neglected.

The broad subject disciplines contributing towards creating heightened levels of food security appear to be solving academic and practical challenges rather than framing the issues around whether they are tackling a puzzle or a problem or a mess. It would be heartening to be able to consider food security challenges as simply being restricted to the application of tools and techniques (i.e. a puzzle); however, this would be viewing the challenge too simplistically. It is also unlikely that we could frame food security solely as a situation where intuitive or creative approaches have not already been attempted (i.e. a problem). Again, an observation here is that even if each separate aspect of food security were to be (successfully) tackled, the critical interconnectedness of all its aspects means that it is unlikely that the overall challenge could be addressed, which therefore leaves us with the realisation that we may need to frame food security as a “mess” of highly inter-related issues and sub-issues, where no single element is either positively or negatively significant – but where, as a collective, all aspects are networked and co-dependent.

Strategic planning: function and tools

The strategic planning process is now part and parcel of most leadership and management function(s), requiring organisational leadership with the support of the management team to efficiently deliver the organisational strategy through effective plans. However, when considered more holistically, from an inter-organisational and/or local or central government perspective (e.g. town planners that need to plan infrastructure), the picture of the planning function (and tools that enable it to happen) within the context of the food system is somewhat different. Pothukuchi and Kaufman (2000) explain that although planning texts have provided widespread commentary on developments and application (of planning) over the years, in areas such as technology, housing and transport, there is a void when it comes to food planning. Pothukuchi and Kaufman (2000) then go onto identify reasons for this limited attention and explain how planner can strengthen the food system. It is within this context where the authors of this paper seek to make a contribution, specifically, in better understanding those tools and strategies that are relevant (and not) to supporting the creation of a food secure community.

Whilst planning strategically for food security is a well-developed approach utilised by national and parastatal organisations, such as UNHCR (2014), food security is a stranger to the planning process (Pothukuchi and Kaufman, 2000). Furthermore, strategic planning interventions and implementations have been poorly researched wherein the effectiveness of strategic planning is relatively unknown outside, apart from tools such as the strategic planning index developed by Phillips and Moutinho (2000).

As Bryson (2011) and indeed Mintzberg and Quinn (1996) note, the strategic planning process allows for a natural progression and pathway between the strategic mission and vision of an organisation and its intended implementation of strategy as part of an overall strategy formulation process. Normally, the strategic planning process includes aspects of mission/vision development, identification of strategic issues, action plan agendas, adoption and responsibilities and implantation of actions. There are a number of tools that support and feed into this process that ultimately allow managers and decision makers to act and address problems and challenges. However, as Kaplan and Jarzabkowski (2006) note, the literature shows that these very same people tend to over-apply strategic tools beyond the means necessary – such as environmental scanning tools including SWOT (Strengths, Weaknesses, Opportunities, Threats) and PESTLE. These tools can contribute to rationalising and understanding the key drivers which underpin strategic choice but which lie at the heart of addressing challenges posed by implementing strategy to address complex and real-world challenges; hence, there is a need to not only put “strategy into practice” as described by Whittington (1996), but to recognise the efficacy of strategic planning tools as methods for exploring and understanding contextually complex situations.

PESTLE: a strategic planning tool

Identifying the diverse drivers that contribute to food insecurity (i.e. the lack of food security) and resulting options to populate strategic frameworks or tools to address food security is a significant management challenge, not least due to the underlying complexity but also given the diverse stakeholder groups wanting to play a role in contributing to tackling this global challenge. In trying to approach this multifaceted “mess”, the authors have sought to adopt a commonly used and widely understood strategic planning tool that will allow this challenging area to be analysed through a multiple of perspectives. In this regard, the underpinning of this enquiry starts with the evaluation of the normative work by Aguilar (1967) that later resulted in what is now known as the PESTLE strategic analysis tool.

Designed as a means through which the business environment can be holistically scanned, the PEST, or as it later became PESTLE, analysis offers an environment within which the external macro-landscape where most businesses operate can be explored. These factors are usually beyond the influence of any single business but represent critical consideration that organisations should be aware when seeking to establish their position, potential and direction of travel. The term PESTLE has been used regularly over the last few decades by large and small organisations alike, and represents a normative tool used by universities during their teaching of strategic planning during MBA and other postgraduate courses. While it could be argued that other additions to the PESTLE domain could be added, such as Transparency, Sustainability or even Ethical, PESTLE has stood the test of time and remains normative in commercial and academic use and instruction. A PESTLE analysis essentially represents the ability of an organisation to explore the environmental influences that impact its operations, resulting in intelligence that provides information to support management decision making. The assumption is that if the organisation is able to audit its current environment and assess potential changes, it will be better placed than its competitors to respond to changes. It is using this rationale that motivates the authors to use a PESTLE approach in attempting to survey the food insecurity landscape, thus, acting as a roadmap to culminate pertinent factors within a PESTLE domain.

Strategic planning tools such as PESTLE appear to be worthwhile candidates for considering and integrating a range of diverse/competing perspectives. However, a challenge in trying to apply structured strategic planning tools, such as PESTLE, is that they do not work in isolation. The reason for this is that the domain of food security is characterised by its unstructured nature and a lack of viable and appropriate solutions to offer advances in tacking the myriad of conflicting interactions.

PESTLE involves an identification, categorisation and placement of strategic factors within a canonical structure. Food security has many cross-cutting features that are not easily placed within single domains of the PESTLE structure. Traditional strategic planning tools are more suited for problems and even puzzles (as described) as these are defined by the clarity of their structure. However, given that food security is highly unstructured and ill defined, PESTLE is less suitable when it comes to exploring the inter-relationships of the mess of what is the food security challenge. Alternative and pluralistic approaches to modelling and understanding need to be used to provide a broader narrative to this challenge context for example via morphological analysis to structure the range of topical elements (Sharif and Irani, 2006a); logical inference to identify linkages between empirical data and theory using qualitative comparative analysis as developed by Ragin (1987); social ecology to deal with socio-economic drivers (Bookchin, 2005); the theory of reasoned action to explain human attitudes and behaviours (Fishbein and Ajzen, 1975) in relation to food security; and causal, cognitive and fuzzy cognitive mapping (Sharif and Irani, 2006b) to model and relate inter-related causal factors dynamically.

Conclusions

The authors of this paper have sought to shed light on how relevant traditional and well-used strategic planning tools are in today's global society. In doing so, gaps have been uncovered when evaluating the relevance of tools like PESTLE, thus calling for the development and use of tools that can accommodate the complex inter-relationships that contribute towards food security. This paper has used the objective opinion and the literature to offer the following conclusions:

- (1) strategic planning (PESTLE) is too blunt a tool to robustly evaluate food security because it lacks the ability to accommodate inter-relationships; and
- (2) food security can be a problem, puzzle and a mess but in its entirety is a mess:
 - elements of food security can be optimised for maximum efficiency and effectiveness whilst other aspects remain extremely complex due to their intractable impact on human and social aspects often with a political under current.

The authors of this paper therefore proffer that the challenges of food security are fast moving from being problem bound to mess bound. As a result, approaches to "solving" or "addressing" the underlying problems and solutions need to be different.

PESTLE remains a powerful and appropriate tool for strategic planning where there is a high degree of structure and inter-dependency. However, food security is highly unstructured where there is a high degree of dependency amongst variables. Therefore, there needs to be a new generation of strategic planning tools that cannot only continue to provide a means to structure the unstructured aspects of food availability, utilisation and access, but also which can accommodate and represent complex inter-relationships. The authors also highlight the importance of considering multiple actor-agencies when collating "facts", which can be partially addressed through a variety of techniques as identified.

References

- Ackoff, R.L. (1979), "Resurrecting the future of operational research", *Journal of Operational Research Society*, Vol. 30 No. 3, pp. 189-199.
- Aguilar, F.J. (1967), *Scanning the Business Environment*, Macmillan, New York, NY.
- Andersen, M.S. (2007), "An introductory note on the environmental economics of the circular economy", *Sustainability Science*, Vol. 2 No. 1, pp. 133-140.
- Anonymous (2016), 9 March, available at: www.lovemoney.com/galleries/51177/how-much-crimes-really-pay (accessed 30 December 2017).
- Bookchin, M. (2005), *The Ecology of Freedom*, AK Press, Stirling.
- Bryson, J.M. (2011), *Strategic Planning for Public and Nonprofit Organizations: A Guide to Strengthening and Sustaining Organizational Achievement*, 4th ed., John Wiley and Sons.
- Dionisio, F. and Gordo, I. (2006), "The tragedy of the commons, the public goods dilemma, and the meaning of rivalry and excludability in evolutionary biology", *Evolutionary Ecology Research*, Vol. 8, pp. 321-332.
- EJF (2015), *Pirates and Slaves: How Overfishing in Thailand Fuels Human Trafficking and the Plundering of Our Oceans*, ISBN 978-1-904523-36-9, Environmental Justice Foundation, London.
- FAO (1996), "Food and international trade", Report WFS 96/TECH/8, Food and Agriculture Organisation of the United Nations, Rome.
- Fishbein, M.A. and Ajzen, I. (1975), *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*, Addison Wesley, Reading, MA.
- Irani, Z. and Sharif, A.M. (2016), "Sustainable food security futures: perspectives on food waste and information across the food supply chain", *Journal of Enterprise Information Management*, Vol. 29 No. 2, pp. 171-178.
- Kaplan, S. and Jarzabkowski, P. (2006), "Using strategy tools in practice – how tools mediate strategizing and organizing", AIM Research Working Paper Series No. 47, Advanced Institute of Management Research, August.
- Lundqvist, J., de Fraiture, C. and Molden, D. (2008), "Saving water: from field to fork – curbing losses and wastage in the food chain", SIWI Policy Brief, Stockholm.
- Mintzberg, H. and Quinn, J.B. (1996), *The Strategy Process: Concepts, Contexts, Cases*, Prentice Hall.
- Nesheim, M.C., Oria, M. and Yih, P.T. (2015), *A Framework for Assessing Effects of the Food System*, Institute of Medicine and National Research Council, Washington, DC.
- Oxfam Food Index (2014), available at: www.oxfam.org.uk/what-we-do/good-enough-to-eat (accessed 30 December 2017).
- Pearce, D. and Turner, R.K. (1990), *Economics of Natural Resources and the Environment*, Harvester Wheatsheaf, London.
- Parfitt, J., Barthel, M. and Macnaughton, S. (2010), "Food waste within food supply chains: quantification and potential for change to 2050. Philosophical transactions of the royal society of London B", *Biological Sciences*, Vol. 365 No. 1554, pp. 3065-3081.
- Phillips, P.A. and Moutinho, L. (2000), "The strategic planning index: a tool for measuring strategic planning effectiveness", *Journal of Travel Research*, Vol. 38 No. 4, pp. 369-379.
- Pidd, M. (2004), *Systems Modelling: Theory and Practice*, John Wiley, Chichester.
- Pothukuchi, K. and Kaufman, J.K. (2000), "The food system", *Journal of the American Planning Association*, Vol. 66 No. 2, pp. 113-124.
- Pramod, G., Nakamura, K., Pitcher, T.J. and Delagran, L. (2014), "Estimates of illegal and unreported fish in seafood imports to the USA", *Marine Policy*, Vol. 48 No. 9, pp. 102-113.
- Ragin, C.C. (1987), *The Comparative Method: Moving Beyond Qualitative and Quantitative Strategies*, University of California Press, Los Angeles, CA.

-
- Renting, H., Marsden, T.K. and Banks, J. (2003), "Understanding alternative food networks: exploring the role of short food supply chains in rural development", *Environment and Planning A*, Vol. 35 No. 3, pp. 393-411.
- Sharif, A.M. (2015), "Food as resource, not food as waste: taking a holistic view of the UK food supply chain", Next steps for UK food waste policy waste reduction, innovation and anaerobic digestion, Westminster Food and Nutrition Forum, 10 September, available at: www.westminsterforumprojects.co.uk/forums/showpublications.php?pid=985 (accessed 23 September 2015).
- Sharif, A.M. and Irani, Z. (2006a), "Applying a Fuzzy-Morphological approach to complexity within management decision-making", *Management Decision*, Vol. 44 No. 7, pp. 930-961.
- Sharif, A.M. and Irani, Z. (2006b), "Exploring fuzzy cognitive mapping for IS evaluation", *European Journal of Operational Research*, Vol. 173 No. 3, pp. 1175-1187.
- Sharif, A.M. and Irani, Z. (2015), "Making sense of food security: a five pillar framework", Meeting the challenges of food security: innovation, sustainability and international collaboration, Westminster Food and Nutrition Forum, 14 July, pp. 64-65, available at: www.westminsterforumprojects.co.uk/forums/showpublications.php?pid=945 (accessed 27 July 2015).
- Sharif, A.M. and Irani, Z. (2016), "People, process and policy perspectives on food security: an exploration using systems archetypes", *Transforming Government: People, Process and Policy*, Vol. 10 No. 1, pp. 3-10.
- Sharif, A.M. and Irani, Z. (2017), "Food security in the UK: a post-Brexit view", *European Financial Review*, February-March, pp. 37-39, available at: www.europeanfinancialreview.com/?p=14084 (accessed 14 March 2017).
- Sinclair, T.R., Purcell, L.C. and Sneller, C.H. (2004), "Crop transformation and the challenge to increase yield potential", *Trends in Plant Science*, Vol. 9 No. 2, pp. 70-75.
- UNHCR (2014), *Global Strategy for Public Health – HIV and Reproductive Health – Food Security and Nutrition Water, Sanitation and Hygiene (WASH)*, United Nations High Commission for Refugees (UNHCR).
- Webster, J.L., Reif, W.E. and Bracker, J.S. (1989), "The manager's guide to strategic planning tools and techniques", *Planning Review*, Vol. 17 No. 6, pp. 4-48.
- Whittington, R. (1996), "Strategy as practice", *Long Range Planning*, Vol. 29 No. 5, pp. 731-735.

Further reading

- CIPD (2015), *PESTLE Analysis History and Application*, CIPD (accessed 4 March 2016).
- IFAD (2013), *The Food Security Learning Framework*, IFAD, July, available at: www.ifad.org/documents/10180/b3a8f0f2-5c3f-42e5-8153-5457f352ac90
- Mintzberg, H. (2000), *The Rise and Fall of Strategic Planning*, Pearson Education.

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