SEM-based Customer Contentment Analysis on Mass Merchandiser

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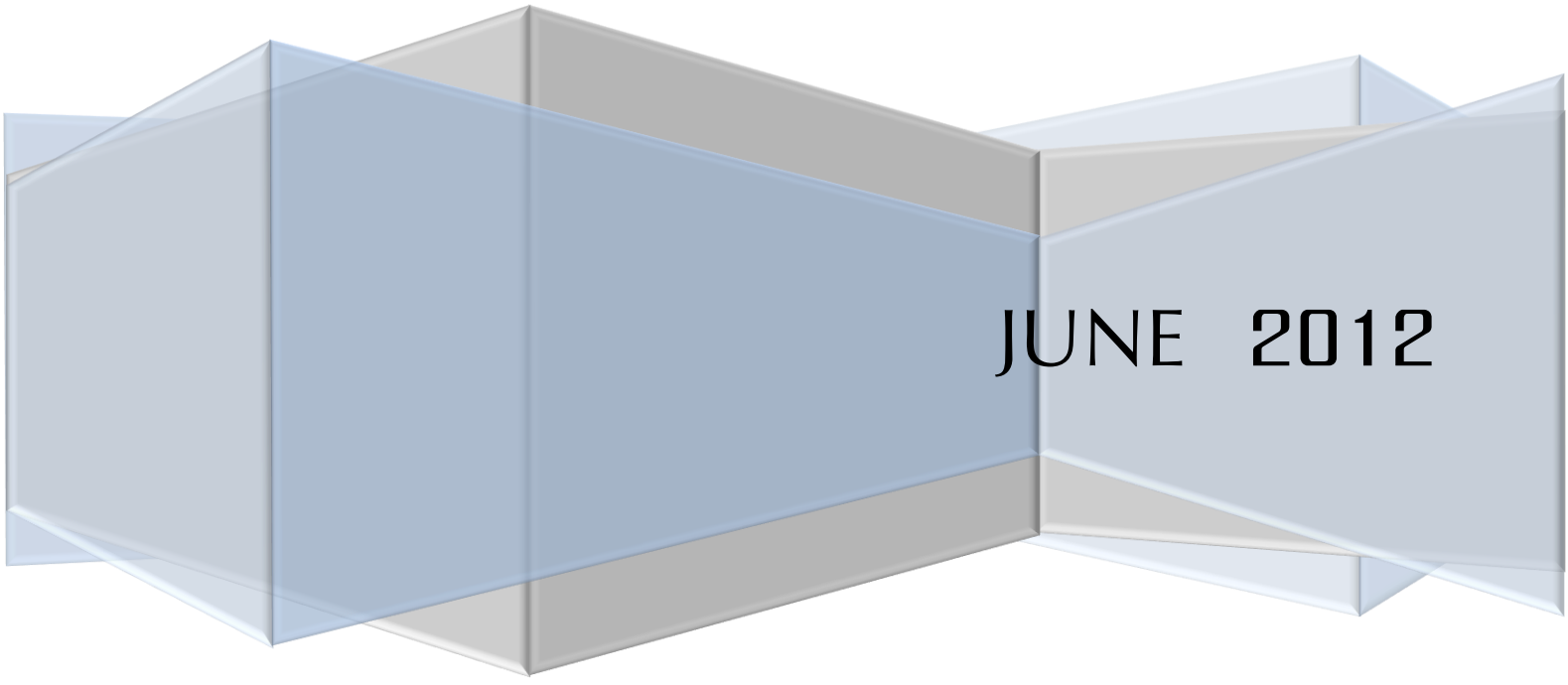

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I. Introduction

Mass merchandisers need to provide the correct information about their products and services to customers. Thus, it is necessary to have the information to enable customers to meet their real needs and to discover the best way to satisfy and retain customers, as well as to follow consumer sentiment, which can provide early warnings of market conduct and performance. This study seeks to understand ways to retain customers and to identify their levels of contentment with mass merchandisers. The research also focused on helping managers assess and identify the major strengths of the critical success factors of merchandisers, so that the company can sustain and maintain the success it has achieved in the market.

II. Methodology and methods

In this research, a previously validated questionnaire was used that was the basis of the study by Wu et al. (2009), which aimed to identify critical success factors for the E-Life Mall Corporation (Taiwan). In the present study, individual characterization items were adapted for the context, to be applied to customers of merchandisers. Five topics in the present study, analyses obtained **Cronbach's α** up to 0.897 or higher, which, according to the parameters, means the reliability of the instrument was good and very good for the respective dimensions.

The main objective of the study was to identify CSFs that maximize the satisfaction of customers, as well as to observe the degree of their satisfaction. To this end, data were collected using a survey with a questionnaire composed of 2 sections, collecting ***objective*** and ***subjective*** feedbacks, respectively. The former aims at the objective perspective from customers, commenting on the building, the products of the merchandiser, the quality of the service and product, and the traffic flow in the shopping area. The later aims at the subjective perspective, where the customers comment on the level of satisfaction, contentment, and impression on collective topics. In the questionnaire, qualitative variables were measured on a Likert ordinal scale with five points: 1 – Strongly disagree, 2 – Disagree, 3 – Neither agree nor disagree, 4 – Agree and 5 – Strongly Agree. The questions designed are presented as follows.

factor		measurement	
Building (M)	staff (AS)	A1	Staff is proactive and amicable.
		A2	Store has a sufficient number of staff.
		A3	Staff is energetic.
		A4	Staff is generous in giving help.
	design (AD)	A5	Products are labeled with detailed and regulated information.
		A6	Products are appropriately displayed.
		A7	Facilities are attractive.
		A8	Shopping center is clean and tidy.
		A9	Shopping center is comfortable.
		A10	Decor is with appropriate selection of colors.
	decor (AE)	A11	Background music is delightful.
		A12	Store lightening is bright.
		A13	Air is fresh indoor.
		A14	Store has a comfortable and pleasant atmosphere.

factor		measurement	
Product (P)	variety (BC)	B1	Store offers a variety of products.
		B2	Store has a wide spectrum of product type.
		B3	Store offers special and interesting products.
	placement (BW)	B4	Store offers products released by famous brands.
		B5	Store has enough inventory
		B6	Store offers mostly mainstream products
		B7	Store offers new products
		B8	Store offers products released by international brands.
	private brand (BP)	B9	Store offers a variety of products released by its own in-house brand.
		B10	Store has a wide spectrum of product type for products from its own in-house brand.

factor		measurement	
Quality (Q)	service (DS)	D1	Staff treats customers with respect.
		D2	Staff takes good care of customers.
		D3	Staff offers high-quality service.
		D4	Staff offers real time service.
	product (DP)	D5	Store offers high-quality products
		D6	Store offers durable products
		D7	Store offers fine products
		D8	Store offers reliable products

factor		measurement	
Traffic Flow (T)	space (ES)	E1	Store is specious.
		E2	Store has good air flow.
		E3	Store is uncomfortably confined.
	customer (EP)	E4	Store is usually crowded with customers
	staff (EB)	E5	Staff is always busy.

factor		measurement	
Satisfaction (F)	delight (CP)	**C1**	You feel joyful while shopping.
		C2	You feel comfortable while shopping
		C3	You feel excited while shopping
		C4	You feel stressed while shopping
	comfort (CC)	**C5**	You feel that you are in control of the surrounding.
	informative (CD)	**C6**	The store provides you with sufficient information while looking for certain products.

factor		measurement	
Contentment (S)	environment (FE)	**F1**	Store offers an ambient atmosphere for shopping.
		F2	Store offers a clean and sanitary environment.
		F3	Products are appropriately displayed, and traffic flow is well designed.
	parking (FS)	**F4**	It is easy to park.
	staff (FP)	**F5**	Staff is amicable.
		F6	Staff are clean and tidy in appearance
		F7	Cashiers has satisfactory register speed.
	product (FC)	**F8**	Prices are reasonable.
		F9	Prices are clearly labeled.
		F10	Product information is consistent with the advertisements.
		F11	Price matches the value of product.
		F12	Price matches the staff service.
		F13	Products offer great value for money.

factor		measurement	
Impression (I)	product (GP)	**G1**	Store offers a variety of products.
		G2	Prices are reasonable.
		G4	Product qualities are credible and trustworthy.
		G5	Store offers a variety of product brands.
		G6	Store has a good assortment of products.
	ambience (GS)	**G8**	Decor is bright and fresh.
		G9	Space is roomy and bright.
		G10	Store is well-equipped with safety facilities.
		G11	Staff has a good attitude in customer service.
		G13	Store offers good after-sales service.
	service (GG)	**G3**	Store offers mostly mainstream products.
		G7	Recreational facilities are attractive.
		G12	Staff have good knowledge of products.
	activity (GA)	**G14**	Store has many taste testing activities.
		G15	Store has many promotional activities.
		G16	Store has many exhibitions.

In order to meet the goals of the present study, the following analyses were carried out:

- Descriptive Analysis
  - With the background information and the behavioral research on consumers, descriptive analysis was performed on gender, education, monthly income, and so on and so forth.
  - By analyzing the averages and standard deviations of the variables among mass merchandisers, the demographics of samples were observed.

- Reliability Analysis and Confirmatory Factor Analysis
  - Reliability analysis were conducted, using **Cronbach's α**, where the factors with weaker reliability were removed, so to reduce dimensions.
  - 1st-order & 2nd-order confirmatory factor analysis (CFA) were proceeded for all factors.

- Structural Equation Modeling Analysis
  - Structural equation modeling (SEM) analysis was performed on the initialized model.
  - Based on the first output, weak connections were removed. Aiming at maximizing indexes, e.g. **GFI** and **AGFI**, the process was repeated to fine the best model.

III. Presentation of results and discussion

a. Descriptive Analysis

The study population was based on the customers visiting mass merchandisers, *Costco*, *Carrefour*, and *a.mart*, and all analyses were based on the responses of customers. Data were collected in 2012, from 280 customers responded to the questionnaire.

Table 1. Summary of the sample characterization

Item		Costco		Carrefour		a.mart		total	
		#sample	%	#sample	%	#sample	%	#sample	%
Location	North	42	**61.8**	110	**65.1**	33	**76.7**	185	**66.1**
	Central	6	**8.8**	22	**13.0**	8	**18.6**	36	**12.9**
	South	20	**29.4**	36	**21.3**	2	**4.7**	58	**20.7**
	East	0	**0.0**	1	**0.6**	0	**0.0**	1	**0.4**
gender	Male	31	**45.6**	82	**48.5**	22	**51.2**	135	**48.2**
	Female	37	**54.4**	87	**51.5**	21	**48.8**	145	**51.8**
age	<20	7	**10.3**	21	**12.4**	2	**4.7**	30	**10.7**
	21 to 40	29	**42.6**	102	**60.4**	20	**46.5**	151	**53.9**
	41 to 60	30	**44.1**	45	**26.6**	21	**48.8**	96	**34.3**
	61<	2	**2.9**	1	**0.6**	0	**0.0**	3	**1.1**
Education	PhD	4	**5.9**	7	**4.1**	3	**7.0**	14	**5.0**
	Master	18	**26.5**	54	**32.0**	9	**20.9**	81	**28.9**
	Graduate	44	**64.7**	106	**62.7**	28	**65.1**	178	**63.6**
	High School	2	**2.9**	2	**1.2**	3	**7.0**	7	**2.5**
Marital Status	Married	36	**52.9**	60	**35.5**	23	**53.5**	119	**42.5**
	Single	32	**47.1**	109	**64.5**	20	**46.5**	161	**57.5**
Monthly Income	170k<	9	**13.2**	16	**9.5**	5	**11.6**	30	**10.7**
	140k to 170k	6	**8.8**	11	**6.5**	3	**7.0**	20	**7.1**
	110k to 140k	9	**13.2**	20	**11.8**	3	**7.0**	32	**11.4**
	80k to 110k	16	**23.5**	38	**22.5**	9	**20.9**	63	**22.5**
	50k to 80k	15	**22.1**	39	**23.1**	10	**23.3**	64	**22.9**
	<50k	13	**19.1**	45	**26.6**	13	**30.2**	71	**25.4**
#people in a Household	11	0	**0.0**	2	**1.2**	0	**0.0**	2	**0.7**
	8	0	**0.0**	1	**0.6**	1	**2.3**	2	**0.7**
	7	2	**2.9**	2	**1.2**	0	**0.0**	4	**1.4**
	6	0	**0.0**	11	**6.5**	4	**9.3**	15	**5.4**
	5	15	**22.1**	33	**19.5**	9	**20.9**	57	**20.4**
	4	35	**51.5**	65	**38.5**	12	**27.9**	112	**40.0**
	3	4	**5.9**	28	**16.6**	10	**23.3**	42	**15.0**
	2	10	**14.7**	16	**9.5**	5	**11.6**	31	**11.1**
	1	2	**2.9**	11	**6.5**	2	**4.7**	15	**5.4**
#visits per Monthly	7<	2	**2.9**	2	**1.2**	0	**0.0**	4	**1.4**
	5 to 6	0	**0.0**	3	**1.8**	5	**11.6**	8	**2.9**
	3 to 4	17	**25.0**	29	**17.2**	11	**25.6**	57	**20.4**
	1 to 2	49	**72.1**	135	**79.9**	27	**62.8**	211	**75.4**
Visiting Time	20:00~23:00	10	**14.7**	41	**24.3**	14	**32.6**	65	**23.2**
	17:00~20:00	24	**35.3**	74	**43.8**	14	**32.6**	112	**40.0**
	14:00~17:00	23	**33.8**	45	**26.6**	12	**27.9**	80	**28.6**
	11:00~14:00	6	**8.8**	6	**3.6**	2	**4.7**	14	**5.0**
	08:00~11:00	5	**7.4**	3	**1.8**	1	**2.3**	9	**3.2**

Through the analysis of the results in Table 1, it can be said that:

- The largest percentage of respondents were belonging to the age group 21 to 40 years old, representing 53.9% of the respondents. It can also be noted that 98.9% of the individuals were less than or equal to 60 years old. Only 1.1% were older than 60 years. Also, comparing to Costco and a.mart, which have close ratios for group 21 to 40 years old and group 41 to 60 years old, Carrefour has 2 times higher for the former group than the later.
- The educational levels of the respondents corresponded to mostly university graduates (63.6%), for a total of 178 respondents. A large percentage of respondents also had a master's degree (28.9% or 81 respondents).
- The marital status of the respondents corresponded to mostly unmarried people for Carrefour (64.5% unmarried), while it was evenly observed in general for Costco and a.mart. Also, most customers are from a family of 4 with 40.0% of respondents, followed by a family of 5 with 20.4% of respondents.
- It can also be noted that up to 75.4% of respondents visit mass merchandisers 1 to 2 times; the most popular visiting hours were from 17:00 to 20:00 with 40.0% of respondents.

Table 2. Summary of statistics

Factor		Costco		Carrefour		a.mart		total	
		avg.	std.	avg.	std.	avg.	std.	avg.	std.
Building	staff	2.12	0.56	1.90	0.43	2.04	0.43	1.98	0.47
	design	2.27	0.48	2.05	0.39	2.11	0.44	2.11	0.43
	decor	4.63	0.79	4.22	0.74	4.28	0.75	4.33	0.77
Product	variety	2.40	0.40	2.11	0.39	2.11	0.39	2.18	0.41
	placement	4.03	0.59	3.45	0.61	3.35	0.75	3.57	0.68
	private brand	1.47	0.31	1.36	0.27	1.28	0.36	1.38	0.30
Quality	service	0.72	0.16	0.67	0.15	0.66	0.19	0.68	0.16
	product	0.69	0.21	0.68	0.18	0.67	0.19	0.68	0.19
Traffic Flow	space	1.56	0.29	1.42	0.29	1.41	0.31	1.45	0.30
	customer	0.74	0.20	0.74	0.19	0.81	0.25	0.77	0.22
	staff	2.07	0.56	1.87	0.42	1.91	0.49	1.92	0.47
Satisfaction	delight	3.21	0.44	2.51	0.52	2.52	0.57	2.68	0.59
	comfort	1.55	0.38	1.39	0.30	1.33	0.35	1.42	0.34
	informative	0.79	0.19	0.68	0.17	0.68	0.18	0.71	0.18
Contentment	environment	0.75	0.22	0.75	0.19	0.68	0.24	0.74	0.21
	parking	2.33	0.43	2.06	0.38	2.02	0.49	2.12	0.43
	staff	1.46	0.35	1.36	0.28	1.34	0.32	1.38	0.31
	product	4.66	0.66	4.03	0.75	4.10	0.95	4.19	0.81
Impression	product	3.93	0.59	3.48	0.63	3.54	0.81	3.60	0.68
	ambience	2.00	0.45	1.77	0.42	1.76	0.50	1.83	0.45
	service	3.86	0.73	3.40	0.63	3.44	0.72	3.52	0.70
	activity	1.60	0.32	1.34	0.33	1.33	0.38	1.40	0.35

b. Reliability analysis and Confirmatory Factory analysis

Reliability Analysis were conducted and presented in Table 3. Factors as **Building**, **Product**, **Quality**, **Contentment** obtained **Cronbach's α** up to 0.897 or higher with the analysis. This indicates that the set of items in a group are closely related to each other. For example, **Cronbach's α** for group Building is above 0.9, meaning the measurements from *A1* to *A14* provided by the respondents, i.e., how good the decoration is, how good the staff is at service, and so on, are highly correlated to each other. After removing the factors with weaker reliability, the **Cronbach's α** for all topics are presented in the table.

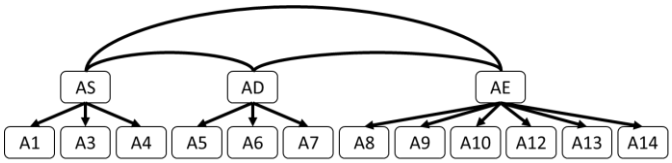
Table 3. Reliability analysis on variable

factor		variable	factor loading	Cronbach's α	Composite Reliability (CR)	t-value
Building (M)	AS	A1	0.829	0.928	0.898	36.039
		A3	0.895			49.634
		A4	0.863			42.490
	AD	A5	0.720		0.800	20.826
		A6	0.814			29.371
		A7	0.749			23.082
	AE	A8	0.802		0.904	33.018
		A9	0.826			37.219
		A10	0.815			35.131
		A12	0.720			22.785
		A13	0.678			19.360
		A14	0.841			40.522
Product (P)	BC	B1	0.621	0.897	0.753	14.178
		B2	0.764			22.220
		B3	0.758			21.821
	BW	B4	0.798		0.863	30.373
		B5	0.638			16.236
		B6	0.748			24.497
		B7	0.782			28.256
		B8	0.773			27.192
	BP	B9	0.837		0.820	24.019
		B10	0.795			22.116
Quality (Q)	DS	D1	0.815	0.920	0.899	34.715
		D3	0.951			65.903
		D4	0.825			36.264
	DP	D5	0.887		0.924	55.315
		D6	0.889			56.009
		D7	0.805			34.032
		D8	0.893			57.510
		G16	0.898			41.919
Traffic Flow (T)	ES	E1	0.832	0.633	0.837	8.388
		E2	0.866			8.447
	EB	E5	0.979		---	34.511
Satisfaction (F)	CP	C1	0.925	0.782	0.943	51.927
		C2	0.965			57.520
	CC	C5	0.871		---	103.500
	CD	C6	0.980		---	150.300

factor		variable	factor loading	Cronbach's α	Composite Reliability (CR)	t-value
Traffic Flow (T)	ES	E1	0.832	0.633	0.837	8.388
		E2	0.866			8.447
	EB	E5	0.979		---	34.511
Satisfaction (F)	CP	C1	0.925	0.782	0.943	51.927
		C2	0.965			57.520
	CC	C5	0.871		---	103.500
	CD	C6	0.980		---	150.300
Contentment (S)	FE	F1	0.845	0.944	0.884	40.210
		F2	0.913			57.746
		F3	0.790			30.586
	FS	F4	0.997		---	138.200
	FP	F5	0.869		0.891	43.146
		F6	0.925			54.092
	FC	F8	0.775		0.929	29.953
		F9	0.756			27.488
		F10	0.858			47.950
		F11	0.895			62.576
		F12	0.905			67.726
		F13	0.779			30.544
Impression (I)	GP	G1	0.751	0.948	0.917	26.537
		G2	0.817			36.583
		G4	0.798			28.317
		G5	0.833			39.982
		G6	0.865			48.772
	GS	G8	0.875		0.888	51.966
		G9	0.617			14.738
		G10	0.855			44.109
		G11	0.882			52.194
		G13	0.781			29.919
	GG	G3	0.748		0.800	25.704
		G7	0.836			32.603
		G12	0.677			19.341
	GA	G15	0.902		0.895	42.531
		G16	0.898			41.919

To continue, 1st-order & 2nd-order CFA were proceeded for all factors with path diagrams.

- **Building -** 1st-order CFA

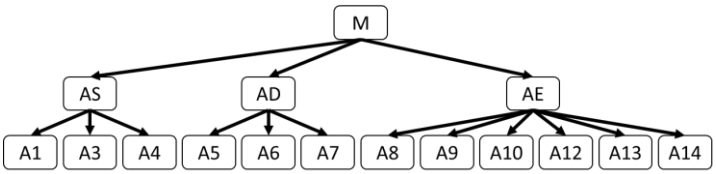


Factors to Variables	Estimated Loadings	Std.	t-values
AS→A1	0.83	0.02	36.04
AS→A3	0.90	0.02	49.63
AS→A4	0.86	0.02	42.49
AD→A5	0.72	0.03	20.83
AD→A6	0.81	0.03	29.37
AD→A7	0.75	0.03	23.08
AE→A8	0.80	0.02	33.02
AE→A9	0.83	0.02	37.22
AE→A10	0.81	0.02	35.13
AE→A12	0.72	0.03	22.78
AE→A13	0.68	0.04	19.36
AE→A14	0.84	0.02	40.52

Variables	Estimated Errors	Std.	t-values
A1	0.31	0.04	8.20
A3	0.20	0.03	6.13
A4	0.25	0.04	7.26
A5	0.48	0.05	9.66
A6	0.34	0.05	7.47
A7	0.44	0.05	9.06
A8	0.36	0.04	9.13
A9	0.32	0.04	8.70
A10	0.34	0.04	8.91
A12	0.48	0.05	10.61
A13	0.54	0.05	11.39
A14	0.29	0.03	8.39

between Factors	estimated corr coef.	Std.	t-value
AS-AD	0.69	0.04	16.27
AD-AE	0.83	0.03	27.52
AS-AE	0.68	0.04	17.45

- **Building -** 2nd-order CFA



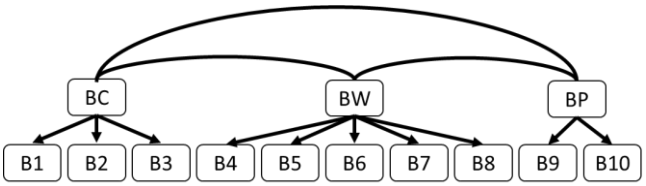
Sub Factors to Variables	Estimated Loadings	Std.	t-values
AS→A1	0.83	0.02	36.12
AS→A3	0.90	0.02	49.57
AS→A4	0.86	0.02	42.45
AD→A5	0.72	0.03	20.69
AD→A6	0.81	0.03	29.37
AD→A7	0.75	0.03	23.21
AE→A8	0.80	0.02	33.18
AE→A9	0.83	0.02	37.30
AE→A10	0.81	0.02	35.01
AE→A12	0.72	0.03	22.77
AE→A13	0.68	0.04	19.33
AE→A14	0.84	0.02	40.47

Variables	Estimated Errors	Std.	t-values
A1	0.31	0.04	8.18
A3	0.20	0.03	6.14
A4	0.26	0.04	7.27
A5	0.48	0.05	9.70
A6	0.34	0.05	7.47
A7	0.44	0.05	9.02
A8	0.35	0.04	9.11
A9	0.32	0.04	8.69
A10	0.34	0.04	8.92
A12	0.48	0.05	10.61
A13	0.54	0.05	11.40
A14	0.29	0.03	8.39

Factor to Sub Factors	Estimated Loadings	Std.	t-values
M→AS	0.75	0.04	20.91
M→AD	0.91	0.03	31.52
M→AE	0.91	0.02	36.93

Sub Factors	Estimated Errors	Std.	t-values
AS	0.31	0.04	8.18
AD	0.20	0.03	6.14
AE	0.26	0.04	7.27

- **Product -** 1st-order CFA

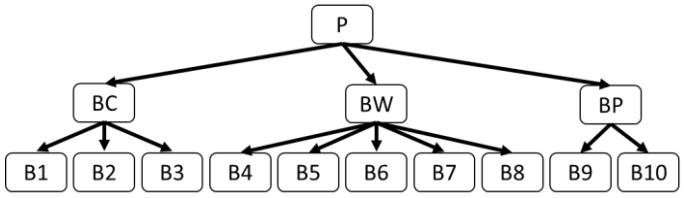


Factors to Variables	Estimated Loadings	Std.	t-values
BC→B1	0.62	0.04	14.18
BC→B2	0.76	0.03	22.22
BC→B3	0.76	0.03	21.82
BW→B4	0.80	0.03	30.37
BW→B5	0.64	0.04	16.24
BW→B6	0.75	0.03	24.50
BW→B7	0.78	0.03	28.26
BW→B8	0.77	0.03	27.19
BP→B9	0.84	0.03	24.02
BP→B10	0.79	0.04	22.12

Variables	Estimated Errors	Std.	t-values
B1	0.61	0.05	11.27
B2	0.42	0.05	7.91
B3	0.42	0.05	8.06
B4	0.36	0.04	8.66
B5	0.59	0.05	11.85
B6	0.44	0.05	9.66
B7	0.39	0.04	9.00
B8	0.40	0.04	9.17
B9	0.30	0.06	5.15
B10	0.37	0.06	6.46

between Factors	estimated corr coef.	Std.	t-value
BC-BW	0.83	0.03	23.95
BW-BP	0.73	0.04	17.36
BC-BP	0.58	0.06	10.00

- **Product -** 2nd-order CFA



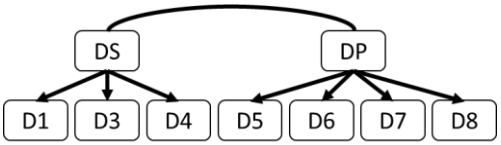
Sub Factors to Variables	Estimated Loadings	Std.	t-values
BC→B1	0.62	0.04	14.18
BC→B2	0.76	0.03	22.22
BC→B3	0.76	0.03	21.82
BW→B4	0.80	0.03	30.37
BW→B5	0.64	0.04	16.24
BW→B6	0.75	0.03	24.50
BW→B7	0.78	0.03	28.26
BW→B8	0.77	0.03	27.19
BP→B9	0.84	0.03	24.02
BP→B10	0.79	0.04	22.12

Variables	Estimated Errors	Std.	t-values
B1	0.61	0.05	11.27
B2	0.42	0.05	7.91
B3	0.42	0.05	8.06
B4	0.36	0.04	8.66
B5	0.59	0.05	11.85
B6	0.44	0.05	9.66
B7	0.39	0.04	9.00
B8	0.40	0.04	9.17
B9	0.30	0.06	5.15
B10	0.37	0.06	6.46

Factor to Sub Factors	Estimated Loadings	Std.	t-values
P→BC	0.81	0.04	18.51
P→BW	1.02	0.04	25.67
P→BP	0.71	0.05	15.17

Sub Factors	Estimated Errors	Std.	t-values
BC	0.34	0.07	4.80
BW	0.05	0.08	-0.58
BP	0.50	0.07	7.45

- **Quality -** 1st-order CFA

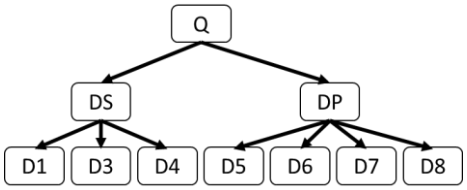


Factors to Variables	Estimated Loadings	Std.	t-values
DS→D1	0.82	0.02	34.71
DS→D3	0.95	0.01	65.90
DS→D4	0.82	0.02	36.26
DP→D5	0.89	0.02	55.31
DP→D6	0.89	0.02	56.01
DP→D7	0.80	0.02	34.03
DP→D8	0.89	0.02	57.51

Variables	Estimated Errors	Std.	t-values
D1	0.34	0.04	8.75
D3	0.10	0.03	3.47
D4	0.32	0.04	8.53
D5	0.21	0.03	7.51
D6	0.21	0.03	7.46
D7	0.35	0.04	9.25
D8	0.20	0.03	7.34

between Factors	estimated corr coef.	Std.	t-value
DS-DP	0.70	0.04	19.80

- **Quality -** 2nd-order CFA



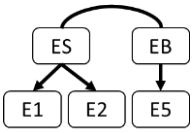
Sub Factors to Variables	Estimated Loadings	Std.	t-values
DS→D1	0.82	0.02	34.71
DS→D3	0.95	0.01	65.90
DS→D4	0.82	0.02	36.26
DP→D5	0.89	0.02	55.31
DP→D6	0.89	0.02	56.01
DP→D7	0.80	0.02	34.03
DP→D8	0.89	0.02	57.51

Variables	Estimated Errors	Std.	t-values
D1	0.34	0.04	8.75
D3	0.10	0.03	3.47
D4	0.32	0.04	8.53
D5	0.21	0.03	7.51
D6	0.21	0.03	7.46
D7	0.35	0.04	9.25
D8	0.20	0.03	7.34

Factor to Sub Factors	Estimated Loadings	Std.	t-values
Q→DS	0.84	0.02	35.27
Q→DP	0.84	0.02	44.79

Sub Factors	Estimated Errors	Std.	t-values
DS	0.30	0.04	7.53
DP	0.30	0.03	9.54

- **Traffic Flow -** 1st-order CFA

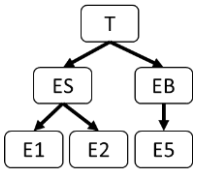


Factors to Variables	Estimated Loadings	Std.	t-values
ES→E1	0.83	0.10	8.39
ES→E2	0.87	0.10	8.45
EB→E5	0.98	0.03	34.51

Variables	Estimated Errors	Std.	t-values
E1	0.31	0.16	1.87
E2	0.25	0.18	1.41
E5	0.04	0.06	0.75

between Factors	estimated corr coef.	Std.	t-value
ES-EB	0.23	0.06	3.94

- **Traffic Flow -** 2nd-order CFA



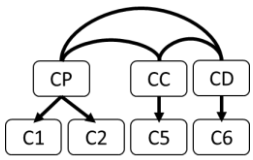
Sub Factors to Variables	Estimated Loadings	Std.	t-values
ES→E1	0.83	0.10	8.39
ES→E2	0.87	0.10	8.45
EB→E5	0.93	0.01	92.48

Variables	Estimated Errors	Std.	t-values
E1	0.31	0.16	1.87
E2	0.25	0.18	1.41
E5	0.13	0.02	6.85

Factor to Sub Factors	Estimated Loadings	Std.	t-values
T→ES	0.25	0.07	3.68
T→EB	0.96	0.00	1160.30

Sub Factors	Estimated Errors	Std.	t-values
ES	0.94	0.03	28.29
EB	0.08	0.00	50.36

- **Satisfaction -** 1st-order CFA

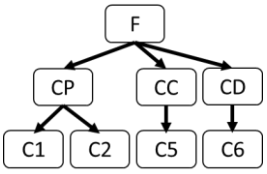


Factors to Variables	Estimated Loadings	Std.	t-values
CP→C1	0.93	0.02	51.93
CP→C2	0.97	0.02	57.52
CC→C5	0.87	0.01	103.50
CD→C6	0.98	0.01	150.30

Variables	Estimated Errors	Std.	t-values
C1	0.14	0.03	4.36
C2	0.07	0.03	2.11
C5	0.24	0.01	16.49
C6	0.04	0.01	3.13

between Factors	estimated corr coef.	Std.	t-value
CP-CC	0.73	0.04	20.17
CC-CD	0.21	0.07	3.21
CP-CD	0.30	0.06	5.34

- **Satisfaction -** 2nd-order CFA



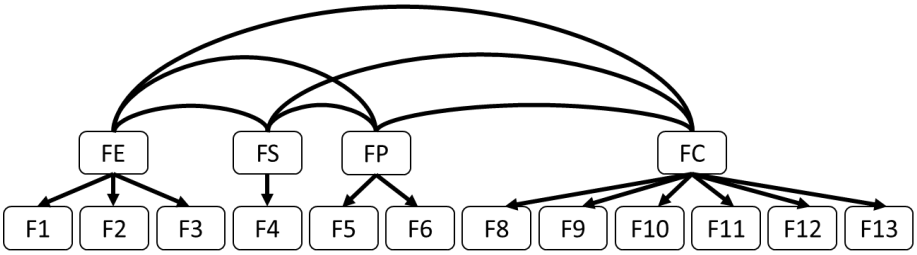
Sub Factors to Variables	Estimated Loadings	Std.	t-values
CP→C1	0.93	0.02	51.93
CP→C2	0.97	0.02	57.52
CC→C5	0.82	0.04	19.79
CD→C6	0.86	0.01	94.56

Variables	Estimated Errors	Std.	t-values
C1	0.14	0.03	4.36
C2	0.07	0.03	2.11
C5	0.33	0.07	4.97
C6	0.27	0.02	17.06

Factor to Sub Factors	Estimated Loadings	Std.	t-values
F→CP	1.02	0.13	8.06
F→CC	0.77	0.07	11.58
F→CD	0.34	0.07	4.62

Sub Factors	Estimated Errors	Std.	t-values
CP	-0.04	0.26	-0.17
CC	0.41	0.10	4.04
CD	0.89	0.05	18.03

- **Contentment -** 1st-order CFA

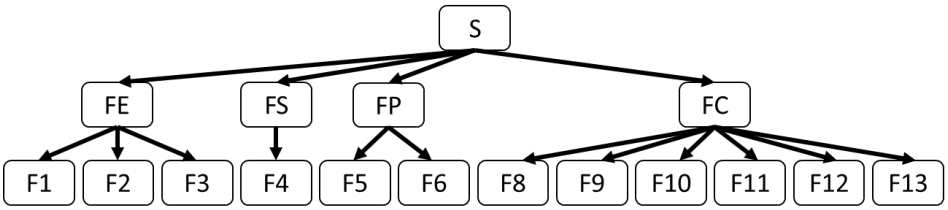


Factors to Variables	Estimated Loadings	Std.	t-values
FE→F1	0.85	0.02	40.21
FE→F2	0.91	0.02	57.75
FE→F3	0.79	0.03	30.59
FS→F4	1.00	0.01	138.20
FP→F5	0.87	0.02	43.15
FP→F6	0.92	0.02	54.09
FC→F8	0.77	0.03	29.95
FC→F9	0.76	0.03	27.49
FC→F10	0.86	0.02	47.95
FC→F11	0.90	0.01	62.58
FC→F12	0.90	0.01	67.73
FC→F13	0.78	0.03	30.54

Variables	Estimated Errors	Std.	t-values
F1	0.29	0.04	8.03
F2	0.17	0.03	5.76
F3	0.38	0.04	9.20
F4	0.01	0.01	0.40
F5	0.24	0.04	6.98
F6	0.15	0.03	4.59
F8	0.40	0.04	9.99
F9	0.43	0.04	10.29
F10	0.26	0.03	8.57
F11	0.20	0.03	7.76
F12	0.18	0.02	7.49
F13	0.39	0.04	9.92

between Factors	estimated corr coef.	Std.	t-value
FE-FS	0.53	0.04	12.00
FE-FP	0.81	0.03	28.44
FE-FC	0.77	0.03	25.59
FS-FP	0.48	0.05	10.09
FS-FC	0.51	0.04	11.58
FP-FC	0.78	0.03	26.62

- **Contentment** - 2nd-order CFA



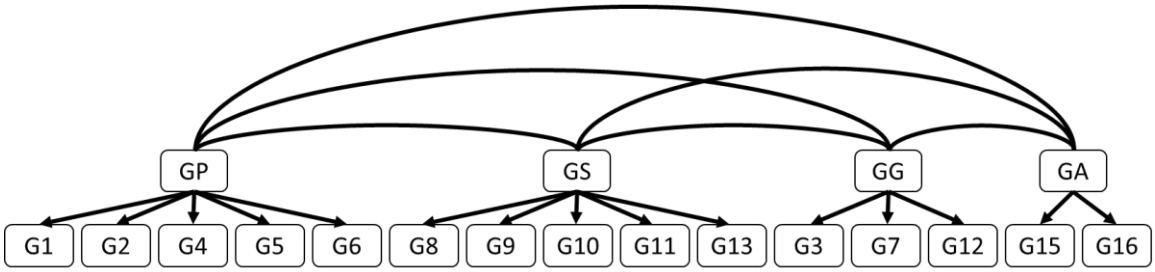
Sub Factors to Variables	Estimated Loadings	Std.	t-values
FE→F1	0.85	0.02	40.16
FE→F2	0.91	0.02	57.97
FE→F3	0.79	0.03	30.46
FS→F4	1.00	0.01	83.35
FP→F5	0.87	0.02	43.17
FP→F6	0.92	0.02	53.69
FC→F8	0.77	0.03	29.79
FC→F9	0.76	0.03	27.47
FC→F10	0.86	0.02	47.82
FC→F11	0.90	0.01	62.80
FC→F12	0.91	0.01	67.93
FC→F13	0.78	0.03	30.60

Variables	Estimated Errors	Std.	t-values
F1	0.29	0.04	8.04
F2	0.16	0.03	5.72
F3	0.38	0.04	9.22
F4	0.01	0.02	0.26
F5	0.24	0.04	6.93
F6	0.15	0.03	4.62
F8	0.40	0.04	10.01
F9	0.43	0.04	10.29
F10	0.26	0.03	8.57
F11	0.20	0.03	7.75
F12	0.18	0.02	7.48
F13	0.39	0.04	9.92

Factor to Sub Factors	Estimated Loadings	Std.	t-values
S→FE	0.90	0.02	39.30
S→FS	0.57	0.04	14.82
S→FP	0.90	0.02	38.03
S→FC	0.87	0.02	36.79

Sub Factors	Estimated Errors	Std.	t-values
FE	0.19	0.04	4.65
FS	0.67	0.04	15.20
FP	0.20	0.04	4.66
FC	0.25	0.04	6.12

- **Impression -** 1st-order CFA

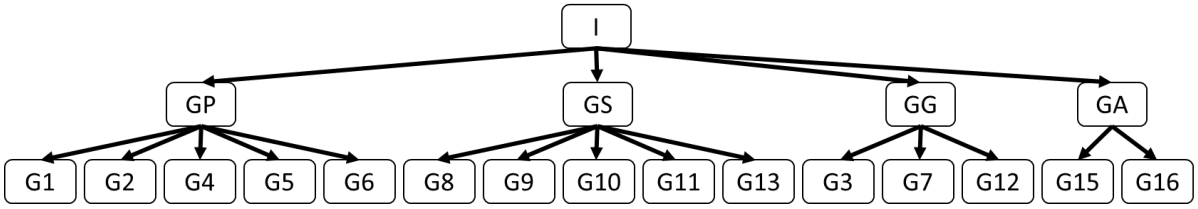


Factors to Variables	Estimated Loadings	Std.	t-values
GP→G1	0.75	0.03	26.54
GP→G2	0.82	0.02	36.58
GG→G3	0.80	0.03	28.32
GP→G4	0.83	0.02	39.98
GP→G5	0.87	0.02	48.77
GP→G6	0.87	0.02	51.97
GG→G7	0.62	0.04	14.74
GS→G8	0.85	0.02	44.11
GS→G9	0.88	0.02	52.19
GS→G10	0.78	0.03	29.92
GS→G11	0.75	0.03	25.70
GG→G12	0.84	0.03	32.60
GS→G13	0.68	0.04	19.34
GA→G15	0.90	0.02	42.53
GA→G16	0.90	0.02	41.92

Variables	Estimated Errors	Std.	t-values
G1	0.44	0.04	10.24
G2	0.33	0.04	9.12
G3	0.36	0.05	8.06
G4	0.31	0.03	8.84
G5	0.25	0.03	8.19
G6	0.23	0.03	7.98
G7	0.62	0.05	12.00
G8	0.27	0.03	8.14
G9	0.22	0.03	7.45
G10	0.39	0.04	9.55
G11	0.44	0.04	10.14
G12	0.30	0.04	7.01
G13	0.54	0.05	11.44
G15	0.19	0.04	4.85
G16	0.19	0.04	5.05

between Factors	estimated corr coef.	Std.	t-value
GP-GS	0.86	0.02	38.37
GP-GG	0.82	0.03	26.69
GP-GA	0.74	0.03	22.04
GS-GG	0.82	0.03	26.54
GS-GA	0.69	0.04	18.26
GG-GA	0.67	0.04	15.54

- **Impression -** 2nd-order CFA



Sub Factors to Variables	Estimated Loadings	Std.	t-values
GP→G1	0.75	0.03	26.50
GP→G2	0.82	0.02	36.47
GG→G3	0.81	0.03	29.06
GP→G4	0.83	0.02	40.20
GP→G5	0.87	0.02	48.83
GP→G6	0.87	0.02	51.80
GG→G7	0.62	0.04	14.73
GS→G8	0.86	0.02	46.09
GS→G9	0.89	0.02	54.81
GS→G10	0.78	0.03	29.13
GS→G11	0.74	0.03	24.98
GG→G12	0.83	0.03	31.58
GS→G13	0.67	0.04	18.95
GA→G15	0.90	0.02	42.10
GA→G16	0.90	0.02	42.23

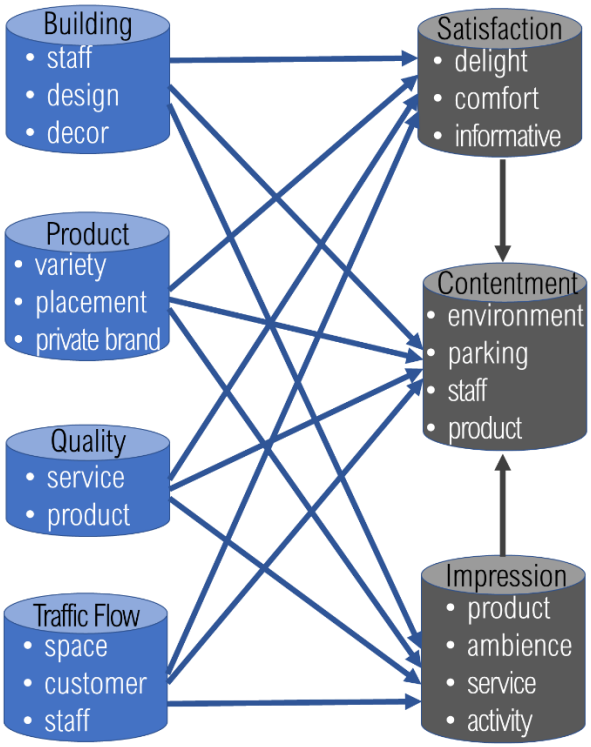
Variables	Estimated Errors	Std.	t-values
G1	0.44	0.04	10.24
G2	0.33	0.04	9.13
G3	0.35	0.04	7.83
G4	0.30	0.03	8.82
G5	0.25	0.03	8.19
G6	0.24	0.03	7.99
G7	0.62	0.05	11.97
G8	0.26	0.03	8.00
G9	0.21	0.03	7.26
G10	0.40	0.04	9.67
G11	0.45	0.04	10.28
G12	0.31	0.04	7.20
G13	0.55	0.05	11.56
G15	0.19	0.04	4.97
G16	0.19	0.04	4.92

Factor to Sub Factors	Estimated Loadings	Std.	t-values
I→GP	0.94	0.02	54.35
I→GS	0.91	0.02	46.12
I→GG	0.88	0.03	33.15
I→GA	0.78	0.03	24.70

Sub Factors	Estimated Errors	Std.	t-values
GP	0.12	0.03	3.60
GS	0.17	0.04	4.89
GG	0.23	0.05	4.98
GA	0.40	0.05	8.14

c. Structural Equation Modeling analysis

To begin , the most complex structure is built, where we assume endogenous variables are affected by all exogenous variables. As shown previously, where **Building**, **Product**, **Quality**, and **Traffic Flow** point to **Satisfaction**, **Contentment**, and **Impression**; among endogenous variables, **Satisfaction** and **Impression** both point to **Contentment**.



latent variables			
exogenous		endogenous	
Building (M)	staff (AS)	Satisfaction (F)	delight (CP)
	design (AD)		comfort (CC)
	décor (AE)		informative (CD)
Product (P)	variety (BC)	Contentment (S)	environment (FE)
	placement (BW)		parking (FS)
	private brand (BP)		staff (FP)
Quality (Q)	service (DS)		product (FC)
	product (DP)	Impression (I)	product (GP)
Traffic Flow (T)	space (ES)		ambience (GS)
	customer (EP)		service (GG)
	staff (EB)		activity (GA)

Next,

i. structural equation modeling (SEM) analysis is performed. The indexes from the first output, i.e., ***GFI***, ***AGFI***, ***NFI***, and ***NNFI***, are served as baselines.

ii. links with significance below the threshold (self-defined, adjustable before reaching the final structure), and perform the analysis once more.

iii. If the indexes improve, repeat the process based on the latest structure, which includes removing few links, performing the analysis, and inspecting the indexes. On the other hand, repeat the process based on the previous structure if the indexes worsen or sustain.

The process stops if no significant improvement is observed, and the (locally) best fitted model is attained. In our experiments, the best fitted model is presented as below.

Figure 2. SEM Structure

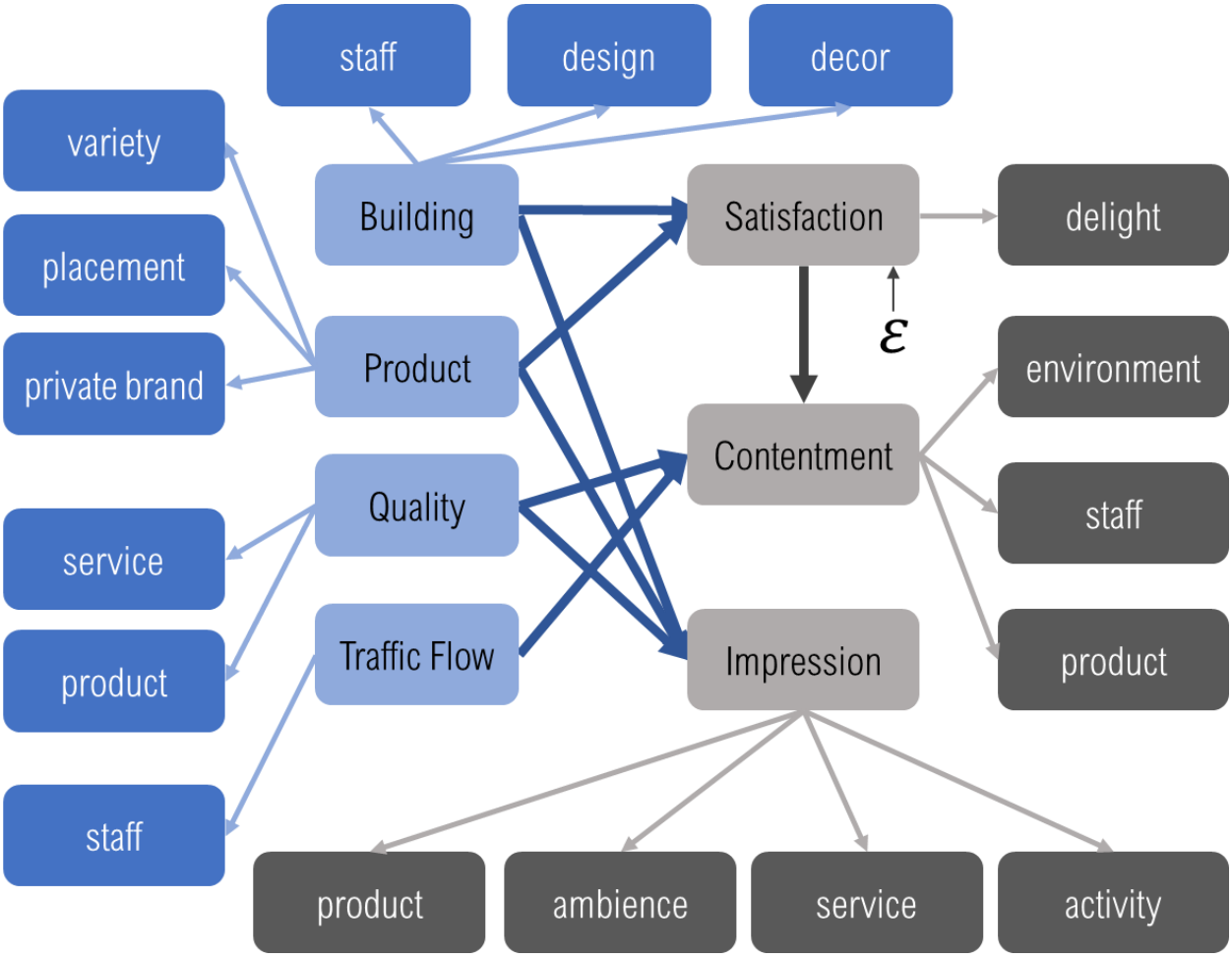


Table 6. Analytical Outputs

Exogenous	SEM coef.	Std.	t-value
M→AS	0.682	0.053	16.422
M→AD	0.775	0.046	21.601
M→AE	0.912	0.036	32.383
P→BC	0.758	0.048	18.604
P→BW	0.903	0.041	25.938
P→BP	0.658	0.054	14.441
Q→DS	0.724	0.048	17.453
Q→DP	0.744	0.046	18.432
T→EB	1.000	0.028	35.480

Endogenous	SEM coef.	Std.	t-value
F→CP	0.886	0.023	44.950
S→FE	0.813	0.037	27.046
S→FP	0.649	0.049	17.522
S→FC	0.734	0.042	22.168
I→GP	0.805	0.041	24.295
I→GS	0.824	0.039	25.517
I→GG	0.617	0.057	14.720
I→GA	0.568	0.061	12.833

SEM	SEM coef.	Std.	t-value
M→F	0.912	0.024	38.691
P→F	0.287	0.036	7.384
Q→S	0.784	0.022	24.854
T→S	0.331	0.020	10.374
F→S	0.636	0.026	19.241
M→I	0.394	0.030	10.509
P→I	0.489	0.026	13.967
Q→I	0.808	0.024	24.248

Table 7. Steps for Model Fitting

analytical output	1st step	2nd step	3rd step	4th step	5th step
Fit Function	7. 1819	6. 4412	5. 3857	4. 4317	4. 1243
Goodness of Fit Index (GFI)	0. 6272	0. 6323	0. 6476	0. 7008	**0. 7013**
GFI Adjusted for Degrees of Freedom (AGFI)	0. 4934	0. 4886	0. 5077	0. 57	**0. 5605**
Root Mean Square Residual (RMR)	0. 3763	0. 393	0. 4063	0. 3747	0. 3883
Standardized Root Mean Square Residual (SRMR)	0. 3763	0. 393	0. 4063	0. 3747	0. 3883
Parsimonious GFI (Mulaik, 1989)	0. 5077	0. 5025	0. 5151	0. 545	0. 5363
Chi-Square	2003. 7633	1797. 0898	1502. 6125	1236. 4352	1150. 6692
Chi-Square DF	170	151	136	119	104
Pr > Chi-Square	<. 0001	<. 0001	<. 0001	<. 0001	<. 0001
Independence Model Chi-Square	5671. 6	5435. 6	5032. 4	4708. 8	4463. 2
Independence Model Chi-Square DF	210	190	171	153	136
RMSEA Estimate	0. 1966	0. 1977	0. 1898	0. 1835	0. 1899
RMSEA 90% Lower Confidence Limit	0. 189	0. 1895	0. 1812	0. 1743	0. 1801
RMSEA 90% Upper Confidence Limit	0. 2044	0. 2059	0. 1985	0. 1928	0. 1999
ECVI Estimate	7. 6567	6. 8985	5. 8027	4. 8317	4. 4997
ECVI 90% Lower Confidence Limit	7. 134	6. 4051	5. 3544	4. 4277	4. 1105
ECVI 90% Upper Confidence Limit	8. 2084	7. 4209	6. 2799	5. 2644	4. 9176
Probability of Close Fit	0	0	0	0	0
Bentler's Comparative Fit Index	0. 6642	0. 6862	0. 7189	0. 7547	0. 7581
Normal Theory Reweighted LS Chi-Square	1741. 4482	1622. 3784	1442. 0575	1072. 2522	1010. 2771
Akaike's Information Criterion	1663. 7633	1495. 0898	1230. 6125	998. 4352	942. 6692
Bozdogan's (1987) CAIC	875. 849	795. 2366	600. 2811	446. 8953	460. 651
Schwarz's Bayesian Criterion	1045. 849	946. 2366	736. 2811	565. 8953	564. 651
McDonald's (1989) Centrality	0. 0378	0. 0529	0. 0871	0. 136	0. 1543
Bentler & Bonett's (1980) NNFI	0. 5852	0. 6051	0. 6465	0. 6846	**0. 6837**
Bentler & Bonett's (1980) NFI	0. 6467	0. 6694	0. 7014	0. 7374	**0. 7422**
James, Mulaik, & Brett (1982) Parsimonious NFI	0. 5235	0. 532	0. 5578	0. 5735	**0. 5676**
Z-Test of Wilson & Hilferty (1931)	35. 3228	33. 486	30. 401	27. 3981	26. 6183
Bollen (1986) Normed Index Rho1 (NFI)	0. 5636	0. 584	0. 6246	0. 6624	**0. 6629**
Bollen (1988) Non-normed Index Delta2 (NNFI)	0. 6667	0. 6885	0. 7209	0. 7565	**0. 7599**
Hoelter's (1983) Critical N	30	30	32	34	33

Comparing to the initial model, removed links are:

- **Quality→Satisfaction**
- **Traffic Flow→Satisfaction**
- **Building→Contentment**
- **Product→Contentment**
- **Traffic Flow→Impression**

The deletions mainly result from the initial model assigning Satisfaction to **Contentment**. Through **Satisfaction**, **Building** and **Product** contribute to **Contentment**; the links from **Quality** and **Traffic Flow** to **Contentment** lead to higher *GFI* and *AGFI*. Furthermore, the link from **Traffic Flow** to **Impression** were removed. Also, **Impression** was not significantly related to **Satisfaction** and **Contentment**.

IV. Summary

In the present work, we study the causal effects from *buildings* and *service* to *satisfaction*, *contentment* and *impression* for mass merchandisers. Based on the best fitted model, the discoveries are:

- On **Building**, well display, fine labeling of the product information, and proper lighting effect and music improve Contentment significantly.
- On **Product**, plentiful product types and rich variety of brands improve **Contentment**, especially for sufficient well-known, international brands resulting in sharp improvement. On the contrary, wide range of products with private brands has poor effects on **Contentment**.
- On **Quality**, staff service and quality of product have general effects on **Contentment**.
- On **Traffic Flow**, large indoor spaces and less crowdedness improve **Contentment** significantly.
- On **Building**, comparing to variety of product, environment has more effects on **Satisfaction**.
- Staff service and product quality generally effects the level of contentment, and ultimately define the impression of the merchandisers.

To sum up, staff service and product quality paly the most important roles in the level of Contentment and customer retention rate. Building, environment, and decor come next.

In the present work, individual comparisons of different mass merchandisers have not been made, and it is recommended that they can be disassembled and analyzed separately. Perhaps different retail stores will determine their contentment through different influencing factors; or different income will have different sensory effects. The above order is the direction that can be further analyzed.