

Supermarket of the Future – Dealing with Changing Environments

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Abstract: The world is constantly evolving, with innovations introduced at an increasing pace. Supermarkets, as key players in the retail landscape, need to adapt to change, without knowing the nature or timing of these changes. To stay informed about current developments, supermarkets hire external research agencies to analyse the trends affecting the industry. Nevertheless, in reality, supermarkets must operate on intuition as the field advances more rapidly than evaluation reports can be produced. Examples of retail field advancements include the rise of e-commerce, an increasing focus on customer experience, and a growing demand for information on food choice-related effects. To understand the impact of the changing environment and devise an adequate response, supermarkets must understand the interconnectivity of their in-store processes and elements. Empirical research highlights a gap in decision making, with policy decisions predominantly being made by higher management lacking practical experience, resulting in decisions that do not align with operational activities. This limits the explicit and balanced inclusion of all relevant stakeholders in decision making. This paper presents a method of conceptualising supermarkets and transforming the in-store environment into a network of entities and interrelations, including product-packaging artefacts, product displays, and customers. Extending beyond supermarket environments, the proposed methodology has the potential to be applied as a systematic approach in understanding interrelations in various product-service systems. This approach not only aims to enhance understanding but also seeks to revolutionise supermarkets' responses to rapid changes, potentially offering a more proactive framework for future decision making. This enhances the position of supermarkets as a pivotal element in supply chains, elevating the significance of product-packaging combinations as a critical entity within these ecosystems.

Keywords: retail, supermarket, decision support, product-packaging combination.

1 Introduction

1.1 Research motivation

A supermarket is a place where people from all backgrounds come together and where experiments are conducted regularly regarding customer behaviour, packaging, or product variety [1-3]. The relationship between supermarkets and packaging is intricate and continues to evolve with changing consumer preferences, technological advancements, environmental considerations, and regulatory changes [4, 5]. Nowadays, there are multiple channels for shopping (e.g. in-store, home delivery, and pickup) and this, together with the new possibilities offered by experiments, brings more variables for supermarket management to consider. The analysis of business processes is becoming more complex, and the increasing number of variables continues to challenge retailers [6].

To deal with changing environments, it is essential to know (a) what variables represent the supermarket and (b) how these variables are related. This information allows for a quick review of the impact of the changing variable on the current situation. According to interviews with a product manager, a store manager and a team leader of the stocking team, the impact may vary in magnitude: the introduction of deposit legislation on cans caused a significant impact on in-store operations while having a new packaging design for one product would be a smaller difference. The supermarket management needs to assess the impact and decide whether to respond and how to do so in order to optimise the store processes.

Making decisions is a necessity but can be complicated by uncertainties and trade-offs that arise from conflicting interests. For instance, what is beneficial for the customer or society may come at the supermarket's expense [7]. Hence, the supermarket management has to handle a lot of data to make well-informed decisions that take all interests into account. Capturing information within a framework contributes to a better understanding of the information and improves the application of the information [8]. This research focuses on conceptualising the supermarket shop floor and analysing the interconnectivity between the various components within the supermarket system to enable informed decision-making about business operations. The objective of this research

is to develop an intervention which enhances decision making when changes occur in the environment of the supermarket. This research is initially focused on the Dutch supermarket industry. The interpretation of what a supermarket is, together with its accessory standards, depends on the country where the supermarket is located and on the target group of customers. This should be kept in mind while reading this paper.

2 Changing environments

The world is constantly evolving, and so is the environment of the supermarket. According to interviews with a category manager and a rayon manager, supermarkets hire external research agencies to analyse the trends affecting the industry to stay informed about current developments. Nevertheless, in reality, supermarkets must operate on intuition as the field advances more rapidly than evaluation reports can be produced. This section elaborates on the current trends in the Dutch supermarket industry and formulates an approach to react to change.

2.1 Trends in the supermarket industry

The (food) retail industry is increasingly experiencing a shift to e-commerce, which was particularly stimulated by the Covid-19 pandemic [9, 10]. However, most supermarkets do not completely switch to online grocery but combine the physical store with an online home delivery service: this principle is called omnichannel retailing. E-commerce has found ground in the supermarket industry, although research has shown that 85% of consumers globally prefer a blend of physical and digital shopping channels, while 10% prefer only digital channels [11]. Next to using technology to realise e-commerce, supermarkets also innovate and experiment with in-store technology for the purpose of making processes more efficient and the customer experience more convenient. Innovations include electronic price tags, smart shopping carts and theft prevention with RFID or computer vision. The trend of using technology to optimise business processes has been going on for a long time and keeps evolving [12]. In the 80's, the self-scan system was introduced in the Netherlands, and nowadays, the first stores without staff or checkouts are opened.

Home delivery covers the purely functional part of doing groceries, this saves the customer time. Accordingly, retailers are rethinking the role of the physical supermarket [13]. The focus of the physical stores shifts towards social engagement, giving advice, including haptic stimuli in the physical store and doing groceries overall being an enjoyable experience [14]. Grocery retailers also aim to educate their customers more about product backgrounds since customers increasingly want transparency regarding the source of their groceries [15]. Packaging plays an essential role in this communication. Furthermore, it is seen that society has become more individualistic, and people focus on the efficient use of their time [16]. This also influences packaging-related trends such as pre-packed portion sizes and single-serve convenience.

Dutch consumers more often choose products which are fruitful for their health or environmentally sustainable [17]. Since 2015, a growing interest in organic, plant-based or local food has been identified, and people are more concerned about sustainability [18]. Next to the customers becoming more interested in sustainable food choices, supermarkets also focus more on sustainable behaviour: inventory management is optimised to reduce food waste, reusable bags are promoted, and more sustainably produced packaging is offered [19]. Some initiatives are started by supermarkets themselves, while other sustainability measures are introduced by the government, e.g., legislation enforcing a deposit fee on metal cans [20].

Another ongoing trend in the supermarket industry is horizontal and vertical integration. Horizontal integration regards the integration between industries. Currently, supermarkets integrate elements of the catering industry, which can be recognised by the food and coffee corners [17]. Furthermore, horizontal integration is also seen in selling non-food products, like pharmaceutical products. Vertical integration occurs in the supply chain and can be recognised by offering store brands and refill systems where customers can refill their packaging in the supermarket [21]. Vertical integration enables the supermarket to reduce material and (transportation) steps in the supply chain of the product-packaging combinations and increase transparency for the customer.

2.2 Classifying change

Environments can be approached at three levels: the macro level (contextual environment), the meso level (transactional environment), and the micro level (organisational environment) [22]. Hence, the changes in the environments can also be categorised into those three levels. This division of levels is combined with Steven Covey's theory, allowing the levels to be labelled as the circle of concern, the circle of influence, and the circle of control [23].

The macro level regards external factors affecting the supermarket industry. A distinction can be made between national and international levels at the macro level. Supermarkets have no control over the developments of this level, but it does concern them. Changes in the macro level are analysed with the DESTEP method in which demographic, economic, social, technological, ecological and political factors are identified [24]. These six factors could impact the business processes of the supermarket.

The meso-level entails the influence of the supermarket industry on a supermarket store, for example, when new point-of-sale software becomes available on the market. Conversely, an individual supermarket can only indirectly influence the factors at this level. A supermarket's meso level is considered to be its circle of influence. The meso level can be analysed using the ABCD method to investigate the factors of the customer, branch, competition and distribution (in Dutch: *'Afnemers, Bedrijfstak, Concurrenten en Distributie'*), which is established in market jargon, following e.g., [25, 26]. Opportunities or threats from these factors are analysed to adjust the in-store operation accordingly.

The micro level includes all organisational aspects within the supermarket store, and therefore, the supermarket management directly influences these internal factors. The micro level is considered a supermarket's circle of control. There are a lot of different methods to analyse specific operations within the micro level, for example, focusing on risks, financial performance or customer satisfaction. However, no general analysis method was found to investigate the in-store operations as a whole. This research aims to fill that gap since it is considered of high importance when a supermarket has to deal with change. Table 1 provides an overview of the environmental levels.

Each level considers a different scale of processes and determines which stakeholders are involved. The trends mentioned in Section 2.1 can be assigned to these environmental levels (see Table 2).

Table 1: Overview of changes in the macro, meso and micro level.

Level	Macro level	Meso level	Micro level
Changing factors	External	External	Internal
Influence of supermarket	No influence (Circle of Concern)	Indirect influence (Circle of Influence)	Direct influence (Circle of Control)
Analysis method	DESTEP	ABCD	<i>Objective of this research</i>

Table 2: Overview of field advancements in the macro, meso and micro level.

Trend	Macro level	Meso level	Micro level
1	Technological advancements	Rise of e-commerce	New applications of in-store technology
2	More individualistic society	Focus on customer experience	Loyalty programmes and rethinking role of packaging
3	Legislation and social trend focussing on sustainability	Customers make more informed food choices	Reduction of (food) waste
4	Focus on efficiency	Horizontal and vertical Integration	Integration elements of other industries into supermarket

2.3 Dealing with change

The analysis methods show the wide range of external and internal factors that could change and impact the supermarket's landscape. After a changing environment on one of the levels, the supermarket management has to analyse the new situation and decide if and how to react. The level where the change occurs, determines which stakeholder must be involved in the decision-making process.

The in-store operations are categorised into themes based on the marketing mix's components (Product, Price, Place, Promotion, Personnel and Presentation). The marketing mix is used to formulate the retail strategy, address customer needs, coordinate operations and respond to competition [3]. The six Ps are identified as the controllable parameters of the in-store operations of a retailer. Thus, with these parameters, the supermarket can initiate a reaction to a change [27]. A review by C. L. Goi discusses the numerous proposed modifications over time regarding the Ps of the marketing mix and concludes that the mix does not consider the unique elements of service well enough [28]. Therefore, the fifth category is not based on one of the 6 Ps but focuses on the services provided by the supermarket to the customers.

The methodology of the marketing mix serves as a basis for the micro analysis method of this research. The methodology is applied and adjusted to the context of a supermarket. Some parameters are combined, and 'Place' is translated to the product's place instead of the store's place in the area initially meant. The themes of reactions to change are defined as follows:

1. **Inventory** [*Product*] – Inventory management includes everything related to the assortment of product-packaging combinations and the product flow (ordering, stocking, and selling). When external changes influence customer demand, for example, demographic changes impacting the composition of customers from the supermarket or trends based on social aspects influencing customers' interests, there should be a reaction regarding inventory processes.
2. **Store Layout** [*Place & Presentation*] – This theme entails where the product-packaging combinations are made available and presented to the customer. In other words, this theme regards routing in the supermarket and product placement on the shelves. When something changes in the assortment, e.g., when a product is out of stock or when a new product is placed on the shelves, the supermarket should react regarding the store layout. Decisions around the layout aim to use the valuable space as effectively as possible.
3. **Pricing** [*Price & Promotion*] – This theme entails financial aspects around the selling of products, including loyalty programmes, marketing, and strategies to persuade the customer to buy the product. Reaction in this theme is expected when opportunities or threats occur due to competition or developments in the branch.
4. **Staff** [*Personnel*] – This theme includes the employees and their functions, salaries, and performance. Besides, it also entails the team's composition, labour schedules, and working conditions. When something changes, impacting the work or workload of the staff, a reaction within this theme is required.
5. **Customer Service** – 'Service' refers to the interaction between the customer and the supermarket and the support the supermarket organisation provides to enhance the shopping experience and meet customers' needs. Reaction in this theme is expected when new concepts are introduced to the customers for additional support.

In the past, customer-employee interaction was the key differentiating factor in customer service [29]. However, customer service should be approached more holistically: all systematic factors and human interaction in general contribute to customer service satisfaction. Service in a supermarket includes, for example, stimulating low waiting times or offering tools that make doing groceries more convenient. Furthermore, it should be noted that the five themes do not function distinctly and influence each other. Inventory, Pricing and Service influence all other reaction themes in some way, while Pricing itself is not influenced that much by other themes.

3 Conceptualisation of a supermarket

This research aims to conceptualise a supermarket to provide insight into the connections between key elements. These insights into the connectivity between the elements should enable the supermarket management to react effectively to a changing environment.

3.1 Conceptual framework

A conceptual framework is a theoretical structure that is an abstract, simplified view of the world one wishes to represent to gain a deeper understanding [30]. It establishes the concepts, principles, and interrelations between variables that are relevant to the subject matter and should be considered when making decisions. To build a conceptual framework of a supermarket, the physical entities (i.e., products, interior, people, etc.) in the supermarket have to be established, and the interrelations have to be identified.

3.2 Entities of a supermarket

The identification of the supermarket entities is done via empirical research since no standardised methodology could be found in the literature. Figure 1 categorises the entities based on their behaviour or functioning. The more you go to the outside of the chart, the more detailed it gets. The subcategory 'Selling Goods' has the common factor of containing entities a customer can buy. The sub-subcategory 'Food' adds to this behaviour that it is consumable and provides the constraint that it has to be sold before the expiration date. The group 'Beverage' specifies it is a liquid quenching your thirst, and the subgroup 'Alcohol' that the consumer has to be an adult. One of the units of the subgroup 'Alcohol' is a bottle of wine, owning then the behaviour of an object with the purpose of selling, before the expiration date, to quench your thirst, to be consumed by an adult.

The primary division of all entities is between living and non-living, as this is set and a crucial factor in defining behaviour. Thus, the two main categories are 'People' and 'Objects'. Further categorising reveals that behaviour is context-dependent. For example, a shopping cart is categorised as a carrier system but can temporarily serve as a product display filled with leftover products and placed in the checkout area.

The sunburst chart categorises the entities up to unit level. After the layer of units, the division would continue with parts, subparts, etc. For example, the unit of the bottle of wine could be further categorised into the product and the packaging, and the packaging could be decomposed into the bottle, label, and cap. Future work could extrapolate the methodology to (sub)parts and investigate the added value.

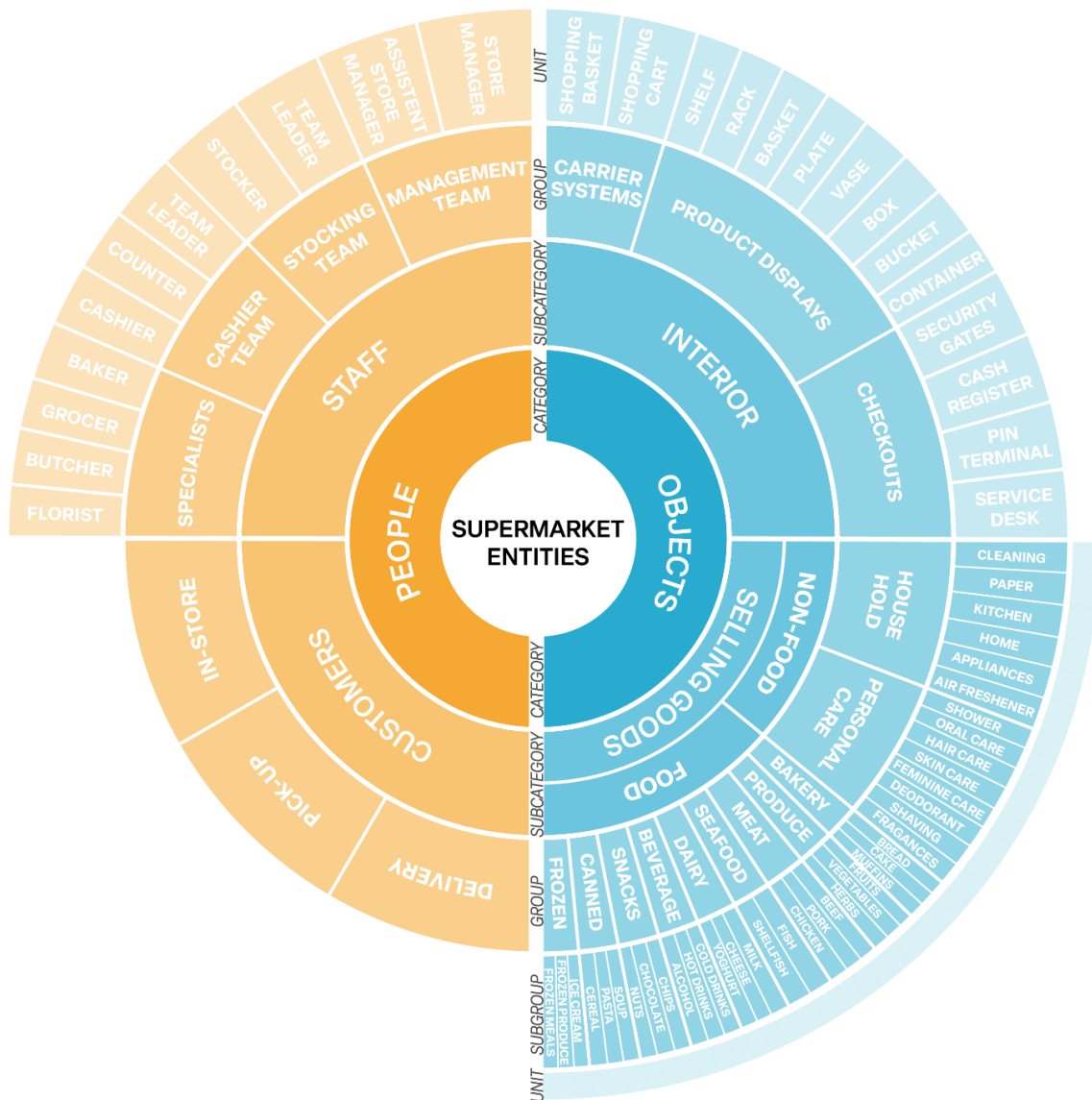


Figure 1: Sunburst chart of the entities in a supermarket.

In addition to behavioural characteristics, each unit has properties. When the unit is placed into a system, for instance a product on the supermarket shelves, the entity owns in addition to its properties also attributes. Attributes can be seen as context-dependent properties such as temperature and location. Performed actions could change the attributes without altering the nature of the entity. For example, the temperature of a product in the freezer section would increase if the power of the freezers is cut off.



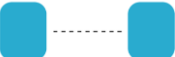
3.3 Interrelations between entities

The second step of constructing the conceptual framework is to determine the interrelations between the identified entities. Connectivity can be deconstructed into different forms. Which forms are relevant is determined by the context. In the supermarket environment, connectivity can be recognised in:

- Functional characteristics or behaviour;
- Physical properties;
- Spatial in-store position;
- Temporal characteristics - a moment in time.

The connectivity matrix in Table 3 shows how connectivity is identified in the interrelationships between living and non-living entities. It should be noted that the interrelationship between two objects is not solely a connection between those two entities. The relationship should be acknowledged by a person to have value. For example, it is generally known that products with light blue packaging are mostly the diet variant, but a blind person will not acknowledge this relationship. This research approaches the connection between objects as a one-to-one relationship.

Table 3: Connectivity matrix of entities in the supermarket.

	Person-Person 	Person-Object 	Object-Object 
Functional	Organisational structure	Means for goal	Substitute, complementary, competitive
Physical	<i>Irrelevant</i>	Object within reach (z)	Dimensions, weight, colour, materials
Spatial	Location in-store	Object in sight, object within reach (x,y)	Product placement, location in-store
Temporal	Work shift, supermarket visit	Work shift, supermarket visit	Transaction, external event

4 Decision support system

4.1 Design

Guidelines for designing the decision support system (DSS) were established to evaluate both its design and the working principle. The guidelines are focused on the functionality of the intervention and are derived from the information gained during the industry analysis and the interviews conducted with the various stakeholders. The list provided a foundation for the design process and may be expanded upon in future research.

The DSS should enable the supermarket to recognise a changing environment and respond efficiently and effectively. Reacting to change means that once a change is identified, the supermarket should first decide if the supermarket should do something, then what the supermarket should do, and finally, how the supermarket should take action. This process can take a considerable amount of time, during which the supermarket's operational performance can be suboptimal. The DSS aims to speed up the process by identifying the changing environment at an earlier stage and recommending to the supermarket whether and how staff should respond effectively to the change. Figure 3 illustrates the benefit the DSS should deliver. After the implementation of the DSS, the intervention aims to optimise the supermarket's overall operational performance by better aligning store operations with the environment of the supermarket, recognising a changing environment earlier in time and facilitating the user in dealing with the change.

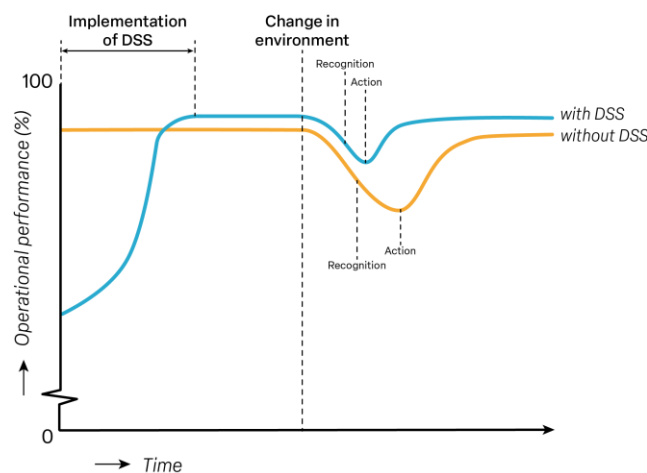


Figure 3: Operational performance of a supermarket with and without the DSS.

Various people within the supermarket organisation will either directly or indirectly come into contact with the DSS or experience its impact. Examples include the higher management, the headquarters, or the in-store operators. The end-user of the DSS is the person who is in a position to make practical decisions on the shop floor. The lower managerial staff is physically present on the work floor during its shift and is the intermediate layer between the operating staff and the higher management. The DSS supports the team leader in deciding if and how to respond to the changing environment. The user interface of the DSS should be intuitive and should provide guidance in getting recommendations out of the intervention.

Research has shown that supermarkets own a large amount of data but do not know how to use this effectively and gain the most out of it [31]. The DSS functions as the intervention between the available data and the supermarket. A design direction is developed defining the functionality of the DSS (see Figure 4). The user makes the decisions in the end. The DSS and the user are the two actors forming the decision-making system.

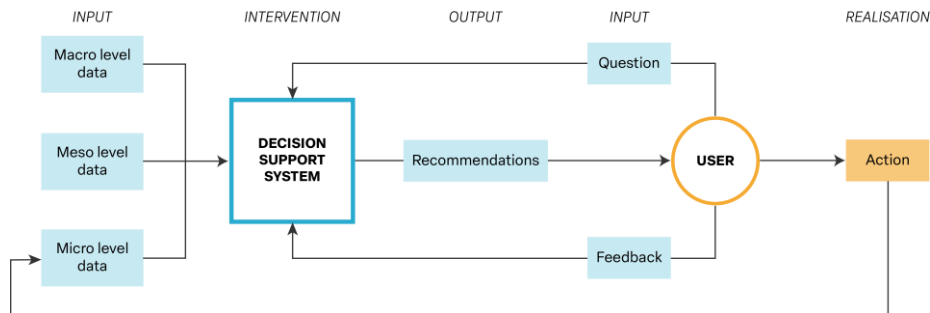


Figure 4: Data flow diagram of the decision-making system.

Either of the two actors can initiate the generation of recommendations. Firstly, the DSS can draw attention to a particular area in the supermarket when it appears the area is not functioning optimally based on the input data flows. For example, when a product-packaging combination aimed at children has an inconvenient product placement on the shelves, the DSS sends a notification to the user and provides recommendations on how to solve this spatial connectivity issue. The user decides to either follow the recommendation and take action or choose one of the alternatives and give the DSS feedback about the course of action. Secondly, the interaction between the DSS and the user can also be initiated by the user. When the user observes something happening on the work floor or notices that the DSS has no access to a source of information, for instance a spillage, the user could give the system feedback about the real-life situation and possibly demand the DSS for help. The implementation of the recommendation, i.e., the action, is fed back into the system via the micro level data flow.

In the DSS, the physical shop floor of the supermarket is represented by a three-dimensional model which is part of the DSS interface. This helps the user place the entities and their interrelations in their context in the store. In this initial design, the interface of the DSS is designed to be used on a screen. The decision to implement a new technology into the working environment is often taken by the higher management, while the employees on the work floor have to work with the technology [32]. Some employees show resistance to change as modifying their way of working takes effort and could be against their preferences. Therefore, the DSS should be first introduced via an interface most people are familiar with and could evolve further from that initial point.

The generation of recommendations can either be initiated by the DSS or by the user. The user will receive a notification of the DSS when the system detects a suboptimal performing environment. When the user decides that the benefits would weigh up against the costs (i.e., time and resources) and implement the recommendation, the user must give feedback to the DSS on the implementation. It could also be that the lower management observes a problem on the shop floor and demands more information about the connectivity of an entity. For example, when a product is temporarily unavailable to be stocked, the lower management is interested in whether this would also impact other products. The interface of the DSS could look like the illustration in Figure 5.



Figure 5: Interface of the DSS – Connectivity showed of a beer can.

4.2 Implementation

The implementation is approached in three phases: before, during and after the implementation. Figure 6 provides an overview of the steps involved in each phase. The squares represent actions, and the circles indicate decisions. The blue actions and decisions are the responsibility of the supermarket management, while the grey action is undertaken by the external organisation that owns the decision support system (DSS) software.

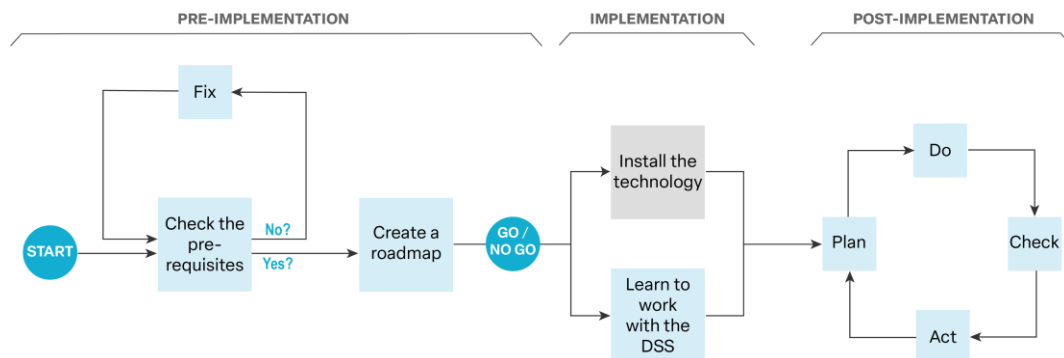


Figure 6: Overview of implementation steps of DSS

The first step is to get the organisation ready for implementation, and thereafter, the management should draw up an implementation plan. As described in the data flow diagram in Figure 4, the DSS runs on data inputs and needs micro level data to capture all in-store processes and include all processes in the recommendations. Additionally, the organisational structure should allow the recommendations to be realised by the user. Before a supermarket can implement and use the DSS, it should reach a certain level of information management maturity and have a well-arranged organisational structure.

When a supermarket meets these two prerequisites for integrating the DSS into its environment, a roadmap for the implementation phase should be drawn up. Technology roadmapping is seen by practitioners in the field as an innovative strategic planning tool to visualise and formulate the linkage between the business and the new technology [33]. The roadmap should describe what steps need to be taken and for what purpose, in which time frame, and who needs to be involved in the steps. However, not everything can be planned in advance, and a roadmap should be seen as an iterative process.

If the supermarket decides to continue the project after the roadmap is drawn up, the implementation phase starts with two parallel processes: the technology has to be set up and the employees have to be introduced to the system. Introducing a new technology to a business may lead to changes in business processes or work culture [33]. It is crucial to apply a change management approach. Change management is a systematically structured method for transforming an organisation from its current state to a future state [34].

After implementing the initial version of the DSS in a supermarket, the plan, do, check, act (PDCA) cycle should be repeatedly applied. New prospects should be constantly monitored to ensure continuous enhancement of the designed intervention and the system around it.

5 Concluding remarks and discussion

The objective of this research was to develop an intervention to ensure that supermarkets of today keep up with the increasingly evolving world and are still present in the future. Three research focuses can be recognised in this aim: change, conceptualisation, and the design of the intervention.

Change can be approached based on the environmental levels (macro, meso, and micro). This research uses these methods to identify and structure the changes occurring in the external environment of the supermarket. No holistic analysis method could be found in the literature for the internal environment, the micro level. The in-store processes were categorised into five reaction themes: inventory, layout, pricing, staff, and service. These themes are used to analyse the supermarket's micro level by focusing on clusters of processes, pre-defining which stakeholders are involved.

To visualise the impact of the changing environments on in-store operations, this paper dived into the conceptualisation of a supermarket store. A conceptual framework was composed including supermarket-related entities and their interrelations. These interrelations exist based on the characteristics of the entities and are categorised based on functional, physical, spatial, and temporal connectivity. The fact that the type of connection exists does not necessarily mean it is interesting for the supermarket to explore. In future research, the current design should be discussed with the end-user to identify the needs of the supermarket organisation.

The data inputs from the three environmental levels are fundamental to the functioning of the DSS. It was concluded that the data input of the micro level was covered for all five themes as many processes are captured in data nowadays, but the data flows from meso and macro levels could be complemented to support the DSS in reacting to change at all levels. Furthermore, the physical store environment is represented by a digital replica in the DSS interface. Although data inputs are available for all five themes of the micro level, this could be further optimised. The representation is as accurate as the micro level data input is.

The future perspective for the intervention would be to incorporate the DSS in several supermarkets belonging to the same supermarket chain. The headquarters would then be able to oversee several stores within the region, leading to more impactful policy decisions. The DSS would not only translate the data from the macro and meso levels to the micro level but also vice versa.

This research focused on the brick-and-mortar Dutch supermarket, and the DSS is designed with this context in consideration. Changing the context to a non-food retail store would be interesting to research in future work. Also, would the methodology still be valid when the supermarket is not located in the Netherlands but in another country? Approaching the changing environments would require the same viewpoint. It is anticipated that the methodology of conceptualising the new store will follow the same steps. However, a new industry analysis should be conducted for the new subject to ensure congruence with the context. Furthermore, the setup of the intervention could still be applied, but its functionality and implementation should be tailored according to the needs of the engaged stakeholders and the industry.

In conclusion, the current design of the intervention for the supermarket of the future aims to support supermarkets with changing environments in decision-making and offers a fundamental basis for future work. The development adheres to a continuous approach, maintaining its core structure and principles while advancing through practical application. Although the current design of the intervention may not yet be ready for full practical use, this continuous approach outlines the method for future work, enabling continuous improvement.

References

1. Clement, J., *Visual influence on in-store buying decisions: an eye-track experiment on the visual influence of packaging design*. Journal of Marketing Management, 2007. **23**(9-10): p. 917-928.
2. Huitink, M., et al., *Can Healthy Checkout Counters Improve Food Purchases? Two Real-Life Experiments in Dutch Supermarkets*. International Journal of Environmental Research and Public Health, 2020. **17**(22): p. 8611.
3. Terblanche, N.S., *Customer interaction with controlled retail mix elements and their relationships with customer loyalty in diverse retail environments*. 2017.
4. Scharpenberg, C., et al., *Analyzing the packaging strategy of packaging-free supermarkets*. Journal of Cleaner Production, 2021. **292**: p. 126048.
5. Parsons, R., *The role of plastic packaging in transforming food retailing*. British Food Journal, 2022. **124**(4): p. 1285-1300.
6. Anderl, E., J.H. Schumann, and W. Kunz, *Helping Firms Reduce Complexity in Multichannel Online Data: A New Taxonomy-Based Approach for Customer Journeys*. Journal of Retailing, 2016. **92**(2): p. 185-203.
7. Lehner, M., *Translating sustainability: the role of the retail store*. International Journal of Retail & Distribution Management, 2015. **43**(4/5): p. 386-402.
8. Lutters, D., *Manufacturing integration based on information management*, in *Design, Production & Management*. 2001, University of Twente.
9. Briedis, H., et al., *Adapting to the next normal in retail: The customer experience imperative*. McKinsey & Company, 2020.
10. Simmons, V., et al., *The next S-curve of growth: Online grocery to 2030*. McKinsey & Company, 2022.
11. Peiris, H.Y.D., V.G.P. Lakshika, and R.M.K.S. Rasanjalee, *Factors affecting consumer acceptance towards omnichannel approach with reference to supermarket sector*. Journal of Business Studies, 2021. **8**(81-104).
12. Wendorf, M. *The Evolution of the Supermarket From Dry Goods Stores to Amazon Go*. 2020 [cited 2023 15 September]; Available from: <https://interestingengineering.com/innovation/the-evolution-of-the-supermarket-from-dry-goods-stores-to-amazon-go>.
13. Ferreira, R., et al., *Transforming the EU retail & wholesale sector*. McKinsey & Company, 2022.
14. EuroCommerce, *Value of European Retail factbook*. 2021.
15. González-Miranda, S., et al. *Future Supermarket: Overcoming Food Awareness Challenges*. in *Seventh International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing*. 2013.
16. Ten Klooster, R. and B. de Koeijer, *A trend-based analysis of packaging material amounts per capita per day in the Netherlands*. 2023.

17. Panteia, *Trends in de detailhandel en betekenis voor de factor arbeid, Deelrapport 2: Supermarkten*. 2017: Zoetermeer.
18. CBS. *Supermarkten verkopen steeds meer duurzame voeding*. 2021 [cited 2023 8 June]; Available from: <https://www.cbs.nl/nl-nl/nieuws/2021/38/supermarkten-verkopen-steeds-meer-duurzame-voeding>.
19. Escursell, S., P. Llorach-Massana, and M.B. Roncero, *Sustainability in e-commerce packaging: A review*. Journal of Cleaner Production, 2021. **280**: p. 124314.
20. Rijksoverheid, *Statiegeld op blik vanaf 1 april*. 2023.
21. Dutzler, H., P. Hochrainer, and J. Greller, *Vertical integration in grocery retailing*. Strategy&, 2019.
22. Strazdas, R., et al., *Macro, meso and micro factors for creative industry development: continuous improvements and system innovations*. Vilnius: VGTU, 2015.
23. Haimes, Y.Y. and C. Schneiter, *Covey's seven habits and the systems approach: a comparative analysis*. IEEE Transactions on Systems, Man, and Cybernetics - Part A: Systems and Humans, 1996. **26**(4): p. 483-487.
24. Kuznetsova, Y., *Market analysis instruments in the development of the startup marketing strategy*. 2020.
25. n.a. *ABCD-analyse uitvoeren (uitleg)*. 2023 [cited 2023 18 July]; Available from: <https://www.marketingscriptie.nl/abcd-analyse/>.
26. Van der Linde, M. *ABCD analyse - Meso analyse volgens de ABCD methode*. 2019 [cited 2024 17 April]; Available from: <https://www.strategischmarketingplan.com/externe-analyse/abcd-analyse/#:~:text=Een%20ABCD%20analyse%20is%20een,%2C%20Bedrijfstakanalyse%2C%20Concurrantieanalyse%20en%20Distributieanalyse>.
27. Armstrong, G., et al., *Principles of marketing*. 2014: Pearson Australia.
28. Goi, C.L., *A review of marketing mix: 4Ps or more*. International journal of marketing studies, 2009. **1**(1): p. 2-15.
29. George, R.J., *Supermarket Shopping*. Journal of Food Products Marketing, 2005. **11**(2): p. 1-20.
30. Guarino, N., D. Oberle, and S. Staab, *What Is an Ontology?*, in *Handbook on Ontologies*, S. Staab and R. Studer, Editors. 2009, Springer Berlin Heidelberg: Berlin, Heidelberg. p. 1-17.
31. Verhoog, C., *Hoe krijgt de fabrikant zijn product op het schap van de supermarkt*, in *Industrieel Ontwerpen*. 2008, University of Twente: Enschede.
32. Carneiro, A., *Adopting new technologies*. Handbook of Business Strategy, 2006. **7**(1): p. 307-312.
33. Gerdri, N., P. Assakul, and R.S. Vatananan, *An activity guideline for technology roadmapping implementation*. Technology Analysis & Strategic Management, 2010. **22**(2): p. 229-242.
34. Harpham, B. *8 ways you're failing at change management*. 2018 [cited 2023 15 November]; Available from: <https://www.cio.com/article/228185/8-ways-youre-failing-at-change-management.html>.