# A Proposed Hypothetical Framework for Investigating Antecedents of Consumer Purchase Intentions towards Traditional Foods

Arnold Moyo, Felix Amoah, and Marlé van Eyk

Abstract - The aim of this paper is to propose a hypothetical framework for identifying and assessing antecedents of consumer purchase intentions towards traditional foods. Literature on theories that have been applied to food choice studies is reviewed, followed by an integration of selected theories into a proposed hypothetical framework for investigating antecedents of consumer purchase intentions towards traditional foods. The resulting hypothetical framework identifies ten variables, acting as antecedents that influence purchase intentions towards traditional foods, which have been grouped into personal factors, external factors and food properties. The proposed hypothetical framework is useful for designing future empirical studies that seek to identify and assess antecedents of consumer purchase intentions towards traditional foods. The hypothetical framework is therefore a first step towards developing a validated model for explaining and predicting purchase intentions towards traditional foods, for the benefit of marketing scholarship and industry practice alike.

*Key words* – Antecedents, Consumer behaviour, Purchase intentions, Traditional food

#### I. INTRODUCTION

Research has established that traditional foods provide consumers with food and nutritional security [1], [2], improve the security of incomes and livelihoods for producers of traditional foods [3], have minimal adverse effects on the environment [4], and support sustainable food systems [4]. In spite of these benefits, the proportion of traditional foods consumed around the world has been declining when compared to cash crops such as maize, rice and wheat [4], [5].

An understanding of antecedents affecting consumer purchase behaviour towards traditional foods, through purchase intentions, is essential for developing marketing strategies designed to modify consumer behaviour [6] by stimulating consumer demand for traditional foods [7], [8], [9], [10], [11]. However, current literature does not offer any model that identifies and explains antecedents of consumer purchase intentions with specific reference to traditional foods.

Arnold Moyo is with the Department of Marketing Management, Nelson Mandela University, Gqeberha, South Africa.

Felix Amoah is with the Department of Marketing Management, Nelson Mandela University, Gqeberha, South Africa.

Marlé van Eyk is with the Department of Marketing Management, Nelson Mandela University, Gqeberha, South Africa.

While there is an abundance of research on consumer purchase behaviour models applied to organic food [12], [13], [14] sustainable food [15], local food [16], [17], functional food [18], [19], [20] etc., consumer research applied to traditional foods is generally limited and there is yet to be research on a comprehensive framework of antecedents affecting consumer purchase intentions towards traditional foods.

The aim of this paper is to propose, from literature, a hypothetical framework for identifying and assessing the antecedents of consumer purchase intentions towards traditional foods, through the integration of validated food choice models. The paper is structured as follows. First, literature on traditional foods and consumer behaviour models applicable to food choice are reviewed in the following section. Thereafter, a hypothetical framework is proposed based on the discussed literature. The paper ends with a discussion of the practical implications of the proposed hypothetical framework and conclusion of the study.

#### II. LITERATURE REVIEW

This section begins by clarifying the concept of traditional food by considering definitions from different sources. This is followed by a discussion of selected models explaining consumer preference and choice with specific reference to food.

#### A. Traditional Foods

Traditional food products (TFP) are defined as products that are connected to a specific geographic location, have been consumed over long periods covering several generations and are linked to specific gastronomic traditions and heritage [21]. TFPs are often prepared in a way that minimises processing so as to preserve their sensory attributes [21].

The above definition by [21] corroborates earlier definitions by, for example, [22], [23] and [24]. The main dimensions of TFP highlighted by the above authors are: (i) a connection to a particular location, (ii) a connection to culture and (iii) consumption over a long time.

## B. Consumer Behaviour Theories Relating To Consumer Purchase Intentions

While there are numerous consumer decision models, they tend to have overlapping constructs and this presents difficulties when selecting an appropriate model [25]. Consequently, researchers have tended to rely on generic and popular consumer decision theories such as the Nicosia model (1976) and the EMB model (1985) [26]. While there is comfort in this approach, the selection of theories ought to be informed by, and aligned to the targeted behaviour and population [25].

Whenever the context relates to food choice, it is always more beneficial to consider a model that is specific to food choice, over one that is generic [20]. On this, the Food Preference Model [27], the Consumer Behaviour Model with respect to food [28], and the Theory of Planned Behaviour [29] have been selected for review.

### 1) Food Preference Model

The Food Preference Model is one of the earliest models to comprehensively incorporate a wide range of factors that affect food choice [27]. These factors are grouped into three dimensions, namely food characteristics, environment characteristics and individual characteristics [26]. The factors in each dimension are shown in Fig. 1 below.

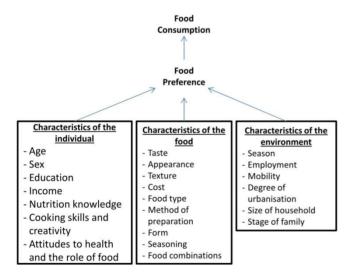


Fig. 1. The Food Preference Model [27]

In the Food Preference Model [27], food consumption is directly affected by food preference, which in turn is affected by individual characteristics, food properties and environmental characteristics [26]. Characteristics of the individual mostly comprise age, nutrition knowledge, income, education, sex and age. Attitude is also included under this category. Food characteristics include several food attributes such as food combinations, form, food type, cost, texture, seasoning, appearance, taste and method of preparation. Environmental characteristics include household size and stage of family, employment, degree of urbanisation, mobility and season [27].

#### 2) Consumer Behaviour Model with respect to food

The Consumer Behaviour Model with respect to food [28]. shown in Fig. 2 below, has the same categories of food choice factors as in the Food Preference Model [27] by [27]. However, [28] makes an improvement by introducing a fourstep decision-making process that explains how consumers make their food choice. The Consumer Behaviour Model with respect to food has eight factors grouped into three broad categories, namely: food properties made up of sensory perception and physiological effects; personal incorporating biological, psychological and sociodemographic variables; and environmental factors, incorporating economic factors of price and income as well as cultural and marketing factors [28].

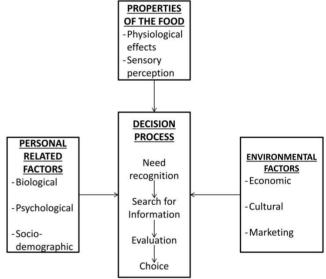


Fig. 2. Consumer Behaviour Model with respect to food [28]

#### 3) The Theory of Planned Behaviour

The TPB is a generally accepted cognitive theory that has been widely applied to food consumption research [30], [31], [32], [33], [34], [35]. The TPB [29], shown in Figure 3 below observed consumer behaviour towards purchase to be influenced by attitude, subjective norms, and perceived behavioural control, through the mediatory effect of behavioural purchase intentions [35].

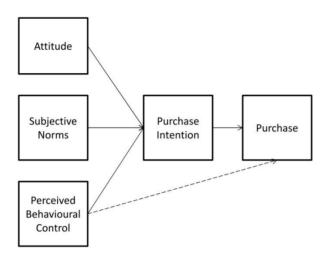


Fig. 3. Theory of Planned Behaviour [29]

#### III. PROPOSED HYPOTHETICAL FRAMEWORK

In spite of the general acceptability of the reviewed models and their wide application to food contexts, they each have significant limitations. The limitation of both the Food Preference Model [27] and the Consumer Behaviour Model with respect to food [28] is that they simply list factors affecting food choice without establishing, through the estimation of causal relationships, the extent to which the identified factors affect food choice. As a result, the two models remain largely descriptive in nature [26].

To address this challenge, researchers have utilised alternative models with capabilities of quantitatively demonstrating causal relationships that are useful for explaining and predicting food choice, with the Theory of Planned Behaviour (TPB) being a popular choice [26]. However, the limitation of the TPB, when compared to the Food Preference Model [27] and the Consumer Behaviour Model with respect to food [28], is that it captures a limited number of factors [36]. This limitation of a single theoretical adequately explaining predicting or sophisticated consumer behaviour involving multiple complex conscious and unconscious factors of behaviour is well established in literature [34], [37].

Having reviewed the Food Preference Model [27], Consumer Behaviour Model with respect to food [28], and the Theory of Planned Behaviour [29]; there emerges an apparent need for a comprehensive explanatory model that sufficiently accounts for the diversity of food-specific antecedents that affect consumer purchase intentions, in a manner that is measurable and useful in predicting consumer purchase intentions towards traditional foods. There is a general consensus among researchers that there is potential theoretic value in developing a comprehensive model by integrating various theories so as to complement their individual strengths while minimising their individual inadequacies [37],[38],[39].

Informed by the above consensus, the Food Preference Model [27], the Consumer Behaviour Model with respect to food [28], and the Theory of Planned Behaviour [29] have been integrated into a proposed hypothetical framework for

identifying and assessing antecedents affecting consumer purchase intentions towards traditional foods. The process of factor integration into a single hypothetical framework entailed making decisions about which factors to include and which ones to exclude. The inclusion/exclusion criteria were informed by [36] recommendations. The first recommendation by Ajzen was that if a variable is to be added to a framework, it should be feasible to imagine that proposed variable as a causal factor directly influencing action or intention [36].

It is on these grounds that the four-step decision making process in the Consumer Behaviour Model with respect to food [28] was excluded as it is not a causal factor of any intention or action. Rather it illustrates internal cognitive processes related to components of the TPB [37]. Cognition is already a fundamental assumption of food choice models, which ascribe observable behaviour to internal cognitive processes in which the consumer is seen as a rational information processor [38]. This logic also applies to the 'food preference' variable in the Food Preference Model, which involves the assessment and selection of alternatives [39].

Informed by this criterion of excluding factors that do not directly affect consumer purchase intention or action, all background factors were excluded from the hypothetical framework [36]. The 'socio-demographic' factor in the Consumer Decision Model with regards to food [28] was also excluded, together with most characteristics of the individual in the Food Preference Model [27], which include demographic factors such as age, sex, education, income, employment, size of family, cooking skills and stage of family. According to the TPB, background factors do not directly affect consumer intention as depicted in the Food Preference Model [27] and the Consumer Decision Model with regards to food [28]. Rather, they have an indirect effect on consumer purchase intentions, through the mediation of TPB components and their underlying salient beliefs [36]. Demographic factors are therefore excluded as they are not the most proximal factors affecting intentions or ultimate behaviour.

The 'psychological factor' in the Consumer Decision Model with regards to food [28] comprising 'values' and 'lifestyle' were excluded from the conceptual framework because they are accounted for in the TPB as part of the background/ predisposing factors [36]. Based on the preceding arguments, the proposed hypothetical framework is built on ten factors (acting as antecedents) grouped under three broad dimensions (external, food properties and personal factors).

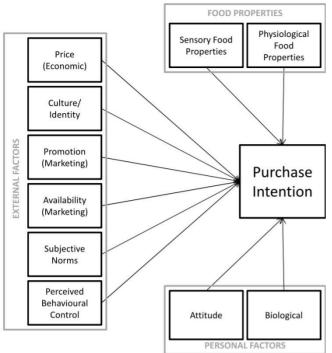


Fig. 4. A proposed hypothetical framework for investigating the antecedents that affect purchase intentions towards traditional foods (adapted from [29], [27],[28])

External factors comprise 'perceived behavioural control' and 'subjective norms', which were derived from the TPB. Additional external factors derived from the Consumer Behaviour Model with respect to food are: 'marketing', 'culture' and 'economic' factors. 'Marketing' has been disaggregated into its marketing mix elements of 'price', 'promotion', 'place' and 'product'). However, for purposes of theory integration, only price and 'promotion' were retained in the 'external factors' group because they were the only marketing mix elements that were distinct from other antecedents. These exclusions are in alignment with Ajzen's recommendation that additional variables should be conceptually independent of existing variables acting as antecedents to avoid a factor redundancy [29]. The 'culture' variable could be operationalised through the 'identity' construct [40] or any selected construct through which culture may find expression.

Personal factors comprise 'attitude' and 'biological' variables. Similarly, researchers will need to select an appropriate construct that can serve as a proxy for the 'biological' For example, a researcher may select 'perceived risk of non-communicable diseases' (NCD) [41] to operationalise the biological benefits from traditional foods. The variables under the food properties group are 'sensory' and 'physiological'.

The proposed hypothetical framework could be used by researchers for designing future empirical studies. Such studies could either adopt a quantitative or mixed methods design, depending on the philosophical perspectives and world-view embraced by a researcher [42].

Whichever way the proposed hypothetical framework is used in future research, it could serve as a comprehensive framework for explaining antecedents affecting consumer purchase intentions towards traditional foods in the chosen populations in which it is applied.

#### IV. PRACTICAL IMPLICATIONS

The consumption of traditional foods can either be promoted by supply-side oriented or demand-side oriented interventions. There is currently abundant supply-side research directed at improving the supply of traditional foods through: increasing agricultural yield, minimising pre-harvest and post-harvest losses, and improving the distribution of small grain foods along the supply chain [43], [44], [45], [46], [47], [48], [49].

Unlike supply-side oriented research, demand-side oriented research aimed at stimulating consumer demand for traditional foods is very sparse. Stimulating consumer demand is recommended by several authors [7], [8], [9], [10], [11] as a viable approach for enhancing the purchase of traditional foods. The proposed hypothetical framework, therefore, complements existing supply-side research by offering a demand-side approach to producing new information that could be instrumental in promoting the purchase and consumption of traditional foods.

#### V. CONCLUSION

The proposed hypothetical framework for investigating the antecedents of traditional food purchase intentions will significantly enrich existing food choice literature with specific reference to traditional foods. Additionally, the proposed hypothetical framework has utility in facilitating further research into factors affecting the formation of purchase intentions towards traditional foods. This will greatly complement existing efforts to promote the purchase and consumption of traditional foods, leading to the possibility of improved public health, reduced rural poverty, enhanced food and nutrition security and strengthening of rural livelihoods.

#### REFERENCES

- [1] P. Banerjee, and S. Maitra, "The role of small millets as functional food to combat malnutrition in developing countries," *Indian Journal of Natural Sciences*, vol 10, no 60, pp 20412–20417, 2020.
- [2] J. McCartan, E. Van Burgel, I. McArthur, S. Testa, E. Thurn, S. Funston, A. Kho, E. McMahon, and J. Brimblecombe, "Traditional food energy intake among indigenous populations in select high-income settler-colonized countries: A systematic literature review," *Current Developments in Nutrition*, vol 4, no 11 pp. 1–26, 2020.
  - https://doi.org/10.1093/cdn/nzaa163
- [3] K. Phiri, T. Dube, P. Moyo, C. Ncube, and S. Ndlovu, (1992). "Small grains "resistance"? Making sense of Zimbabwean smallholder farmers' cropping choices and patterns within a climate change context," *Cogent Social Sciences* [Online], 5(1). pp 1-13, Available:

https://www.tandfonline.com/doi/full/10.1080/23311886.2019. 1622485. [Accessed 18 July 2020]

- [4] R. Akinola, L. M. Pereira, T. Mabhaudhi, F. M. de Bruin, and L. Rusch, "A review of indigenous food crops in Africa and the implications for more sustainable and healthy food systems," *Sustainability*, vol 12, no 8, pp 1–30, 2020. https://doi.org/10.3390/su12083493
- [5] J. P. Musara, L. Musemwa, A. Mushunje, M. Mutenje, and C. Pfukwa, "Sorghum value chain analysis in semi-arid Zimbabwe," *South African Journal of Agricultural Extension*, vol 47, no 1, pp 164-178, 2019. https://doi.org/10.17159/2413-3221/2019/v47n1a497
- [6] J. J. Sierra, A. M. Turri, and H. A. Taute, "Unhealthy food and beverage consumption: An investigative model," *Journal of Foodservice Business Research*, vol 18, no 5, pp 470–488, 2015.
  - https://doi.org/10.1080/15378020.2015.1093453
- [7] J. Dera, and M. P. Bag, "Sorghum and millet processed products availability in retail supermarkets: Bulawayo, Zimbabwe," *Journal of Agricultural Science*, vol 2, pp 18–27, 2017.
- [8] Y. Deribe, and E. Kassa, "Value creation and sorghum-based products: What synergetic actions are needed?" *Cogent Food* and Agriculture, vol 6, no 1, pp 1-16, 2020. https://doi.org/10.1080/23311932.2020.1722352
- [9] A. C. Hoek, S. Malekpour, R. Raven, E, Court, and E. Byrne, "Towards environmentally sustainable food systems: Decision-making factors in sustainable food production and consumption,". Sustainable Production and Consumption, vol 26, pp 610–626, 2021 https://doi.org/10.1016/j.spc.2020.12.009
- [10] T. Mabhaudhi, T. P. Chibarabada, V. G. P. Chimonyo, V. G. Murugani, L. M. Pereira, N. Sobratee, L. Govender, R. Slotow, and A. T. Modi, "Mainstreaming underutilized indigenous and traditional crops into food systems: A South African perspective," *Sustainability*, vol 11, no 1, pp 1-22, 2018. https://doi.org/10.3390/su11010172
- [11] A. Orr, C. Schipmann-Schwarze, A. Gierend, S. Nedumaran, C. Mwema, E. Muange, E. Manyasa, and H. Ojulong, (2020)Why invest in research and development for sorghum and millets? The business case for East and Southern Africa. *Global Food Security* [Online], 26. Available: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7726312/. https://doi.org/10.1016/j.gfs.2020.100458
- [12] N. Dangi, S. K. Gupta, and S. A. Narula, "Consumer buying behaviour and purchase intention of organic food: A conceptual framework," *Management of Environmental Quality: An International Journal*. Vol 31, no 6, pp 1515–1530, 2020. https://doi.org/10.1108/MEQ-01-2020-0014
- [13] B. Melovic, D. Cirovic, B. Dudic, T. B. Vulic, and M. Gregus,. "The analysis of marketing factors influencing consumers' preferences and acceptance of organic food products: Recommendations for the optimization of the offer in a developing market," *Foods.* vol 9, no 3, pp 1–25, 2020. https://doi.org/10.3390/foods9030259
- [14] F. Pacho, "What influences consumers to purchase organic food in developing countries?" *British Food Journal*. Vol 122, no 12, pp 3695–3709, 2020. https://doi.org/10.1108/BFJ-01-2020-0075
- [15] I. Vermeir, and W. Verbeke, "Sustainable food consumption: Exploring the consumer "attitude behavioural intention" gap", *Journal of Agricultural and Environmental ethics*, vol. 19 No. 2, pp. in press.
  - https://doi.org/10.1007/s10806-005-5485-3
- [16] I. Black, and C. Campbell, "Food or Medicine? Choice factors for functional foods," *Journal of Food Products Marketing*, vol 12, no 3, pp 19–27, 2006. https://doi.org/10.1300/J038v12n03\_02

- [17] S.E. García-Barrón, D.A. Leyva-Trinidad, R.P. Carmona-Escutia, A. Romero-Medina, and S. J. Villanueva-Rodríguez, "Evaluation of traditional foods from a consumer's perspective: A review of methods and highlights," *British Food Journal*. ahead-of-p(ahead-of-print), 2021. https://doi.org/10.1108/BFJ-12-2020-1090
- [18] N. Nguyen, H. V. Nguyen, P. T. Nguyen, V. T. Tran, H.N. Nguyen, T.M.N. Nguyen, T.K. Cao and T. H. Nguyen, "Some Key Factors Affecting Consumers' Intentions to Purchase Functional Foods: A Case Study of Functional Yogurts in Vietnam," Foods, vol 9, no 1, pp 24, 2020. https://doi.org/10.3390/foods9010024
- [19] W. Verbeke, "Consumer acceptance of functional foods: Sociodemographic, cognitive and attitudinal determinants," Food Quality and Preference. vol 16, no 1, pp 45–57, 2005. https://doi.org/10.1016/j.foodqual.2004.01.001
- [20] I. Black, and C. Campbell, "Food or medicine? Choice factors for functional foods," *Journal of Food Products Marketing*, vol 12, no 3, pp 19–27, 2006. https://doi.org/10.1300/J038v12n03\_02
- [21] L. Guerrero, M. D. Guàrdia, J. Xicola, W. Verbeke, F. Vanhonacker, S. Zakowska-Biemans, M. Sajdakowska,, C. Sulmont-Rossé, S. Issanchou, M. Contel., M. L. Scalvedi, B. S. Granli, and M. Hersleth, "Consumer-driven definition of traditional food products and innovation in traditional foods: A qualitative cross-cultural study," *Appetite*, vol 52, no 2, pp 345–354, 2009. https://doi.org/10.1016/j.appet.2008.11.008
- [22] EU. "Council Regulation (EC) No 509/2006 of 20 March 2006 on agricultural products and foodstuffs as traditional specialities guaranteed," *Official Journal of the European Union L* 93/1, 2006.
- [23] L. Bertozzi, "Tipicidad alimentaria y dieta mediterra' nea. In A. Medina, F. Medina, andG. Colesanti (Eds.), El color de la alimentacio'n mediterra'nea," *Elementos sensoriales y culturales de la nutricio'n*, pp 15–41, 1998.
- [24] JJordana, "Traditional foods: Challenges facing the European food industry," *Food Research International*, vol 33, no 3–4, pp 147–152, 2000. https://doi.org/10.1016/S0963-9969(00)00028-4
- [25] H.R. Kwon, and E. A. Silva, "Mapping the landscape of behavioral theories: Systematic literature review," *Journal of Planning Literature*, vol 35, no 2, pp 161–179, 2020. https://doi.org/10.1177/0885412219881135
- [26] M. Gorton, and D. Barjolle, "Theories of food choice", in Food consumer science: Theories, methods and application to the Western Balkans. Edited by D. Barjolle, J.M. Dordević, M. Gorton and Z. Stojanović, New York: Springer Science. 2013, 15-26.
  - https://doi.org/10.1007/978-94-007-5946-6\_2
- [27] E. Randall, and D. Sanjur, "Food preferences—their conceptualization and relationship to consumption," *Ecology of Food and Nutrition*, vol 11, pp 151–161, 1981. https://doi.org/10.1080/03670244.1981.9990671
- [28] J-B.E.M. Steenkamp, "Dynamics in consumer behavior with respect to agricultural and food products," in *Agricultural marketing and consumer behavior in a changing world*. Edited by Wierenga, B., van Tilburg, A., Grunert, K.G., Steenkamp, J.-B.E.M., Wedel, M. Boston, MA: Springer. 1997, pp 143– 188.
  - https://doi.org/10.1007/978-1-4615-6273-3\_8
- [29] I. Ajzen, "The theory of planned behaviour," *Organizational Behavior and Human Decision Processes*, vol 50, no 2, pp 179–211, 1991.
  - $https:/\!/doi.org/10.1016/0749\text{-}5978(91)90020\text{-}T$

- [30] J. Aertsens, W. Verbeke, K. Mondelaers, and G. van Huylenbroeck, "Personal determinants of organic food consumption: A review," *British Food Journal*, vol 111, no 10, pp 1140–1167, 2009. https://doi.org/10.1108/00070700910992961
- [31] R.P.F. Guiné, S.G. Florença, M.J. Barroca, and O. Anjos, "The duality of innovation and food development versus purely traditional foods," *Trends in Food Science and Technology*, vol 109, pp 16–24, 2021. https://doi.org/10.1016/j.tifs.2021.01.010
- [32] F. Katt, and O. Meixner, "Is it all about the price? An analysis of the purchase intention for organic food in a discount setting by means of structural equation modelling". *Foods*, vol 9, no 4, pp 1-13, 2020. https://doi.org/10.3390/foods9040458
- [33] I.A. Saha, "A framework for studying consumer intention towards green consumerism In India". Doctoral thesis. Dept. Management and Economics, Tomas Bata University, Zlín, Czechia, 2017.
- [34] Y-C. Shen, and H-S. Chen, "Exploring consumers' purchase intention of an innovation of the agri-food industry: A case of artificial meat," *Foods*, vol 9, no 6, pp 1-15, 2020. https://doi.org/10.3390/foods9060745
- [35] W. Zhuang, X. Luo, and M.U. Riaz, (2021). On the factors influencing green purchase intention: A meta-analysis approach. *Frontiers in Psychology*, 12 [Online]. Available: https://www.frontiersin.org/articles/10.3389/fpsyg.2021.64402 0/full.
  - https://doi.org/10.3389/fpsyg.2021.644020
- [36] I. Ajzen, 2010. "Constructing a theory of planned behavior questionnaire," *Biofeedback and Selfregulation*, vol 17 pp 1–7, 2010.
- [37] J. Curtis, B. Weiler, and S.H. Ham, "Beliefs underlying visitor behaviour: A comparative elicitation study based on the theory of planned behaviour," *Annals of Leisure Research*. vol 13, no 4, pp 564–589, 2010. https://doi.org/10.1080/11745398.2010.9686865
- [38] J.P. Bray, "Consumer behaviour theory: Approaches and model," Bournemouth: Discussion paper. Unpublished, pp 1-33, 2008.
- [39] F. Hsu, "Food tourism: Consumer behaviour in relation to traditional food. Doctoral thesis, Dept. Business School, University of Queensland, Australia, 2021.
- [40] K.L. Sidali, R. Capitello, and A. J. T. Manurung, "Development and Validation of the Perceived Authenticity Scale for Cheese Specialties with Protected Designation of Origin," *Foods*. Vol 10, no 2, pp 248, 2021. https://doi.org/10.3390/foods10020248
- [41] S. Sumaedi, and Sumardjo. "A model of traditional functional food consumption behaviour", *British Food Journal*, vol 123, no 1, pp 13–30, 2020. https://doi.org/10.1108/BFJ-01-2020-0019
- [42] M.N.K. Saunders, P. Lewis, and A. Thornhill, Research methods for business students. 8<sup>th</sup> ed. Harlow: Pearson Education Limited, 2019.
- [43] B. Chazovachii, A. Chigwenya, and A. Mushuku, "Adoption of climate resilient rural livelihoods through growing of small grains in Munyaradzi communal area, Gutu district," *African Journal of Agricultural Research*, vol 7, no 8, pp 1335-1345, 2012.
  - https://doi.org/10.5897/AJAR10.921
- [44] M. J. Chegere. "Post-Harvest Losses, Intimate Partner Violence and Food Security in Tanzania. PhD thesis. Economics School of Business, University of Gothenburg, Sweden, 2017.
- [45] V. Jaiswal, T. Bandyopadhyay, V. Gahlaut, S. Gupta, A. Dhaka, N. Ramchiary, and M. Prasad, "Genome-wide

- association study (GWAS) delineates genomic loci for ten nutritional elements in foxtail millet (Setaria italica L.)," *Journal of Cereal Science*, vol 85, pp 48–55, 2019. https://doi.org/10.1016/j.jcs.2018.11.006
- [46] M. Muthamilarasan, and M. Prasad, "Small Millets for Enduring Food Security Amidst Pandemics," *Trends in Plant Science*. vol 26, no 1, pp 33–40, 2021. https://doi.org/10.1016/j.tplants.2020.08.008
- [47] D. Raheem, M. Dayoub, R. Birech, and A. Nakiyemba, "The Contribution of Cereal Grains to Food Security and Sustainability in Africa: Potential Application of UAV in Ghana, Nigeria, Uganda, and Namibia," *Urban Science*. vol 5, no 1 pp 8, 2021. https://doi.org/10.3390/urbansci5010008
- [48] S.T. Tara, R. K. Solanki, R. K. Kakani, C. Bharadwaj, T. Singhal, J. Padaria, V. Khandelwal, R. Srivastava, R. S. Tomar, and M. I. Iqubal, "Genomics assisted breeding for abiotic stress tolerance in millets," in *Genomics assisted breeding of crops for abiotic stress tolerance*. ed. V. R. Rajpal, D. Sehgal, A. Kumar, and S. N. Raina, New York: Springer, 2019, 241–255. https://doi.org/10.1007/978-3-319-99573-1\_13
- [49] M. Vetriventhan, V.C.R. Azevedo, H.D. Upadhyaya, A. Nirmalakumari, J. Kane-Potaka, S. Anitha, S. A. Ceasar, M. Muthamilarasan, B. V. Bhat, K. Hariprasanna, A. Bellundagi, D. Cheruku, C. Backiyalakshmi, D. Snatra, C. Vanniarajan, and V. A. Tonapi, "Genetic and genomic resources, and breeding for accelerating improvement of small millets: Current status and future interventions," *Nucleus*, vol 63, no 3, pp 217–239, 2020.
- [50] S. Li, and N. S. Jaharuddin, "Identifying the key purchase factors for organic food among Chinese consumers," *Frontiers* of *Business Research in China*, vol 14, no 1, pp 14-25, 2020. https://doi.org/10.1186/s11782-020-00093-3