Applications of Business Intelligence Tools in the Retail Industry in Indian Context: An Approach to Tap Profitable Customers

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ABSTRACT

In times of global recession Business Intelligence (BI) tools like data warehousing, data mining, and OLAP can be fruitful and profitable as they provide quality actionable information to the retailers which helps them in increasing their revenues. A close look at the retail organizational functions across the world suggests that BI can play a vital role in almost every function. It gives insights about customer behaviour; which in turn helps the retailers to meet ever-changing needs and desires of the customers. On the supply side, BI can help retailers identify their vendors by analysing their past behaviour and determine what separates them from not so good vendors. With the help past data analysis, it helps retailers in better inventory management and better storefront operations through better category management. BI can also improve support services of retail organization like finance and human resource management. BI helps retailers in investing only in areas where it is monetarily and strategically fruitful.

KEYWORDS

Keywords: Business Intelligence; Retail Industry, Data warehousing, Data Mining; OLAP; CRM

1. INTRODUCTION

With the emergence of large chain departmental stores and shopping malls in India small independent retailers are under threat and forced to re-consider their operations. Large retailers have gained considerable power in the supply chain. They are increasingly dictating terms to the retailers and inventing new ways of attracting customers. But to hold the customer’s imagination for long has remained an elusive dream. Changing demographic shifts, tastes and preferences with increasing competition and the changing attitude of customers of trying out something new coupled with large range of choices have to be blamed for customer disloyalty. No wonder retailers today are going that extra mile to reach and understand the customer. Some of the initiatives taken by retailers are:

- Streamlining the supply chain management
- Improving storefront operations
- Exploring alternative channels like the Internet Technology
- Implementing Enterprise Resource Manager Products
- Improved customer relationship management

- Implementing Business Intelligence Tools

These initiatives have played a key role in retailers’ effort to compete in this volatile market. It is more relevant in times of global recession when retailers are money stringent. This paper explores the various applications of business intelligence in the retail industry keeping in mind the the growing trend among retailers to grow revenues from their most profitable customers. Business intelligence refers to a host of technologies like data warehousing, online analytical processing (OLAP), and data mining, which seek to turn data into actionable information.

2. INDIAN CONSUMER BEHAVIOUR

The Indian market, one of the most promising in the world, is fast evolving. So is the Indian consumer, across all socioeconomic strata, regions and towns. Rising incomes, multiple income households, exposure to international lifestyles and media, easier financial credit and an upbeat economy are enhancing aspirations and consumptions. In these fast changing times, it becomes imperative for companies reaching out to the Indian market, to catch the pulse of the Indian consumer. The modern Indian consumer is technologically aware, educated and spoilt with choices. It is imperative to gain a better understanding of the Indian consumer behaviour and get key insights into the issues like:

- What motivates them to make a buying decision or what are the factors that affect their attitude and generate trust. Also, what are the predominant personality characteristics of Indian consumers?

There has been a rapid growth of computer literates from 2004 to 2006. In 2006, there were 21 million active internet users, 59 million PC literates and 32 million passive internet users in India (Cube, 2006). According to the study done by Syndicated Research of e-technology group Indian Market Research Bureau (IMRB) International on 13.2 million internet users over 26 cities, 5% Indians deal in stock and shares, 5.5% buy products such as books, flowers and gifts and 14.2% buy travel tickets through internet. Most of the Indians use internet for e-mail and information search and the numbers of users drawn to e-commerce are growing rapidly.

India is swiftly emerging as an important economic country, with its economy growing at more than 9% annually. Online retail services are rising rapidly in recent years. It is important to understand the factors that influence Indian consumers...
regarding retail buying, both online as well as offline. According to Internet and Mobile Association of India (IAMAI) and IMRB, the size of e-commerce industry touched the figure of Rs. 9,210 Cr at the end of 2008.

Culture plays a role in forming the attitudes of consumers towards buying. Therefore, cultural conventions and regulations must be studied to tap the target consumers of a country. India has a collectivist and high context culture. With ever increasing internet users, recorded to be 21 million in March 2006 (Cube, 2006), Indian consumers’ attempt to shop online because of changing consumer characteristics in terms of demographic, psychographic, as well as situational influences.

3. INDIAN RETAIL INDUSTRY

Over the last few decades, fast moving consumer goods in India were predominantly distributed through neighborhood stores (kirana stores). These stores were small (about 100 sq ft.), and were owned and run by family members. Customers were mostly from the immediate neighbourhood and were usually well known to the store owners, the assortment was limited, and customers were typically loyal. The stores provided convenience in the form of easy credit and free home delivery for bulk purchases. Organized retail had no presence, departmental stores, super markets, hyper-markets and malls were never heard of, and the shopping experience was seen as something that was necessary. The Indian retail market, which is the fifth largest retail destination globally, has been ranked as the most attractive emerging market for investment in the retail sector by AT Kearney's eighth annual Global Retail Development Index (GRDI), in 2009. The share of retail trade in the country’s gross domestic product (GDP) was between 8–10 per cent in 2007. It is currently around 12 per cent, and is likely to reach 22 per cent by 2010. A McKinsey report, 'The rise of Indian Consumer Market', estimates that the Indian consumer market is likely to grow four times by 2025.

India’s overall retail sector is expected to rise to US$ 833 billion by 2013 and to US$ 1.3 trillion by 2018, at a compound annual growth rate (CAGR) of 10 per cent. As a democratic country with high growth rates, consumer spending has risen sharply as the youth population (more than 33 percent of the country is below the age of 15) has seen a significant increase in its disposable income. Consumer spending rose an impressive 75 per cent in the past four years alone. This is likely to give way to a sizeable number of retail construction projects. Organised retailing comprises only about 3% of the total retailing, and is estimated at around US$ 8.7 billion. This represents both an opportunity and a challenge for organized retailers. The need for heavy investments in real estate, technology, warehouses, lean supply chain, and lack of qualified manpower are all challenges that need to be addressed. However, changing shopper behavior, favourable demographics, increasing purchasing power can mitigate these challenges and present opportunities for growth.

To make inroads, organized retailers need to attract consumers with winning strategies i.e. to provide better value for money, shopping experience, greater choice of assortment, and better quality, while managing the costs required to do business. In this scenario, retailers have to make the right investments in technology and processes to gather accurate data around consumers, suppliers, purchases, employees, and stores. Above all, what would separate a winning retailer from the rest of the pack by taking a recourse to business intelligence which is derived from data-driven decision making. This would enable retailers to acquire and retain the right customers, make the right pricing, promotion and product placement decisions, develop effective collaborative relationships with their suppliers and hire the right employees and provide the right incentives that motivate them to perform.

With the base IT infrastructure in place (ERP system), these organisations are looking at investing in business intelligence tools. Retail sector is investing in knowledge management, data warehousing, data mining and business intelligence tools. Answers to questions, such as the location where a particular product is selling more, the period when demand spikes and in which store, etc. can be given by business intelligence tools. The retailers who fared the best during recent periods of recession are the ones who invested in technology. Business Intelligence tool can be used to understand the buying patterns of customers. Once trends are identified, planning merchandise movements become simpler.

4. KEY TRENDS IN THE INDIAN RETAIL INDUSTRY

4.1 RISE OF GLOBAL RETAILERS

There is a phenomenal rise of the 'Chain of Global retailers' in India. Growing consolidation and globalization in the sector has seen the bargaining power of the retailer increase in the supply chain. In order to counter local markets and increasing competition, leading global retailers across the world would continue to expand globally. Wal-Mart acquired Britain's third largest supermarket chain ASDA, to establish itself in Europe and has already entered Indian market. Wal-Mart opened its cash-and-carry joint venture with telecom giant Bharti Enterprises. Fifteen Walmart-Bharti merchandise stores in north India are in the pipeline for the next 2-3 years. Indiabulls group, a rising company with interests spanning from financial services to retail is in talks with some foremost global single-product retailers seeking a pan-India presence. Global brands such as Reebok, Louis Vuitton and Gucci have set up their own stores in India.

4.2 CUSTOMER RELATIONSHIP MANAGEMENT

Smart retailers have reoriented their business around the customer. In the mad rush to acquire new customers, they have realized it is equally important to retain the existing ones.
Increased interaction and sophisticated analysis techniques have given retailers unprecedented access to the mind of the customer; and they are using this to develop one-to-one relation with the customer, design marketing and promotion campaigns, optimize store-layout, and manage e-commerce operations. For example, Westside and Pantaloons use its ABC loyalty card to record each customer's individual transactions. This coupled with other relevant data has given them tremendous knowledge about customer buying patterns - knowledge that has significantly helped in augmenting customer loyalty.

4.3 SUPPLY CHAIN MANAGEMENT

Supply chain management (SCM) is the top management priority for retailers in today’s business scenario. Fierce competition is forcing retailers to respond to changes in the market quickly. This highlights the growing importance of SCM in managing stock availability, supplier relationships, new value added services and cost cutting. We are now moving into an era where supply chains will compete with each other, rather than there being competition between products and marketing techniques alone, to ensure that the right goods are available at the right place at the right time, in the right quantities and at the right cost. Big Bazar of Future group in India could dominate the market because of its effective supply chain management.

The introduction of wide and varied product ranges and the growth of competitive pressure have been the driving forces behind the development of logistics systems in the retail environment. The challenge for the retailer has been to maintain control of a supply chain, which has grown in complexity. However, SCM in India continues to be perceived as a low value added activity of managing transportation and warehousing. It is time Indian retailers started thinking about SCM from a strategic perspective rather than just as an operational issue.

Core supply chain issues such as month-end sales peaks, forecasting inaccuracy, constraint-based planning and so on continues to plague Indian retailers even after the ERP implementations. In many organisations, SCM was started as a kneejerk reaction to increasing costs and pressure on margins due to competition.

The guiding philosophy for retailers to improve the organisation’s performance is to manage constraints and uncertainty inherent in the prevailing system. The focus should be on using new tools and techniques and changing mindsets to manage the constraints and uncertainty. SCM is now customer oriented. For example, SCM at Shoppers’ Stop begins and ends with the customer.

Increasingly retailers are handling their inbound logistics by setting up their own distribution networks. A vital criterion for success in future would be the ability to harness worldwide distribution and logistics network for purchasing. This global supply chain should ensure high levels of product availability that, consumers want to buy.

4.4 RISE OF ONLINE RETAILING

The retail infrastructure has witnessed a transformation all over the world with the rapid growth of electronic commerce, especially in the past two decades. India has swiftly emerged as an important economic country with its economy growing at a more than 9% annually and online retail services rising rapidly in recent years.

Business is moving online and the internet is being used as a channel of information and commerce. In fact, business and transactions via electronic means have become an indispensable part of the repertoire of services that a marketer has to offer if long term survival and success is what he aims at. The application of technology-based online retail services has grown rapidly in recent years.

The Internet represents a huge marketing opportunity, as the use of technology as a means of conducting businesses continues to rise. The number of people accessing the Internet and entering into commercial transactions has been on a rise, and online shopping has been a growing phenomenon all over the world (Joines et al., 2003; Jayawardhena, 2004). Such transactions have been witnessed for both organizational as well as personal buying; and the trend will continue to rise through online retailing.

Bakos (1991), describes an e-market as “...An interorganisational information system that allows the participating buyers and sellers to exchange information about prices and product offerings”. Liu and Arnett, 2000 define it as "a way of conducting business by companies and customers performing electronic transactions through computer networks". Meuter et al. (2000) have defined e-retailing in terms of the internet market as “a virtual realm where products and services exist as digital information and can be delivered through information-based channels”. We may define online-retailing as use of an electronic via media through which the customer and the marketer may enter into a transaction for sale and purchase, so as to benefit both the parties in the long run.

Online retail in India is directly related to the overall environment that has been conducive to Internet usage, viz., an increasing young population of computer literates, the availability of the Internet, active Internet users and the utilitarian and hedonic dimensions associated with Internet usage. There are number of online retailers such as Fabmart.co, First and second.com, Sharekhon.com, Makemytrip.com, ICICI who have offered products and services in India but have not been able to tap the mass segment; reasons being, failure in understanding the demographics of Indian consumers, the lack of proper connectivity and interactivity of the Internet, uncertainties about quality of product or services, and also risky payment modes (Internet and Mobile Association of India and Indian Market Research Bureau, 2007). Most of the online retailers have been generating maximum revenues from advertisements and not from customers.

Some say that the Internet will completely change the face of retailing; others believe that the ‘touch and feel’ factor would ultimately dominate and the Net will have only a marginal impact on the shopping ’ behaviour. Probably the truth lies somewhere in between. But one thing is sure - online retailing
is here to stay. Many retailers realized that and have rushed to start their own e-commerce website. We believe that the key to success would be the effectiveness with which retailers integrate the Internet with their existing business model.

5. BUSINESS INTELLIGENCE SOLUTIONS FOR THE RETAIL INDUSTRY

Business Intelligence (BI) refers to the ability to collect and analyze huge amounts of data pertaining to the customers, vendors, markets, internal processes, and the business environment. A data warehouse is the cornerstone of an enterprise-wide business intelligence solution; various analytical (OLAP) and data mining tools are used to turn data stored in the data warehouse into actionable information. Customer Relationship Management (CRM) forms the focal point from where the vital insights gained about the customers using BI tools are absorbed in the entire organization. BI also plays a critical role in all the other retail functions like supply chain management, store front operations, and channel management. This paper is an introduction to the various BI applications in the different functions in the retail organization, including support functions like finance and human resources.

5.1 CUSTOMER RELATIONSHIP MANAGEMENT

The Customer Relationship Management (CRM) strategy should include:
(a) Operational CRM: Automating interaction with the customers and sales force.
(b) Analytical CRM: Sophisticated analysis of the customer data generated by operational CRM and other sources like Point of Sell (POS) transactions, web site transactions, and third-party data providers.

A typical retail organization has a huge customer base and often customer’s needs are fairly differentiated. Without the means to analyze voluminous customer data, CRM strategy is bound to be a failure. Hence, Analytical CRM forms the core of a retailer’s customer relationship strategy. Marketing and sales functions are the primary beneficiaries of Analytical CRM and the main touch points from where the insights gained about the customer is absorbed in the organization. Analytical CRM uses the key business intelligence tools like data warehousing, data mining, and OLAP to present a unified view of the customer. Following are some of the uses:

- **Customer Segmentation:** Customer segmentation is a vital ingredient in a retail organization’s marketing recipe. It can offer insights into how different segments respond to shifts in demographics, fashions and trends. For example it can help classify customers in the different segments.
- **Campaign/Promotion Effectiveness Analysis:** Once a campaign is launched its effectiveness can be studied across different media and in terms of costs and benefits; this greatly helps in understanding what goes into a successful marketing campaign.
- **Product Pricing:** Pricing is one of the most crucial marketing decisions taken by retailers. Often an increase in price of a product can result in lower sales and customer adoption of replacement products. Using data warehousing and data mining, retailers can develop sophisticated price models for different products, which can establish price-sales relationships for the product and how changes in prices affect the sales of other products.
- **Cross Selling:** Retailers use the vast amount of customer information available with them to cross sell other products at the time of purchase. This effort is largely based on the tastes of a particular customer, which can be analyzed using BI tools based on previous purchases. Retailers can also ‘up sell’ - sell more profitable products - to the customer at the time of contact.
- **Customer Lifetime Value:** Not all customers are equally profitable. At the same time customers who are not very profitable today may have the potential of being profitable in future. Hence it is absolutely essential to identify customers with high lifetime value; the idea is to establish long-term relations with these customers.
- **Customer Loyalty Analysis:** It is more economical to retain an existing customer than to acquire a new one. To develop effective customer retention programs it is vital to analyze the reasons for customer attrition. Business Intelligence helps in understanding customer attrition with Analytical CRM: with respect to various factors influencing a customer and at times one can drill down to individual transactions, which might have resulted in the change of loyalty.

5.2 SUPPLY CHAIN MANAGEMENT AND PROCUREMENT

Supply chain management (SCM) promises unprecedented efficiencies in inventory control and procurement to the retailers. With cash registers equipped with bar-code scanners, retailers can now automatically manage the flow of products and transmit stock replenishment orders to the vendors. The data collected for this purpose can provide deep insights into the dynamics of the supply chain.

However, most of the commercial SCM applications provide only transaction-based functionality for inventory management and procurement; they lack sophisticated analytical capabilities required to provide an integrated view of the supply chain. This
is where data warehousing can provide critical information to help managers streamline their supply chain. Some of the applications of BI in supply chain management and procurement are vendor performance analysis, inventory control (Inventory levels, safety stock, lot size, and lead time analysis), product movement and the supply chain, demand forecasting etc.

If correctly implemented, a data warehouse can significantly help in improving the retailer’s relations with suppliers and can complement the existing SCM application.

5.3. STOREFRONT OPERATIONS
The information needs of the store manager are no longer restricted to the day to day operations. Today’s consumer is much more sophisticated and she/he demands a compelling shopping experience. For this the store manager needs to have an in-depth understanding of tastes and purchasing behaviour of consumers. Data warehousing and data mining can help the manager gain this insight. Following are some of the uses of BI in storefront operations:

- Market basket analysis: Data mining tools can do market basket analysis and analyse what items are likely to be purchased together according to the association rules, primarily with the aim of identifying cross-selling opportunities. The Market basket analysis sometimes is also referred to as Product Affinity Analysis. Knowing and analyzing what products people purchase as a group can be very helpful to a retailer in particular or to any other seller in general.

- Category management: The retail market is an especially dynamic one. This is traditionally due to the similarity in the offered products since all retailers have access to more or less the same range of products via their distributors. In the last years the internet allowed new business concepts and further intensified internationalization and increased competitive pressure. For the application of a typical data mining process many, mostly anonymous data of the customer behaviour is available, which can be used for the optimization of the offers. The problems arising in category management can be separated into four different areas:
  1. campaign optimization (i.e., selection of target groups and customers),
  2. cross- and up-selling (i.e., additional sales to customers),
  3. assortment optimization (i.e., product assortment and categories),
  4. price optimization (i.e., optimization of product prices and promotions).

- Out-of-stock analysis: Data mining renders actionable information about the gap between the percentage of items actually out of stock and what the inventory system believes to be out of stock.

Typically a number of variables are involved and it can get very complicated. An integral part of the analysis is calculating the lost revenue due to product stock out.

5.4. ALTERNATIVE SALES CHANNELS
The success of a retailer in future would depend on how effectively it manages multiple delivery channels like the Internet, interactive TV, catalogues, etc. A single customer is likely to interact with the retailer along multiple channels over a period of time. This calls for an integrated strategy to serve the customer well, which requires smooth flow of information across channels. To ensure smooth flow of information customer data needs to be collected from different channels in one data warehouse. Customer relationship strategy can then be built around this customer-centric data warehouse. We have already seen how Analytical CRM can provide analyses over the centralized data warehouse. In this section we will explore how data warehousing and data mining can improve the effectiveness of a channel.

- E-Business Analysis: The Internet has emerged as a powerful alternative channel for established retailers. Increasing competition from retailers operating purely over the Internet has forced the “Bricks and Mortar” retailers to quickly adopt this channel. Their success would largely depend on how they use the Net to complement their existing channels. Web logs and Information forms filled over the web are very rich sources of data that can provide insightful information about customer’s browsing behaviour, purchasing patterns, likes and dislikes, etc.

- Web Log Analysis: This involves analyzing the basic traffic information over the e-commerce web site. This analysis is primarily required to optimize the operations over the Internet.

- Site Navigation: An analysis of the typical route followed by the user while navigating the web site. It also includes an analysis of the most popular pages in the web site. This can significantly help in site optimization by making it more user-friendly.

- Referrer Analysis: An analysis of the sites, which are very prolific in diverting traffic to the company’s web site.

- Error Analysis: An analysis of the errors encountered by the user while navigating the web site. This can help in solving the errors and making the browsing experience more pleasurable.

- Keyword Analysis: An analysis of the most popular keywords used by various users in Internet search engines to reach the retailer’s e-commerce web site.

- Web Housing: This involves integration of web log data with data from other sources like the POS transactions, third party data vendors etc. Once the data is collected in a single customer centric data warehouse, often referred to as ‘Web house’, all the applications already described under CRM can be
implemented. Often a retailer wants to design specific campaigns for users who purchase from the e-commerce web site. In this case, segmentation and profiling can be done specifically for the ‘e-customers’ to understand their needs and browsing behaviour. It can also be used to personalize the content of the e-commerce web site for these users.

- **Channel Profitability:** Data warehousing can help analyze channel profitability, and whether it makes sense for the retailer to continue building up expertise in that channel. The decision of continuing with a channel would also include a number of subjective factors like outlook of key enabling technologies for that channel. For example M-commerce - though not a very profitable channel today – has the potential to be a major alternative channel in the years to come.

- **Product - Channel Affinity:** Some product categories sell particularly well on certain channels. Data warehousing can help identify hidden product-channel affinities and help the retailer design better promotion and marketing campaigns.

5.5. ENTERPRISE MANAGEMENT

Enterprise management typically involves the various activities performed by the top management; and the role of data warehousing and data mining is to provide the top management with reports and analyses to meet their decision-making requirements.

One possible BI application in this area is: **Dashboard Reporting on key performance indicators (KPIs):** Key performance indicators like contribution margin, response rate, campaign costs, customer Life time value can be presented in dashboard reports to the top management to facilitate decision-making process. Also alerts can be triggered if any KPI reaches a pre-defined threshold level. These reports can incorporate retail industry benchmarks, provided by third party researchers, which can be used as threshold levels for various KPIs.

5.6. HUMAN RESOURCES

Data warehousing can significantly help in aligning the HR strategy to the overall business strategy. It can present an integrated view of the workforce and help in designing retention schemes, improve productivity, and curtail costs. Some BI applications in HR are:

- **Human Resource Reports/ Analytics:** Reports and analysis can be generated to support an integrated view of the workforce. Various analyses include staff movement and performance, workforce attrition by store, workforce performance by store, compensation and attrition, and other customized analyses and reports. The HR data can be integrated with benchmark figures for the industry and various reports can be generated to measure performance viz.-&-viz industry benchmarks.

- **Manpower Allocation:** This includes allocating manpower based on the demand projections. According to the seasonal variation in demand, temporary manpower can be hired to maintain service levels. The demand levels vary within one working day also, which can be used to allocate resources accordingly.

- **HR Portal:** Employers need to maintain accurate employee data, which can be viewed by the employees for information relating to compensation, benefits, retirement facilities, etc. Payroll data can be integrated with data from other human resource management applications in the HR data warehouse. This data can then be circulated within the organization through the HR portal.

- **Training and Succession Planning:** Accurate data about the skill sets of the workforce can be maintained in the data warehouse. This can be used to design training programs and for effective succession planning.

5.7. Finance and Fixed Asset Management

The role of financial reporting has undergone a paradigm shift during the last decade. It is no longer restricted to just financial statements required by the law; increasingly it is being used to help in strategic decision making. Also, many organizations have embraced a free information architecture, whereby financial information is openly available for internal use. Many companies, across industries, have integrated financial data in their enterprise wide data warehouse or established separate Financial Data Warehouse (FDW).

Following are some of the uses of BI in finance:

- **Budgetary Analysis:** Data warehousing facilitates analysis of budgeted versus actual expenditure for various cost heads like promotion campaigns, energy costs, salary, etc. Online Analytical Processing (OLAP) tools can provide drill down facility whereby the reasons for cost overruns can be analyzed in more detail. It can also be used to allocate budgets for the coming financial period.

- **Fixed Asset Return Analysis:** This is used to analyze financial viability of the fixed assets owned or leased by the company. It would typically involve measures like profitability per sq. foot of store space, total lease cost vs. profitability, etc.

- **Financial Ratio Analysis:** Various financial ratios like debt-equity, liquidity ratios, etc. can be analyzed over a period of time. The ability to drill down and join inter-related reports and analyses - provided by all major OLAP tool vendors - can make ratio analysis much more intuitive.

Profitability Analysis: This includes profitability of individual stores, departments within the store. Product categories, brands, and individual stock keeping units (SKUs). A major component of profitability analysis is the costs incurred by stored
departments and the cost of acquiring, storing and allocating shelf space to particular product categories, brands, or SKUs. It goes without saying that profitability analysis has an extremely universal appeal and would be required by other groups within the retail organization.

CONCLUSION
Retailers are known for innovation. The most innovative retailers of today are those who are using business intelligence to gain sustained competitive advantage. These retailers have also realized that Business Intelligence can be used strategically only when it is implemented with utmost care and complete support from the top management. Unless all the user-groups are consulted and the objectives clearly defined, BI solution cannot be a success. Also, like any other technology solution, BI cannot exist in vacuum. We strongly believe that it is just a means to an end. The wisdom, gathered by analyzing huge amount of data, should reach every corner of the retail organization. The end objective is to convert this wisdom into effective action. And for this the entire organization should be able to leverage the business intelligence network. History shows that the retailers who survive global recession are the ones who get inventive, get resourceful, and invest in technology.

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