

Study on the Design of Supermarket Store Layouts: The Principle of “Sales Magnet”

Masao Ohta, and Yoshiyuki Higuchi

Abstract—This study analyses store layout among the many factors that underlie supermarket store design, this; in terms of what to display in a shop and where to place the items. This report examines newly-opened stores and evaluates their interior shop floor layouts, which we then attempt to categorize by various styles. We then consider the interaction between shop floor layout and customer behavior from the perspective of the supermarket as the seller. At this point, we focus on the “store magnets”—the main sections within the shop likely to attract customers into the store.

Keywords—Supermarket Store Layout, Sales magnet, Customer Circulation Rate, Section Drop-by Rates.

I. INTRODUCTION

THE growth in the popularity of supermarkets has transformed the marketplace in which buyers and sellers of fresh produce—essential to everyday life—meet face-to-face. These days, supermarkets as sellers commonly highlight their selling points using shop floor layout. Among the many factors that underlie store design, this study analyses store layout; in terms of what to display in a shop and where to place the items.

Firstly, this report examines newly-opened stores and evaluates their interior shop floor layouts, which we then attempt to categorize by various styles. We then consider the interaction between shop floor layout and customer behavior from the perspective of the supermarket as the seller. At this point, we focus on the “store magnets” [1]—the main sections within the shop likely to attract customers into the store. The types of sales sections placed at the store magnets in individual areas of the shop have a significant effect on the flow of customers. Designing the shop floor layout for the shop magnets to display products of interest enables customers to circulate around many sections and allows significant contact with a variety of products. We clarify the characteristics of each sales section layout using the store magnets concept.

Supermarkets covered in this study are defined under the “Japan Standard Industry Classification” [2] as shops that sell general groceries with a total shop floor area of approximately 250 m²–2,650 m².

II. STORE DESIGN AND LAYOUT

A satisfying shopping experience entails an ease with which products are found and the ability to check for freshness and

price; some customers also regard low shopping time as satisfying shopping experience. In contrast, although the seller’s primary aim is convenience to its customers, it also attempts to create a sales floor that enables customers to have significant communication with the seller by offering, for instance, new products and goods that promote new eating habits. To ensure this the seller seeks a store design that allows customers to wander around all areas of the floor without getting uninterested or feeling like as if they have been walking for miles. A store’s design is based on an arrangement of entrances, exits, and aisles that is physically and psychologically welcoming. [3] Psychological inducements include a combination of the factors found in Table I (shop section categories) and Table II (store magnets, presentations, and others). Store magnets are sales locations and goods that easily attract customers as they are looking around the shop.

This report covers “Magnet 1” and “Magnet 2,” which are placed in customers’ forward line-of-sight as they walk around the shop and are easiest to attract, as shown in Fig. 1. We quantitatively evaluate the circulation rate of customers in the shop and the drop-by rate for the store magnets, and look at store design from the perspective of the interior shop floor layout that allocates the sales sections categorized in Table I to store magnets.

TABLE I
 STORE SECTION CATEGORIES

Category Abbreviations	Definitions	Representative Examples
SF	Seafood	Fresh Fish, Salted/Dried
MT	Meat	Fresh Meat, Eggs, Processed, Meat
PR	Produce (Fresh)	Fruit, Vegetables
PF	Processed Food	Dried Goods, Confectionary, Seasoning
DA	Daily Food	Bread, Chilled and Frozen Products
DL	Delicatessen	Fried, Stewed, Lunch Boxes

TABLE II
 STORE MAGNET CATEGORIES

Definition	Details
Magnet 1	Leading product sales sections on either side of the main aisles
Magnet 2	Sales sections at the beginning and end of the aisles
Magnet 3	Sales sections at shelf ends
Magnet 4	Quantity items, temporary displays within the shelves

Masao Ohta is with Graduate School of Symbiotic Systems Science and Technology, Fukushima University, 1 Kanayagawa Fukushima City, 960-1296, Japan (e-mail: ohta@hi-higuchi.com).

Yoshiyuki Higuchi is with Faculty of Symbiotic Systems Science, Fukushima University, 1 Kanayagawa Fukushima City, 960-1296, Japan (e-mail: higuchi@sss.fukushima-u.ac.jp).

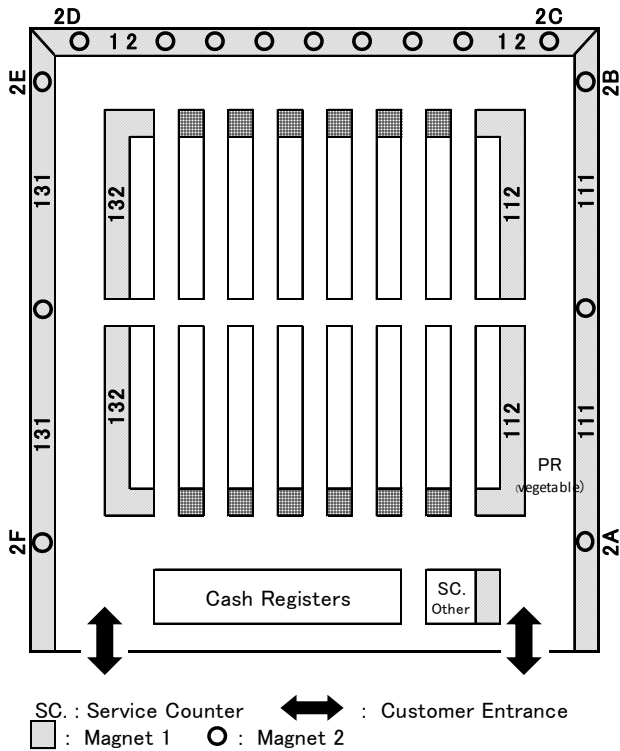


Fig. 1 Distribution of Store Magnets within a Shop

III. TRENDS IN SHOP FLOOR LAYOUT

To study recent shop floor layouts, we collected the layout of 64 shops within the supermarket category from 100 newly opened stores (including stores that underwent large-scale refurbishment), as published in three industry magazines [4], [5], [6] between October 2010 and April 2011. Fresh fruits and vegetables were at the entrance of all shops. Using this feature, we encoded a typical shop floor layout as shown in Fig. 1, with “Magnet 1” (111, 112, 12, 131, and 132) and “Magnet 2” (2A–2F) placed in relation to the fresh fruit and vegetable section. Table III shows the sections that acted as store magnets for the 64 shops.

A standard layout may be viewed as one in which the sections holding a no. 1 ranking are used as the store magnets. However, some problems persist; do we split DA between positions 112 and 132, and why does PF not hold a first-place ranking at all? To deal with this, the standard format for newly opened stores is a shop floor layout that considers both first and second ranked sections based on the experiences of the store staff, as summarized in Fig. 2. Fifty-nine of the 64 shops, or 92%, were organized using this standard format.

The five shops that were not organized using this format had the same configuration, with “Magnet 1” focused on locations 111, 112, and 12 while “Magnet 2” focused on locations 2A and 2B. The shop floor layout of these five stores is shown in Fig. 3, designated as “minority layout.”

IV. FIELDWORK AND ANALYSIS ON SHOP FLOORS

A. Fieldwork Summary

To clarify the special features of the standard layout and minority layout of the shop floors, as described in the preceding

section, we conducted case studies on Friday July 22, 2011 from 14:46 to 16:39. The case studies [7] were conducted in two stores in Fukushima, as shown in Table IV. These are new stores managed by the same company. Figs 4 and 5 show the respective shop floor layouts. A total of 127 customers who visited the two shops were the subjects for our survey.

TABLE III
 RECENT TRENDS IN SALES SECTIONS PLACED AT STORE MAGNET LOCATIONS

Store Magnet Location Code	Shop Floor			
	Ranking No. 1	Ranking No. 2	Ranking No. 3	
MAGNET 1	111	PR (92)	SF (77)	DA (34)
	112	DA (80)	PR (56)	SF, PF(17)
	12	MT (98)	SF (95)	DL (31)
	131	DL (84)	DA (66)	MT (33)
	132	DA (95)	PF (30)	MT (28)
MAGNET 2	2 A	PR (92)	DL (8)	-
	2 B	SF (75)	DL (9)	DA (8)
	2 C	SF (86)	MT (8)	DL (3)
	2 D	MT (52)	DL (23)	DA (20)
	2 E	DL (39)	MT (27)	DA (25)
	2 F	DL (58)	DA (38)	PF (3)

N.B. Figures in parentheses are percentages values of the 64 stores. Unit: %

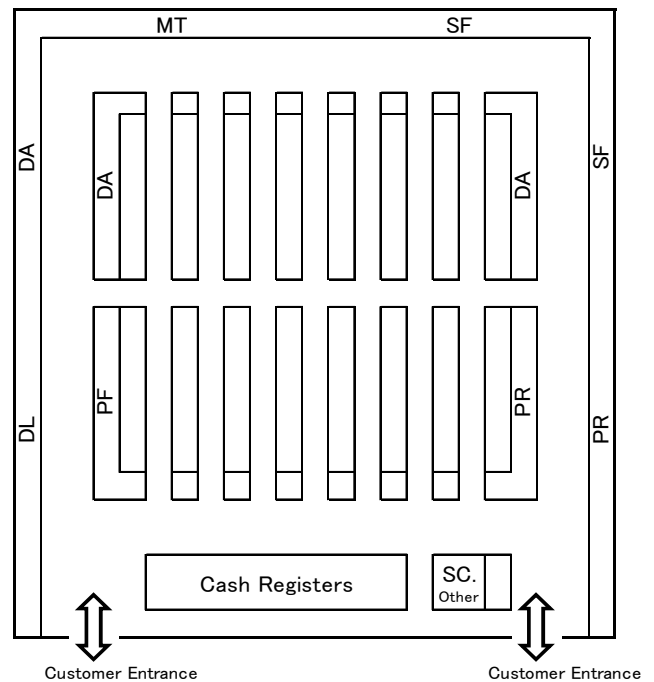


Fig. 2 Standard Layout

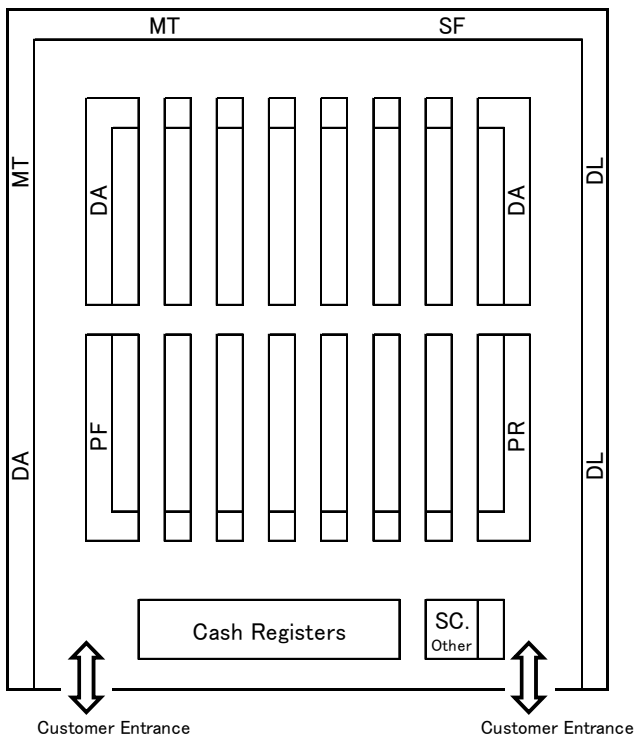


Fig. 3 Minority Layout

TABLE IV
 SUMMARY OF STORES STUDIED IN FIELDWORK

Store Classification	Shop Floor Area [m ²]	Annual Sales [bn. JPY]	Age of Shop [Years]
Standard Layout	2,043	18.0	3
Minority Layout	2,671	22.4	10

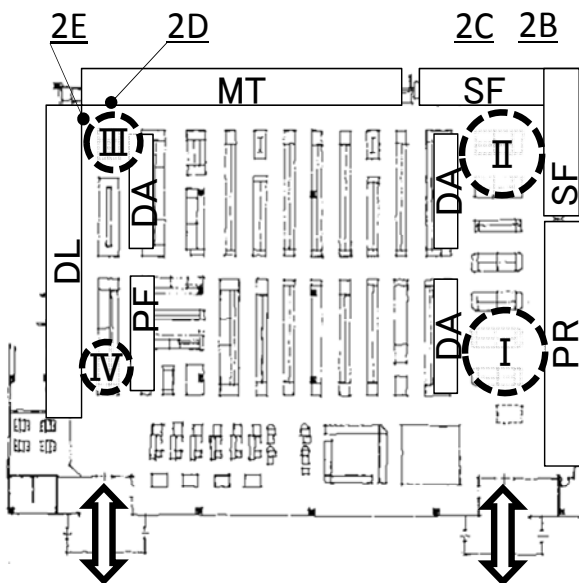


Fig. 4 Standard Layout Store as per Fieldwork

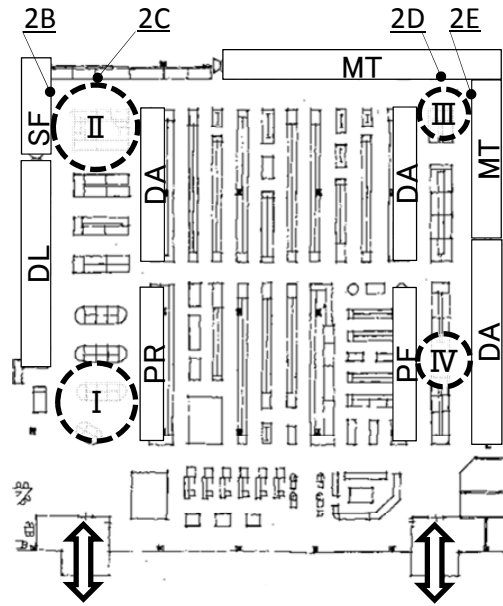


Fig. 5 Minority Layout Store as per Fieldwork

We studied the customer circulation rate and section drop-by rates for the two stores, with their different shop floor layouts. As indicated in Figs. 4 and 5, the customer circulation rate is designated as the percentage of customers, in time unit, who passed from location I to location IV—primarily locations that are strongly influenced by “Magnet 1.” We further distinguish between those customers who circulated “fruit & vegetable-wise” (i.e., they began their route through the entrance to the fruit and vegetable section) and those customers who circulated “counter fruit & vegetable-wise” (i.e., they began their route through the entrance that did not have the fruit & vegetables). The section drop-by rate is defined as the percentage of customers who stopped for one second or longer [8] at “Magnet 2” sections in locations 2B, 2C, 2D, and 2E within the time unit.

B. Customer Circulation Rate: Survey Results and Analysis

Table V shows the survey results on customer circulation rates. The standard layout shows that customers going around “fruit & vegetable-wise” circulate effectively. In contrast, under the minority format, the circulation rate was comparatively better in one section of the shop floor for the “counter fruit & vegetable-wise” route. Overall, we confirm that the standard format layout is more advantageous.

C. Section Drop-by Rates: Survey Results & Analysis

Table VI shows the survey results for section drop-by rates. We infer that the standard layout is clearly superior to the minority layout. Further, we see that users of shops with the minority layout, in particular customers taking the “counter fruit & vegetable-wise” route, were reluctant to visit locations 2B through 2E (SF: seafood and MT: fresh meat sections), which are at the back end of the shop and away from the entrance.

TABLE V

COMPARISON OF CUSTOMER CIRCULATION RATES BY STORE LAYOUT

Store Location Code	Customers Circulating Fruit & Vegetable-wise		Customers Circulating Counter Fruit & Vegetable-wise		All Customers	
	Standard Layout	Minority Layout	Standard Layout	Minority Layout	Standard Layout	Minority Layout
I	88	85	54	76	67	80
II	104	62	62	27	78	42
III	46	70	51	51	49	59
IV	112	25	97	78	103	56
E(x)	88	61	66	58	74	59

E(x): Average Value of Items Bought, Unit: [%]

[8] Katsutoshi YADA, Path analysis in a supermarket and string analysis technique, Statistical Mathematics, Vol.56, No2, pp.199-213, 2008.

TABLE VI

COMPARISON OF DROP-BY RATES BY STORE LAYOUT

Store Location Code	Customers Circulating Fruit & Vegetable-wise		Customers Circulating Counter Fruit & Vegetable-wise		All Customers	
	Standard Layout	Minority Layout	Standard Layout	Minority Layout	Standard Layout	Minority Layout
2B	63	19	38	14	23	8
2C	83	67	51	49	32	28
2D	58	26	36	19	22	11
2E	88	37	54	27	22	16
E(x)	73	45	37	27	28	16

E(x): Average Value of Items Bought, Unit: [%]

V. CONCLUSION

This report examined and categorized the shop floor layouts of newly opened supermarkets in Japan. As a result, we made a general classification between the standard layout, which accounted for approximately 90% of the survey sample, and the minority layout, used by less than 10% of the survey sample. We clarified in terms of store layout, the type of sales sections placed at the store magnets (the key display points within the store). Based on the survey results, we analyzed the customer circulation rates and section drop-by rates as influenced by the store magnets by layout. As a result, we were able to confirm the superiority of the standard layout.

Further steps need to be taken to continue and accumulate fieldwork research to improve the reliability of our data. We also intend to further categorize the standard format and explore the factors behind its superiority. In addition, we would like to investigate

REFERENCES

- [1] Shunichi ATSUMI, Store Layout, pp85-112 Zitsumukyo hiku press, 2003.
- [2] Ministry of Internal Affairs and Communications Japan, Statistics Bureau, Yearly Amount of Expenditures per Household for City Group, District and City with Prefectural Government, Household Expenditure Survey 2010, 2010.
- [3] Shunichi ATSUMI, The Indispensable word 1001 for a Chain Store, pp117-118, Japan Retailing Center, 2009.
- [4] Monthly Food Retailing, 39(11) - 40(5), the Shogyokai Publishing, 2010-2011.
- [5] Chain Store Age, 41(15) - 42(5), DIAMOND Friedman, 2010-2011.
- [6] Store Japan Weekly, No.612 - 637, Store Japan, 2010-2011.
- [7] Masao Ohta & Yoshiyuki Higuchi, A Study of Supermarket Location Distribution in Urban Areas, Innovation and Supply Chain Management, Vol.6, No.3, pp.105-111,2012.