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EXAMINATION OF INFOMEDIARY ROLES IN B2C E-COMMERCE

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ABSTRACT

This article provides a parsimonious research model that assists in the study of infomediary roles in B2C E-Commerce, their level of integration and sophistication, and their impact on infomediary performance and customers' satisfaction. After an extensive literature review, discovery, facilitation, and support roles were identified as the main roles that infomediaries perform in the B2C e-commerce arena. Based on a sample of 150 infomediaries from three industries namely automobile, retail, and travel, four hypotheses related to the research model were tested. Results suggest that infomediaries with high integration and sophistication level are found in the retail industry. In addition, not all infomediary roles exhibit the same level of integration and sophistication across the three selected industries.

Keywords: Infomediary Roles, Intermediation, Re-intermediation, Disintermediation, B2C e-Commerce

1. Introduction

Early researchers had predicted the downfall of traditional intermediaries as the opportunities provided for direct selling proliferated with Internet growth. However, many examples now exist to refute the possibility of ever eliminating the middlemen [Wilder 1997; Sakar et al. 1995; Giaglis et al. 2002]. In fact, a very important phenomenon that has emerged, thanks to the Internet, is the use of "infomediary" in B2B and B2C electronic marketplaces. Previous research has explained the phenomenon of infomediaries in the context of B2B e-commerce [Ordanini and Pol 2001; Hagel and Rayport 1997]. An infomediary is an emergent business model adopted by organizations in response to the enormous increase in the volume of information available and the critical role of information in enabling ecommerce. Infomediaries perform an indispensable function by matching buyers' needs with suppliers' products and services to facilitate transactions. There is a wealth of market information exchanged through the infomediaries as they perform these functions. As a result, Infomediaries become vital resources of knowledge about the nature of exchanges in electronic marketplaces. However, there is little research related to the role of *infomediaries* in B2C e-commerce. This study provides explanation regarding different infomediary roles in B2C e-commerce across three industries, namely automobile, retail, and travel. Specifically, this study identifies whether infomediary's roles differently support the online shoppers' buying process across the before mentioned industries.

In the early stages of e-commerce, lower search cost was the major benefit that online shopping [Chu et al. 2005] renders to online shoppers. However, as e-commerce matured, online shoppers expect more than just reducing searching cost. We posit that in the context of B2C eMarketplaces, intermediaries have evolved into *infomediaries* that add value to their stakeholders by translating product information and matching online shoppers' needs with sellers' products and/or services. According to Grover and Teng [2001], infomediaries are "e-commerce companies leveraging the (power of) the Internet to unite buyers and suppliers in a single, efficient virtual marketspace to facilitate the consummation of a transaction". In other words, in the context of B2C e-commerce, infomediaries assist online shoppers' decision making process.

The customer service life cycle framework (CSLC) [Ives and Learmonth 1994] identifies the different customer's decision making process stages. CSLC encompasses four stages: the initial realization to the need for a product or service, acquisition of the product or service, ownership, and the upgrade and/or retirement of the product or service. Here, based on marketing literature, specifically the CSLC, and e-commerce literature, we grouped infomediary functions into three different roles. The first role is *Discovery,* which consists of the process of

identification of buyers and sellers which meet each others' requirements. The second role is *Facilitation* of transactions to allow the flow of information and tangible goods and services between the buyers and sellers. The last role is the *Support* of knowledge intensive decision process that lead to deep collaborative relationships between e-marketplace participants. These three roles are used to determine the integration and sophistication level of infomediaries in B2C e-Commerce across three industries, namely automobile, retail, and travel. We state that infomediaries with higher integration and sophistication level will be able to obtain higher customer's satisfaction and therefore will have a superior performance.

The paper is organized as follows. First, the literature related to eMarketplaces and infomediary in the context of B2C is reviewed and an overview of different infomediaries' functions is provided. Second, the proposed research model and research hypotheses are crafted. Third, statistical analysis of the collected data is conducted and a discussion and implications of the results are presented. Finally, we present suggestions for future research and conclusions.

2. Literature Review and Its Analysis

Rajagopalan and Deshmukh [2005] state that the growth in B2C e-Commerce has raised many questions of interest for both researchers and practitioners. They recognized that studies aimed at identifying factors that affect online shoppers' attitudes are needed. As we stated earlier, in the context of B2C e-commerce, infomediaries are aimed at assisting online shoppers' decision making process. Here, we analyze the customer's decision making process, the different functions of infomediaries in the context of B2C e-commerce, and we identify the relationships that exist among the infomediaries roles and the different stages of the customer's service life cycle and develop our research framework.

2.1 The Customer Service Life Cycle

It has been recognized that suppliers can achieve competitive advantage when they offer value added products and/or services that are difficult to copy or imitate. Ives and Learmonth [1984] suggest that a supplier can differentiate itself form its competitors by enhancing customer services through supporting the customer's service life cycle. More recently, Lightner [2004] explains that B2C websites assist companies in delivering their unique advantages if such websites support a customer throughout the stages of the buying cycle. Therefore, it is important to understand how the Customer Service Life Cycle (CSLC) can be applied in the context of B2C e-commerce.

The Customer Service Life Cycle (CSLC) proposed by Ives and Learmon [1984] includes four stages: Requirements, Acquisition, Ownership, and Retirement. In the requirement stage the customer establishes a need for the product and determines the characteristics of the product. The acquisition stage involves sourcing, ordering, paying, obtaining, and installing the product. In the ownership stage, the customer uses the product and upgrade and/or repair when it is necessary. The retirement stage, the last one, the customer returns or disposes the product and looks for discounts and monitors the expenses related to the product. The CSLC has been widely used to study how information technology can be utilized to enhance the customer buying experience. In the context of B2C e-Commerce, Lightner [2004] develops, based on the CSLC, a set of 50 functional requirements that can be used to evaluate the websites functionality and the level of customer service. Lightner [2004] suggests that websites that exhibit such functionality are able to render superior customer service. However, a drawback of Lightner [2004] study it is that the proposed functional requirements were evaluated using only two websites and therefore further evaluation and refinement is needed.

In the next section, we describe the electronic marketplace phenomenon and analyze the literature related to the infomediary's roles. Then we identify the relationships that exist between the CSLC and the infomediary's roles and develop our research model.

2.2 Electronic Marketplace and Infomediary

Electronic marketplaces are defined as interorganizational information systems that facilitate the exchange of information about price and product offerings between buyers and sellers that participate in the marketplace [Bakos 1991]. Choudhury et al. [1998] identified the following examples of electronic marketplaces: airline reservation systems (CRSs) such as SABRE and APOLLO [Copeland and McKenney 1988]; American Gem Market System [HBS 1988] in the precious stones industry; and TELCOT in the cotton industry [Lindseyetal 1990]. Recently, Amazon.com and eBay.com have become some of the most popular electronic marketplaces. Figure 1 depicts the structure of a typical electronic marketplace.

According to marketing literature, intermediaries are "organizations that support exchanges between producers and consumers, increasing the efficiency of the exchange process by aggregating transactions to create economies of scale and scope" [Sarkar et al. 1996]. Bhattacharya and Hagerty [1989] recognize the role of intermediaries as "price setters," serving as regulators between buyers and sellers. It is clear that electronic marketplaces present challenges and opportunities to the role of intermediaries. Sakar et al., [1996] argue that electronic markets have given the

opportunity for a new kind of intermediaries to emerge: "cybermediaries". Rayport and Sviokla [1994] identify a process where traditional industry players develop electronic commerce capabilities and start competing in electronic markets along with newer pure-play "cybermediaries". Electronic markets may present new opportunities to traditional intermediaries to become re-intermediaries [Giaglis et al. 2002]. Bailey and Bakos [1997] recognize the necessity for intermediation in eMarketplace. Based on an analysis of B2B and B2C firms, they concluded that eMarketplaces continue to require provision of one-stop shopping, trust, information exchange and information filtering functions. On the other hand, Malone et al. [1987] explain that intermediaries will be eliminated from the e-value chain. Such tendency is known as "disintermediation". We refer the reader to Grover and Teng [2001] for a detailed discussion about infomediaries vs. intermediaries.

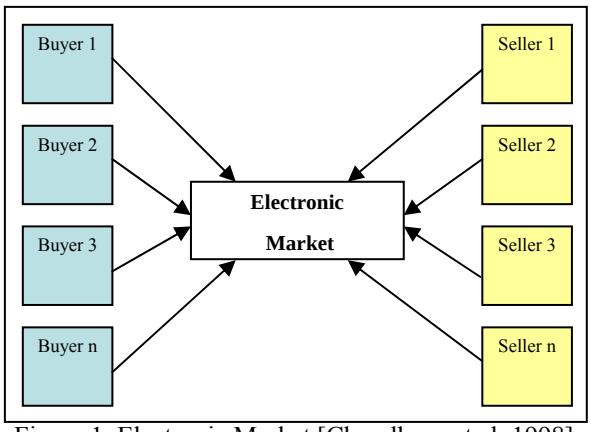

Figure 1. Electronic Market [Choudhury et al. 1998]

Hagel and Rayport [1997] defined infomediary as "a business whose sole or main source of revenue derives from capturing consumer information and developing detailed profiles of individual customers for use by selected third-party vendors". Moreover, Grover and Teng [2001] stated that "infomediary is an emergent business model adopted by organizations in response to the enormous increase in the volume of information available and the critical role of information in enabling processes in electronic markets". In addition they defined infomediary as "e-commerce companies leveraging the (power of) the Internet to unite buyers and suppliers in a single, efficient virtual marketspace to facilitate the consummation of a transaction". In this paper, we argue that in the context of eMarketplaces, intermediaries have evolved into infomediaries that add value to their stakeholders by deciphering complex product information and matching buyers' needs with sellers' products and/or services.

2.3 Infomediary Roles

In a decentralized market afforded by the Internet, coordination costs are higher than in a centralized market because decentralized market requires that each buyer communicates with all possible suppliers. The infomediary role in the eMarketplace is to reduce the coordination costs and vulnerability costs of buyer and supplier organizations [Malone 1987].

Three primary functions of a marketplace are to match buyers and sellers, facilitate transactions and provide an institutional infrastructure that allows for transactions to take place [Bakos 1998]. In addition, Choudhury et al. [1998] state that an electronic market provides support for at least one of the following market-making functions: *identification* of potential trading partner, *selection* of prices and product offering information, and *execution* of the transaction per se.

Bailey and Bakos [1997] identify the roles of market intermediaries as:

- *Aggregate:* intermediaries provide both buyer demand and seller ways to obtain economies of scale or scope [Demsetz 1968; Resnick et al. 1995] and to reduce bargaining asymmetry [Williamson 1975];
- Protect buyers and sellers from the opportunistic behavior of other participants in market by becoming an agent of *trust* [Williamson 1975];
- *Facilitate* the market by reducing operating cost [Malone et al. 1987; Resnick et al. 1995]; and
- *Match buyers and sellers [*Malone et al. 1987; Resnick et al. 1995].

Grover and Teng [2001] explain that infomediaries perform the following roles:

- Search/complexity services: helps buyers to understand complex product features
- Matching Services: enables the matching of buyers' needs with sellers' products and services.

- Content Service: provides additional relevant information about the products or services.
- Community Services: fosters long term relationships by adding value to buyers.
- Informational Services: uses customers' profiles to match new product offers and potential demand.
- Privacy Protection Services: guarantees an environment to protect customer's privacy.
- Infrastructure Services: provides a secure infrastructure and services for conducting transactions.

Bakos [1998] and Singh et al. [2005] explain that the critical roles of the infomediary-based eMarketplaces are alike to the roles of eMarketplace, and identify such roles as the following:

- *Discovery* consists of the process of identification of buyers and sellers which meet each others' requirements. Discovery encompasses search/complexity services and marching services previously identified by Grover and Teng [2001] and identification of potential trading partner identified by Choudhury et al. [1998];
- *Facilitation* of transactions to allow the flow of information and tangible goods and services between the buyers and sellers. This role was previously identified by Malone et al. [1987], Resnick et al. [1995], and Bakos, [1998]; and
- *Support* of knowledge intensive decision process that lead to deep collaborative relationships between e-marketplace participants. This role is similar to execution identified by Choudhury et al. [1998], and infrastructure services identified by Grover and Teng [2001].

Based on the analysis of the literature, it is clear that a relationship between the CSLC framework and the roles of the infomediary exists. First, the infomediary's Discovery role supports the requirements phase of the CSLC framework. The infomediary's Discovery role assists the on-line costumers in redefining their needs and in identifying and selecting the right supplier(s) and product(s). Second, the infomediary's Facilitation role supports the acquisition and ownership phases of the CSLC framework. The infomediary's Facilitation role helps the on-line customers ordering, acquiring, evaluating, and owning the product(s) once the right product(s) or service(s) has been identified using the discovery role. Finally, the infomediary's Support role supports the retirement phase of the CSLC framework. The infomediary's Support role provides the mechanisms needed to complete the on-line transactions and the post-transactions support including customer feedback and community support. Figure 2 shows how the infomediary's roles support the different phases of the CSLC framework.

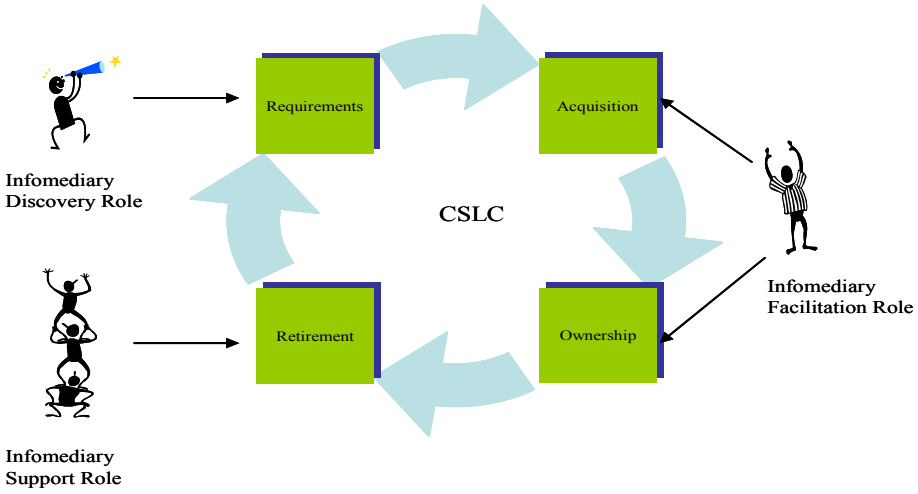

Figure 2. The CSLC Framework [Ives and Learmonth 1984] and Infomediary's Roles

Based on the above literature review and analysis, we develop taxonomy of infomediary roles to classify the different infomediary functions.

3. Proposed Research Model and Hypotheses

From the e-commerce and marketing literature, it is obvious that infomediaries perform multiple roles. In this regard, in order to develop a parsimonious research model that depicts the primary roles of infomediaries, we posit that most of the functions performed by infomediaries can be classified using the discovery, facilitation, and support classification scheme suggested in Bakos [1998] and Singh et al. [2005]. Using such classification scheme, we categorize the different infomediaries functions as follows:

- *Discovery* [Grover and Teng 2001; Williamson 1975; Singh et al. 2005]
  1. Search & Matching - Ability to find and retrieve specific products/services/information using typed words/category clicks provided.
  2. Spot Market Makers – Auction, bringing together buyer and seller (who may not be a formal business).
  3. Consumer Research – Gather data for use by others, i.e.: business, market research companies, registration/membership information.
  4. Neutral Evaluators/Regulators – Evaluate products/services unbiasedly, regulate and build trust.
  5. Advertising – Banners, displays and information about the product and other products and/or services.
- *Facilitation* [Grover and Teng 2001; Malone et al. 1987; Resnick et al. 1995; Bakos 1998; Demsetz 1968; Singh et al. 2005; Ordanini and Pol 2001]*:*
  1. Customization – Personalization of site/products/services/information based on customer preferences and/or previous visit activities.
  2. Facilitation - Provide directory/portal services, virtual mall, provide e-commerce platforms for others.
  3. Expertise/Infomediary – Provide expert information. The ability to answer specific and unusual questions.
  4. Delivery – Channels/speed options, combining shipments for cheaper delivery.
  5. Aggregation –consolidate requirements from several customers to offer better price.
  6. Bundling/Unbundling – Consolidate offerings from same/different businesses as a single deal or separate offerings based on membership/fee levels.
- *Support* [Grover and Teng 2001; Singh et al. 2005; Bakos 1998]*:*
  1. E-commerce capability - ability to provide transaction mechanism on the site.
  2. Logistics/Tracking – Track your purchases, accounts and history.
  3. Financial services – financing, insurance, and warranties available online.
  4. Community – Comments by other customers, chat, online discussion groups, and newsletters.
  5. Customer Relations – Online/offline, web based/phone, 24/7 customer service.

The sophistication and integration level of an infomediary is a multidimensional construct that cannot be measured directly from just looking at the infomediary website. In this study, we define that the sophistication and integration level of an infomediary is the result of how well the roles of discovery, facilitation, and support are performed. Based on the marketing literature, it is clear that infomediaries assist the functions of customer service, marketing automation, and sales. In this context, it has been recognized that the use of IT applications to facilitate the delivery of services and products has a positive impact on the customer satisfaction [Karimi et al. 2001; Schaupp and Belanger 2005]. In other words, we can state that the infomediary integration and sophistication level should have a direct impact on the level of customer satisfaction. By the same token, the performance of an infomediary will depend on the infomediary integration and sophistication level. Figure 3 depicts the research model.

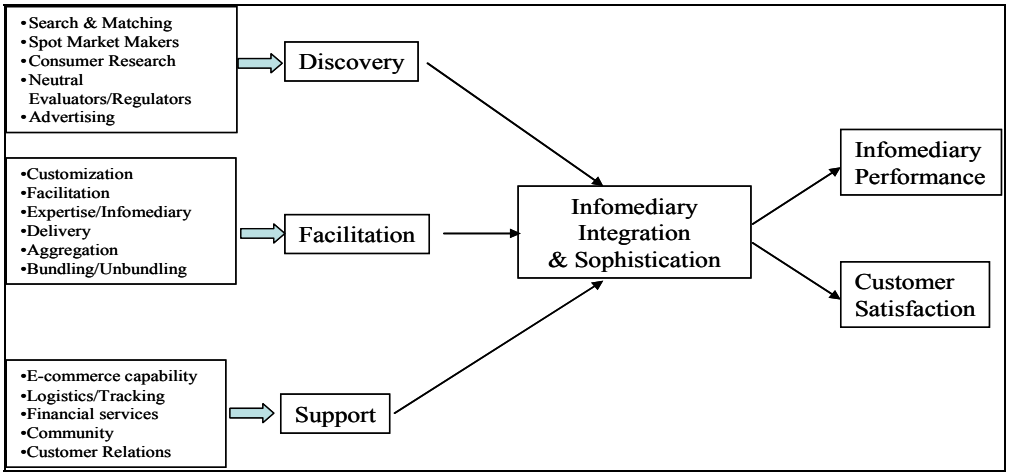

Figure 3. Proposed Research Framework

According to the economics of information theory [Nelson 1970; Darby and Karni 1973] products can be classified into search, experience, and credence products. Such classification is based on how consumers perceive and evaluate products. Here, products that exhibit search qualities can be fully evaluated prior to purchase, while

experience based products must be first acquired and consumed before they can be evaluated by the customer [Beldona et al. 2005]. We posit that on-line shoppers expect different infomediary functions depending upon the nature of the product or service they are interested in. Beldona et al. [2005] explain that when shoppers buy products that are considered less complex such as flights and car rentals, shoppers are driven by transactional objectives. On the other hand, when shoppers buy product that are considered of high complexity and that involved a greater perceived risk, shoppers are driven by information parameters.

Given that products and/or services characteristics vary from industry to industry, the infomediary roles must be designed in such a way that the on-line shopper buying needs are supported accordingly. Here, in order to validate the proposed research model across different industries, we select three industries that exhibit different degree of B2C e-commerce maturity and whose products/services pose different characteristics as well. The industries selected for this study are the following: travel, automobile, and retail industry. The travel industry is well known for being one of the first industries that started doing business on-line and it offers very specialized products and/or services and it is perhaps the more mature industry in the B2C e-commerce area. The retail industry includes infomediaries dealing with general merchandise (from CDs to appliances). Most of the products offered in the retail industry can be easily described and this industry represents a broad segment of infomediaries. Finally, even though the automobile industry has been slow in adopting the infomediary model, it represents a different type of infomediary in the market of durable goods. It is noteworthy to mention that cars are products that involve high economic and social risk and therefore they are less likely to be successfully sold online [Goldstuker et al. 2001]. We believe that the industry selection covers both ends of the infomediary continuum. Appendix B contains a list of the companies classified by industry that were included in the study.

Based on the proposed research model and current literature, we formulate the following hypotheses. Travel industry is perhaps one of the pioneers in conducting business electronically. For instance, since the introduction of SABRE in the 1960s, American Airlines has used electronic information about reservations in its marketing and sales efforts. Additionally, the airlines is recognized as a highly information intensive industry where information-based expertise and monitoring are critical factors [Christiaanse and Venkatraman 2002]. Based on the background of the travel industry and its maturity level, we posit the following hypothesis:

> *H1: Infomediaries in the travel industry will exhibit the highest integration and sophistication level compared to the retail and automobile industries.*

Because the discovery role consists of the process of identification of potential buyers and sellers which meet each others' requirements [Grover and Teng 2001; Choudhury et al. 1998], the discovery role exhibits high importance in any kind of industry. It has been recognized that on-line shoppers face information overload every time they try to find a particular product and/or service that meets their needs [Srikumar and Bhasker 2005]. Here, regardless the industry, the infomediary discovery role must reduce the on-line shopper information overload by selecting only relevant products and/or services that meet the shopper needs. The discovery role is a primary function of any infomediary and it is needed to trigger the subsequent roles of facilitation and support. Therefore, we will test the hypothesis:

> *H2: All industries will be associated with the highest level of discovery role compared to other roles.*

The infomediary facilitation role relates to providing the means and transactions to allow for the flow of information and tangible goods and services between buyers and sellers [Malone et al. 1987; Resnick et al. 1995; Bakos 1998]. As mentioned before, the travel industry is a highly information intensive industry [Christiaanse and Venkatraman 2002] and their goods and services can easily be traded electronically. Similarly, the goods and services offered in the retail industry can easily be traded electronically. On the other hand, given the characteristics of the goods and services offered in the automobile industry and that the buyers need to try or test drive such products, the infomediary *facilitation* role in the context of B2C in the automobile industry adds little to no value to the on-line shoppers. In this regard, Cap Gemini Ernst & Young [2001] found that the use of Internet to purchase cars represents about five percent of the total car sale. Furthermore, they found that although buyers preferred to use the Internet as a research tool, buyers still purchased their cars in the traditional way. Consequently, the following hypothesis can be drawn:

> *H3: The infomediary facilitation role will be higher in the travel and retail industry than in the automobile industry.*

The infomediary support role supports knowledge intensive decision process that lead to deep collaborative relationships between e-marketplace participants [Choudhury et al. 1998; Grover and Teng 2001]. This role includes the functions of E-commerce capability, financial services, community, and customer relations. Once again, given that the products' characteristics, services offered, and customers needs vary across industries, we expect that in the travel and retail industries the infomediary *support* role will have a higher importance than in the automobile industry. The rationale behind this statement is that in the case of the automobile industry, customers will need to go

to the dealer or seller in order to get the after sales services and/or warranty work done; on the other hand, in the case of the travel and retail industries, customers do not need to physically move to get the customer support that is needed. Therefore, we propose the following hypothesis:

H4: The infomediary support role will be higher in the travel and retail industry than in the automobile industry.

Infomediaries with high level of integration and sophistication will be able to efficiently reduce searching costs, reduce the coordination costs and vulnerability costs of buyer and supplier organizations [Malone et al. 1987], and they will help to solve the problem of information overload [Grover and Teng 2001]. As a result, customers of such kind of infomediaries will be better off because they will get better deals and relevant information. In addition, recent research in the context of infomediary and intelligent agents has shown that their use can lead to an increase in consumer welfare [Swaminathan 2003] and to decrease consumer cognitive stress [Singh et. al. 2005].

4. Methodology

This study examines the functions offered by infomediaries in the B2C segment that are transparent to customers. As explained earlier, three industries – travel, automobile, and retail were chosen. In order to be inclusive, we chose "bricks-and-clicks" infomediaries who conduct business using both traditional and electronic methods as well as "pure-play" infomediaries who conduct business only on the Internet.

Using the proposed research model and based on marketing and e-commerce literature, an instrument was developed to evaluate the level of sophistication of the infomediary in each function. The instrument uses a Likert scale of 1 to 5, (5 represents the highest level of sophistication in the function). In order to test the instrument, a pilot was conducted on a set of 10 websites in each selected industry. No refinements or modifications needed to be made. The final sample of 50 infomediary websites in each industry (obtained from searches using two search engines and lists of popular sites) was rated by two independent coders based on a set of definitions for each role and the type of indicators that would indicate the presence and sophistication of each function on the website. The two sets of ratings were tested for inter-coder reliability (Appendix A). The inter-coder reliability was greater than 90% in 65% of the categories and greater than 85% in 85% of the categories. This agreement was considered adequate allowing us to use the data for further analysis. Rather than averaging the two sets of ratings, we used only one set of ratings to ensure internal consistency.

The ratings for each of the three roles (i.e., discovery, facilitation, and support) were obtained by taking a simple arithmetic average of the functions constituting the role. The overall rating (i.e., the integration & sophistication level) was obtained by averaging all the functions.

5. Results

From the initial sample size of 150 infomediary websites, six infomediaries were excluded from analysis because they did not fulfill all the infomediary roles and therefore they were considered to be outliers. Table 1 present the distribution of the sample size by industry.

Table 1. Sample Size and Distribution

Industry	Number of Infomediaries
Automobile	47
Travel	48
Retail	49
Total	144

Table 2 shows the summary statistics for all industries, broken down by each infomediary role. Table 3 shows the summary statistics for each industry and each infomediary role. Table 4 shows the summary statistics for the infomediary integration and sophistication level broken down by industry.

Table 2. Summary Statistics by Infomediary role

Role	Mean	Standard Deviation
Discovery	2.251	0.567
Facilitation	2.181	0.519
Support	2.391	0.756

Table 3. Summary Statistics by Industry and Infomediary role

Industry Type	Role	Mean	Standard Deviation
Automobile	Discovery	2.643	0.542
	Facilitation	1.990	0.410
	Support	1.923	0.583
Retail	Discovery	2.217	0.560
	Facilitation	2.219	0.478
	Support	3.041	0.504
Travel	Discovery	1.910	0.314
	Facilitation	2.327	0.598
	Support	2.204	0.675

Table 4. Summary Statistics for the Infomediary Integration and Sophistication Level

Industry Type	Infomediary Mean- Level of integration and sophistication	Standard Deviation
Automobile	2.173	0.420
Retail	2.480	0.405
Travel	2.160	0.451

Using ANOVA tests, p-values were calculated to assess the proposed hypotheses. We used Least Square Distance (LSD) method to test the means differences. The level of significance for the analysis was set to $\alpha = 0.05$. Table 5 shows the results for *H1: Infomediaries in the travel industry will exhibit the highest integration and sophistication level compared to the retail and automobile industries.*

As can be seen in table 5, there is a statistically significant difference between the mean level of integration and sophistication for the Retail and Automobile industries, and for the Retail and Travel industries. However, there is no statistically significant difference between the mean level of integration and sophistication for the Automobile and Travel industries. These results are similar regardless the adjustment method used - Tukey's Studentized range test or Least Squared Different (LSD). To sum up, the results show that H1 was not supported by the data. Furthermore, contrary to our hypothesized expectation, infomediaries in the retail industry had a greater level of integration and sophistication than infomediaries in the travel and automobile industries, and there was no difference between travel and automobile industries.

Table 5. Statistics Results for H1

Industry Type Comparison	Different Between Means	95% Confidence Intervals
Retail-Automobile	0.30239	0.12957 - 0.47520 ***
Retail - Travel	0.31710	0.14607 - 0.48812 ***
Automobile – Travel	0.01471	-0.15723 - 0.18665
Critical Value of t 1.9769 Comparisons significant at the 0.05 level are indicated by ***		

We conducted six individual t-tests to test *H2: All industries will be associated with the highest level of discovery role compared to other roles.* Table 6 shows the statistics for H2.

Table 6. Test Results for H2

Industry	Mean Comparison	Results
Automobile	Discovery vs. Facilitation Mean	Critical value of t = 8.860 p-value <.0001
	Discovery vs. Support Mean	Critical value of t = 7.941 p-value <.0001
Retail	Discovery vs. Facilitation Mean	Critical value of t = -.025 p-value = 0.51
	Discovery vs. Support Mean	Critical value of t = -8.5 p-value ≈ 1
Travel	Discovery vs. Facilitation Mean	Critical value of t = -5.368 p-value ≈ 1
	Discovery vs. Support Mean	Critical value of t = -3.199 p-value ≈ 0.99

As can be seen in table 6, the infomediary *discovery* role does not have a higher value for the retail and travel industries; therefore, H2 is not supported by the data. Going in more detail, the data supports the hypothesis that the mean level of the *discovery* role is greater than the mean level of the *facilitation* role and *support* role in the

automobile industry. Thus the data does provide support for H2 in the automobile industry – it is not supported in the retail and travel industries.

For *H3: The infomediary facilitation role will be higher in the travel and retail industry than in the automobile industry*, we used the ANOVA test and LSD method to test means differences for the infomediary facilitation role across industries. As can be seen in table 7, there is a statistically significant difference between the mean level of the *facilitation* role for the travel and automobile industries, and for the retail and automobile industries. The t-tests also confirm these results. Thus hypothesis H3 is fully supported.

Table 7. Statistics Results for H3

Industry Type Comparison for the Infomediary Facilitation role	Different Between Means	95% Confidence Intervals
Retail-Automobile	0.229	0.0254 - 0.4333 ***
Travel-Automobile	0.337	0.1342 - 0.5401 ***
Critical Value of t 1.9769 Comparisons significant at the 0.05 level are indicated by ***		

For *H4: The infomediary support role will be higher in the travel and retail industry than in the automobile industry,* we used the ANOVA test and LSD method to test means differences for the infomediary *support* role across industries. Table 8 shows these results. There is a statistically significant difference between the mean level of the infomediary *support* role for the retail and automobile industries, and between travel and automobile industries. Thus hypothesis H4 is fully supported.

Table 8. Statistics results for H4

Industry Type Comparison for the Infomediary Support role	Different Between Means	95% Confidence Intervals
Retail-Automobile	1.1183	0.8780-1.3585***
Travel-Automobile	0.2807	0.0417-0.5197***
Critical Value of t 1.9769 Comparisons significant at the 0.05 level are indicated by ***		

6. Discussion

The existing literature in e-commerce and marketing suggests that the infomediary roles are numerous and fragmented. In fact, we identified sixteen different functions or roles that are executed by infomediaries. The fragmented nature of these roles makes it difficult to evaluate the infomediaries' performance and to decide what functions infomediaries should fulfill. We were able to group these functions into three main roles namely *discovery, support,* and *facilitation*. The proposed taxonomy was successfully used to determine the level of integration and sophistication of 144 infomediaries from three different industries. This finding has important implications for practitioners. In this regard, infomediaries designers and developers need to make sure that infomediaries fulfill all the three identified roles. In addition, managers need to allocate resources toward the technical platforms that allow infomediaries to successfully perform such roles; so that they can achieve a higher level of integration and sophistication.

Results suggest that even though the travel industry has been recognized as one of the pioneers of electronic marketplaces, infomediaries in this industry do not exhibit the highest integration and sophistication level. In contrast, infomediaries in the retail industry are the ones that exhibit the highest integration and sophistication level. This phenomenon could be explained by the differences in the level of competition that exists in the travel and retail industries. We argue that the travel industry is dominated by some big players such as Sabre, Travelocity, Microsoft Expedia, and Orbitz.com, while in the retail industry there is not a clear player that dominates the retail market. The lack of intense competition in the travel market allows infomediaries to be reactive and less than proactive to the market. On the other hand, infomediaries on the retail market need to be proactive to keep up with the competitors.

Regarding the differences in the level of integration and sophistication among infomediaries, the most noticeable feature of the retail industry, according to our sample, is the high prevalence and extensive sophistication of the search and matching function of the *discovery* role and the e-commerce capability of the *support* role. The delivery, customer relations and logistics//tracking functions of the *facilitation* role also rate highly across the retail industry which is not very surprising, considering the nature of its products and businesses. At the same time, it is important to mention that, in terms of the bundling and unbundling function of the *facilitation* role, the travel

industry is significantly more sophisticated than the other two industries. This is due to the fact that there is more potential in the travel industry to put together different products in combinations that might be attractive to various segments of consumers, e.g., airlines, hotel, and car rental. This one-stop-shopping feature has a positive impact on the travel industry's profitability [Jarach 2002].

An important contribution of this study to the infomediary literature is the relationship that seems to exist between the infomediary role and industry type. Our results suggest that each industry exhibit different levels of infomediary roles. We found that for the automobile industry the role with the highest level is *discovery*, for the retail industry the role with the highest level is *support*, and for the travel industry it is the *facilitation* role. Some plausible explanations for this phenomenon are the characteristics of the products themselves, and the customers' needs and expectations in regard to each industry. For instance, in the automobile industry, buyers mainly use infomediaries to search for prices and to find information about cars-rating and dealers' locations, and not for making the purchase itself. This is consistent with existing literature that suggests that goods that involve high economic and social risk, like cars, are less likely to be sold successfully online [Goldstuker et al. 2001]. Alternatively less expensive and less tangible products, such as books, CDs, clothing, and services are more likely to be sold electronically [Valdani 2000]. These observations agree with Grover and Teng [2001] infomediary value grid. They explain that automobiles are in the High-High region of the value grid and that such products reflect high acquisition costs and require extensive search; whereas, CDs, books, and etc. are in the High-Low region of the grid since such products have low acquisition costs and require support on the requirements and sales fulfillment.

Finally, the results suggest that infomediaries in the travel and retail industry exhibit higher level of integration and sophistication for the roles of *facilitation* and *support* than the infomediaries in the automobile industry. These findings are supported by the fact that infomediaries in the retail and travel industry are more mature than the ones in the automobile industry. Therefore, these are important implications for practitioners in the automobile industry. In this regard, designers and developers can improve the level of integration and sophistication of infomediaries in the automobile industry by adding features like financial services, customer relations, bundling and unbundling of services, and customization.

These findings have important implications related to the CSLC framework. Here, even though all the phases of the CSLC framework are presented to be equally important, the findings suggest that the importance of such phases vary from across industries. Therefore, in order to fully realize the benefits of infomediary in the context of B2C e-commerce, infomediary must be designed taking not only the CSLC phases, but also the characteristics and features of the products and/or services of the industry they serve.

7. Future Research

In order to increase the generabizability of the proposed research model, further evaluations that include different industries and a bigger sample size could be conducted.

Part of our future research includes analyzing the relationship that exists between Infomediaries with higher levels of integration and sophistication and their *performance and customer satisfaction* level. In order to conduct this research, researchers might develop sound and relevant user-oriented measures of web site performance and satisfaction. Then they could select a group of infomediaries that exhibit low, middle, and high level of integration and sophistication level, and assess their relationship with performance and satisfaction. These studies could be accomplished using a positivist or an interpretive approach, and with surveys or case studies.

Moreover, practitioners and academics have realized that trust plays a vital role in the development of e-commerce [Bhattacherjee 2002; Bryant and Colledge 2002]. So, we consider that another important research area that needs to be explored is related to the level of buyers' trustworthiness toward infomediaries. In this regard, despite the anticipated benefits, in the past few years, eMarketplaces have experienced a roller coaster ride. Several e-markets have failed in spite of the tremendous prospects for growth predicted by reputed research groups including the Gartner Group, Forrester, and e-Marketer.com. A survey by Davenport et. al., [2001] on B2B eMarketplaces identified lack of trust as a primary barrier for eMarketplace growth. This lack of trust is essentially due to poor real time information about trading partners, such as collective feedback from multiple companies, third-party approvals and availability of product information. Therefore, we need to understand the variety of features infomediaries needs to offer in order to capture buyers' credibility.

8. Conclusions

We recognize that our research is not by any means perfect and given that the proposed research model was validated using companies from only three industries, drawing generalization about the findings must be done with caution. The main limitations of this study include the use of only two coders for evaluating the infomediaries and the sample size. However, the contributions of this paper are many-fold. First, this paper contributes towards

building a theory of infomediary by providing a parsimonious framework that assists in the study of infomediaries roles in B2C E-Commerce, their level of integration and sophistication. The model is well grounded and was empirically tested using an initial sample of 150 infomediaries from three industries, namely: automobile, retail, and travel. Second, the findings suggest that not all infomediary roles exhibit the same level of integration and sophistication across the three selected industries and that infomediaries with high integration and sophistication level are found in the retail industry. These findings have important implications for B2C e-commerce designers and managers because by knowing that the roles of infomediary vary across industries, they would be able to develop and tailor better web-sites that will lead to higher level of performance and customer satisfaction. In addition, given that the proposed research model identified the main functions that infomediary must exhibit under each role, B2C designers and companies that provides infomediary based e-commerce solutions may use the identified functions to develop effective solutions. Finally, the proposed infomediary roles and functions can be used by any on-line shopper to evaluate the level of sophistication and integration of the infomediary before starting and/or conducting a transaction with it.

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APPENDIX A: Inter Coder Reliability Statistics
The inter coder reliability for the entire sample is 89.33%

Rated Intermediary Functions	Travel	Auto	Retail
Search & Matching	88%	90%	85%
Customization	86%	92%	90%
Facilitation	70%	92%	92%
Expertise / Infomediation	70%	85%	92%
Bundling / Unbundling	80%	94%	94%
Ecommerce provision	82%	94%	96%
Financial Services	92%	92%	92%
Delivery	82%	92%	83%
Advertising	78%	88%	92%
Logistics/Tracking	86%	92%	96%
Community	90%	90%	92%
Aggregation	94%	96%	96%
Spot Market Makers	96%	92%	96%
Neutral Evaluators / Regulators	96%	94%	94%
Customer Relations	86%	90%	88%
Consumer Research	94%	85%	88%
Overall Reliability by Industry	**86%**	**91%**	**91%**

APPENDIX B: List of Companies Selected for the Study
Industry: Travel

www.expedia.com
www.travelocity.com
www.orbitz.com
www.priceline.com
www.travel.yahoo.com
www.travel.com
www.lonelyplanet.com
www.frommers.com
www.counciltravel.com
www.travelpage.com
www.statravel.com
www.hotwire.com
www.travelzoo.com
www.thetrip.com
www.uniglobe.com
www.lastminutetravel.com
www.bestfares.com
www.away.com
www.travelcity.com
www.travel-ascending.com
www.mytravelguide.com
www.travelselect.com
www.travelassist.com
www.travelhub.com
www.kasbah.com
www.freetraveltips.com
www.flifo.com
www.familytravelguides.com
www.travelinsure.com
www.libertytravel.com
www.travelhero.com
www.realadventures.com
www.sportstravelandtours.com
www.travelonline.com
www.1uptravel.com
www.worldweb.com
www.travelstore.com
www.amtrak.com
www.aaa.com
www.iexplore.com
www.travelon.com
www.tripspot.com
www.vtourist.com
www.thetraveloutlet.com
www.mytravel.com
www.cheaptickets.com
www.airtravelcenter.com
www.clubtripmakers.com
www.johnnyjet.com

Industry: Automobile

www.carsdirect.com	www.carseverything.com	www.new-cars.com
www.autoweb.com	www.carsnet.com	www.carbuyer.com
www.edmunds.com	www.carscost.com	www.carsunlimited.com
www.pricequotes.com	www.autobytel.com	www.automatchcars.com
www.carbuyingtips.com	www.autotrader.com	www.automotive.com
www.invoicedealers.com	www.ausedcar.com	www.nadaguides.com
www.automobilemag.com	www.cars-online.com	www.stoneage.com
www.buyingadvice.com	www.kbb.com	www.car-stuff.com
www.car-buying-strategies.com	www.caranddriver.com	www.carprices.com
www.automobile-portal.com	www.buycarson-line.com	www.thecarconnection.com
www.autoatlanta.com	www.carsearch.com	www.carfax.com
www.cars.com	www.wheelsforyou.com	www.thecarplace.com
www.carpoint.msn.com	www.lldc.com	www.cartrackers.com
www.1inamillioncars.com	www.digitalcars.com	www.intellichoice.com
www.fossilcars.com	www.autointerface.com	www.carsmart.com
www.buyclassiccars.com	www.marquecars.com	www.carinsuranceamerica.com

Industry: Retail

www.1800flowers.com	www.drugstore.com	www.officedepot.com
www.allbookstores.com	www.ebags.com	www.orientaltrading.com
www.altrec.com	www.ebay.com	www.qvc.com
www.amazon.com	www.eluxury.com	www.radioshack.com
www.americangreetings.com	www.epinions.com	www.redenvelope.com
www.barewalls.com	www.etoys.com	www.returnbuy.com
www.bellacor.com	www.fao.com	www.samash.com
www.bestbuy.com	www.fortunoff.com	www.sharperimage.com
www.bluenile.com	www.furniturebuzz.com	www.smartbargains.com
www.buy.com	www.fye.com	www.starbucks.com
www.buychoice.com	www.guild.com	www.target.com
www.cameraworld.com	www.hallmark.com	www.technoscout.com
www.cooking.com	www.ice.com	www.towerrecords.com
www.crutchfield.com	www.igo.com	www.tweeter.com
www.damark.com	www.lowes.com	www.ubid.com
www.dealtime.com	www.netgrocer.com	www.w3-pet-things.com