Marketing Science and Spatial Diffusion

A Look at the Role of the EPCglobal™ Network and Unique Identification[a]

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[a]Adapted from **GLOBAL RFID: The Value of the EPCglobal Network for Supply Chain Management (2007)** by Edmund W. Schuster, Stuart J. Allen and David L. Brock. Published by Springer Verlag.

Most of the proposed applications for the EPCglobal Network and RFID technology have focused on innovative ways to reduce cost within the supply chain through tagging cases and pallets. While this cost orientation should create significant savings given continued improvements in tag costs and read rates, there is also the possibility of creating value in other ways. Within the consumer goods industry, the data generated by the EPC could be an effective tool to enhance revenue. Achieving top line growth is the goal of every firm and an area of great interest to senior management. Driving revenue growth might prove to be the ultimate value of the EPC.

There are three basic ways to grow revenue. [1] First, a company can stimulate sales of existing products through improved pricing, promotion, and advertising. Second, a firm can increase overall sales though introduction of new products. Finally, growth can occur though acquisition of businesses lines or entire companies.

Given the competitive nature of many markets, growth through selling more of existing products is becoming increasingly difficult and often causes a drain on profits because of rising advertising and promotion costs. As an alternative, growth through acquisition

presents significant risks. Most corporate mergers do not achieve pre-merger growth targets. [2] Because of these business realities, many firms are looking to increase revenue through the introduction of new products. This is especially the case in the consumer goods industry, although new product introductions also bear great risk.

Many managers and business consultants feel that increasing the efficiency of advertising and promotion for existing products, along with improving the process for introducing new products into markets, is the most consistent overall strategy for achieving long-term revenue growth. Historically, the bar code has played a role in supporting revenue growth by providing product data on the volume sold through retailers for both durable and non-durable consumer goods. [3] This data has been instrumental in creating an entire family of market mix models that measure customer response to promotion and advertising, allowing retail managers and manufacturers to make better trade-offs in practice. [4] However, even with the large amounts of data generated from barcodes the science of marketing remains a "fact-based art." [5]

The EPC has the potential to go a step further by helping companies not only to understand what stores are selling, but also what individual customers are buying. [6.] With the capability of unique identification for an item, the possibility exists of tracking

customer sales at a level of detail not currently possible. This could lead to important insights concerning the demographic, economic, and geographic forces influencing purchasing decisions. At least one marketing services company has already managed to take the first steps in building customer profiles using transactional data gathered from barcodes. [7] The EPC will enhance this process by providing unique identification of individual customers.

Though it will be several years before tagging of all items in retail stores becomes economically feasible, situations currently exist where tagging single, high value items might make sense. The top candidates are durable consumer items such as appliances and electronics. These consumer items share a common characteristic in that the logistical shipping unit, a case, contains a single end-item. In these situations, tagging individual cases and the use of the EPC becomes a favorable option given the additional supply chain and marketing information that could result.

There are also opportunities to use the EPC on loyalty cards, a means of customer sales tracking used by many retailers such as CVS/pharmacy. [8] This type of application provides opportunities to do interactive marketing within a store, expanding the ways to send advertising and promotional messages to targeted individual customers.

In all of these cases, the use of the EPC to obtain detailed information on individual customer purchasing behavior presents significant issues of privacy and data security that retailers and manufacturers must address before widespread application can take place. Though privacy is an unanswered issue, the value of unique identification poses many yet to be realized advantages for customers, retailers, and manufacturers.

It is seldom the case that technological innovations like the EPCglobal Network and RFID technology take place within a vacuum. Even as manufacturers and retailers analyze its implications, there are other structural changes taking place in the consumer goods industry that could have an impact on the eventual use of the EPC. This is especially true in the area of advertising and interactive marketing.

The traditional notion of mass marketing and the concept of the economies of scale for advertising are changing rapidly. With new possibilities for reaching individual consumers through the Internet and other communication networks, advertisers no longer "treat consumers as homogeneous masses." [9] In this environment unique identification, whether through the EPC, a personal computer, or a cell phone, takes on new meaning and value to business. The next section discusses several emerging applications poised to change the

way advertisers reach customers, and the way industry and the public view technologies such as the EPC.

New Developments in Advertising

In practice, only about half of all advertising is successful. [10] With the advent of commercial skipping devices like TiVo, along with the fragmentation of viewers caused by cable television, video games, and the Internet, the traditional business practice of mass communication through television and radio commercials is coming under increasing pressure. [11] Though this approach has worked well since the beginning of radio in the 1920's and television in the 1950's, the impact on today's audience appears to be diminishing. Companies well known for popular network television commercials such as the GAP, inc. and Anheuser-Busch are shifting advertising dollars to direct mail catalogs, cable TV, and the Internet. [12, 13] The primary reason given for these shifts in advertising budgets is recognition of the changing nature of viewership associated with network television.

As the growth rate of network television advertising declines, Internet-based advertising continues to grow rapidly. For example, the home pages of Yahoo, America On Line (AOL), and Microsoft's MSN are sold out for display ads "months in advance." [14] In some cases, online advertisers are seeing double digit increases in ad prices.

Even though online advertising totaled only 3.7% of the total ad dollars in the US during 2004, [15] ad response rates are comparatively high at about 3% for popular web sites such as AOL. [16] Some believe this high response rate is a result of the community aspects of a web site like AOL, where news, entertainment, and the opportunity to interact with other online users keep visitors returning and spending money. [17] As businesses such as AOL, Yahoo, and MSN refine the techniques of building a community, online ads should increase in importance.

With more Internet users responding to online ads, it becomes possible to measure a particular advertisement's effectiveness using such methods as econometrics to estimate how various factors affect sales. [18] Through various means, the Internet can provide a wealth of data needed for econometric models. As the online advertisement business matures, some companies such as Yahoo are hiring firms to track the effectiveness of search related ads. Concerning this trend, one author comments that "the effectiveness of search-related ads is seen as easy to measure -- advertisers only pay for the ads' placement when people click on them, and can track when clicks translate into purchases." [19] This represents a major improvement in targeting a marketing message.

Marketing Innovations

Along with the new developments in online advertising, a number of innovative marketing ideas are emerging as retailers and manufacturers explore new ways to use technology. Three interesting ideas involve using wireless communication as a means to reward customers who visit a restaurant, employing an EPC loyalty card for interactive marketing within a store, and the use of cell phones as a promotional tool and to measure advertising effectiveness.

Walt Disney Corporation has filed a patent application for a system that would provide a portable media player to those who visit particular restaurants and purchase a meal. [20] The media player is capable of holding a Disney movie, music, games, or photographs and is WiFi enabled. According to the pending patent, users would receive an electronic code "that authorizes a partial download of a movie, video or other media file, which can be downloaded while in the restaurant." [21] With each subsequent visit to the restaurant, patrons would earn points and could download additional files. This produces a powerful incentive to return to the restaurant and purchase more meals.

In another example, retailers and technology companies are experimenting with different methods of in-store interactive marketing. For some time, researchers have known that a significant

relationship exists between a store's marketing environment and customer purchasing behavior. [22] Reaching the customer with a promotional message at the instant of purchase is a powerful method of increasing sales and brand loyalty. The only barrier holding retailers and manufacturers from doing more interactive marketing is the expense and lack of technology at the store level.

However, with the imminent changes in the mass communication industry as advertisers attempt to reach an increasingly fragmented audience, retailers and manufacturers view in-store interactive advertising as the wave of the future. Even established consumer goods manufacturers like Proctor & Gamble, the company that popularized mass market advertising almost one century ago, are shifting to a strategy of pitching brands directly to customers as they shop in stores. [23]

To build on this trend, one company has created an entire business based on in-store, interactive digital signage that responds in different ways to customer traffic along with methods to evaluate the effectiveness of the posted message. [24] The fundamental technology employs video camera surveillance. Most of these in-store applications are outside of the United States. Anecdotal accounts put product sales gains at about 10% through the use of digital, interactive signage. [25]

In another situation, IBM has proposed technology that uses an EPC embedded in clothing displayed for sale. As a potential customer selects an article of clothing from a rack or shelf, a reader scans the tag and a digital display located close-by shows information about potential accessories or other types of clothing that match. [26] This type of technology reduces search time inside stores, satisfies the customer and increases the probability of a sale. In a similar way, loyalty cards might contain an EPC, allowing customized messages to be displayed as customers walk through a store.

Interactive marketing and monitoring provides other benefits indirectly linked to increasing sales. One company has developed a means of using RFID technology to monitor the timing of point-of-sale (POS) displays sent by manufacturers to retailers for set-up in stores. Goliath, Inc. reports that about 50% of the time, stores "do not deploy the displays in a timely and consistent manner." [27] The company provides an in-store monitoring service for consumer goods companies to audit the timeliness of POS displays. By combining this information with check-out scanner data gathered from barcodes, a true picture of the impact of POS displays on sales emerges. In this case, data from RFID supplements existing data obtained from bar codes.

A final example involves an interesting situation in Japan where cell phones are used in an elaborate system of interactive advertising. As part of a promotional campaign, Northwest Airlines has constructed billboard advertisements in Tokyo that also contain two-dimensional bar codes. A passerby can scan the bar code posted on the billboard with a cell phone specially equipped to decode the information contained in the bar code. Once decoded, the message automatically directs the cell phones' web browser "to coupons, games, or further details on a product" located on the Internet. [28] There are 30 million cell phones in Japan equipped with QR technology, the means needed for scanning and decoding of large bar codes located on billboards. The technology-oriented Japanese find QR scanning a curious pastime. Advertisers find QR technology a valuable source of information about traffic patterns in cities and the advertising effectiveness of billboards.

In all of these cases, unique identification plays an important role in enabling the interaction between consumers, retailers, advertising and marketing research companies, and manufacturers. As business moves into an age of mass customization for consumer products, markets will continue to fragment. Given this ongoing trend, the EPC should take on greater importance as a basic element in

dealing with the complexity of future markets where product life cycles are shorter and new product introductions are frequent.

Beyond enhancements to advertising and promotion, the next section explores ways the EPC might improve the logistics of new product introductions. This builds on another important trend in business, the integration of marketing science, engineering technology, and supply chain management.

NEW PRODUCT LAUNCHES

The launch of a new product is a challenging task that every consumer goods firm must face. With individual stores now carrying up to 100,000 different items, [29] the ongoing reality of marketing is that the average customer encounters over 1 million different stock keeping units (SKUs) across all channels of distribution. Yet the typical family gets 85% of their needs from only 150 SKUs. [30]

Complicating matters, each year there are over 10,000 new product introductions in the non-durable consumer goods segment alone. [31] About 80% of these new introductions are food products. Of the non-food items introduced each year, about 80% are health and beauty aids.

Few reliable estimates exist concerning the number of new durable consumer goods introduced each year. Counting all of the line

extensions within individual brands, and the wide range of durable consumer products ranging from personal computers to lawn equipment, the number must be staggering.

Given these conditions, manufacturers and retailers need to focus on innovative ways to advertise and track new products and to target potential customers. Future success will depend on using technologies that create opportunities for detailed analysis, and the ability to optimize advertisement expenditures during critical new product rollouts. With slotting allowances charged by retailers accounting for 16% of product introduction costs, it becomes critical that sales take-off for each retail outlet to realize a positive return on this investment. [32]

One of the most important factors influencing new product rollouts involves the geographic forces that affect adoption by individual customers. Commonly called spatial diffusion, this area studies the rate and pattern of adoption for a geographical area based on the frequency and type of advertising, demographics, and distance to retail outlets, along with other elements of the market mix such as pricing, promotion, and tactical product positioning versus competitors. Besides the general goal of describing and understanding customer behavior, the study of spatial diffusion also seeks to build mathematical models of the adoption process through time. This

model building approach has practical value for retailers and manufacturers in providing general guidelines about how consumers adopt new products. Future trends in information technology will allow these models to exist in a network with the prospect of rapid linkage to data for real-time analysis. [33]

Marketing managers and academic researchers realize the importance of studying spatial diffusion. A research article on the subject notes, "Managers who understand the geography of the processes by which consumers change their behaviors can be much more successful in launching new initiatives and can make much better use of their resources while doing so." [34]

For all types of consumer goods companies, the initial spatial pattern of adoption is an early indicator of longer-term success or failure. This becomes critical information for the process of establishing a new national brand. Achieving rapid market penetration in select areas of the US is vital in gaining profitability and forestalling competitor response, especially since national rollouts are costly, characterized by historical risk of failure, and seldom done in practice. [35]

While the development of marketing research in the US economy has been a fundamental reason for the growth and sophistication of the consumer goods industry, the introduction of new

products into select markets continues to represent an area of great inefficiency in terms of supply chain and advertisement costs. For example, in examining the entire new product introduction process from initial conceptualization to successful launch, only 1 in 58 are successful in the food industry. [36]

Assuming a new product is properly developed and is reasonably matched to customer needs, [37, 38] a significant reason for failure lies in the amount, quality, level of aggregation, and timeliness of data available to managers concerning the rate of geographic customer adoption. With a lack of data, marketing managers have no chance to take a rational and analytic approach to decision-making about advertising and supply chain factors such as level of customer service that influence the level of success for a new product.

In a typical product launch, the only sources of near real-time data are point estimates of aggregate demand from retailers obtained from scan data, consumer feedback from various types of interviews, namely focus groups, and household market research sampling by companies such as IRI and Neilsen. Often data from these sources give conflicting views of new product success. [39] In addition, none of these sources include the detailed geographical data needed for observation and modeling of spatial diffusion. Sometimes important geographical links do exist in the data although these links must be

culled from daily purchase transactions. Technologies such as the EPCglobal Network and RFID offer the future prospect of obtaining real-time geographical data on spatial diffusion within a market, serving as an important data input to decision-making.

Further, there currently is a lack of efficient ways to visualize and organize the data needed to make spatial diffusion a management tool suitable for daily decision-making. There are no open computing systems capable of matching mathematical models describing spatial diffusion to geographic location data obtained from such sources as loyalty cards, and other future means that might include virtual private networks. [40] While history-based methods such as share and distribution analysis are valuable market research tools, spatial diffusion through its focus on the dynamics of customer behavior and real-time analysis of data offers much more potential to gain insight into the success or failure of a new product. This is especially the case for high tech products such as consumer electronics.

Recent advances in three-dimensional geographic visualization of urban areas and improved ability to manage different types of digital maps through browsers open a range of possibilities for the widespread application of spatial diffusion modeling. The next two sections analyze the details and value of spatial diffusion along with a more detailed discussion of data.

SPATIAL DIFFUSION IN MARKETS

Regardless of advertising on television, radio, magazines, newspapers, and the Internet, word-of-mouth remains a powerful force in marketing. Some initial survey data suggest that recommendations from a "friend, expert, or relative" influences up to 80% of all purchases. [41] Large and small companies alike hold this type of advertising in high esteem. [42].

Geographical proximity is perhaps one of the strongest determinants of the rate of word-of-mouth communication. In a first attempt to understand the impact of product recommendations made through interpersonal communication, a study conducted in the 1940s focused on the diffusion of technological innovation within an agricultural setting. [43] The authors concluded that personal networks, in conjunction with mass communication, played an important role in the decision by each farmer to purchase hybrid seed corn. This work also categorized adopters into types and developed curves of cumulative market share through time.

During the late 1960's, Professor Frank M. Bass took this work a giant step further by developing a model that predicts the number of users who will adopt a new product. [44] This model has been applied to describe the "sales of televisions, clothes, dryers, dishwashers, refrigerators, and other consumer durables." [45] Through time,

researchers have added modifications to the basic model and applied it to a variety of products and situations. An interesting example is the diffusion of a free email service (Hotmail). [46] In this case, the Bass model made an accurate prediction of adoption rate when matched to historical data.

Through the intensive examination of new product introductions, Professor Gerard Tellis goes even further in developing a large set of aggregate data and modeling techniques to determine the time of product take-off in the United States and other countries based on different cultural and categorical variables. [47, 48] This is valuable to know given that executives like General Electric's Jeff Immelt predict that as much as 60% of the companies' growth during the next decade will come from overseas, specifically from developing countries. [49]

The basic diffusion models made famous by Bass and others provide insight and an analytical tool for marketers to make decisions. The next stage in the development of this type of analysis involves the introduction of spatial data. For many years, economists have used spatial data to predict the location of industry, the expansion of cities, and the clustering of similar businesses within regions. [50] Making the transition to using spatial data as a common element of marketing and supply chain analysis requires the capability of unique identification

that the EPCglobal Network and RFID technology can provide. With this capability, it becomes possible to analyze the geographical forces that influence word-of-mouth communication and the adoption of new products.

The modern history of spatial diffusion in marketing begins with research conducted by William H. Whyte in 1954. [51] In this study, aerial photographs of urban Philadelphia were used to identify homes that had window mounted air conditioning units, an innovative home appliance that gained popularity in the immediate post WWII era.

After compiling the data, Whyte observed that city blocks of equal size and demographics had sharply different rates of market penetration. For example, some city blocks had 18 air conditioners while others, located in the same general area, had only three. This study provided the first evidence that adoption of a new product, like an air conditioner, occurs in clusters and is not homogeneous over a geographical area.

Three Important Stages

Since the Whyte study, there has been a great deal of research about spatial diffusion in the context of geography, sociology, urban planning, and environmental science, however, little research has related to the introduction of new products and services to consumers in a defined geographical area. In theory, spatial diffusion for consumer products comprises three relatively predictable stages: 1) lead adopters, 2) neighborhood effects, and 3) consolidation of adoption. [52] As a generalization, the outcome of the three stages is an S-shaped curve of cumulative adoptions through time. The main driver of each stage is the rate of information dissemination to consumers within a market. Temporal aspects of spatial diffusion have particular importance in analyzing dynamic customer behavior, an under researched area of marketing.

When a new product is introduced into a market, no information about it exists. Leading adopters piqued by curiosity will likely be the first to make a purchase. The geographical pattern of these lead adopters is random. Since there are relatively few lead adopters in any market, the random pattern is characterized by significant physical distance between purchasers.

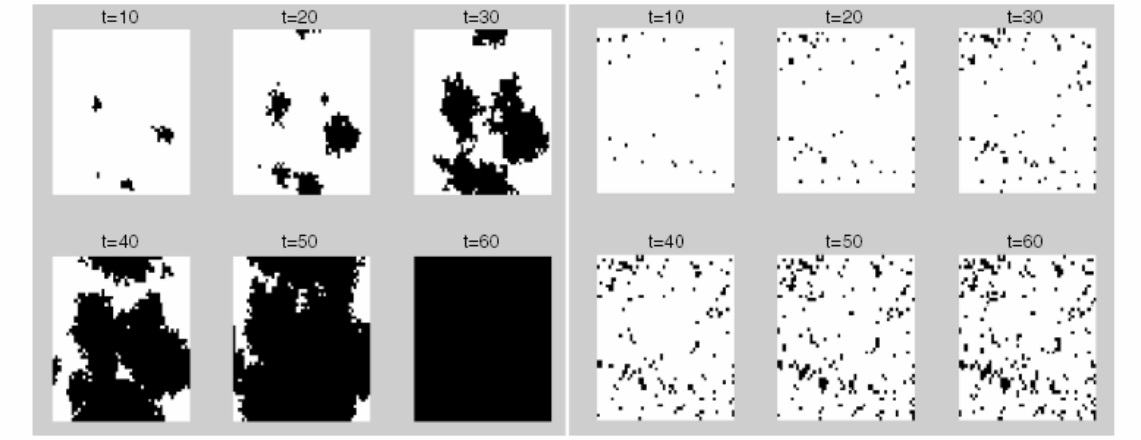
If experience with the product is positive, there tends to be local word-of-mouth communication by lead adopters, which influences

others within close proximity to consider purchasing the product. In addition, advertisement often provides an impersonal means of communicating information about a new product across a wide geographical area. Because of both advertising and word-of-mouth from lead adopters, there tends to develop a neighborhood effect where clusters of adopters begin to form within a geographical area. These clusters continue to consolidate as more information about the product is diffused within the neighborhood network.

Finally, the overall market reaches a saturation of information about the new product. Lag adopters, who are inherently cautious in taking risks, begin to make purchases. Clusters of adopters tend to merge forming a pattern of complete market penetration.

Figure 1 shows a classic case of spatial diffusion for a successful new product introduction through time. Figure 2 shows a different situation where spatial diffusion never advances from state 1 to stage 2. The result is a failure of the new product introduction.

Figure 1 – Successful Introduction **Figure 2 – Unsuccessful Introduction**



Source – (Garber et al. 2004) [53]

THE DATA ISSUE

To initiate spatial diffusion studies, data for new product sales must contain some aspect of time and location for a specific geographical area. Since the late 1980s, there has been a consistent effort by marketing research firms to gather "single source" data at the household level. [54] The EPC will play a future role in this type of data capture, both for marketing research studies and for new product sales to the public.

Single source data contains information on several independent variables and allows for causal analysis at the point of effect, either the store or the household level. Independent variables might include the impact of promotions, advertising, coupons, or the local

competitive dynamics between stores. The level of detail is often on an individual product basis.

Obtaining large volumes of household level single-source data has been a historical limitation in conducting spatial diffusion studies. Improved technology is creating new opportunities to overcome this limitation through high tech market research techniques where individual household occupants agree to independent monitoring of their shopping, reading, and television habits. [55] However, this still only represents a sample of all households within a geographical area. At best, various in-home technologies might allow monitoring of perhaps several hundred thousand households across 24 countries including all marketing channels. [56] In some cases, the sample is not large enough within specific demographic groups for reliable spatial diffusion analysis, especially when considering large, developed economies like the United States where a great deal of diversity exists and population densities differ by a wide range.

At the store level, the situation is no better. In general, data gathered from barcode scanners provides little value in making short-term decisions about product strategy, advertising, forecasting, and spatial diffusion. This is because important demographic information and knowledge of other independent variables that might affect the purchasing habits of specific consumer segments are missing. [57] An

additional limitation, important to the study of spatial diffusion, involves the lack of customer geographic information.

Some firms, most notably Target, have gone as far as to issue a branded Visa credit card in an attempt to get improved data about customer demographics and sales patterns for products purchased in their stores and elsewhere. [58] This follows a general trend toward using credit card information and other means as indicators of aggregate sales increases by category during the holiday shopping season. [59, 60]

Because none of these approaches provides a truly representative sample of total commerce, there is often divergence in the sales increases predicted, even between various credit card reporting groups. No indications exist that transactional data from credit cards is a fundamental part of spatial diffusion studies even though this data contains customer location and products purchased.

In one of the most practical and comprehensive efforts to date, a research study used data obtained from loyalty card information. [61] The purpose of this study was to understand the rate of spatial diffusion for loyalty card adoption; hence, the address for each adopter and the time of enrollment became the data needed to conduct the study. Advanced information technologies can convert street addresses appearing in databases to earth coordinates, longitude and

latitude, for automatic use in digital mapping. This is a powerful tool to visualize spatial diffusion through time.

With the loyalty card example, each enrollment results in a data element consisting of time and location within a geographical area. Loyalty cards also allow the ability to record individual customer transactions, potentially giving data concerning a new product's sales history. However, since those customers that hold a loyalty card represent a subset of all customers for a particular retail outlet and geographical area, the data obtained from loyalty cards is subject to sampling statistics. Since lag adopters are likely to hold a loyalty card in fewer numbers, no direct inference can be drawn unless a high percentage of all customers visiting the store hold loyalty cards and use them regularly to make purchases.

The growing trend toward online sales offers additional prospects for gaining the data needed to conduct spatial diffusion studies. When a customer purchases a product, it is shipped to a specific location at a specific time. Since online retailers capture all of this information, detailed geographical, time, and location data exist.

However, spatial diffusion studies might be of lesser value to online retailers, because the means of promotion and advertisement mostly occurs through the Internet, a medium that has no geographic

boundaries. Although spontaneous, interpersonal word-of-mouth advertising remains an important element of marketing, product recommendations obtained though the Internet are taking on greater importance as millions of Blogs provide useful information to consumers and emails alert of pending new product introductions. In this instance, diffusion studies with no specific geographical component, like those first initiated by Bass, might provide greater insight concerning Internet communication and its impact on new product sales.

In all cases mentioned above, the central theme is the lack of unique identification associated with individual product at time of purchase. The EPC has a role in providing this information for high value, durable consumer products such as electronics and home appliances sold through traditional retailers where the purchase amount is generally one unit.

Perhaps the more important near-term role of the EPC involves increasing the efficiency of household market research studies and placement on loyalty cards as a means of increasing ease of use. This opens a number of possibilities for interactive marketing, understanding the true impact of advertising and promotion, and local spatial diffusion studies of new products.

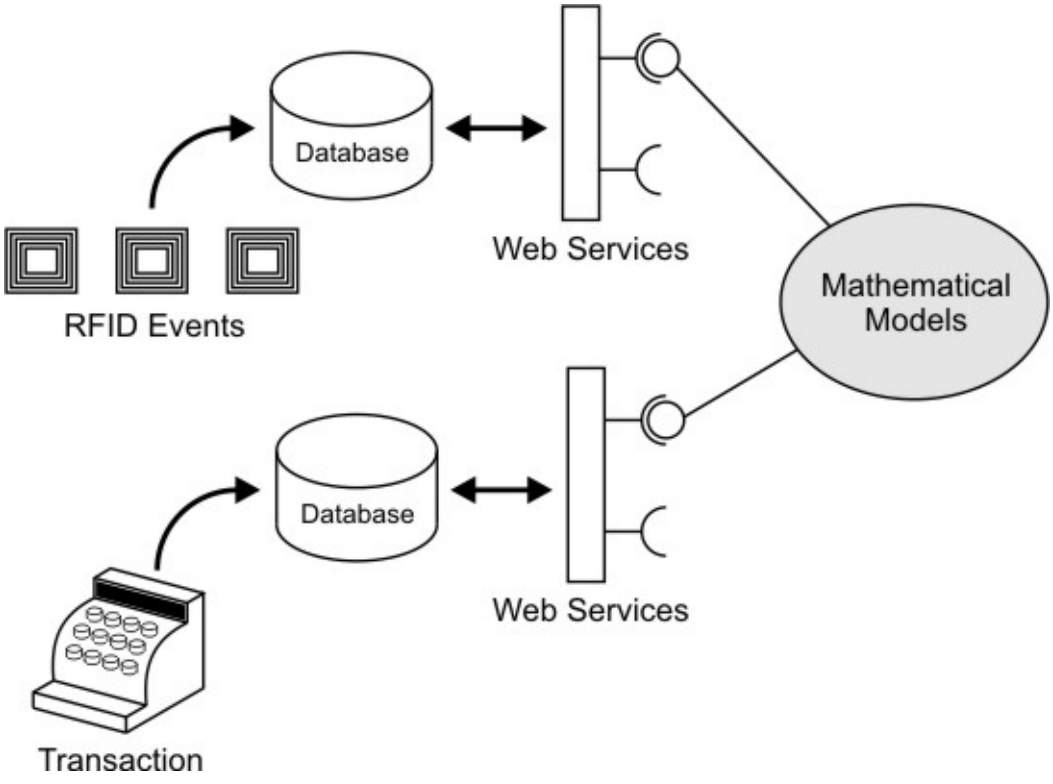
While the data gathering capabilities of the EPC offer many beneficial possibilities for marketing analysis, there also exists the important issue of privacy. Obtaining detailed information about personal purchasing patterns is something many consumer groups and the American public feel uncomfortable. There is always the possibility that personal data could be compromised through computer hacking.

As a case in point, the drug store retailer CVS/pharmacy has received criticism for making available to customers the purchase data from loyalty cards through a password secured web site.[62] The password security did not prove to be robust and this web site was hacked, allowing access to a history of recent purchases for each customer. Since CVS/pharmacy has issued 50 million loyalty cards, a great deal of private information existed on the web site for a large cross-section of the American public. Since the incident, the company has improved its security procedures in an effort to eliminate the future possibility of a data compromise.

Assuming that privacy and security issues can be overcome, [63] the integration of EPC and other data into digital maps holds great promise for building real-time systems that highlight the important aspects of spatial diffusion of new products. Advances in RFID technology provide a means of obtaining consumer data with a

geographical component. The read event for an EPC, which contains "what," "when," and "where," represents a parallel stream of data, in addition to loyalty and credit/debit cards (see Figure 3). As the costs of the technology decrease and reliability improves, it is probable that this form of data collection will surpass financial transactions and loyalty cards as a means of gaining geographic specific data on new products.

Figure 3 – Gathering Data for Spatial Diffusion Analysis



With improved digital mapping technology, open source systems, [64], data, and model interoperability, detailed studies of spatial diffusion are possible at the street address level for new product launches. Assuming compromise can be reached on privacy concerns, spatial diffusion will become an important tool in new product demand forecasting and optimizing advertising expenditures during an initial launch.

Making this tool a part of everyday management decision in supply chain and marketing will require continuing integration of data, digital maps, and mathematical models. The information technology infrastructure is in place to accomplish this integration with the long-term prospect of improved new product launches in terms of supply chain efficiency, cost, and success.

Knowing the location of customers is perhaps the most important part of retailing. [65] This is particularly true in choosing the means of advertising. The announcement of Google's proposal to offer city wide, free WiFi access for San Francisco highlights the importance that the company places on customer location. As part of the announcement, a company representative noted that Google, "...is especially interested in testing out future services and advertising systems that take advantage of knowing a user's location, which would be possible through offering such wireless Internet access." [66]

The emphasis regarding customer location will only increase in the future as innovative companies like Google develop new approaches in advertising. Hence, the EPC will play a greater role in customer location, interactive marketing, and spatial diffusion analysis.

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