RFID TECHNOLOGY: IMPROVING EFFICIENCIES AND CREATING A BETTER CUSTOMER EXPERIENCE IN RETAIL INDUSTRY

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ABSTRACT

The word Retail originated from the old French word tailler, which has got a meaning of "to cut off, clip, pare and divide" in tailoring parlance (1365). As a noun the word was first recorded with the meaning of a "sale in minimal quantities" in 1433 ("piece cut off, shred, scrap, paring" from the Middle French retail). As in French, the word retail means selling of items in minimal quantities in both German and Dutch. Retail is the process of making profit by selling services and/or consumer goods to customers through multiple distribution channels. Diverse target markets and tactical promotion created demand, catering to consumers' needs through a lean supply chain. In the 2000s, much of retailing is done online with payment through electronic gateways and delivery of goods is done through postal mail or courier. Retailing includes delivery also, which are called subordinated services.

Key Words: Retailing, RFID, Customers, Supply Chain, Services

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1.   INTRODUCTION

Department of Industrial Policies and Promotion (DIPP) reports reveals that in the single-brand segment the Indian retail industry has got Foreign Direct Investment (FDI) equity inflows summing to US$ 275.4 million during the period between April 2000 and May 2015. In the past few months many companies have invested in the Indian retail space since there is an increasing need for consumer goods in different retail sectors including home appliances and consumer electronics. Another challenge facing the organized retail sector in India is trained manpower shortage. The Indian retailers have to compensate more to retain trained people and have difficulty in finding them also. The profit levels of Indian retailers are brought down by this. Entry of global retail giants to organized retail sector in India is difficult since the Indian government has allowed 51% foreign direct investment (FDI) in India retail sector to one-brand shops only and this is a challenge being faced by Indian organized retail sector. Indirectly through franchisee agreement and cash and carry wholesale trading, global retail giants like Tesco, Metro AG and Wal-Mart are venturing into the Indian organized retail sector. Many Indian companies like Reliance Industries Limited, Pantaloons, and Bharti Telecom are also facing stiff competition from these global retail giants for entering into Indian organized retail sector. And hence discounting is becoming an accepted practice which brings down profit of Indian retailers.

All these are challenges faced by the Indian organized retail sector. The Indian organized retail sector has to deal with these challenges and only then this sector can prosper. For its fast-paced growth the various issues and challenges witnessed by the organised retail sector in India has been proving to be a hurdle, it provides ample opportunities for retailers, and it could accomplish better growth and economies of scale, if it surpasses some of the hurdles, even though the organised sector of the retail industry is in its initial stages in India, at this point of time. The challenges and risks that the sector faces are elucidated below: For any organised food and grocery retailer it is imperative to establish a robust cold chain since logistics is another challenge related to the supply chain. 'Amul' has developed a cold storage chain across India and is the best example of this scenario. Organised retailers like Reliance and Food Bazaar would continue to incur loss of considerable amount of money through wastages of perishable items while moving huge quantities from one place to another, until and unless they fully develop

integrated-cold chains. Procurement is the third challenge related to the supply chain. Based on their size and expansion plans big organised retailers enjoy economies of scale. When procurement is made in thousands or millions of units the economical benefits of scale in procurement are achieved; however, the resultant rise in inventory can affect bottom lines if they fail to procure only adequate amount of stock according to customer requirements.

The new tracking technology that involves small tags that emit distinct signals is known as Radio frequency identification, or RFID. To read RFID tags placed on individual products Retail business owners use remote scanners enabling them to record a various type of information, including quantities of individual items and their store locations. As the customer scan items and put those items in his shopping cart equipped with a scanner and a touch-screen computer that acts as a virtually personalized shopper, the computer provides information about each product and recommends complementary items. And the customer knows exactly how much they're spending since the computer keeps a list of items in the customer cart with a running total. The customer head to a self-checkout stand or to a cashier when finished shopping. The wait time is minimal since all that the customer has to do is pay as his items are already totalled and bagged. Radio frequency identification (RFID) technology is the power behind this hassle-free shopping experience. Around the world RFID is helping retailers improve customer satisfaction and increase sales.

By offering retailers real-time insights into inventory and product movement to enhance store productivity and loss reduction, the technology is transforming the retail industry. RFID tagging has been mandated by many of the world's largest retailers. This drives worldwide market for hardware and software to support RFID affecting more than 200,000 manufacturers and suppliers. RFID is improving efficiencies and creating a better customer experience in retail industry in these few ways. For retailers Inventory control is often a costly, time consuming process., RFID enables inventory managers to manage inventory supply at all times by offering real-time inventory visibility. By automating inventory-tracking process and by maintaining optimum inventory levels, stores can keep costs down avoiding stock-outs and eliminating unnecessary orders.

2.   LITERATURE REVIEW

Piyush Kumar Sinha and Sanjay Kumar Kar (2007) in their working paper explained that Indian retailers are operating almost everything manually. They face several challenges like maintaining inventory, ordering and above all keeping track of customer by maintaining consumer database. They argued that Technology would play a major role in retail development in India. Retailers will experience the impact of technology in retail. Most of the organized retailers are using available and affordable technology to capture consumer information. Modern retailers use scanner data to figure out answer to lot of questions. Through technology, retailers capture a whole lot of segmentation variables and subsequently use them for shopper segmentation. Technology helps to take better decision in some critical areas such as new product introduction, suitable product offering, quicker ordering and assortment planning. Retailers use shopper's loyalty data to design customized promotional offering for different set of customers. Ramakrishnan and Sudharani (2012) argued that India has witnessed significant growth in the organized retail store format and customers prefer shopping in new formats. Customers expect quality service from the store. However, the expectations vary from store to store, or depend on the store format. Selwyn Piramuthu (2013) studied the recall dynamics of perishable food supply networks because of its complexity. The complexity is added because of time delay in identifying the contamination source. The authors illustrate how RFID generated traceability at finer levels of granularity both upstream and downstream will determine appropriate visibility levels and recall policies.

Srinivasan and Saravanan (2013) studied the financial challenges confronted by the retailers in Tamil Nadu. They argued that the unorganized retail format has been rapidly replaced by the modern organized retail format not only in metro and urban cities, but semi-urban areas. Even though it signifies the development in one hand; another side it severely disturbs the livelihood and survival of unorganized retailers. Though the retailers face many challenges in the wake of modern retailers, financial challenges occupy a prominent place. The study found that low margin of profit, huge investments and lack of financial resources are the significant financial challenges faced by the unorganized retail traders. Barry Dickinson (2008) in his research titled "The Role of Business Process Capabilities and Market-Based Assets in Creating Customer Value and Superior Performance", the purpose of this study is to develop and test a model of the

way in which business processes interact with market-based assets to create superior performance in business markets. The present research augments the growing body of research examining the interface between the marketing and financial departments. The model is grounded in the resource-based view of the firm. The RBV postulates that firms must possess certain assets and deploy them successfully to achieve a sustainable competitive advantage. Assets alone do not provide a competitive advantage; it is the interaction of strong market-based assets with effective business processes (customer relationship management, product innovation management and supply chain management) that create customer value.

3.   BACKGROUND OF THE STUDY

Retailing is a global industry, which also influences the Indian retail sector. A number of the retailers are continuing their growth by making their presence in various nations. Walmart continues to enjoy the topmost position in the retailing sector, with greater than threefold of sales of Carrefour, the largest in the second position. The biggest 250 retail players have their presence in 6.8 countries on average; with 21.3 percent of their sales are achieved in other than the retailers' home nations. The retailers who are headquartered in the European continent are more global players than the United States based retailers (Levy and Weitz, 2012).The global economic slowdown, inflation, and huge unemployment are the issues that have a negative effect on the retail industry. Alternatively, the positive parameters that have an increasing effect of sales in the industry include rapid urbanization, growth of technology, more demand of the products, and the practice of buying over the Internet is continuously increasing.

Multiple attributes such as consumer spending behaviour and demographic attributes collectively affects the dynamics of the market considerably. The international Retail industry and the opportunities for retail segment players are driven by the increasing population and GDP growth, more disposable income, and growth in the customer spending. The market is forecasted to reach the estimated value of $20,002 billion in the year of 2020and in the coming six years the CAGR will be around 4.9% (2016-2021). The heavily fragmented nature of the retail sector is influenced by macroeconomic parameters such as Gross Domestic Product, surplus earning, and spending behaviours. The global retail industry is dominated by Asia Pacific (APAC), which comprises of about 37% of the international market. The predictions are that the overall market

will be influenced by APAC retail industry. The industry will also grow during the future period of 2012-2017 at a much greater rate than that of the other regions (Lucintel, 2012).

Table 3.1: Top 10 Retailers in the International Scenario

Rank	Name of the Retailer	Country of Origin:	Countries of Operation	Annual Revenue in $ Bn (2015)
1	Wal-Mart	U.S.	52	581.52
2	Sinopec Group	China	39	241
3	Royal Dutch Shell	Netherlands	22	192.45
4	China National Petroleum	China	39	109.25
5	Exxon Mobil	Irving, TX	29	95.75
6	British Petroleum	Britain	49	98.74
7	State Grid	China	14	89.37
8	Volkswagen	Germany	40	79.55
9	Toyota Motor	Japan	45	79.72
10	Glencore	Switzerland	5	81.22

Source: http://www.siliconindia.com/news/business/Top-10-Retailers-Around-the-World-nid-129475-cid-3.html and http://money.cnn.com/magazines/fortune/global500/2015/full_list/

Being the biggest among the industries in India, retail with an employment of around 8% to above 10% of the nation's Gross Domestic Product. The Indian Retail industry is predicted to grow 25% annually and it will be influenced bystrong growth in earnings, improving lifestyles, and positive demographic factors. The change in the consumer buying behaviour has revolutionized Indian Shopping patterns and the whole behaviour of shopping is also changing. The modernization of the Indian retail industry is evident from the current situation that there are sprawling complexes that provide all amenities, big shopping locations that are feature rich, and multi-storeyed malls which provide food, buying, and entertainment all at the one stop. The retail sector of the Indian Industry is currently valued at around USD 500 billion and it will become a USD 1.3 trillion opportunity by 2020. There will be more than 200 cities by then with population increase of about 0.5 million that will favour growth of the retail sector. Moreover, modern retail, will become six times to USD 229 Billion from the current 5 % of USD 29 billion in the

coming 9 years period (Shilpa Gupta, 2012). The Food industry is considered as the most critical sector in the Indian retail business and it is expanding at a yearly rate of 9.5%. The Indian retail industry is experiencing lot of change with the branded food sector coming intoit and will make lot of Indian consumers to opt for branded food items. Currently 62% of the Indian grocery baskets are non-branded goods and hence the Indian retail industry has a large potential of progressing well with the joint efforts of both retailers and the Indian government.

Table 3.2: Major Indian Retailers

S. No.	Store group	Brands
1	Pantaloon Retail:	Big bazaar, furniture bazaar, shoe factory, Food bazaar, Hometown, collection-i, Futurbazaar.com, e-zone, Star, Depot, Sitara, Bowling co.
2	K Raheja Group	Crossword, Shopper's Stop, In orbit Mall, Hyper City,
3	Tata group	Titan, Tanishq, Star India Bazaar, Landmark,Croma, Westside
4	RPG group	Books and Beyond, Au Bon Pain, Spencer's Hyper, Spencer's Daily, Beverly Hills Polo Club, Music World
5	Landmark group	Home Centre, Fitness First, Lifestyle Department Stores Centrepoint, Babyshop, Splash, Citymax India, Lifestyle, Max, SPAR hypermarkets, Shoe Mart, Foodmark, Fun City
6	Piramal Group	Jammin, TruMart, Pyramid Megastore,
7	Mahindra	Mom & Me
8	Bharti-Walmart	Best Price Modern Wholesale
9	Reliance	Reliance MART, Reliance Autozone, Reliance SUPER, Reliance Trends, Reliance FRESH, Reliance Jewellery, Reliance Footprint, iStore, Reliance Living, Reliance Digital
10	Aditya Birla Group	More, Louis Phillipe,Pantaloon,Van Heusen, Madura garments,Trouser town, Peter England,Allen Solly.

Source: http://retail.franchiseindia.com/article/whats-hot/trends/Top-Retailers-in-India.a404/

4.   METHODOLOGY

Fundamentally, the study is designed as descriptive research. The phenomenon of study are not controlled or modified. They are just measured and reported to highlight the facts. As descriptive research mainly uses interview or survey technique to collect the data, it is proposed to use a self administered questionnaire. Before research instrument is developed, a thorough review of literature and series of interview was conducted among the subject experts and possible respondents to find the items that need to be measured. Multi item constructs that measures phenomenon are framed. Proper scales such as five point agreeableness likert scales, importance scale and satisfaction scales are used. The sources of data include both primary and secondary. The primary source includes opinions of top management of the respondent retail stores and the opinion of customers visiting retail stores. The secondary source includes reports, standard textbooks, journals, magazines, web sites, newspapers etc. The population consists of retail outlets, which are operating in India. For convenience the sample framework was created limiting samples to the major cities in south India, Bangalore, Chennai, and Coimbatore. Though Indian retail sector has majority of retail stores in unorganised sector, the application of technology was found relevant in the organised retailing. Therefore, sampling framework restricted to retails stores of various product categories of modern format. 300 stores were randomly selected for collecting data. However, only 268 stores responded the survey. The main objective of the study is to understand the application of silent commerce technology in retail supply chain management.

5.   ANALYSIS AND DISCUSSIONS

The demography of the retail units is shown in the Table 5.1. 268 stores spread in the South Indian metropolitan cities responded to the study. Of the respondents109 stores comprising of 40.7% were chain stores, 159 stores was an independent store, comprising of 59.3%. Based on the strategy of decision making of the respondents, independent procurement and operational decision-making were done by 153 stores (57.1%), which are stores with independent owners predominantly. Of the respondents nearly 13.0% had centralized structure of decision-making and 18.3% of the respondents have a decentralized structure of decision-making. 11.6% stores approximately had a combinational structure of both decentralised and centralized decision-making.

Table 5.1: Summaries of Store Attributes

Demography	Types	Frequency	Percent
Ownership Category	Chain of stores	109	40.7
	Independent store	159	59.3
	Total	**268**	**100.0**
Structure of Decision Making	Centralised	35	13.0
	Decentralised	49	18.3
	Independent	153	57.1
	Both	31	11.6
	Total	**268**	**100.0**
Type of Product Sold	Grocery/ Food	29	10.8
	Garments	89	33.2
	House Hold Durables	39	14.5
	Gold	27	10.1
	Footwear	27	10.1
	Electronic	38	14.2
	Others	19	7.1
	Total	**268**	**100.0**
Format of The Store	Department Store	35	13.1
	Specialty Store	19	7.1
	Category Killer	61	22.7
	Warehouses	32	11.9
	Super Market/ Hyper mart	81	30.2
	Discount Store	31	11.6
	Malls	9	3.4
	Total	**268**	**100.0**

Retail units having different product categories responded to the survey. Of the respondents 10.1 % were golden jewellery units, 10.8% were food and grocery units, 14.2 % were Electronics goods sellers, 14.5 % of were Household Durable units, 33.2% were Garment selling units, 10.1 % were Footwear selling units and the rest 7.1 % were of other categories not mentioned above. Organised retail units are mainly apparel stores which are succeeded by household durables as revealed by the analysis. Medium market share is held by Electronic goods, Grocery/ Food and Footwear sellers and Gold Jewellery units have a limited presence. Classifying on the store format, the outcome shows that, of the respondents (7.1%) were specialty stores who deal with a single range of product, 14.9% were department stores, 22.7% were category killers that have a broad collection of the product category, 9.7% were warehouse stores, 10.4% were discount stores and around 5.2% respondents were malls.

5.1 Regression analysis to find the influence of perceived RFID advantages and setbacks on Attitude on Technology

A regression analysis is conducted to analyze the factors having significant impact on technology innovation in retail industry. The following null hypotheses are formulated, to study the impact of perceived RFID advantages and setbacks on the Attitude on Technology.

5.1.1 Hypothesis

Ho1 : There is no significant influence of perceived RFID advantages and Perceived RFID setbacks on the Attitude on Technology.

Ha1 : There is significant influence of perceived RFID advantages and Perceived RFID setbacks on the Attitude on Technology.

With the perceived RFID advantages and setbacks as the predictor variables, a multivariate linear regression considering the Attitude on technology as the dependent variable is conducted. With F = 47.664 and P < 0.003 and R Square value=0.432 the regression model is significant. The perceived RFID advantages and setbacks impacts the attitude on technology up to a limit of 43%, but the remaining of 57% variability will be due to the variables that are unknown or not in the scope of the study, as indicated by the study. It is found that there is a significant positive

influence of RFID advantages on the attitude (B= 0.245, P < 0.007), by analysing the regression coefficients. When the perception is one unit of advantage, the corresponding increase of positive attitude on technology will be 0.245 units as interpreted by the study. It is also observed that the regression coefficient of perceived RFID drawbacks is B= - 423, p=0.033. There is a significant negative influence of RFID setbacks on the attitude on technology. When the perceived RFID setbacks increase by one unit, it is observed that the attitude on technology becomes negative by 0.424 units as interpreted by the study. The setbacks have more influence in changing the attitude, when compared to the impact of perceived advantages and setbacks. From the outcome of the analysis, it leads to rejection of the null hypothesis that there is no significant influence of perceived RFID advantages and setbacks on the Attitude on Technology and it leads to the acceptance of the alternate hypothesis that there is significant influence of perceived RFID advantages and setbacks on the Attitude on Technology.

Table 5.2: Regression on Technology Attitude

SUMMARY OF THE MODEL			
R	R SQUARE	R SQUARE (ADJUSTED)	ESTIMATE STD. ERROR
.654[a]	.432	.424	.76659835
a. PREDICTORS: (CONSTANT), Drawbacks of RFID, Advantages of RFID			
b. DEPENDENT VARIABLE: Technology Attitude			

ANOVA[b]					
	SUM OF SQUARES	DF	MEAN SQUARE	F	SIG.
REGRESSION	56.025	2	28.019	47.664	.003[a]
RESIDUAL	76.993	142	.593		
TOTAL	133.000	145			

COEFFICIENTS [a]				
	UNSTANDARDIZED COEFFICIENTS	STANDARDIZED COEFFICIENTS	T	SIG.

	B	STD. ERROR	BETA		
(CONSTANT)	-3.865E-16	.073		.003	1.002
RFID Benefits	.245	.265	.243	3.775	.007
RFID Challenges	-.425	.265	-.423	-2.235	.033

5.2 Regression analysis for predicating influence of attitude on technology on the RFID usage

Another regression analysis is conducted to analyze the behaviour of the factors that impacts the technology innovation in the retail sector which in turn will impact the technology usage such as RFID. The following null hypotheses are formulated to test the impact of the attitude on technology on use of RFID.

5.2.1 Hypothesis

Ho2: There is no significant influence of Attitude on technology on the usage of RFID.

Ha2: There is significant influence of Attitude on technology on the usage of RFID.

Considering the Attitude on technology as the predictor variable and RFID usage as the dependent variable, the data is subjected to a bivariate linear regression analysis. The values of F =73.645 and P < 0.003 and R Square value=0.364 indicate that the regression model is significant. The attitude on technology will impact the RFID usage to a level of 36.4 %, as inferred from the study. The remaining 63.6% of the variability are due to the variables that are unknown or not in the scope of the study. It is found that there is a significant positive influence of attitude on technology on the RFID Usage (B= 0.583, P < 0.002), by analysing the regression coefficients. When the Attitude on technology becomes one unit positive, the corresponding increase will be 0.583 units of RFID usage as inferred from the study. From the outcome of the analysis, it leads to the rejection of the null hypothesis that there is no significant influence of the Attitude on technology on the usage of RFID and the acceptance of the alternate hypothesis that there is significant influence of Attitude on technology on the usage of RFID.

Table 5.3: Regression for Usage of RFID

SUMMARY OF THE MODEL			
R	R SQUARE	R SQUARE (ADJUSTED)	ESTIMATE STD. ERROR
.584[a]	.364	.365	.80423254
a. Predictors: (Constant), Technology Attitude b. Dependent Variable: USAGE OF RFID			

ANOVA[b]					
	SUM OF SQUARES	DF	MEAN SQUARE	F	SIG.
REGRESSION	47.643	1	47.633	73.645	.003[a]
RESIDUAL	85.395	145	.655		
TOTAL	133.038	146			

COEFFICIENTS [a]					
	UNSTANDARDIZED COEFFICIENTS		STANDARDIZED COEFFICIENTS	T	SIG.
	B	STD. ERROR	BETA		
(CONSTANT)	1.463E-16	.072		.003	1.004
Technology Attitude	.583	.081	.583	8.593	.002

6. CONCLUSION

By the year 2020 India's retail sector is projected to grow almost double its size to $1.3 trillion, triggered by projections of 27 % yearly growth on an average in organised retail sector favoured by the approval of overseas investment. In the retail sector in India, approximately 95 % is conventional or unorganised. Organized retail employs approximately 800,000 people and is projected to grow by 2.5 million by 2018 not considering FDI and indirect employment will contribute to another 4.2 million. Moreover FDI in retail will provide 1.5 million employments by 2018 and direct employment is projected to grow by 0.7 million and indirect employment by 1.2 million (Asian News Service, 2012). The focus is on the retail sector since it is important to the economy of the nation. Research on the issues in the sector is unavoidable to make it more

efficient and contributing in all the facets. Technology adoption helps the entire sector to be more rewarding, in addition to creating competitive advantage.

REFERENCES

1. Asian News Service (2012) India's retail industry to grow to $1.3 trillion by 2020: FICCI - Yahoo! News India. Retrieved January 1, 2013, from http://in.news.yahoo.com/indias-retail-industry-grow-1-3-trillion-2020-121004703--finance.html.

2. Barry Dickinson, J (2008), The role of business process capabilities and market based assets in creating customer value and superior performance, Ph.D. Thesis, Drexel University.

3. Department of Industrial Policies and Promotion (DIPP). (2010), Issue of discussion paper on Foreign Direct Investment (FDI) in multi-brand retail trading. Retrieved January 1, 2013, from http://dipp.nic.in/english/Discuss_paper/DP_FDI_Multi-BrandRetailTrading_06July2010.pdf

4. Levy, Michael and Weitz, Barton A. (2012), Retailing management, 8th ed. Tata Mcgraw Hill: New Delhi.

5. Lucintel (2012). Global Retail Industry 2012-2017: Trend, Profit, and Forecast Analysis. Market Research Reports. Lucintel, Dallas, Texas, USA.

6. Piyush Kumar Sinha and Sanjay Kumar Kar (2007), An Insight into the Growth of New Retail Formats in India, W.P. No.2007-03-04, Indian Institute Of Management, Ahmedabad, India.

7. Ramakrishnan and Sudharani Ravindran (2012) Customer Expectation of Retail Service Quality – A Comparative Study of Departmental Stores in Coimbatore. International Journal of Research in Finance & Marketing, Volume 2, Issue 7, pp. 25-29.

8. Selwyn Piramuthu, Poorya Farahani and Martin Grunow (2013). RFID-generated traceability for contaminated product recall in perishable food supply networks, European Journal of Operational Research, 225, pp. 253–262.

9. Shilpa Gupta, (2012) A Billion+ Customers need a Million Sales and Service Touch Points. FICCI Blog. Retrieved January 1, 2013, from http://blog.ficci.com/retail-india/1174/.

10. Srinivasan K. and Saravanan S. (2013). A Study on Financial Constraints and Challenges in Retailing Trade: A Bird's Eye View. Advances in Management Vol. 6 (1) Jan, pp. 21-25.