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Applying a Topical Relevance Typology to Analyze Online Product Information Types and Their Effects on Internet Consumer Decision Making

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Abstract: This paper lays out a research proposal of systematically analyzing and comparing the decision effects of online product information types. Hardly any in-depth knowledge is currently available on how different information types influence online consumer trust and purchase intention. To address this research gap, we apply a generic function-based topical relevance typology to classify the variety of online product information and plan for focused comparisons of the functional roles played by different information types in e-retailing. Understanding the differential impacts of each information type provides a basis for prioritizing online information provisioning and organization, which becomes particularly meaningful in the current context of information overload. The paper briefly reviews information research in e-commerce, introduces the product type as an important moderating factor, and discusses the conceptual basis and applicability of applying the generic relevance typology to analyze product relevant information. The research model and preliminary hypotheses are also described.

Keywords: information organization, e-business, topical relevance relationship, customer decision making

1. INTRODUCTION

Consumer (B-to-C) internet commerce has flourished not only in the advanced economies such as US and Japan, but also in newly industrialized countries like China. According to IDC¹, China's online shopping volume rose to 784.93 billion Yuan (\$120.76 billion) in 2011, a 66% increase from 2010. With the emerging 3G mobile economics, Internet retailing is expected to explode in China in the next three to five years. However, the majority of the Chinese population is still hesitant to adopt Internet shopping. To address this concern, e-commerce researchers in China have steered their work towards an in-depth understanding of consumer trust and decision making on the Internet^[1].

Online product information provided by dot-com storefronts plays a central role in informing the consumer of the product value and strengthening the consumer's confidence of making the right purchase^[2]. To substitute the physical inspection in brick-and-mortar stores, online shoppers now have to base their decisions on information reading on the Internet. In the virtualized shopping environment, they feel more risk^[3] and become highly responsive to the online product-related information they are getting.

The present e-commerce information research has primarily focused on *information quality* and *information display*, while seriously lacking research on *information type*. Product information type and its decision mechanisms are not well understood. The existing information-type research seems limited to only one information type, user reviews analysis. Regarding many other types of product-related information such as product comparisons, return policy, manufacturing details, retailer reputability, use scope, side effects and so on,

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¹ International Data Corporation (IDC) is a global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC is a wholly-owned subsidiary of International Data Group (IDG), the world's leading technology media, events and research company.

research is largely absent or only scratching the surface. There is not yet research systematically investigates and compares the functional roles played by different types of product-related information and hardly any in-depth knowledge is currently available on their impacts on *consumer trust*, *perceived value*, *perceived risk*, and *purchase intention*.

Our study aims to systematically investigate and compare the effects of various types of product-relevant information on the online consumer decision-making process. We first apply a function-based topical information typology^{[4][5]} to guide the systematic categorization of online product information and thus enable a focused comparison between different information types. The findings will provide a basis for prioritized information provisioning and organization which helps to remedy the pressing issue of information overload in e-retailing especially with small-screen mobile devices.

2. LITERATURE REVIEW

2.1 Information's Effects on Online Consumer Decision Making

Information is a multi-dimensional concept and each of these dimensions has its unique impacts on Internet retailing:

- **Information quality:** Many studies have shown that better quality of presented online information significantly improves online purchase decisions. Specific attributes of information quality include accuracy, completeness, usefulness, timeliness, reliability, relevance, objectivity, sufficiency, easiness, availability, and so on.^{[2][6][7]}
- **Information presentation:** Researchers^{[8]-[10]} compared the different effects of textual, graphical (or visually oriented), and multimedia information displays on internet decision-making performance.
- **Information type:** The existing researches have focused on the decision effects of a single information type, user reviews. A great number of studies have confirmed that consumers are highly dependent on the product-oriented user reviews on the web, even though they might not always follow these reviewers' opinions and suggestions^{[11][12]}. Moreover, positive reviews seem to have a stronger influence on the consumer than negative reviews do^[13].

Among the above three dimensions of information research, the decision effects of information quality and information presentation have been studied more systematically and more thoroughly; in-depth understanding is reached on the key components of these two dimensions and consistencies are found across comparable studies. In contrast, the analysis of information type is currently limited to only one instance, user review analysis. This is an area that is largely ignored and lacks systematic investigation. The information research community as a whole has very limited knowledge of how different types of online product information affect consumer trust and decision making and whether these effects vary with the product type. The current study sets out to address this missing link.

2.2 Product Classification, Information Type, and Online Shopping Preferences

From the perspective of advertising, a number of published researches have proved strong associations between the information type and the consumer's shopping preferences for product classes^{[14]-[17]}. In Nelson's *Advertising as Information*^[16], he first brought forth a product classification which soon gained wide acceptance and has provided a fruitful avenue since for understanding merchants' information provision (advertising) in relation to consumers' buying behavior. The product classification originally began with two major categories (*search product* and *experience product*). It was later refined and extended^{[17]-[19]} and eventually adapted to analyze Internet retailing^{[14][15][20][21]}. The product classification as adapted to e-retailing is summarized as follows:

- **Search products:** the consumer can determine the quality of the product prior to the purchase by searching

information about the products. Examples are books and music CDs.

- **Experience products:** the consumer has a difficult time (if at all possible) to determine the quality of the product prior to the purchase; instead s/he needs to personally experience the product to determine the quality. Experience product can be further divided into experience-1 product (such as clothing and perfume) and experience-2 product (such as cell phones and TVs).
- **Credence products:** the consumer has no way of fully evaluating and determining the quality of the product prior to as well as after the purchase; instead s/he has to base the purchase on credence or trust of the brand. Examples are water purifier, vitamins, and anti-aging cream.

Significant differences are found in the preferred information characteristics as advertising for search, experience, and credence products. *Direction information* is dominant when advertising for search products and *indirect information* (such as brand reputability and endorsements) is preferred for experience products (Nelson, 1974). For e-retailing, products with “digital attributes (which can be communicated on the web at very low cost)” are more likely to succeed than products associated with “nondigital attributes (for which physical inspection of the product is necessary)”^[21]. Digital attributes are mostly corresponding to search products while nondigital attributes are often associated with experience and credence products^[15]. From a series of empirical analyses, consumers demonstrate stronger preference of shopping search products rather than experience and credence products on the web^{[14][15][20]}. This preference can be attributed to online information provisioning: the provided standard direct product information is usually sufficient for consumers to make informed decisions about purchasing search products, yet it is inadequate for consumers to judge experience and credence products. Instead, when evaluating experience and credence products consumers tend to draw on indirect, contextual, and evaluation information, such as the retailer’s reputability information, third-party evaluation, product comparison guides, and customer reviews.

Given its strong influence on consumers’ information preferences, “product type” will be incorporated into our study as an important factor that moderates the decision effects of information type. It guides us to identify effective information provisioning and organization strategies to target various products.

3. APPLYING FUNCTION-BASED TYPOLOGY TO CLASSIFY PRODUCT INFORMATION

As discussed earlier, “information type” has not been systematically attended by existing information research in online consumer decision analysis. First of all, it lacks a systematic typology to consistently classify product-related information. There is a large variety of product-related information online, just to name a few, direct product description (including dimensions, functions, etc.), manufacturing information, related patents, product comparisons, user reviews, Internet retailer reputation, customer service, return policy, and so on. To systematically classify product information is the *prerequisite* to carry out a solid and in-depth examination of information types and their differential effects on online consumer decision making.

This study applies a generic typology of topical relevance relationships^{[4][5][22]-[24]} to systematically classify and analyze online product information types. “Topical relevance” is the fundamental concept of information organization and information retrieval. Relevance lies at the heart of human cognition; in turn, topical relevance lies at the heart of relevance^{[22][25]-[29]}. Simply speaking, topical relevance is the logical connection between topic and information, between topic and topic, and between information and information. It provides the cognitive foundation for human thinking, reasoning, communication, and decision making. Without recognizing and understanding the relevance connection between an input (or a stimuli) and its context, human beings could hardly make through simple daily conversations in which inferential communicative intentions are often embedded, nor could they come to any meaningful judgment or conclusion about their situation^[37]. Although the importance of topical relevance is widely recognized, our understanding of the notion remains vague, limited,

oversimplified, and unexplicated ^{[22][23] [25]- [27] [29]- [35]}. To address this gap in existing literature, Huang ^{[4][5]} conducted a multidisciplinary inquiry into topicality by analyzing theories and thinking from Argument & Logic, Cognitive Psychology & Education, Communication, Rhetoric, Information Science, Legal Reasoning, History, Clinical Medicine, Art Theory and Art History. The examined literatures help to elaborate the conceptual substance of the intangible notion of topicality and relevance from various angles. The primary outcome of the multidisciplinary inquiry is a theory-grounded and empirically-refined typology of topical relevance relationships. The typology is structured around three relevance facets (*function-based*, *reasoning-based*, and *semantic-based*) and contains 230 fine-grained relationships.

In particular, the function-based facet of the typology provides the theoretical basis for classifying the product-relevant information in this study (Figure 1). This relevance facet is based on *functional role*, that is, the role a piece of information plays in the overall structure of a topic, by taking into account its relations with other parts of the given information passage. It adopts the perspective of *Rhetorical Structure Theory* (RST) in discourse analysis ^[36], “for every part of a coherent text, there is some function for its presence, evident to readers”. The emphasis of the functional classification is on the *cognitive effect* achieved on the receiver, such as a reader, a hearer, an information user, a consumer, etc. The “cognitive effect” refers to a substantial change of the receiver’s knowledge state or view points after receiving a piece of relevant information, which can confirm, reinforce, revise, or disprove the receiver’s beliefs. Similarly, each kind of product information relates to the product in a different way and plays a specific role of improving the consumer’s perception of the product and strengthening their buying intention. For example, product specs and return policy relate to the product in two very different ways and each of them plays a different role in influencing the consumer’s buying decision. Essentially, the function-based relevance facet provides a relationship framework for differentiating cognitive effects to be achieved on the consumer, by specifying the functional role and highlighting the specific contribution of each type of product-relevant information. The advantage of applying the functional classification is to directly tie the product information type with the consumer’s knowledge state and cognitive process underlying online decision making.

Table 1 illustrates the function-based classification of product relevant information. More product information will be collected from the Internet to further carry out the analysis.

Table 1. Function-based product information classification

Selected functional relevance type	Corresponding product information type
Direct / Matching topic	Product specs, functions, etc.
Indirect evidence	Patents, awards, manufacturer, materials, working logic, etc.
Context	Instructions, use scope, expiration date, customer service, return policy, etc.
Comparison	Product comparison guides, price comparison, etc.
Evaluation	Consumer reviews, Internet reputation evaluation, etc.

The function-based facet provides a generic information classification that is meaningful across topics and domain boundaries. It has been successfully applied to analyze three heterogeneous datasets in oral history, clinical question answering and art image tagging ^{[4][5][22][23]}. Moreover, Huang & White ^[31] developed *policy-capturing models* (regression-based) to explore individual effects of different relevant information on the overall judgment and decision making; in these models, highly consistent results were found regarding the relative importance of each information type to the overall judgment. The current study extends the research to Internet business context by investigating individual effects of various product-relevant information on the overall purchase decisions.

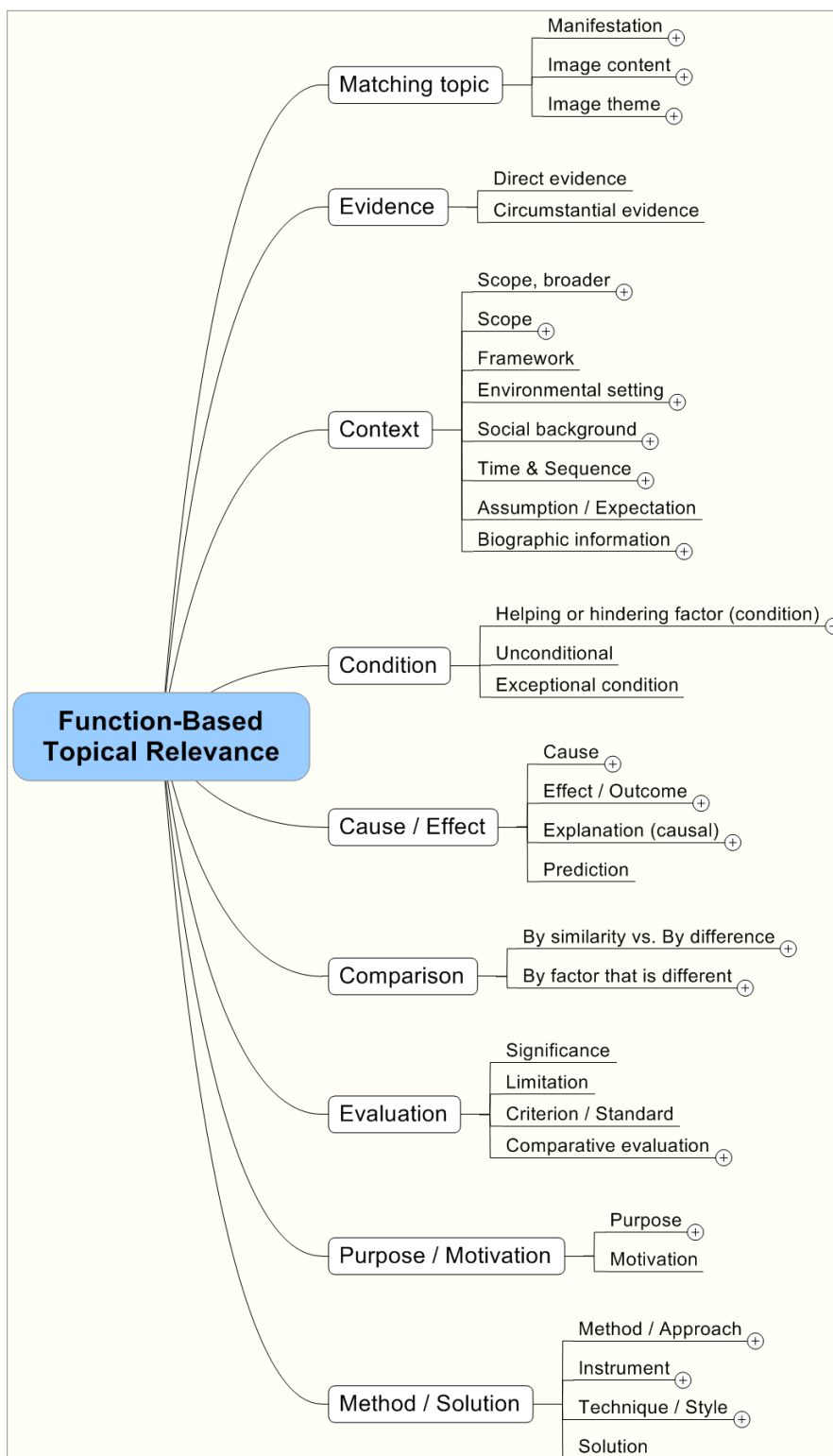


Figure 1. Function-based relevant information typology

4. RESEARCH MODEL

On the basis of categorizing the online product information, the study proceeds to analyze the “type effect” on Internet consumer decision making. The research model (Figure 2) adopts four important constructs from the trust-based consumer decision-making model in e-commerce [7]. Three mediators of *consumer trust*, *perceived*

risk, and *perceived value*, and one dependent variable of *intention of purchase*. The four constructs capture and highlight the critical factors in the process of selecting products and making purchase. Moreover, Kim et al.'s model identified six antecedents (i.e., information quality, privacy protection, security protection, presence of a 3rd-party seal, positive reputation, familiarity, and consumer disposition to trust) that significantly influence the mediators and dependent variables in their statistic analysis. Since our research focuses on exploring the decision effect of *information type* as moderated by *product type*, *information type* is studied as the only antecedent and *product type* is studied as the moderator which together influence *consumer trust*, *perceived value*, *perceived risk*, and *purchase intention*. At the mean while, all the antecedent variables specified in Kim's study will be controlled in the analysis. Once the empirical data are collected, structured equation models (SEM) will be developed to compare the effects of different information types. In particular, the path comparisons will be done first across the product types and then between the product types.

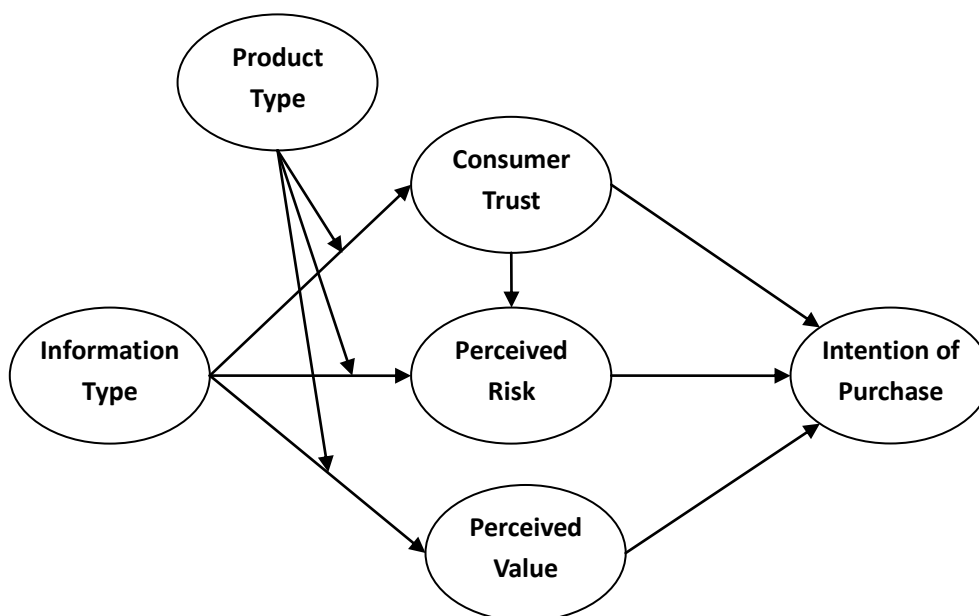


Figure 2. Research model

5. PRELIMINARY HYPOTHESES

The following describes a set of preliminary hypotheses to be tested in the study, which are subject to further development and adjustment.

We will first explore whether there is significant difference in the functional roles played by different types of product information. For example, direct (advertising) information is designed to directly introduce the product to the consumer. It is a direct source of information describing what the product is like, what it can do, and what its values are to the potential buyer. However, because of its advertising flavor likely to be strong and exaggerations likely to take place, consumers tend to be more conservative when treating direct information. Therefore, direct information can directly help the consumer better understand the value of the product (*perceived value*), but it may not have as much influence on improving *consumer trust* and reducing *perceived risk* as indirect, context, and evaluation information does. Similarly, product comparison is useful for the consumer to quickly pin down critical differences in attributes and functions among similar products and brands in the market. It also directly strengthens the consumer's *perceived value* of a particular product. On the other hand, indirect, context, or evaluation information does not directly introduce the product, rather it informs the consumer from different aspects such as manufacturing details, related patents, return policy, and other users' experience. Although not directly advertising, these three types of information have a better chance to address

consumers' concerns and strengthen their confidence of making the purchase. This round of path comparisons aims for the generic truth about the functional roles played by different information types and therefore will be done regardless of the product categories. In this round, we will test the following hypotheses:

H1: Compared to other information types, indirect, context, and evaluation information is more likely to improve consumer trust and reduce perceived risk.

H2: Compared to other information types, direct and comparison information is more likely to improve perceived product value.

H3: Comparison and evaluation information significantly improves the consumer's buying intention for all three product types.

The second round of path comparisons will be made between product types and take the moderating effects of *product type* into consideration. We want to put a particular emphasis on the hard-to-sell experience and credence products in e-retailing and seek corresponding strategies. Since the information type preferred for making online buying decisions significantly varies with the product type, retailers need to customize their strategy of information provisioning and organization to different types of products^[14]. For example, on the one hand, Internet retailers could focus on direct information for selling search products and be more selective about providing other types of information. On the other hand, they want to intentionally offer more comparison, evaluation, and review information to complement standard product description, so as to "motivate consumers to purchase the difficult-to-sell products online"^[14]. Accordingly the following hypotheses will be tested:

H4: The effects of different types of product-related information on consumer trust, perceived risk, perceived value, and purchase intention vary significantly with the product type.

H5: For experience products (such as clothing and cell phones), indirect information significantly improves the consumer's buying intention.

H6: For credence products (such as vitamin), context information significantly improves the consumer's buying intention.

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