Just Walk Out

Team 8

Contents

Will it be more profitable if manned convenience stores switch to unmanned convenience stores using Just Walk Out technology?

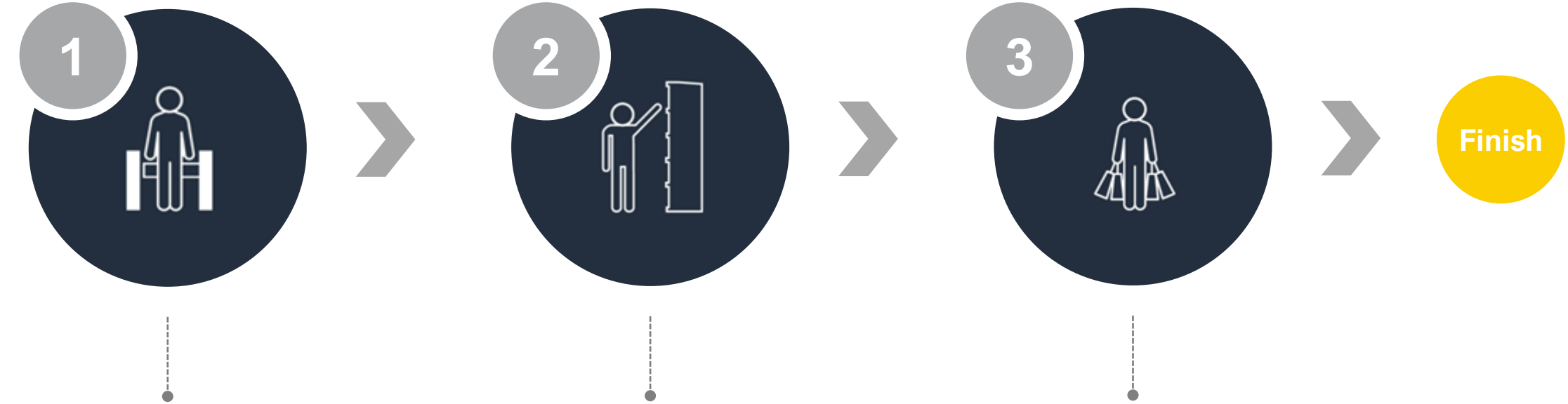
Environmental Analysis

1

Item

- ITEM Description
- Perspective in the analysis
- Technologies adopted
- Current Status and Future Prospects

1 Item Description



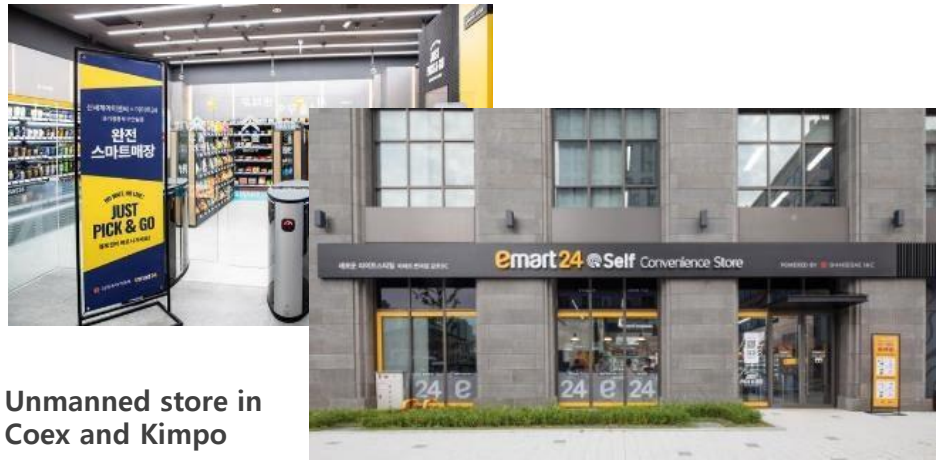
https://justwalkout.com/

2 Perspective in the analysis

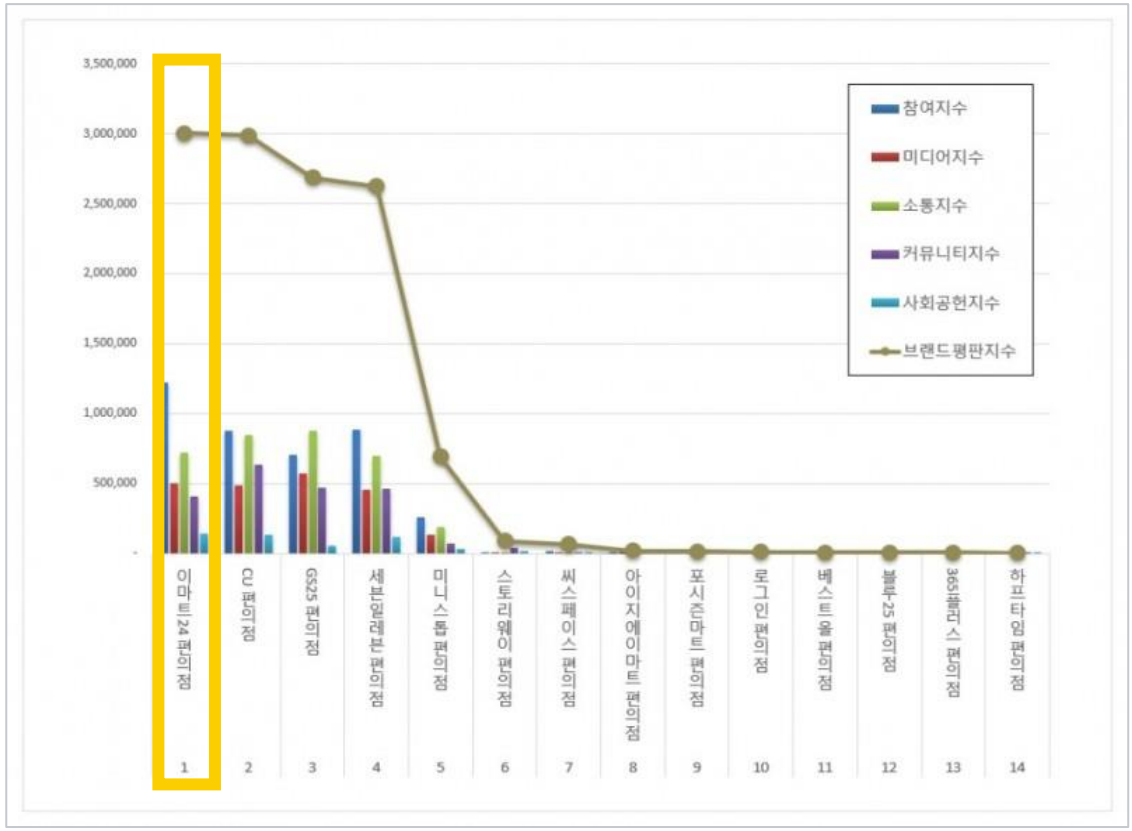
PROVIDER

emart24

- **Active expansion** of unmanned convenience stores
- Ranked first in brand reputation



Unmanned store in
Coex and Kimpo



https://cnews.pinpointnews.co.kr/

3 Technologies adopted

Automated Payment System?

Enter

QR code

Amazon One to scan their palm

insert a credit or debit card linked to their Amazon account

User movement analysis

computer vision

sensor fusion

deep learning

Cloud POS

Weight Sensor

https://digitaltransformation.co.kr/
https://www.aboutamazon.com/news/retail/amazon-fresh-grocery-store-meet-just-walk-out-shopping

4 Current Status

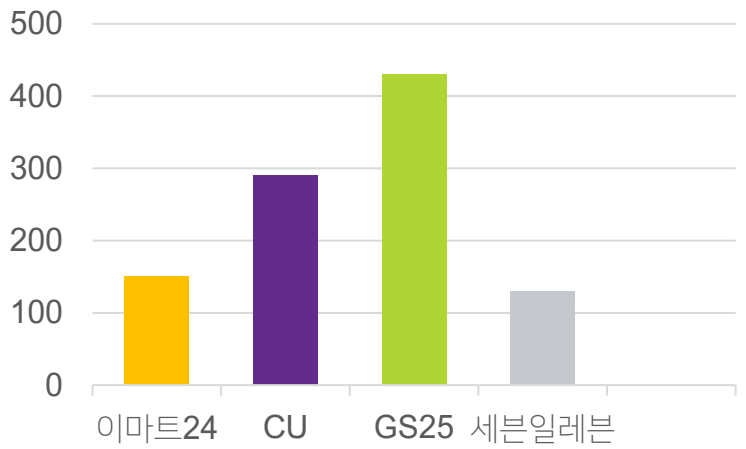
What is Hybrid Convenience Store?

“A manned store during the day,
An unmanned store at night”

access systems and **self-payment systems**
through **identity authentication**

- **In-School**
- **In-Office**
- **In-Factory**

The number of "Hybrid Convenience Store"



How about

Convenience store that's always open?

https://news.mt.co.kr/mtview.php?no=2021071414240080736

5 Future Prospects of the Item & Technology

"Amazon's ability to scale its cashier-less tech to a full-size grocery store with Just Walk Out technology will send ripples throughout the grocery and retail industry, giving a snapshot of what the future could look like,"

https://www.winsightgrocerybusiness.com/amp/retailers/amazons-just-walk-out-technology-makes-waves

2

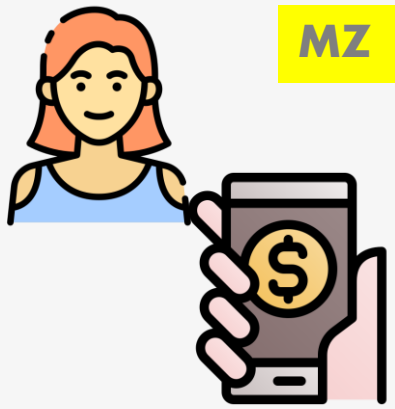
Market

- Customer Analyses
- Competitors Analyses
- Market Analyses
- Regulations

1 Customer Analysis

Target customer : Convenience store users

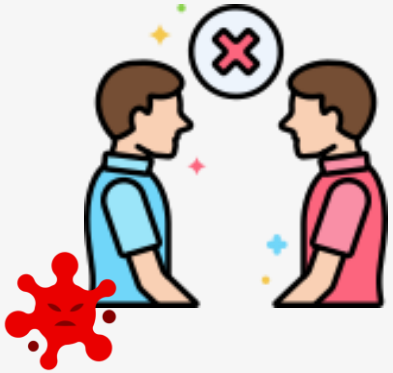
Characteristics



Familiar with digital technology (ex>***Mobile payment***)

Value the latest trends & unique experiences

Value convenience & shopping experience



Prefer **Non-face-to-face**

https://www.hankyung.com/economy/article/202103032868g
https://m.etnews.com/20200401000131
https://inthenews.co.kr/mobile/article.html?no=33306

2 Competitors Analysis

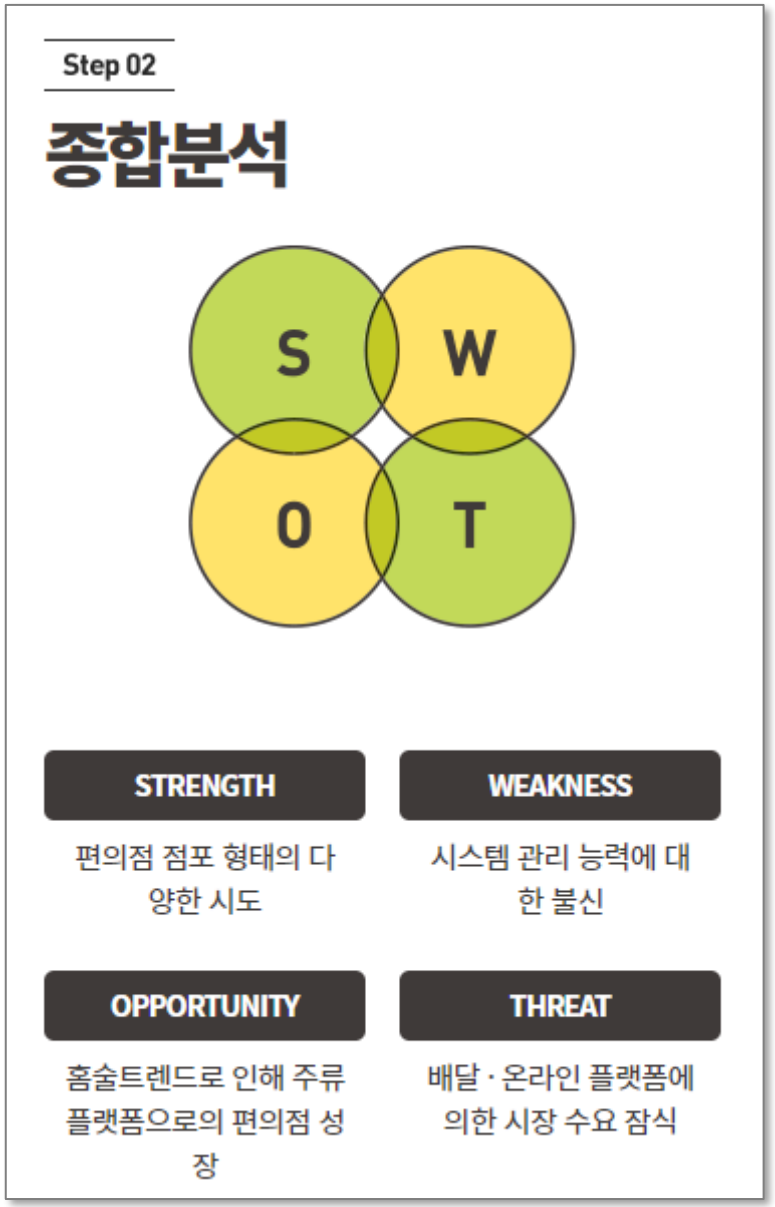
Emerging Competitors : Online shopping market & supermarkets

Why? The main purpose is to buy groceries

배민B마트

coupang

➡ **Price competition** and **differentiation strategies**



https://www.catch.co.kr/Comp/AnalysisCompView?ID=1207
https://www.speconomy.com/news/articleView.html?idxno=238892
https://www.mk.co.kr/news/business/view/2021/05/452623/

3 Market Analysis

Market Size & Growth

210%

over the past **10 years**

The global unmanned convenience store market

expected to grow from **$67 million** in 2019 to **$1.6 billion** in 2027
Average annual growth rate: 51.9%

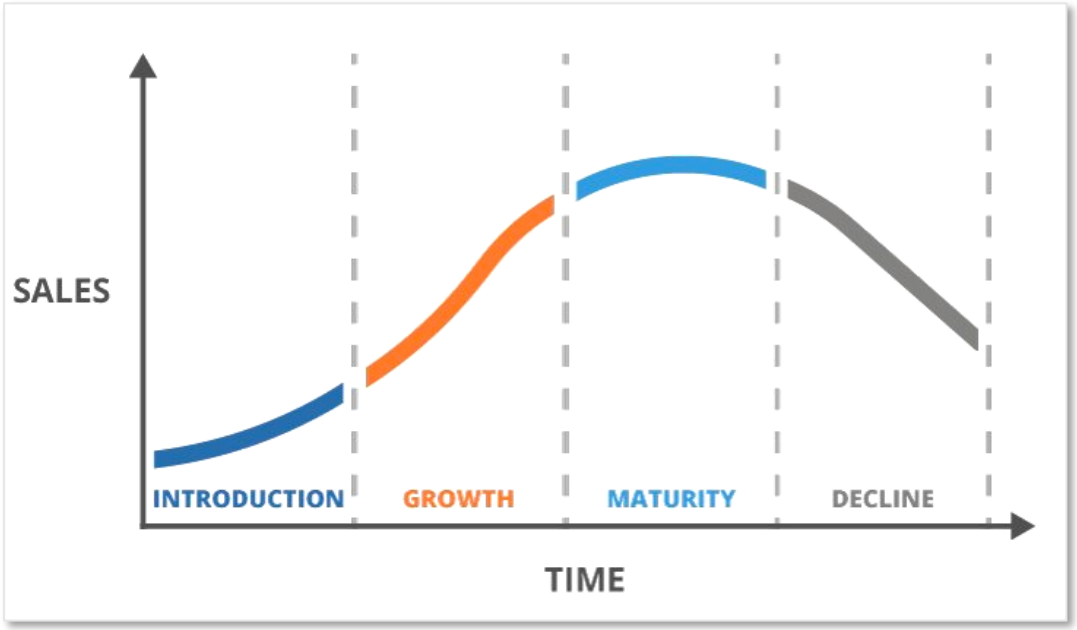
https://paxnetnews.com/articles/70159
https://www.researchandmarkets.com

3 Market Analysis

Convenience Store:
Red Ocean?

- The number of new stores
- The entire convenience store market
- The performance of related companies

has steadily risen !



"Time to introduce automatic payment"

https://magazine.hankyung.com/business/article/202006100326b
https://www2.deloitte.com/content/dam/Deloitte/kr/Documents/consumer-business/2020/kr_consumer_issue-highlights_20200128.pdf

4 Regulations

- Convenience stores are **relatively free** compared to supermarkets

	Mandatory holiday	Late night time regulation
Convenience store	X	X
Supermarket	○	○

- The convenience store **distance limit** ends in December this year

- **Liquor sales** are allowed in unmanned stores

http://biz.heraldcorp.com/view.php?ud=20210705000312&cpv=1

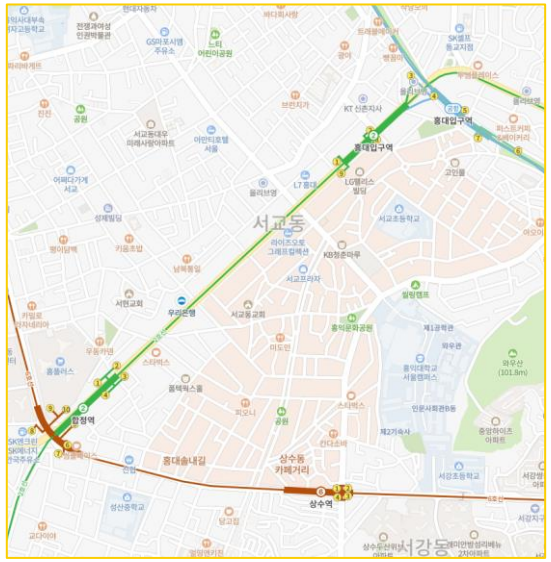
Topic

E-mart 24

Unmanned store
in Coex and Kimpo

The company's active expansion of unmanned convenience stores compared with other brands

Targeting MZ



Hot place like Hapjeong station and Hongdae Station that target customers, MZ generation, go to often

Topic

Would it be valuable if Emart24 near **Hapjeong Station and Hongdae Station** to transform into Unmanned convenience store using Just-Walk-Out technology?

Cost and Benefit Analysis

1

Item Identification & Estimation Process - Benefit

2 Benefit Item

	Tangible	Intangible
Effectiveness	- Increase in the number of customers - Personalized service through customer big data	- Increase in store turnover - Increase in customer convenience - Increase in customer satisfaction
Efficiency	- Reducing labor cost	- Save time (no waiting in line, reduced payment time, reduced time to cancel the purchased item)

2 Benefit Item : tangible

Apps Users : 2000 about 90,000 per year, in 19 Muji personalized marketing revenue growth due to 46 percent.

→ *E-Mart, 24 the number of : about 60,000 expected due to personalized marketing, sales growth rate : 30 %.*

Sensors in stores connected to the cloud can detect every move of customers and recommend products that meet customer interest in real-time through accumulated purchase data of individual customers

-> **Estimated sales growth rate due to personalized marketing: 30%**

"The average number of customers entering an Amazon Go store is **15%** (or more than 11 per hour) higher than that of neighboring store"

Labor costs decrease because there is no need for a cashier (employee) when switching to an unmanned store

Number of customers: Analysis of the Amazon Go Platform and Its Implications on Large Format Grocery Stores | by Focal Systems | Focal Systems | Medium

Personalized service: [Top-Notch]⑦ 아마존, 스마트 상점 '아마존 고(GO)' 가동… 유통 혁명 시작됐다 - 조선비즈 (chosun.com), 라이프스타일 기업들은 어떻게 개인화를 활용하고 있을까? (undernamu.com) , 인공지능 빅데이터를 활용한 개인형 맞춤형 시대 : Dagyeom 다겸

Reducing labor cost: 無결제·편리함 속…한국형 '아마존 고'의 시사점 - 아시아경제 (asiae.co.kr) , 편의점업계, 간편결제·인건비 절감 위한 '무인 매장' 주목 - 이뉴스투데이 (enewstoday.co.kr)

2 Benefit Item : intangible

Perceived Economics(PE) through payment methods in unmanned stores

No waiting in line

Reduced Payment time

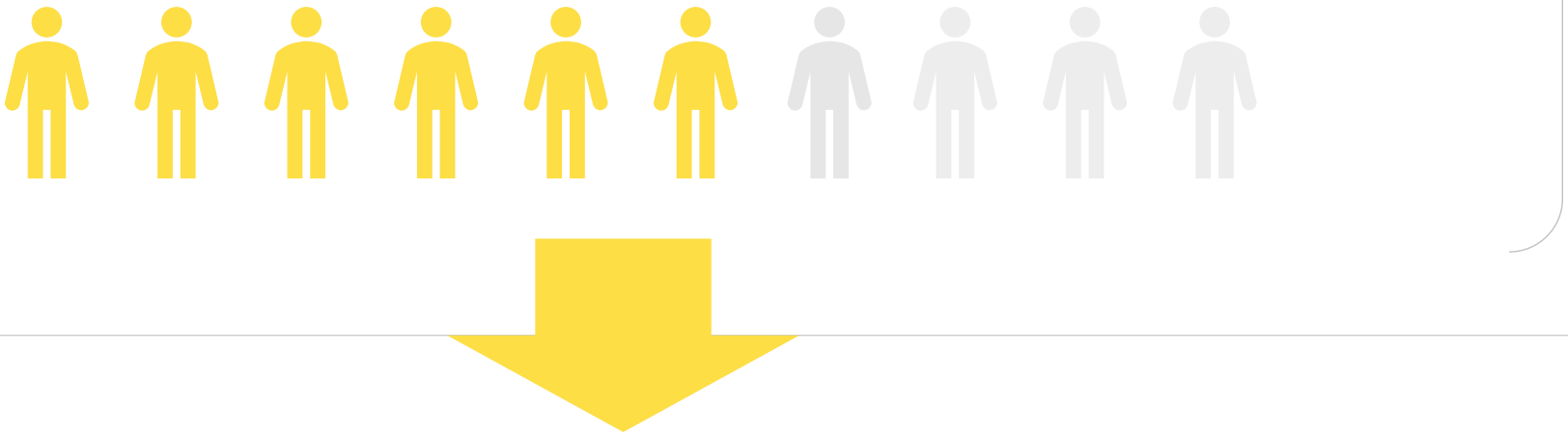
Reduced time to cancel the purchased item

Time Saving

비대면시대 소비자의 무인점포 지속적이용의도에 관한 연구: COVID-19 사회적 위험의 조절효과를 중심으로 (1편_오종철_2021_0107.hwp (koreascience.or.kr)

2 Benefit Item : intangible

Six out of ten people say **waiting time** is the biggest stressor in in-store shopping!



Through unmanned convenience stores, consumers' waiting time can be minimized to secure convenience, and the decrease in waiting time will increase store turnover, contributing to the increase in corporate sales

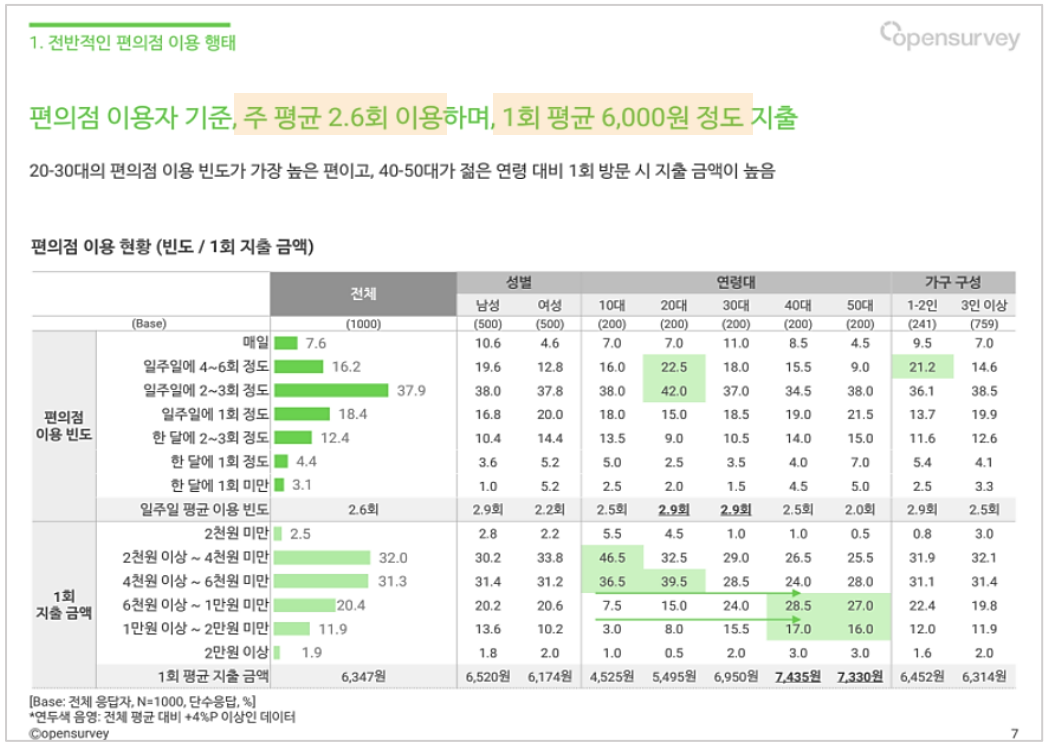
여기 마트엔 점원도 계산대도 없다, 앱만 켜고 입장하면 집까지 배달까지 I 더농부 : 네이버 포스트 (naver.com)
계산원·계산대·대기줄 없는 무인 편의점 고공행진 - 인더스트리뉴스 (industrynews.co.kr)

2 Benefit Estimation Logic : before (manned store)

3.3㎡(1평)당 월평균 매출액 165만원

소비자물가 상승률은 2021년 1.8%, 2022년 1.4%로 전망됨

소비자물가상승률은 2020년 0.4%로 1%에도 미치지 못하지만 그 이후 점진적으로 상승하여 2040년 이후 1.6%를 유지하여 2020~2070년간 평균 1.5% 수준을 보일 전망이다. 명목임금상승률은 2020년은 1.7%이지만 점차 회복하여 2030년 이후 3%



1. 전반적인 편의점 이용 행태

opensurvey

편의점 이용자 기준, 주 평균 2.6회 이용하며, 1회 평균 6,000원 정도 지출

20-30대의 편의점 이용 빈도가 가장 높은 편이고, 40-50대가 젊은 연령 대비 1회 방문 시 지출 금액이 높음

편의점 이용 현황 (빈도 / 1회 지출 금액)

		전체	성별		연령대					가구 구성	
			남성	여성	10대	20대	30대	40대	50대	1-2인	3인 이상
(Base)		(1000)	(500)	(500)	(200)	(200)	(200)	(200)	(200)	(241)	(759)
편의점 이용 빈도	매일	7.6	10.6	4.6	7.0	7.0	11.0	8.5	4.5	9.5	7.0
	일주일에 4~6회 정도	16.2	19.6	12.8	16.0	22.5	18.0	15.5	9.0	21.2	14.6
	일주일에 2~3회 정도	37.9	38.0	37.8	38.0	42.0	37.0	34.5	38.0	36.1	38.5
	일주일에 1회 정도	18.4	16.8	20.0	18.0	15.0	18.5	19.0	21.5	13.7	19.9
	한 달에 2~3회 정도	12.4	10.4	14.4	13.5	9.0	10.5	14.0	15.0	11.6	12.6
	한 달에 1회 정도	4.4	3.6	5.2	5.0	2.5	3.5	4.0	7.0	5.4	4.1
	한 달에 1회 미만	3.1	1.0	5.2	2.5	2.0	1.5	4.5	5.0	2.5	3.3
	일주일 평균 이용 빈도	2.6회	2.9회	2.2회	2.5회	2.9회	2.9회	2.5회	2.0회	2.9회	2.5회
1회 지출 금액	2천원 미만	2.5	2.8	2.2	5.5	4.5	1.0	1.0	0.5	0.8	3.0
	2천원 이상 ~ 4천원 미만	32.0	30.2	33.8	46.5	32.5	29.0	26.5	25.5	31.9	32.1
	4천원 이상 ~ 6천원 미만	31.3	31.4	31.2	36.5	39.5	28.5	24.0	28.0	31.1	31.4
	6천원 이상 ~ 1만원 미만	20.4	20.2	20.6	7.5	15.0	24.0	28.5	27.0	22.4	19.8
	1만원 이상 ~ 2만원 미만	11.9	13.6	10.2	3.0	8.0	15.5	17.0	16.0	12.0	11.9
	2만원 이상	1.9	1.8	2.0	1.0	0.5	2.0	3.0	3.0	1.6	2.0
	1회 평균 지출 금액	6,347원	6,520원	6,174원	4,525원	5,495원	6,950원	7,435원	7,330원	6,452원	6,314원

[Base: 전체 응답자, N=1000, 단수응답, %]
*연두색 음영: 전체 평균 대비 +4%P 이상인 데이터
©opensurvey 7

Gross annual sales profit

= **(Average monthly sales per pyeong) * (The number of pyeong) * 12 * (Margin rate)**

= 1,650,000 * 17 * 12 * 0.2 (20%)

= 67,320,000

>> The annual consumer price growth rate will be reflected in gross annual sales profit

2022: 1.4%
2023~: 1.5%

The number of customers per month

= (Average monthly sales) / (Average expenditure per customer) / (Average number of visits per month)

2.6 * 4 = about 10 times

= (1,650,000 * 17) / 6,000 / 10

= 467

이마트24(emart24) | 마이프차 (myfranchise.kr)
오픈서베이 '2020 편의점 트렌드 리포트'
경제전망(2021.5월) | 경제정책자료 | KDI 경제정보센터, '2020 NABO 장기 재정전망'

2 Benefit Item : after (unmanned store)

"The average number of customers entering an Amazon Go store is **15%** (or more than 11 per hour) higher than that of neighboring store"

Sensors in stores connected to the cloud can detect every move of customers and recommend products that meet customer interest in real-time through accumulated purchase data of individual customers

-> **Estimated sales growth rate due to personalized marketing: 30%**

Labor costs decrease because there is no need for a cashier (employee) when switching to an unmanned store

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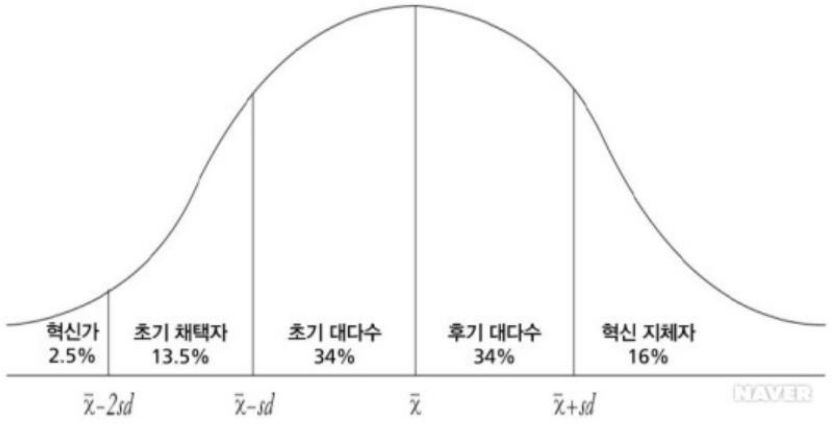
2 Benefit Estimation Logic : after (unmanned store)

Number of customers

"The average number of customers entering an Amazon Go store is **15%** (or more than 11 per hour) higher than that of neighboring store"

Based on 'Innovation Diffusion Theory', Calculate gradually increase by 15%



year	
1	0.75%
2	3%
3	5%
4	10%
5	15%

출처: Number of customers: Analysis of the Amazon Go Platform and Its Implications on Large Format Grocery Stores | by Focal Systems | Focal Systems | Medium

2 Benefit Estimation Logic : after (unmanned store)

Number of customers

The number of customers per month

2.6 * 4 = about 10 times

= (Average monthly sales) / (Average expenditure per customer) / (Average number of visits per month)

= (1,650,000 * 17) / 6,000 / 10

= 467

The number of customers per year

= 467*12 = 5604

year	
1	0.75%
2	3%
3	5%
4	10%
5	15%

year	Increase # of customer	
1	42.03	= 5604 * 0.75%
2	155.511	= 5604 * 3%
3	268.992	=5604 * 5%
4	554.796	= 5604 * 10%
5	840.6	= 5604 * 15%

출처: Number of customers: Analysis of the Amazon Go Platform and Its Implications on Large Format Grocery Stores | by Focal Systems | Focal Systems | Medium

2 Benefit Estimation Logic : after (unmanned store)

Number of customers

Average expenditure per customer (per year)

= (Average expenditure per customer) * (Average number of visits per month) * 12

= 6,000 * 10 * 12

= 720,000

year	Increase # of customer	
1	42.03	= 5604 * 0.75%
2	155.511	= 5604 * 3%
3	268.992	=5604 * 5%
4	554.796	= 5604 * 10%
5	840.6	= 5604 * 15%

year	Increased sales	
1	30240000	=42*720000
2	112320000	=156*720000
3	193680000	=269*720000
4	399600000	=555*720000
5	604800000	=841*720000

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2 Benefit Estimation Logic : after (unmanned store)

Personalized service

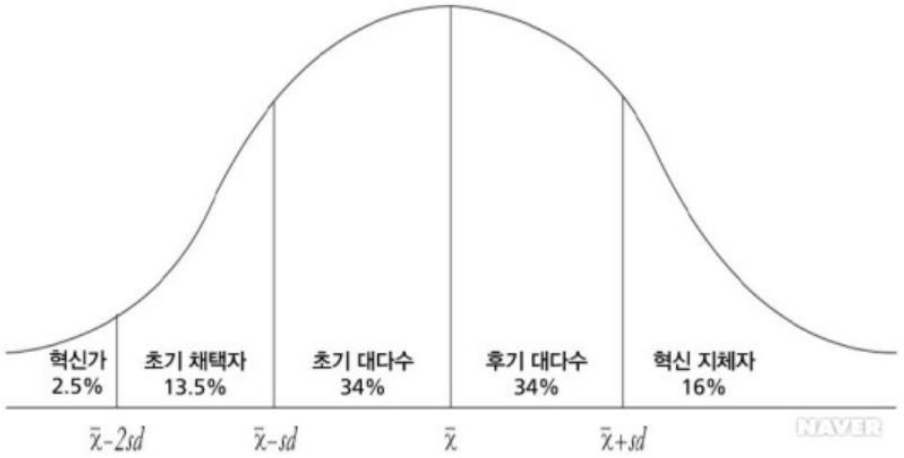
Sensors in stores connected to the cloud can detect every move of customers and recommend products that meet customer interest in real-time through accumulated purchase data of individual customers

→ Estimated sales growth rate due to personalized marketing: 30%

= Yearly increase in the number of users * 30%

= total number of users increased

Based on 'Innovation Diffusion Theory', Calculate gradually increase by 30%



year	
1	1.50%
2	6%
3	10%
4	20%
5	30%

출처: Personalized service: [Top-Notch]⑦ 아마존, 스마트 상점 '아마존 고(GO)' 가동… 유통 혁명 시작됐다 - 조선비즈 (chosun.com), 라이프스타일 기업들은 어떻게 개인화를 활용하고 있을까? (undernamu.com) , 인공지능 빅데이터를 활용한 개인형 맞춤형 시대 : Dagyeom 다겸

2 Benefit Estimation Logic : after (unmanned store)

Personalized service

Gross annual sales

= **(Average monthly sales per pyeong)** * **(The number of pyeong)** * **12**

= 1,650,000 * 17 * 12 = 336,600,000

year	
1	1.50%
2	6%
3	10%
4	20%
5	30%

year	Increased sale	Increased gross sale		Increased sales due to personalized services
1	30,240,000	336,600,000 + 30,240,000	= 366,840,000	= 366,840,000 *1.015
2	112,320,000	336,600,000 + 112,320,000	= 448,920,000	= 448,920,000 *1.06
3	193,680,000	336,600,000 + 193,680,000	= 530,280,000	= 530,280,000 *1.1
4	399,600,000	336,600,000 + 399,600,000	= 736,200,000	= 736,200,000 *1.2
5	604,800,000	336,600,000 + 604,800,000	= 942,120,000	= 942,120,000 *1.3

출처: Personalized service: [Top-Notch]⑦ 아마존, 스마트 상점 '아마존 고(GO)' 가동… 유통 혁명 시작됐다 - 조선비즈 (chosun.com), 라이프스타일 기업들은 어떻게 개인화를 활용하고 있을까? (undernamu.com) , 인공지능 빅데이터를 활용한 개인형 맞춤형 시대 : Dagyeom 다겸

2 Benefit Estimation Logic : after (unmanned store)

Gross annual sales profit

= **(Annual sales) * (Margin rate = 20%)**

year	sale	Gross annual sales profit	Include remaining value
1	372,342,600	73,368,000	73,368,000
2	475,855,200	89,784,000	89,784,000
3	583,308,000	106,056,000	106,056,000
4	883,440,000	147,240,000	147,240,000
5	1,224,756,000	188,424,000	188,424,000 + 90,900,000 + 50,000,000

Clearing the remaining value of camera & pressure sensor

- camera cost : 181,800,000
- camera life span : 10 year
- pressure sensor cost : 100,000,000
- pressure sensor life span : 10 year

Remaining value of camera in year 5 = 181,800,000 / 10 * 5

Remaining value of pressure sensor in year 5 = 100,000,000 / 10 * 5

Item Identification & Estimation Process - Cost

2

1 Item Identification – Cost Item

In an individual case

Would it be valuable if Emart24 near **Hapjeong Station and Hongdae Station** to transform into Unmanned convenience store using Just-Walk-Out technology?

Individual case of the convenience store manager's point of view.

Purchase Cost

About the equipment of hardware, software and technology used in 'Just-Walk-Out' technology

Maintenance Cost

Which gets out with the same amount annually (ex. Monthly membership fee, monthly rent)

Operating Cost

Which is used in mostly maintaining and upgrading the store (ex. electricity bill, data analysis fee)

1 Item Identification – Cost Item

What is in Purchasing Cost category

Purchasing Cost
AI Cameras
LiDAR Cameras
Pressure sensor in display stands
Entrance gate
Database & Software

Reference for Purchasing cost category
https://news.nate.com/view/20210907n20476
https://www.shinsegaegroupnewsroom.com/49780/
https://aws.amazon.com/ko/panorama/pricing/

A total of 27 cameras with **AI cameras** and self-developed **LiDAR technology cameras** are installed in COEX's Smart 24.

A total of 850 stand with a **built-in weight measurement sensor (road cell)** to cross check in Kimpo smart-emart24.

Entrance gate that makes automatic purchase payment possible.

Needed Software and a database that can store data of each person for future analysis.

1 Item Identification – Cost Item

What is in Maintenance Cost category

Maintenance Cost
Annual membership
Rental fee

구분		상생형1	창업지원형	성과공유형
계약조건	월회비 / 수수료 (VAT별도)	월회비		경영지원 수수료
		60만원	150만원	상품매입액의 15%
	계약기간	5년		

Unlike other brands, emart24 has a **fixed membership** which they need to pay to the company.

투자	점포임차	경영주	경영주	본부 전대보증금 최소 2,000만원
	인테리어	경영주	본부	
	영업장비/집기			
	담보(3가지 중 택 1) 근저당, 질권, 보증보험	3,000만원	5,000만원	

Don't have to think about other costs such as interior design, but the store owner **must pay for the rental fee**.

Reference for Maintenance cost category
https://thecheck.co.kr/convenience/

1 Item Identification – Cost Item

What is in Operating Cost category

Operating Cost
Payroll cost
Data analysis cost

부산 금정구	이마트24 부대복문점 주말반 오전 · 오후알바구합니다 스크랩 요약보기 새창보기	07:00~14:00	시급 8,720	17시간전
경기 안양시 동안구	이마트24 안양한남점 이마트24 안양한남점 평일 목~금 파트타이머 구인 공고 스크랩 요약보기 새창보기	19:00~01:00 (협의가능)	시급 8,720	9시간전
경기 부천시	이마트24 소사은성로점 주말 오전 및 오후 알바모집 스크랩 요약보기 새창보기	시간협의	시급 8,720	17시간전
경남 창원시 성산구	이마트24 창원반지점 주말(금,토) 야간 근무자 구함 스크랩 요약보기 새창보기	23:00~06:30	시급 8,720	10/25

Using part-time worker is essential if it is not an unmanned store

By using various data analyzing companies, we can use big data generated from cameras and sensors, eventually set up efficient marketing.

Reference for Operating cost category
https://tm.alba.co.kr/job/annex/BrandList.asp?schtext=1205D015&brandname=%C0%CC%B8%B6%C6%AE24

1 Cost Estimation Logic

001 >> Purchase Cost

Hardware cost
- 25 AI Cameras, 8 LiDAR Cameras, Pressure sensor on display stands, Entrance gate with average costs)

Software cost
- AWS database storage, software that controls cameras, sensors and 'just-walk-out'

002 >> Maintenance Cost

Annual membership fee for e-mart 24 + Rental fee (Average data per area in Hongdae)

003 >> Operating Cost

Payroll costs, Data analysis costs(General data analysis site) + Electricity bills

1 Cost Estimation Logic

001 Purchase Cost

BEFORE

No Purchase cost

AFTER

Hardware cost <u>with average costs</u>

- 25 AI Cameras
- 8 LiDAR Cameras
- 870 Pressure sensor on display stands
- 2 Entrance gate

+ 5,160,000 * 25 = 129,000,000
+ 6,600,000 * 8 = 52,800,000
+ 114,942 * 870 ≒ 100,000,000
+ 500,000 * 2 = 1,000,000
=282,800,000

Software cost <u>with average costs</u>

- 'just-walk-out' system software
- Software for control and collects data from cameras
- AWS database

+ 4,000,000
+ 8.33 * 33 * 1184 ≒ 325,470
+ 0.1 * 2 * 1184 ≒ 237
= 7,908,479

Estimating the Cost of establishment
https://www.hani.co.kr/arti/economy/consumer/1010825.html
https://www.sedaily.com/NewsVIew/1Z5H7KADG7
https://aws.amazon.com/ko/panorama/pricing/

1 Cost Estimation Logic

002 Maintenance Cost

BEFORE & AFTER

Annual membership fee for e-mart 24 + Rental fee (Average data per pyeong(3.3m²) in Hongdae)

>> maintain 1,600,000 * 12 + 200,000 * 17

구 분		상생형 1	창업지원형	성과공유형
계약조건	월회비/수수료 (VAT별도)	월회비	월회비	경영지원 수수료
		65만원	160만원	상품매입액의 15%
	계약기간	5년	5년	5년
투자	점포임차	경영주	경영주 / 본부 (전대보증금 최소 2,000만원)	경영주 / 본부 (전대보증금 최소 2,000만원)
	인테리어	경영주	본부	본부
	영업장비/집기	경영주	본부	본부
	담보(3가지중 택1) : 근저당, 질권, 보증보험	3,000만원	5,000만원	5,000만원
개정투자비	가맹비(VAT포함)	770만원	770만원	770만원
	상품준비금	1,600만원	1,600만원	1,600만원
	소모품비	50만원	50만원	50만원
	계	2,420만원	2,420만원	2,420만원
총 투자 비용		점포임차+인테리어&집기+ 개점 투자비(2,420만원)	점포임차+ 개점 투자비(2,420만원)	점포임차+ 개점 투자비(2,420만원)

· 임대시세현황 (데이터 기준 : 2020.1Q) (단위:천원/㎡)

시도	지역	중대형							소규모		
		지하1층	1층	2층	3층	4층	5층	6-10층	지하1층	1층	2층
	전체	16.9	58.2	24.8	19.9	18.2	17.8	19.2	22.9	54.7	28.9
	광화문	35	87.2	42.1	21.8	18.6	16.1	18.1	12.3	95.1	61.8
	동대문	14.6	36.7	18	14.3	14.3	17.7	15.5		44	17
	명동	40.7	294.6	89	62.8	51.8	45.2	36.1		262	80.6
	서울역	19.1	90.4	29.4	21.6	20.3	17.3	15.3		75.4	24.2
	종로	22.5	81.1	38.9	32.8	27.3	14.4	12.1		75.4	39.8
	충무로	9.9	43.3	17.3	15.4	11.8			17.6	48.9	18.6
	강남대로	38.7	124.2	48.5	34.7	30.9	32.2	28.4	20.8	99	46.1
	논현역	14.1	38.7	19.1	16.4	17.5	16.2	11.9	25.6	51.1	31.4
	도산대로	21.8	44.3	27.1	23.8	22.4	23.1	22.1	14.1	46.1	21
	서초	12.4	27.3	17.7	16.9	16	16.5	23.1	12.6	52.6	32
	신사역	26.3	84.6	32.8	25.9	23.3	21.4	17.9	37.5	82.9	44.9
	압구정	16.1	55.9	31.7	28.1	25	23.4	24.1	20.3	38.6	24.7
	청담	18.5	55.8	26.3	22.4	21.5	21.1	17.7	17.7	63.6	28.5
	테헤란로	21.4	47.7	32.7	25.1	21.3	21.3	21.2	33.4	63.2	41.4
	강남역	14.7	44.7	19.1	16.7	15.2	16.7	16.1	26.7	57.2	30.1
	신촌	16.6	57.8	25.5	21.6	20.1	17.6	29.9	13.4	39.7	19
	영등포	10.9	39.4	17.2	13.2	11.6	11.8	13.8		33	28.8
	홍대합정	21.6	67.8	30.9	22	19.2	18.2	17.9	52.4	61.5	36.4

평당 임대료 계산 방법

61,500원/㎡ X 3.3 = 202,950원/1평

Commercial supremacy analysis
https://salonforrest.tistory.com/28

1 Cost Estimation Logic

003 Operating Cost

Payroll costs → Data analysis costs(General data analysis site) + Electricity bills(Survey on store owners)

BEFORE Annual labor cost + 850,000

AFTER 300,000 + 850,000 * 2

Considering the additional facilities, electricity bills are expected to be double
ex> walk-in cooler, showcase, vertical freeze, etc.

Estimation : Estimated labor cost increase rate : 7%

	Annual labor cost
2021	26,771,214
2022	28,645,200
2023	30,090,600
2024	32,193,000
2025	34,426,800
2026	36,824,850
2027	39,387,150

Status of determining the minimum wage by year
https://www.minimumwage.go.kr/stat/statMiniStat.jsp

3

Cash Flow

3 Cash Flow

In the individual case

Calculating by using Excel spreadsheet

: Computing two cases and compare → There are differences in the presence or absence of part-timers, increase in electricity bills, and occurrence of data analysis costs.

Before applying 'Just-Walk-Out' technology

discount rate	10.10%					
year	0	1	2	3	4	5
cost	50,221,214.95	52,095,200	53,540,600	55,643,000	57,876,800	60,274,850
benefit		67,320,000	68,262,480	69,286,417	70,325,713	71,380,599
cash flow	-50,221,215	15,224,800	14,721,880	13,643,417	12,448,913	11,105,749
NPV	₩1,310,752.55					
B/C ratio	₩1.03					
IRR	11%					

After applying 'Just-Walk-Out' technology

AFTER						
year	0	1	2	3	4	5
cost	282,800,000	32,508,479	32,510,729	32,517,479	32,523,479	32,538,479
benefit		73,368,000	89,784,000	106,056,000	147,240,000	329,324,000
cash flow	-282,800,000	40,859,521	57,273,271	73,538,521	114,716,521	296,785,521
NPV	₩118,172,544.14					
B/C ratio	₩1.42					
IRR	21%					

3 Cash Flow

In the individual case

Calculating by using Excel spreadsheet

: Final Incremental B/C analysis using two cash flows introduced before : comparing implementing to not implementing

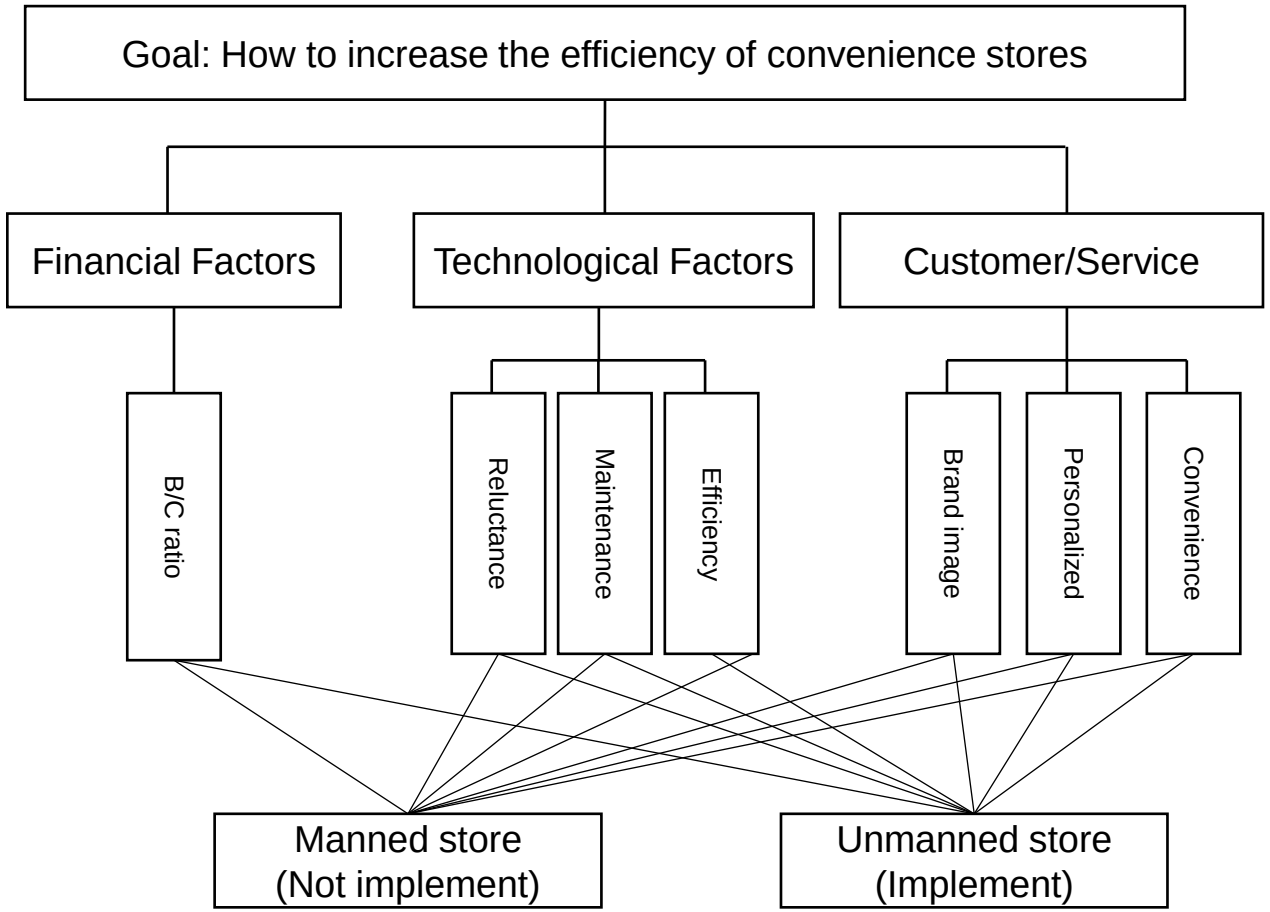
<Incremental>						
year	0	1	2	3	4	5
cost	232,578,785	-19,586,721	-21,029,871	-23,125,521	-25,353,321	-27,736,371
benefit		6,048,000	21,521,520	36,769,583	76,914,287	257,943,401
cash flow	-232,578,785	25,634,721	42,551,391	59,895,104	102,267,608	285,679,772
NPV	₩116,861,791.5					
B/C ratio	₩1.50					

→ Since Incremental B/C ratio is 1.5 >1.0,

implementing 'Just-Walk-Out' technology is selected.

AHP Analysis

1 Decision hierarchy



2 AHP analysis – Factor Weight

진아

1 Level	Technological	Customer/Servi	Financial
Technological	1	3	4
Customer/Service	0.3333333333	1	2
Financial	0.25	0.5	1
Total	1.583333333	4.5	7
Technological	Efficiency	Maintenance	Reluctance
Efficiency	1	2	3
Maintenance	0.5	1	2
Reluctance	0.3333333333	0.5	1
Total	1.833333333	3.5	6
Customer/Service	Convenience	Personalized	Brand Image
Convenience	1	0.5	3
Personalized	2	1	4
Brand Image	0.3333333333	0.25	1
Total	3.333333333	1.75	8

가경

1 Level	Technological	Customer/Servi	Financial
Technological	1	3	5
Customer/Service	0.3333333333	1	4
Financial	0.2	0.25	1
Total	1.533333333	4.25	10
Technological	Efficiency	Maintenance	Reluctance
Efficiency	1	2	3
Maintenance	0.5	1	0.5
Reluctance	0.3333333333	2	1
Total	1.833333333	5	4.5
Customer/Service	Convenience	Personalized	Brand Image
Convenience	1	5	6
Personalized	0.2	1	0.5
Brand Image	0.1666666667	2	1
Total	1.366666667	8	7.5

재이

1 Level	Technological	Customer/Servi	Financial
Technological	1	2	0.3333333333
Customer/Service	0.5	1	0.3333333333
Financial	3	3	1
Total	4.5	6	1.666666667
Technological	Efficiency	Maintenance	Reluctance
Efficiency	1	4	3
Maintenance	0.25	1	0.3333333333
Reluctance	0.3333333333	3	1
Total	1.583333333	8	4.333333333
Customer/Service	Convenience	Personalized	Brand Image
Convenience	1	5	4
Personalized	0.2	1	2
Brand Image	0.25	0.5	1
Total	1.45	6.5	7

효안

1 Level	Technological	Customer/Service	Financial
Technological	1	0.3333333333	0.1428571429
Customer/Servic	3	1	0.5
Financial	7	2	1
Total	11	3.333333333	1.642857143
Technological	Efficiency	Maintenance	Reluctance
Efficiency	1.00	0.33	0.20
Maintenance	3.00	1.00	0.50
Reluctance	5.00	2.00	1.00
Total	9.00	3.33	1.70
Customer/Ser	Convenience	Personalized	Brand Image
Convenience	1	3	5
Personalized	0.3333333333	1	2
Brand Image	0.2	0.5	1
Total	1.533333333	4.5	8

2 AHP analysis – Factor Weight (normalized)

진아

1 Level	Resulting Priorities
Technical	0.6232247285
Customer/Service	0.2394876079
Financial	0.1372876636
Total	1
Technological	Resulting Priorities
Efficiency	0.538961039
Maintenance	0.2972582973
Reluctance	0.1637806638
Total	1
Customer/Service	Resulting Priorities
Convenience	0.3202380952
Personalized	0.5571428571
Brand Image	0.1226190476
Total	1

가경

1 Level	Resulting Priorities
Technical	0.6193520887
Customer/Service	0.284228474
Financial	0.09641943734
Total	1
Technological	Resulting Priorities
Efficiency	0.5373737374
Maintenance	0.1946127946
Reluctance	0.268013468
Total	1
Customer/Service	Resulting Priorities
Convenience	0.718902439
Personalized	0.1126693767
Brand Image	0.1684281843
Total	1

재이

1 Level	Resulting Priorities
Technical	0.2518518519
Customer/Service	0.1592592593
Financial	0.5888888889
Total	1
Technological	Resulting Priorities
Efficiency	0.6079622132
Maintenance	0.1199392713
Reluctance	0.2720985155
Total	1
Customer/Service	Resulting Priorities
Convenience	0.6767715044
Personalized	0.192497158
Brand Image	0.1307313376
Total	1

효안

1 Level	Resulting Priorities
Technical	0.09262187088
Customer/Service	0.2923583663
Financial	0.6150197628
Total	1
Technological	Resulting Priorities
Efficiency	0.1095860566
Maintenance	0.3091503268
Reluctance	0.5812636166
Total	1
Customer/Servic	Resulting Priorities
Convenience	0.6479468599
Personalized	0.2298711755
Brand Image	0.1221819646
Total	1

Geomean

1 Level	Resulting Priorities
Technical	0.2464569559
Customer/Service	0.1838133022
Financial	0.4887842032
Total	0.9190544613
Financial	
B/C ratio	1
Technological	
Efficiency	0.3867750793
Maintenance	0.2266663425
Reluctance	0.2442015203
Total	0.8576429421
Customer/Service	
Convenience	0.6360331753
Personalized	0.1747462252
Brand Image	0.1707189406
Total	0.9814983412

Geomean-normalized

1 Level	Resulting Priorities
Technical	0.2681636032
Customer/Service	0.2000026222
Financial	0.5318337746
Total	1
Financial	
B/C ratio	1
Technological	
Efficiency	0.4509744794
Maintenance	0.264289871
Reluctance	0.2847356496
Total	1
Customer/Service	
Convenience	0.6480226697
Personalized	0.1780402655
Brand Image	0.1739370649
Total	1

2 AHP analysis – Consistency

진아

1 Level	Technological	Customer/Serv	Financial	weighted sum vector	**Consistency Vector**	CI	CR
Technological	0.6232247285	0.7184628237	0.5491506544	1.890838207	3.034	0.00916862862	0.01763197812
Customer/Service	0.2077415762	0.2394876079	0.2745753272	0.7218045113	3.014		
Financial	0.1558061821	0.119743804	0.1372876636	0.4128376497	3.007		
Technological	Efficiency	Maintenance	Reluctance	weighted sum vector	**Consistency Vector**	CI	CR
Efficiency	0.538961039	0.5945165945	0.4913419913	1.624819625	3.014725569	0.004604333486	0.008854487473
Maintenance	0.2694805195	0.2972582973	0.3275613276	0.8943001443	3.008495146		
Reluctance	0.1796536797	0.1486291486	0.1637806638	0.4920634921	3.004405286		
Customer/Service	Convenience	Personalized	Brand Image	weighted sum vector	**Consistency Vector**	CI	CR
Convenience	0.3202380952	0.2785714286	0.3678571429	0.9666666667	3.018587361	0.00916239707	0.01761999436
Personalized	0.6404761905	0.5571428571	0.4904761905	1.688095238	3.02991453		
Brand Image	0.1067460317	0.1392857143	0.1226190476	0.3686507937	3.006472492		

재이

1 Level	Technological	Customer/Service	Financial	Sum	Consistency Vector	CI	람다	CR
Technological	0.2518518519	0.3185185185	0.1962962963	0.7666666667	3.044117647	0.02695218061	3.053904361	0.05183111656
Customer/Service	0.1259259259	0.1592592593	0.1962962963	0.4814814815	3.023255814			
Financial	0.7555555556	0.4777777778	0.5888888889	1.822222222	3.094339623			
Technological	Efficiency	Maintenance	Reluctance	Sum	Consistency Vector	CI	람다	CR
Efficiency	0.6079622132	0.479757085	0.8162955466	1.904014845	3.131798002	0.03706696697	3.074133934	0.07128262879
Maintenance	0.1519905533	0.1199392713	0.09069950517	0.3626293297	3.023441163			
Reluctance	0.2026540711	0.3598178138	0.2720985155	0.8345704004	3.067162637			
Customer/Service	Convenience	Personalized	Brand Image	Sum	Consistency Vector	CI	람다	CR
Convenience	0.6767715044	0.9624857901	0.5229253505	2.162182645	3.194848824	0.04778348827	3.095566977	0.0918913236
Personalized	0.1353543009	0.192497158	0.2614626753	0.5893141341	3.061417323			
Brand Image	0.1691928761	0.09624857901	0.1307313376	0.3961727927	3.030434783			

CR <= 0.1, decision maker's ratings are relatively consistent and the AHP method can be used for making a decision

2 AHP analysis – Consistency

효안

1 Level	Technological	Customer/Service	Financial	weighted sum vector	consistency vector	람다	CI	CR
Technological	0.09262187088	0.09745278876	0.08785996612	0.2779346258	3.000745106	3.002641846	0.001320922819	0.00254023619
Customer/Service	0.2778656126	0.2923583663	0.3075098814	0.8777338603	3.002253267			
Financial	0.6483530962	0.5847167325	0.6150197628	1.848089592	3.004927164			
Technological	Efficiency	Maintenance	Reluctance	weighted sum vector	consistency vector	람다	CI	CR
Efficiency	0.11	0.10	0.12	0.33	3.001192843	3.003696088	0.001848044202	0.003553931157
Maintenance	0.33	0.31	0.29	0.93	3.003523608			
Reluctance	0.55	0.62	0.58	1.75	3.006371814			
Customer/Service	Convenience	Personalized	Brand Image	weighted sum vector	consistency vector	람다	CI	CR
Convenience	0.6479468599	0.6896135266	0.6109098229	1.948470209	3.007145076	3.003696668	0.001848333917	0.003554488303
Personalized	0.2159822866	0.2298711755	0.2443639291	0.6902173913	3.00262697			
Brand Image	0.129589372	0.1149355878	0.1221819646	0.3667069243	3.001317957			

가경

1 Level	Technological	Customer/Servi	Financial	Sum	Consistency Vector	람다	CI	CR
Technological	0.6193520887	0.852685422	0.4820971867	1.954134697	3.155127323	3.086690971	0.04334548532	0.08335670254
Customer/Service	0.2064506962	0.284228474	0.3856777494	0.8763569196	3.083283343			
Financial	0.1238704177	0.0710571185	0.09641943734	0.2913469736	3.021662246			
Technological	Efficiency	Maintenance	Reluctance	Sum	Consistency Vector	람다	CI	CR
Efficiency	0.5373737374	0.3892255892	0.804040404	1.730639731	3.220551378	3.025116724	0.01255836176	0.02415069569
Maintenance	0.2686868687	0.1946127946	0.134006734	0.5973063973	3.069204152			
Reluctance	0.08933782267	0.3892255892	0.268013468	0.7465768799	2.78559464			
Customer/Service	Convenience	Personalized	Brand Image	Sum	Consistency Vector	람다	CI	CR
Convenience	0.718902439	0.5633468835	1.010569106	2.292818428	3.189331825	3.08739321	0.04369660481	0.08403193232
Personalized	0.1437804878	0.1126693767	0.08421409214	0.3406639566	3.023571858			
Brand Image	0.1198170732	0.2253387534	0.1684281843	0.5135840108	3.049275945			

CR <= 0.1, decision maker's ratings are relatively consistent and the AHP method can be used for making a decision

3 AHP analysis – Financial factor

Financial factor
B/C ratio

☐ B/C 비율 표준점수 전환식:

$$B/C\ 표준점수 = 5.11532 \times \ln(B/C) + i$$

$$단,\ B/C \geq 1 \rightarrow i = 1,\ B/C < 1 \rightarrow i = -1$$

(incremental cash flow)

B/C Ratio = 1.5

Standard Score = 5.11532 * ln(1.5) + 1 = 3.074

All member

Financial	Implementation	Not Implementation
Implementation	1	3
Not Implentation	0.3333333333	1
Total	1.333333333	4

Normalized

Financial	Implementation	Not Implementation
Implementation	0.75	0.75
Not Implentation	0.25	0.25
Total	1	1

3 AHP analysis – Technological factor

Technological factor	
Reluctance	problem that can be occurred by the 'just walk out' technology (ex. Reluctance to new technology)
Maintenance	How 'Just walk out' technology makes it easy to maintain & manage convenience stores
Efficiency	how efficiently the store can be operated through the technology

3 AHP analysis – Technological factor

진아

Efficiency	Implementation	Not Implementation
Implementation	1	3
Not Implementation	0.3333333333	1
Total	1.333333333	4

Reluctance	Implementation	Not Implementation
Implementation	1	5
Not Implementation	0.2	1
Total	1.2	6

Maintenance	Implementation	Not Implementation
Implementation	1	0.5
Not Implementation	2	1
Total	3	1.5

재이

Efficiency	Implementation	Not Implementation
Implementation	1	4
Not Implementation	0.25	1
Total	1.25	5

Reluctance	Implementation	Not Implementation
Implementation	1	4
Not Implementation	0.25	1
Total	1.25	5

Maintenance	Implementation	Not Implementation
Implementation	1	0.25
Not Implementation	4	1
Total	5	1.25

효안

Efficiency	Implementation	Not Implementation
Implementation	1	5
Not Implementat	0.2	1
Total	1.2	6

Reluctance	Implementation	Not Implementation
Implementation	1	5
Not Implementat	0.2	1
Total	1.2	6

Maintenance	Implementation	Not Implementation
Implementation	1	3
Not Implementat	0.3333333333	1
Total	1.333333333	4

가경

Efficiency	Implementation	Not Implementation
Implementation	1	3
Not Implementation	0.3333333333	1
Total	1.333333333	4

Reluctance	Implementation	Not Implementation
Implementation	1	4
Not Implementation	0.25	1
Total	1.25	5

Maintenance	Implementation	Not Implementation
Implementation	1	3
Not Implementation	0.3333333333	1
Total	1.333333333	4

3 AHP analysis – Technological factor

진아-normalized

Reluctance	Implementation	Not Implementation
Implementation	0.8333333333	0.8333333333
Not Implementation	0.1666666667	0.1666666667
Total	1	1

Maintenance	Implementation	Not Implementation
Implementation	0.3333333333	0.3333333333
Not Implementation	0.6666666667	0.6666666667
Total	1	1

Efficiency	Implementation	Not Implementation
Implementation	0.75	0.75
Not Implementation	0.25	0.25
Total	1	1

재이-normalized

Reluctance	Implementation	Not Implementation
Implementation	0.8	0.8
Not Implementation	0.2	0.2
Total	1	1

Maintenance	Implementation	Not Implementation
Implementation	0.2	0.2
Not Implementation	0.8	0.8
Total	1	1

Efficiency	Implementation	Not Implementation
Implementation	0.8	0.8
Not Implementation	0.2	0.2
Total	1	1

효안 - normailzed

Reluctance	Implementation	Not Implementation
Implementation	0.8333333333	0.8333333333
Not Implementat	0.1666666667	0.1666666667
Total	1	1

Maintenance	Implementation	Not Implementation
Implementation	0.75	0.75
Not Implementat	0.25	0.25
Total	1	1

Efficiency	Implementation	Not Implementation
Implementation	0.8333333333	0.8333333333
Not Implementat	0.1666666667	0.1666666667
Total	1	1

가경 - normalized

Reluctance	Implementation	Not Implementation
Implementation	0.8	0.8
Not Implementation	0.2	0.2
Total	1	1

Maintenance	Implementation	Not Implementation
Implementation	0.75	0.75
Not Implementation	0.25	0.25
Total	1	1

Efficiency	Implementation	Not Implementation
Implementation	0.75	0.75
Not Implementation	0.25	0.25
Total	1	1

3 AHP analysis – Technological factor

Geomean

Efficiency	
Implementation	0.78254229
Not Implementation	0.2136435032
Total	0.9961857932
Maintenance	
Implementation	0.4400547683
Not Implementation	0.4272875405
Total	0.8673423088
Reluctance	
Implementation	0.8164965809
Not Implementation	0.1825741858
Total	0.9990707668

Geomean-normalized

Efficiency	
Implementation	0.7855384963
Not Implementation	0.2144615037
Total	1
Maintenance	
Implementation	0.5073599706
Not Implementation	0.4926400294
Total	1
Reluctance	
Implementation	0.8172560024
Not Implementation	0.1827439976
Total	1

3 AHP analysis – Customer / Service factor

Customer / Service factor	
Brand image	how positive customer experience affects brand images
Familiarity	The degree to which customers become familiar with unmanned technology
Convenience	The convenience that customers feel by using it

3 AHP analysis – Customer / Service factor

진아

Brand Image	Implementation	Not Implementation
Implementation	1	2
Not Implementation	0.5	1
Total	1.5	3

Personalized	Implementation	Not Implementation
Implementation	1	0.2
Not Implementation	5	1
Total	6	1.2

Convenience	Implementation	Not Implementation
Implementation	1	2
Not Implementation	0.5	1
Total	1.5	3

재이

Brand Image	Implementation	Not Implementation
Implementation	1	2
Not Implementation	0.5	1
Total	1.5	3

Personalized	Implementation	Not Implementation
Implementation	1	4.0
Not Implementation	0.25	1
Total	1.25	5.0

Convenience	Implementation	Not Implementation
Implementation	1	7
Not Implementation	0.1428571429	1
Total	1.142857143	8

효안

Brand Image	Implementation	Not Implementation
Implementation	1	2
Not Implementat	0.5	1
Total	1.5	3

Personalized	Implementation	Not Implementation
Implementation	1	3.0
Not Implementat	0.3333333333	1
Total	1.333333333	4.0

Convenience	Implementation	Not Implementation
Implementation	1	7
Not Implementat	0.1428571429	1
Total	1.142857143	8

가경

Brand Image	Implementation	Not Implementation
Implementation	1	2
Not Implementation	0.5	1
Total	1.5	3

Personalized	Implementation	Not Implementation
Implementation	1	6.0
Not Implementation	0.1666666667	1
Total	1.166666667	7.0

Convenience	Implementation	Not Implementation
Implementation	1	2
Not Implementation	0.5	1
Total	1.5	3

3 AHP analysis – Customer / Service factor

진아-normalized

Brand Image	Implementation	Not Implementation
Implementation	0.6666666667	0.6666666667
Not Implementation	0.3333333333	0.3333333333
Total	1	1

Personalized	Implementation	Not Implementation
Implementation	0.1666666667	0.1666666667
Not Implementation	0.8333333333	0.8333333333
Total	1	1

Convenience	Implementation	Not Implementation
Implementation	0.6666666667	0.6666666667
Not Implementation	0.3333333333	0.3333333333
Total	1	1

재이-normalized

Brand Image	Implementation	Not Implementation
Implementation	0.6666666667	0.6666666667
Not Implementation	0.3333333333	0.3333333333
Total	1	1

Personalized	Implementation	Not Implementation
Implementation	0.8	0.8
Not Implementation	0.2	0.2
Total	1	1

Convenience	Implementation	Not Implementation
Implementation	0.875	0.875
Not Implementation	0.125	0.125
Total	1	1

효안 - normailzed

Brand Image	Implementation	Not Implementation
Implementation	0.6666666667	0.6666666667
Not Implementat	0.3333333333	0.3333333333
Total	1	1

Personalized	Implementation	Not Implementation
Implementation	0.75	0.75
Not Implementat	0.25	0.25
Total	1	1

Convenience	Implementation	Not Implementation
Implementation	0.875	0.875
Not Implementat	0.125	0.125
Total	1	1

가경 - normalized

Brand Image	Implementation	Not Implementation
Implementation	0.6666666667	0.6666666667
Not Implementation	0.3333333333	0.3333333333
Total	1	1

Personalized	Implementation	Not Implementation
Implementation	0.8571428571	0.8571428571
Not Implementation	0.1428571429	0.1428571429
Total	1	1

Convenience	Implementation	Not Implementation
Implementation	0.6666666667	0.6666666667
Not Implementation	0.3333333333	0.3333333333
Total	1	1

3 AHP analysis – Technological factor

Geomean

Convenience	
Implementation	0.7637626158
Not Implementation	0.2041241452
Total	0.9678867611
Personalized	
Implementation	0.5410822691
Not Implementation	0.2777619034
Total	0.8188441725
Brand Image	
Implementation	0.6666666667
Not Implementation	0.3333333333
Total	1

Geomean-normalized

Convenience	
Implementation	0.7891032779
Not Implementation	0.2108967221
Total	1
Personalized	
Implementation	0.6607878364
Not Implementation	0.3392121636
Total	1
Brand Image	
Implementation	0.6666666667
Not Implementation	0.3333333333
Total	1

3 AHP analysis – Final AHP Computation

진아

Overall Decision Priorities					Implementation	Not Implementation
	Weights		Weights			
Financial	0.1372876636	B/C ratio	1		0.1029657477	0.0343219159
Technical	0.6232247285	Efficiency	0.538961039		0.2519203854	0.08397346179
		Development	0.2972582973		0.0617529072	0.1235058144
		Problem	0.1637806638		0.0850601331	0.01701202662
Customer/Service	0.2394876079	Convenience	0.3202380952		0.05112870359	0.0255643518
		Familiarity	0.5571428571		0.02223813502	0.1111906751
		Brand Image	0.1226190476		0.0195771616	0.009788580799
Total	1				0.5946431736	0.4053568264

효안

Overall Decision Priorities					Implementation	Not Implementation
	Weights		Weights			
Financial Factc	0.6150197628	B/C ratio	1		0.4612648221	0.1537549407
echnical Factor	0.0926218708	Efficiency	0.1095860566		0.008458387991	0.001691677598
		Development	0.3091503268		0.02147556124	0.007158520413
		Problem	0.5812636166		0.0448647697	0.00897295394
ustomer/Servic	0.2923583663	Convenience	0.6479468599		0.1657535997	0.02367908567
		Familiarity	0.2298711755		0.050403571	0.01680119033
		Brand Image	0.1221819646		0.02381394637	0.01190697318
Total	1				0.7760346581	0.2239653419

재이

Overall Decision Priorities					Implementation	Not Implementation
	Weights		Weights			
Financial Factors	0.5888888889	B/C ratio	1		0.4416666667	0.1472222222
Technical Factors	0.2518518519	Efficiency	0.6079622132		0.1224931274	0.03062328185
		Maintenance	0.1199392713		0.006041385515	0.02416554206
		Reluctance	0.2720985155		0.05482281202	0.013705703
Customer/Service	0.1592592593	Convenience	0.6767715044		0.09430936241	0.01347276606
		Personalized	0.192497158		0.02452556384	0.006131390959
		Brand Image	0.1307313376		0.01388011733	0.006940058664
Total	1				0.7577390352	0.2422609648

가경

Overall Decision Priorities					Implementation	Not Implementation
	Weights		Weights			
Financial Factors	0.09641943734	B/C ratio	1		0.07231457801	0.02410485934
Technical Factors	0.6193520887	Efficiency	0.5373737374		0.24961766	0.08320588666
		Development	0.1946127946		0.09040038062	0.03013346021
		Problem	0.268013468		0.132795761	0.03319894024
Customer/Service	0.284228474	Convenience	0.718902439		0.1362216955	0.06811084773
		Familiarity	0.1126693767		0.02744901	0.004574835001
		Brand Image	0.1684281843		0.03191472386	0.01595736193
Total	1				0.7407138089	0.2592861911

3 AHP analysis – Final AHP Computation

Geomean weight & priorities

Financial	
Implementation	0.75
Not Implentation	0.25
Total	1
Efficiency	
Implementation	0.7855384963
Not Implementation	0.2144615037
Total	1
Maintenance	
Implementation	0.5073599706
Not Implementation	0.4926400294
Total	1
Reluctance	
Implementation	0.8172560024
Not Implementation	0.1827439976
Total	1
Convenience	
Implementation	0.7891032779
Not Implementation	0.2108967221
Total	1
Personalized	
Implementation	0.6607878364
Not Implementation	0.3392121636
Total	1
Brand Image	
Implementation	0.6666666667
Not Implementation	0.3333333333
Total	1

1 Level	Resulting Priorities
Technical	0.2681636032
Customer/Service	0.2000026222
Financial	0.5318337746
Total	1
Financial	
B/C ratio	1
Technological	
Efficiency	0.4509744794
Maintenance	0.264289871
Reluctance	0.2847356496
Total	1
Customer/Service	
Convenience	0.6480226697
Personalized	0.1780402655
Brand Image	0.1739370649
Total	1

Geomean AHP

Overall Decision Priorities					*Implementation*	*Not Implementation*
	Weights		*Weights*			
Financial Factors	*0.5318337746*	*B/C ratio*	*1*		*0.3988753309*	*0.1329584436*
Technical Factors	*0.2681636032*	*Efficiency*	*0.4509744794*		*0.09499905198*	*0.02593588938*
		Maintenance	*0.264289871*		*0.03595808469*	*0.03491483941*
		Reluctance	*0.2847356496*		*0.06240218501*	*0.01395355276*
Customer/Service	*0.2000026222*	*Convenience*	*0.6480226697*		*0.1022727034*	*0.02733352974*
		Personalized	*0.1780402655*		*0.02352967686*	*0.0120788431*
		Brand Image	*0.1739370649*		*0.02319191271*	*0.01159595636*
Total	*1*				*0.7412289456*	*0.2587710544*

2 AHP analysis – Final AHP Computation

종합평점 / 시행:미시행	AHP < 0.45	0.45 ≤ AHP <0.5	0.5≤ AHP <0.55	0.55 ≤ AHP
4 : 0	-	-	타당성 있음	타당성 있음
3 : 1	Feedback	아주 신중	약간 신중	타당성 있음
2 : 2	AHP<0.42 타당성 없음 AHP>0.42 약간 신중	신중	신중	AHP>0.58 타당성 있음 AHP<0.58 약간 신중
1 : 3	타당성 없음	약간 신중	아주 신중	Feedback
0 : 4	타당성 없음	타당성 없음	-	-

주: 1) '시행:미시행'은 사업 시행 평가자 수와 사업 미시행 평가자 수의 비율(4인 기준)을 나타냄.
2) AHP는 사업 시행 대안의 AHP 종합점수를 나타냄.
3) '-'는 해당 사항 없음을 나타냄.

Based on these overall priorities, **unmanned store using 'Just walk out' technology** is the best choice


Thank you !