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# Using GIS and CRM to Develop Intermediary Portal E-Business Model: The Case of Automobile Industry

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**Abstract:** As Internet-based and other virtual technologies are being used more and more for procurement, supply chain management, product development, customer relations, and other business functions, and as they are proving to be efficacious, e-business has undoubtedly become an integral element in the business and engineering strategies of many automakers and suppliers. What e-business can provide to an automotive cooperation has been well stated for improving product quality, reducing costs, and shortening time-to-market cycles.

In this paper, Renault Australia is used as an example of where the automobile industry is currently positioned in relation to E-Business. Online WebGIS-based Marketing Support System, developed as a portal e-business model, is designed to assist information and knowledge exchange between the market analysis business and decision makers (and sales people) in auto industry. Incorporating marketing information gives rise to a better understanding of the potential of particular market areas or target markets, and helps identify the strengths and weaknesses of the competition in particular market areas or among particular target market segments. Such market analysis strategies obviously provide competitive advantages. Sharing information and obtaining market analysis outcomes through the Web will provide business decision makers with up to date information and knowledge. This solution will not only reduce costs for business planning, but also help to avoid the cost of wrong decisions.

**Keywords:** E-Business models, GIS, CRM.

## I. Introduction

In the automotive industry, retail dealers are independently owned and have a quasi-franchise agreement with vehicle local manufactures or distributors for imported cars. This structure has been in place in most western countries since the 1920s. However, increasing competition and wide adoption of e-business technologies have, recently, challenged the traditional automobile retailing and marketing. Most automobile firms have conducted the transformation to e-business using Web technology.

What e-business can provide to an automotive cooperation has been well stated for improving product

quality, reducing costs, and shortening time-to-market cycles [5]. As Internet-based and other virtual technologies are being used more and more for procurement, supply chain management, product development, customer relations, and other business functions, and as they are proving to be efficacious, e-business has undoubtedly become an integral element in the business and engineering strategies of many automakers and suppliers. Although the automotive industry has comparatively slower e-business progress than other industries, both survey and research have suggested that e-business is becoming and will become more critical in the near future for many automotive companies [5], [10].

In order to meet these challenges most automobile firms have created an integrated and cross-functional e-Business structure, comprising Internet-related activities in the four e-Business domains (B2C, B2B, B2E and e-vehicle). Currently, most automobile firms, such as Renault, Ford and Toyota, have their well designed web sites which provide a good interface with potential customers and aim mainly at marketing their products, reducing operational cost, and managing value chain. However, few opportunities have been provided to potential customers to order vehicles on line. This direct linkage with customers is rarely available at present, however, it will be an essential feature of e-Business for the automobile industry in the next few years. Aligned with this e-business opportunity, managing customer relationship and gaining market intelligent information can be valuable business opportunities as well. These opportunities could be enhanced by using GIS and CRM technologies and implementing atomic e-business models.

In this paper, Renault's e-business suite is analyzed, using atomic e-business models proposed by Weill & Vitale [11], to highlight the current e-business value to Renault and additional e-opportunities.

## II. The Current E-Business Strategies and Suites in Automobile Industry

Different automobile corporations have their own different e-business development strategy; however, in essence, they have similar e-business offerings at current stage. The following cases of Renault and Ford demonstrate these similarities.

In February 2000, Renault announced the launch of its E-business Program and the expansion of its electronic-commerce activities [7], [8]. The goal of the e-business program is to develop a comprehensive Renault e-commerce

offering. The program focuses on four areas:

- business-to-consumer;
- business-to-business;
- e-vehicles (production of “communicating” vehicles);
- business-to-employee

“From the start Renault was looking to transform its business processes, both internally towards the company’s employees, and externally towards dealers and consumers on the one hand, and suppliers on the other” [2]. Currently, e-business development is playing a key role in Renault’s B2B business activities, and the B2E area as well. For the area of B2C, “this site (main website) enables end customers to browse the range of models, ask questions, and even configure their own individualized car. From there, they can contact a dealer directly either online or by email.” Although this system cannot provide a real online transaction, the dealers have the prospect of receiving valuable and highly qualified leads. “Not only did this promote contacts between end-customers and dealers, it also shortened the sales cycle for dealers, thus freeing up resources for additional sales,” explains Thierry Moreau, Director B2C. Renault is constantly looking for new opportunities. Some offer immediate promise of success such as the transformation of B2E, the introduction of supplier services, and the improvements to existing B2C projects. Some have a more long-term perspective such as the e-vehicle project comprising online services in the vehicles [8].

Meanwhile, Ford, since the fall of 1999, has been working on an e-business strategy that will link the dealer and the customer as well as the engineering and manufacturing functions to allow a vehicle to be custom-built through the Internet, the so called “order-to-delivery”, which is similar to the Dell model. Ford’s e-business vice president, described Ford’s plan to rebuild itself as a move to “consumercentric” from “dealercentric,” and stated that Ford would transform itself from being a “manufacturer to dealers” into a “marketer to consumers.” But the move is slow, Forrester Research [4], based in Cambridge, Mass., estimates that only about 1 percent of B2C trade were conducted through online marketplaces in 2000. There were many obstacles in Ford’s path. Eventually, Ford has shifted its focus to the B2B model, while keeping the vision on B2C implementation [3], [5].

Based on the e-business development strategies, e-business technology has supported each automobile firm’s e-business suite with easy to use interface, well organized front page as single point of contact for e-business customers to conduct activities related to their purchase and service process such as, products display, online enquiry and newsletters for managing customer relationship, etc. The value of these e-business suites offered can be analyzed using Atomic e-business model framework proposed by Weill & Vitale [11].

For example, Renault’s front web page

([www.renault.com](http://www.renault.com)) contains web links to the web sites of Renault in different countries ( such as [www.renault.com.au](http://www.renault.com.au), [www.renault.co.uk](http://www.renault.co.uk) ), and links for different services, for example rental of Renault cars in Europe ([www.renaulteurodrive.com.au](http://www.renaulteurodrive.com.au)). In this front page model, communication with customers quickly moves to the business unit in different region or different business type. Creating this umbrella web page as a front page has coined the front page whole-of-enterprise model suggested by Weill & Vitale. Renault presents an array of products, services, and solutions to all important parts related to one’s Automobile purchase life (e.g., products category information, test-drive, finding a nearby location to purchase and/or have services). This integrated implementation has a consolidated customer interface. The customer is then able to navigate wide-range offerings to find suitable products and services. All these suggest the integrated whole-of-enterprise atomic business model has been implemented. The value proposition of the models is to increase customer intimacy and service level, and consolidate the brand recognition. The revenue could be generated from the repeated purchases of loyal customer, or out-of-mouth recommendation to new customers, although there is no tangible and quantitative revenue generated directly from using the web sites.

Renault’s B2B e-business strategy is the same as the concept of Value Chain [9] – the set of activities through which a product or service is created and delivered to customers. Renault operates simultaneously both in the physical and virtual worlds. In the physical world, Renault products and services move along the physical value chain from Renault manufacturers/distributor to dealers to customers. In the parallel virtual world information about members (dealers and suppliers) of the physical value chain is gathered, synthesized, and distributed along the virtual value chain. Based on the *Value net integrator model* displayed in Weill & Vitale [11], Renault, as a value net integrator, receives and sends information to all other players (dealers and suppliers), manages relationships with customers and all major dealers and suppliers via using its trusted brand recognized at all places in the value chain. The Net integrator model adds value by means of bidirectional communication, ease connectivity – all at making business activities more cost effective and electronic data interchange. For example, Renault might use information about consumer to increase profit margin by meeting customer need; by using information about suppliers, Renault can reduce cost by cutting inventories. The value proposition provides to increase brand awareness and improve relations with all dealers and suppliers in the value chain. Furthermore, the virtual electronic procurement lowers telecommunication costs, enables effective reduction of administrative cost.

Each automobile firm uses a content management solution (Content Provider) to support the management, distribution and delivery of its branded vehicle products content, that is distributed through its distributors and

dealers in different nations and regions, including the products catalogues and marketing brochures via electronic and physical distribution. The revenue could be the benefit to dealers by directly reducing cost of content production and distribution, alternatively, by providing all professional information to relevant Renault products without direct benefit, the company can avoid at least some portion of the expenses for marketing its products.

Applying Virtual Community model to host virtual space would help to find and retain members who share common interest regarding branded products and services. The activity in virtual community can be in multiple formats, for example, chatting room for customers to ask questions, FAQ for searching answers to common questions, e-learning and e-training regarding the products and offering, newsletters sent via email list, etc. This e-business model can increase the company competencies by discovering customer needs and understanding the value of customers; building an intimacy sense of community, and building loyalty to the community by providing attractive content. Renault could not generate profit from the virtual community directly, but consider it as a cost of brand building and loyalty maintenance.

In summary, using Weill & Vitale's framework, the most commonly used atomic e-business models in Automobile industry are Content Provider, Value Net Generator, Virtual Community, and Whole of Enterprise/Government, however, still more e-business opportunities could be further developed and incorporated into their business models by using Direct to Customer and Intermediary portals models.

### III. Additional E-business Opportunities in Automobile Industry

#### III.1 Direct-to-Customer

At present, most automobile firms do not sell vehicles online directly to the end customers. Implementing online sales provide business opportunity for Renault to realize its "New Distribution" project, which aims at made-to-order production chain. These represent a dramatic change in the automotive industry. Building Made-to-order, instead of for dealers' showroom, Turban *et al* [10] estimated that tens of billions of dollars annually could be saved just from inventory reduction. Online sale has been predicted to be one of the main sale channels after 2007 [5], [10].

Adopting the direct-to-customer model, automobile firms will gain leverage from three sources – relationship, data, and transaction – relative to their current place-based business. Owning the customer relationship, will provide Renault powerful position and influence where the customer looks to the relationship holder for trust and brand reinforcement. Owning customer data will provide the potential to develop powerful insight into its customers' needs and desires, therefore help products development and increase competitive competencies. Owning the transactions

will provide the company more profitable revenue not only in sales of new products, but also with service revenue.

The main sources of revenue will be attained by gaining higher margins of products sales compared by means of cutting steps out of the distribution dealers and reducing the commission to the dealerships. More importantly, having relationship, data and transaction could improve Customer Relationship Management (CRM), the indirect value can be generated from identifying opportunities for increased sales or product offerings, therefore enhance the competitive capability by improving their intelligent, branded e-market analysis.

#### III.2 Using GIS and CRM to Develop Intermediary Portal E-business Model

Portal, under the general definition of "access point for aggregated information", is continuing to expand, and will be a feature of e-business for some time [11]. The ability to customize a portal allow users to modify the content and format of the information provide by their portal. Applying Portal (Intermediary) atomic e-business model, automobile incorporations can take advantage of rich information, collect, maintain, and share market intelligence with business partners. For example, in the case proposed in this paper, market analysis displayed on maps in appendices can be provided by a e-business portal which is supported by a WebGIS-based Marketing Support Systems. Such e-business portal is designed to assist information and knowledge exchange between the market analysis business and decision makers (and sales people) in auto industry.

A WebGIS-based Marketing Support System uses Geographical Information System (GIS) technology as the backbone. GIS is a digital mapping and spatial analysis system capable of assembling, storing, manipulating and displaying geographically referenced information. The power of a GIS in business decision support areas is its ability to manage spatial data from a number of sources, to display spatial data, and provide spatial analysis modelling [1]. A Web GIS platform provides a powerful online data process and display system. However, much of its usage for online e-commerce has been to explore initial ways of querying and acquiring geo-referenced data or images (e.g., online maps for tourists). Our innovation is to integrate CRM (Customer Relationship Management) techniques into a Web GIS platform, providing dynamic database management and market analysis.

There are three distinct advantages in adopting GIS and CRM technologies in market research. First is the ability to overcome the weakness embedded within each system by integrating GIS capabilities with the power of CRM. Second is the ability to use effectively data from different sources for market analysis, such as Census. Third is the advantage for users of being able to visualise spatial data in different forms; for example, to visualise the spatial distribution of data on maps prior to further market analysis. In this way the application of GIS and CRM in market analysis can be seen as decision support tools for reaching a desired solution, and

therefore could be used widely for solving practical marketing problems related to retail chain network planning based on demographic analysis, marketing positioning, and consumer targeting.

Incorporating marketing information gives rise to a better understanding of the potential of particular market areas or target markets, and helps identify the strengths and weaknesses of the competition in particular market areas or among particular target market segments. Such market analysis strategies obviously provide competitive advantages. Sharing Information and obtaining market analysis outcomes through the Web will provide business decision makers with up to date information and knowledge. This solution will not only reduce costs for business planning, but will also help to avoid the cost of wrong decisions.

Using the Web GIS-based DSS will help decision makers undertake automobile market segmentation to create a new vision of how particular markets are structured and operate, and will uncover the needs and wants of their targeted segments therein. Therefore, it is expected that use of the online system to conduct the B2B e-commerce will improve business planning processes in the automobile industry in the following ways:

- Better understanding of consumer needs in each of the segments, resulting in the identification of new marketing opportunities.
- Develop a market and/or advertising campaign to attract business in a particular market area or among a target market. Budget marketing expenses more effectively, according to needs and the likely return from each segment.
- Use precision marketing approaches. The company can make finer adjustments to the product and service offerings and to the marketing appeals used for each segment.
- Use specialist knowledge to enable the company to dominate particular segments and gain competitive advantage.
- Assist local dealerships with their understanding of the right mix of quantities for each type of vehicle. The product assortment can be more precisely defined to reflect differences between customer needs.

Developing the Web GIS-based DSS as an e-commerce solution could address broad benefit to e-business development from three aspects: .

Firstly, it uses existing Technologies in an innovative way. There is clear support for the development and use of GIS and Data Mining techniques for database marketing linked to company CRM systems [6]. However, while there is the potential for integrating these techniques within wider business process applications, this paper aims at bringing the benefit of information and knowledge exchange through B2B e-commerce to a diverse range of targeted automobile businesses, allowing decision makers to interact more efficiently with the information and the knowledge provided from market analysis and reduce the costs involved through

online solutions. The business model proposed ought to identify and overcome the barriers to e-commerce use by creating a platform for business growth and met the needs of automobile Industry.

Secondly, it leads to increased industry competitiveness. Use of the proposed online systems could help firms to generate revenue (through a better understanding of actual and potential market demand) and/or reduce costs (through efficiency gains). The proposed system uses maps and graphics to help communicate these results, enabling a distributor / dealership to see at a glance their current and target market shares (See Maps in Appendices). These results can be used by either an existing auto dealer or manufacturer, or by someone thinking of opening an auto dealership and trying to select the right geography and target market. All these courses of action would be expected to lead to increased industry competitiveness. The results of sales performance analysis in different geographical regions also provide relevant information to distributors/dealers, who can maintain an improved supply mix for possible demands of different brands and amount of sales in their business regions.

Thirdly, it delivers broad benefits e.g. reduced costs, improved information flows and efficient business processing. The cost of using market analysis information and knowledge in the manner proposed here is affordable for auto businesses when compared to the cost of employing or contracting a specialist. As the project will demonstrate, through the application of information technologies and e-commerce, small business can be helped to be successful and overcome their problem of inadequate market knowledge. Sharing Information and obtaining market analysis outcomes through the Web will provide business decision makers with up to date information and knowledge. This solution will not only reduce costs for business planning, but will also help to avoid the cost of wrong decisions for new entrants. The Information flow delivered to business decision makers could be improved through the advanced analysis technologies, analysis dimensions and time frames. Figure 1 illustrates some of these information flows, for example:

*Information could be delivered to DMs using spatial and analysis technologies*

- Overall analysis of automobile industry
- Sales by brand, time, and postcode
- Advertising expenditure by test drive campaigns
- Top sellers by postcode
- Difference analysis (by brand/time)
- Pump in / pump out analysis for a dealership's PMA
- Customer locations in postcode / CCD
- Demographic distributions in postcode / CCD
- Market potential within 20 minutes zones around service station, etc
- Information could be provided through different Analysis Dimensions:
- Time: current & historical market, future forecast

- Geographical Boundaries: (Market share in different Postcodes areas)
- Location Data: (Customer Locations)
- Demographics: Sex, Age, Income, Occupations, Number of Vehicles per Household, etc.
- Information for User-defined analysis scheme
- for example: combining different dimensions and/or VFACTS defined vehicle sales:
- Competitors market penetration for a model
- Selling patterns of one or many models

Segments and components analysis at a time frame for postcode areas

#### IV. Conclusion and Recommendations

Automobile manufacturers/distributors have been actively engaging in the transformation of the business using E-business technology. Renault's e-business case, based on the information from its Web sites, has shown that the company has gained the benefit and competitive advantage by adopting the following current e-business strategies:

1. establish online single point of contact for the e-business customers
2. establish e procurement system with trading partners
3. fully integrate the e commerce systems with its normal financial systems
4. establish customer information database from online information

Although direct sales of automobile products via internet to customer is still in the initiative stage. In the future, as business endeavours to develop e-business as the normal means of trading with customers and other businesses, there will be large cost efficiencies gained by the process of business reengineering. Examples of efficiencies will be standard product catalogues, simple online shopping facilities and direct linkages with customers.

In general, despite automakers desire to build relationships with Internet consumers, it will take time to do so because of existing dealers place distribution strategies, and the situation that dealers may be reluctant to espouse online purchasing for various reasons, including a lack of recognition for the need to commit to the channel and a fear

that the channel conflict.

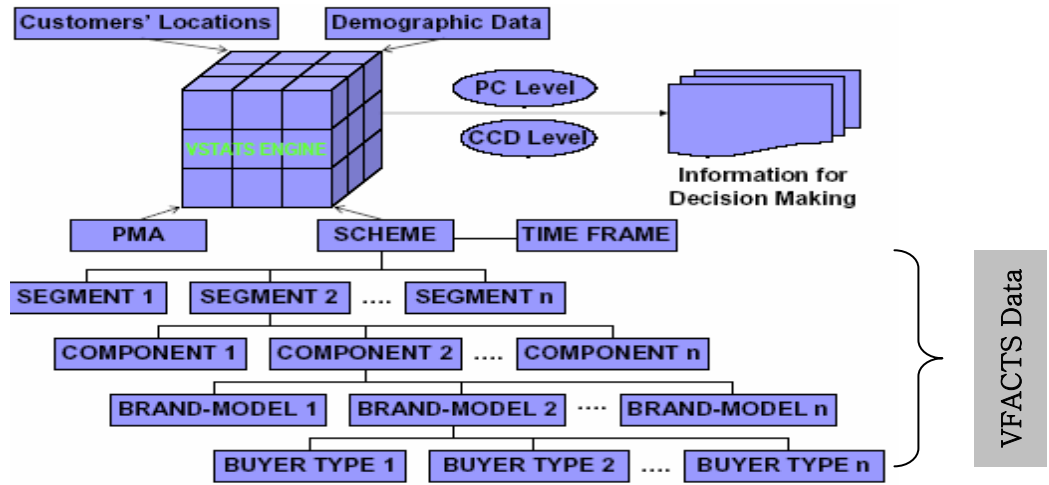
Successfully migrating to a click-and-mortar business model has been suggested as a major change, the direct-to-customer model will affect every aspect of a firm including channel and dealership management, customer segmentation, organizational form, incentives, skills, IT infrastructure, culture change, and a convergence of business processes, workflows, infrastructure, and data assets.

Furthermore, while there is the potential for integrating techniques within wider e-business process applications, this paper has argued on bringing the benefit of information and knowledge exchange through B2B portal e-commerce model to a diverse range of targeted automobile businesses, allowing decision makers to interact more efficiently with the information and the knowledge provided from market analysis and reduce the costs involved through online solutions. The business model proposed ought to identify and overcome the barriers to e-commerce use by creating a platform for business growth and met the needs of automobile Industry.

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Figure 1. Information Flows for Decision-Makers(DMs)



(Source: Mapdata, 2005)

