

A Frame Work for Behavioral Business Intelligence based on Trust Driven Decision Process Model

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ABSTRACT

The study aims at online retailers. It explores the use of behavioral business intelligence for increasing trust of online consumers. Behavioral Business Intelligence (BBI) focuses on the people, their behaviors, and the factors that influence their behaviors. The aim of BBI is to know why online buyers exhibit certain preferences. This insight empowers decision makers power in evaluating the success of their strategic decisions.

Internet is rapidly gaining acceptance worldwide as well as in India as its reach expands in Indian social milieu. There is a positive trend towards online buying; however doubts continue to linger on the online buying process. It is important to understand the factors which impact trust in the online buying process.

This paper explores predominant factors that impact trust. A trust based decision process model is developed and ratified through empirical study. In the end, a behavioral business intelligence framework is developed by integrating trust based decision process model.

General Terms

Computer Application in Social Sciences, Business Intelligence and Consumer Behaviour, Behavioral Business Intelligence, E-Commerce, Buyer Behaviour

Keywords

Business Intelligence, Online Buying Behavior, Trust, Behavioral Business Intelligence, Empirical Study on Indian Online Buyer

1. INTRODUCTION

Business Intelligence (BI) provides powerful and useful information for businesses that enables useful insight and understanding into the fundamental component behind business success: the people (customer). Ultimately it is the customer that drives the decisions and they need to be won over in order for a business to succeed. Understanding what people do and why they do it provides great business insight while making strategic decisions. These powerful insights into consumer behaviour and their dynamics can mean the difference between success and failure of a business strategic plan. Business Intelligence allows firms to predict the behaviour of existing and potential customers. Empowered with this information, firms are able to devise suitable strategies to better manage their respective businesses.

With the worldwide growth of internet and an emergence of e-commerce over the past two decades there has also been a revolution in the basic format of transaction from a physical store format to a non-store one. With a change in the consumers' mindset of purchase made from a physical store to online buying, the industry has witnessed the ever-increasing volumes of online transactions. The growth in online buying is mainly due to advancement in technology; consumer characteristics, both demographic as well as psychographic; and situational influences. While the customers of today, driven by functional and hedonic motives, like to search the internet and search products and services, they often find themselves in a sense of discomfort, apprehension and skepticism when it comes down to the actual physical and monetary exchange. The basic underlying issue here is the lack of trust, especially with regard to financial and personal information. The lack of trust in online security and policy, reliability of a company and web site technology play major role in consumers buying intentions. With the lack of physical interactivity between the buyer and the seller in this new system, it is imperative today that organizations re-orient themselves towards creation and adoption of newer approaches for building and maintaining trust and manage relationships for online transactions.

Large amounts of data are now available due to advanced data storage and networking technologies. Business Intelligence techniques can be applied to these large volumes of data to come up with meaningful information that can help in making businesses more competitive and sustain economic development in the long run. A framework is needed to structure the complex system of effects of the demographic, psychographic and situational factors that impact a consumer's decision to shop online, and develop an in-depth understanding of consumers' trust to shop online.

The objective of the study is to explore the critical factors that influence the trust of online buyers and develop trust based decision process model; test the model and design a framework for business intelligence. The model is tested through empirical study done on users of irctc.co.in, an online reservation system of railway tickets

2. THEORETICAL CEPTUALIZATION OF TRUST:

Trust is a feeling of mutual acceptance between two parties; it develops out of continuous physical interaction and leads to long-term acceptance and commitment. So the important issue that needs to be addressed is "trust", amongst the seller-buyer, the lack of which often acts as an impediment in the trial and adoption of the virtual market concept (26). As has been

remarked by (2), “if the web site does not lead the consumer to believe that the merchant is trustworthy, no purchase decision will result” (34). It is also widely agreed that if online trust can be understood, developed and maintained by the marketer, it would act as a precursor to online buying and the number of online buyers would increase considerably (28, 49). Online buying and selling necessitate customer trust (26, 39, 30). Online trust is an important determinant for the success of online transactions (31, 3, 24).

Trust has been defined as “confidence in or reliance on some quality or attribute of a person or thing, or the truth of a statement” (Oxford English Dictionary). It is “a belief or confidence in the honesty, integrity and reliability of trustee”. It has also been defined in terms of “interdependence between two or more parties”, (27); “willingness to accept vulnerability, but with an expectation or confidence that one can rely on the other party” (27, 33); “willingness to rely on an exchange partner in whom the buyer has confidence” (33, 35). “. . . a device to reduce complexity, a shortcut to avoid complex decision processes when facing decisions that carry risk” .

3. TRUST IN ONLINE BUYING:

Online trust is a positive expectation that online marketer will not – through online dealings – act opportunistically. The two most important elements of this definition are that it implies familiarity and risk; this is impacted by knowledge and familiarity about the online seller. Online trust is a belief that online seller could be trusted. It is a feeling of confidence and security towards the online transactions.

Trust forms an important issue in online transactions; as it acts as a driver or as a barrier in the trial and adoption new technologies (16, 13, 30) and thus the importance of trust in the online context is noteworthy (48); it helps retain customers (22, 25), and develop long-term relationships (42, 21). It helps reduce the levels of risk associated with purchase transaction processes, be it trial or adoption (40, 24). The lack of trust acts as a barrier in the success of the online medium and is likely to discourage online consumers from participating in online buying (6).

Trust is a prerequisite in online buying; the phenomenon encompasses trust in the company image, website content and the very process of online buying. It includes safety of personal information, misuse of private consumer data, transaction privacy and security, hacking, fraud, and scams. Trust is an “..... an attitude of confident expectation in an online situation of risk that one’s vulnerabilities will not be exploited” (7). The physical distance across borders, the lack of personal contact between the seller/product and the buyer, the anonymity of the Internet and a break from the traditional store format are factors that lead to a discomfort among consumers. The feeling gets aggravated with presence of risk and information imbalances. Lack of proper information about the product or service is a major contributing factor towards feeling of suspicion and mistrust thereby endangering the adoption of electronic markets and the very process of online buying (13).

According to (18), trust is the resultant outcome of the “specific beliefs of integrity, ability, and benevolence”; in the context of e-commerce, “integrity” was holding on to stated rules and promises; “ability” was the capacity to provide quality products

and services; “benevolence” was compassion and kindness towards customers without a materialistic gain in mind. Credibility, competence and benevolence, as two parameters have also been proposed by other researchers (11, 44, 45), “credibility” implying the buyer’s belief in the seller, product, service and expertise; and “benevolence” implying the buyer’s belief in the goodwill and positive intention of the seller (17).

Trust may also be defined in terms of three characteristics: reliability; predictability; and fairness, all of which play an important role in improving competitiveness and providing flexibility especially in the electronic context (1). “Trust”, may be defined in terms of “confidentiality, honesty and integrity, as well as high ethical standards” (9) or even as “security, privacy and reliability” (5).

A high degree of trust stimulates and meets consumers’ high expectations of satisfying transactions and reduces uncertainty and perceived risks in online buying (31, 32, 40, 24). The higher the degree of consumers’ trust, the higher the degree of buying intentions of consumers, and the easier it is for companies to attract, retain and maintain long-term relationships with them (20).

4. DETERMINATION OF TRUST IN ONLINE BUYING AND DECISION PROCESS MODEL

Online retailers must exhibit trustworthiness through high degrees of integrity and sincerity, as well as attempt at reducing uncertainty. Researchers in online trust have attempted to study the phenomenon as it pertains to the online buying context. In the research done by(6) author studied the concept in terms of perceived technology, perceived risk, company competency, and trust propensity, with perceived usefulness, perceived security, perceived privacy, perceived good reputation, and willingness to customize as important antecedents to online initial trust. Perceived security and privacy are key determinants affecting consumers' online initial trust in a company (23, 54, 6). In the research conducted by (53), author proposes the means behind online trust in terms of three distinct dimensions, viz., technical-based, uncertainty of transactions and security, and, competency-based. Also, prior experiences of online shopping and familiarity with online transactions is also an most important factor affecting trust and purchase intentions (11; 12, 18, 43).

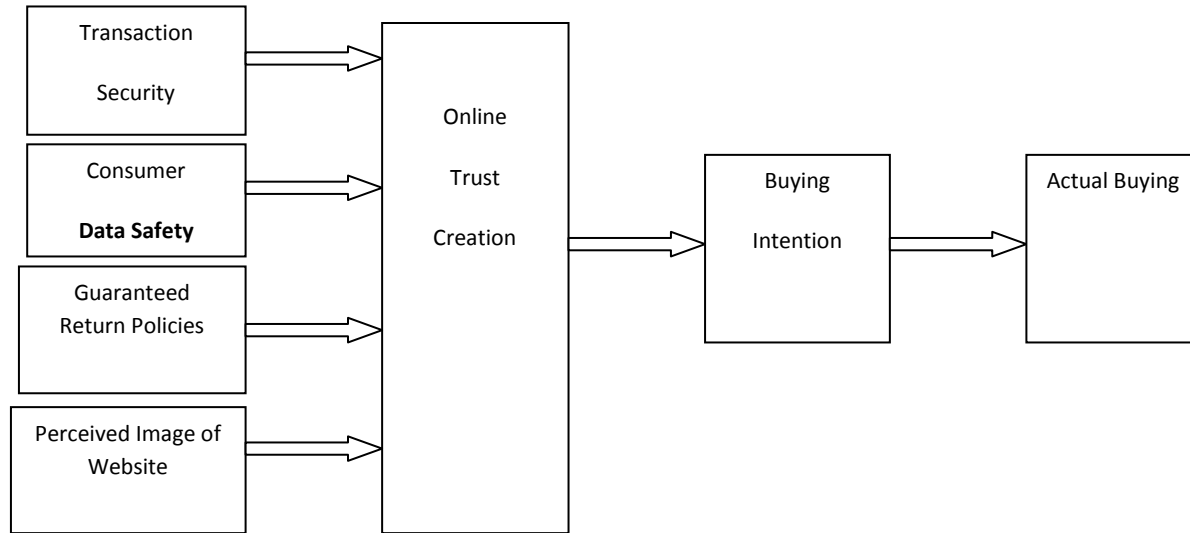
Research in trust delineates components like customer's propensity to trust, customer confidence in the website, and the customer's trust in internet technology features (35, 36), confidentiality, honesty and integrity, as well as high ethical standards (9). In the research conducted by (7), author highlights the psychological factors in online trust, in the form of transaction security, customer data abuse, customer data safety, uncertainty reducing elements and guarantees/return policies (see Figure 1).

5. EMPIRICAL STUDY:

5.1. Objective:

The study has been conducted with the objective of tapping the consumers’ trust factors that affect online buying intention.

Figure 1: Trust Driven Decision Process Model for Online Buying



The objectives may be summarized as follows:

- (1) To establish the impact of transaction security based trust factors on online purchase intention
- (2) To establish the impact of consumer data privacy and safety based trust factors on online purchase intention
- (3) To establish the impact of credible / guaranteed return policies based trust factors on online purchase intention
- (4) To establish the impact of perceived image of the website based trust factors on online purchase intention.

5.2. Methodology:

In order to test the proposed model an empirical study is undertaken which is descriptive, diagnostic, and causal in nature. It is aimed at identifying the critical trust parameters of buyers in online booking of railway tickets in India through using the registered railway website of Indian Railway Catering and Tourism Corporation (www.irctc.com). A pilot study was conducted on a total of 100 sample respondents. The statistical method used in these scales was principal component factor analysis. The sample size recommended for this statistical method is at least 50 responses. The guideline used was a factor loading of 0.5 or above (21). The recommended guidelines for principal component factor analysis are at least 50 responses, and a ratio of 5 responses for every variable in each scale being measured (21). This sample size met both the criteria. The following Table (see Table 1) illustrate the results of the pre – test in detail.

Reliability concerns the extent to which a measurement of a phenomenon provides stable and consistent result. In assessing measurement reliability, (15), stress the established the reliability of a total of 11 items, which were grouped under 4 factors viz., Security of Online Transaction, Data Privacy and Safety, Guarantee Return Policies, and Perceived Image of Website. The reliability score and factorial loading of each item were found to be well above the acceptable criterion of 0.50. (See Table 1)

Table 1: Analysis of Factorial Validity and Construct Reliability

Note: Acceptable factor loadings and reliabilities (guidelines used $\lambda > 0.5$ and reliability > 0.5 respectively.)

The designed questionnaire for the final study comprised two parts; the first part comprised questions on basic demographic information about the user (age group, gender, income level, educational qualification, regional location, frequency of online ticket booking, etc.); the second part measured the users' relative preferences and experiences that are critical to generate trust to induce them to reserve the railway tickets online in India. The study was thus aimed at identifying the critical parameters of consumers' trust as a necessary prerequisite to online buying of railway tickets and thereby establishing the causality between the online trust factors and the online buying intention of railway tickets.

5.3. Research Hypotheses

The following hypotheses were developed from the objectives of the study mentioned above. A series of multiple regressions was conducted to test each of the hypotheses in the subsequent section of this study.

Hypothesis 1: Security of online transactions creates trust to

Constructs	Measured Items	Factor Loadings (λ)	Composite Reliability (α)
Security of Online Transaction (SOT)	T11	0.757	0.7301
	T12	0.914	
Data Privacy and Safety (DPS)	T21	0.849	0.6869
	T22	0.914	
	T23	0.702	
	T24	0.820	
Guarantee Return Policies (GRP)	T31	0.521	0.7139
	T32	0.619	
Perceived Image of Website (PIW)	T41	0.552	0.8237
	T42	0.608	
	T43	0.590	

reserve railway tickets online in India.

Hypothesis 2: Consumer / user data privacy and safety develop trust to reserve railway tickets online in India.

Hypothesis 3: Guarantee return policies create trust to reserve railway tickets online in India.

Hypothesis 4: Perceived image of the company / website develops trust to reserve railway tickets online in India.

5.4. Data Collection

The final questionnaire that was developed to capture quantitative data was administered to a cross-section of respondents. The sample was heterogeneous consisting of a total number of 327 respondents and represented educated middle and upper class people, who are registered users of Indian railway website (IRCTC). These 327 questionnaires were found to be complete and valid for analysis.

5.5. Analysis of Data

The responses were subjected to various empirical analyses through using 10.0 version of SPSS. The findings were finally presented with a set of conclusions and recommendations. The statistical analyses were descriptive as well as causal, and included multivariate statistical techniques for testing of the hypotheses to arrive at the research findings.

The factor analysis had grouped the items into 4 constructs with 11 items (see Table 1). For analytical purposes, descriptive statistics were used through measures of central tendency and

dispersion (see Table 2). The users of railway website were asked to rate the parameter based statements on a scale of 1 to 5, based on their level of agreement or disagreement to each statement. The sum total produced a consolidated score. The means and standard deviations were calculated construct wise. The mean scores for various constructs ranged between 3.2049 and 3.3068, with 'Data Privacy and Safety' having the least score and 'Perceived Image of Website' have the highest score.

Table 2: Descriptive Statistics for Trust related Constructs on Online Buying Behavior

Constructs	No. of Items	Mean	Std. Dev.	N	
1. Security of Online Transaction (SOT)	2	3.2202	.9027	327	
2. Data Privacy and Safety (DPS)	4	3.2049	.6862	327	
3. Guarantee Return Policies (GRP)	2	3.2446	.8380	327	
4. Perceived Image of Website (PIW)	3	3.3068	.9212	327	

Having calculated the descriptive statistics, the linear relationships were established among the various constructs using correlation analysis so as to measure the strength and direction of linear relationship between them. Each construct was correlated with its individual measuring items to establish the linear relation between them. Also, the various constructs were correlated with each other to establish the strength of association between them (see Tables 3 to 7).

A series of multiple regressions was conducted to test the hypotheses in order to assess the causal relationships between the various online trust constructs of consumer / user groups and their impact on the online reservation of railway tickets in India. The procedure used for these analyses involved a study of the p value, which indicated whether or not the regression model explained a significant portion of the variance of the dependent variable and the independent variable.

Table 3: Correlation Analysis of Trust related Constructs on Online Buying Behavior

Constructs	Security of Online Transaction (SOT)	Data Privacy and Safety (DPS)	Guarantee Return Policies (GRP)	Perceived Image of Product (PIW)
Security of Online Transaction (SOT)	1.00			
Data Privacy and Safety (DPS)	.664**	1.00		

Guarantee Return Policies (GRP)	.648**	.614**	1.00	
Perceived Image of Website (PIW)	.696**	.676**	.651**	1.00

** Correlation is significant at 0.01 level (2 tailed).

5.6. Hypotheses Testing

Hypothesis 1: Security of online transactions creates trust to reserve railway tickets online in India.

Regression analysis was performed with the trust based on online transaction security as the dependent variable, and assurance given by the website for transaction security, and the actual security of transaction for payment as independent variables. On entering the variables in a single block, it was found that 78.1% of the variance in trust based on online transaction security is explained by all the other constructs ($R^2 = .781$, F Value = 217.033, $p < 0.01$). Both the dimensions offered significant contributions with their respective t values and the associated level of significance (see Table 4).

Table 4: Model Summary for Trust related to Security of Online Transaction on Buying Behavior

1.1 Model 1	R	R Square	F	Sig.
	.813	.781	217.033	.000
1.2 Items Measuring Security of Online Transaction (SOT)	Item Total	Standardized	t	Sig.
Constant			.000	1.000
I can see the letter 'S' in the "http" of the URL before entering financial information. (SOT1)	.887**	.565	11.025	.000
Transaction for payment is secured. (SOT2)	.886**	.562	18.116	.000

a Predictors: (Constant), SOT1, SOT2

b Dependent Variable: Security of Online Transaction (SOT)

The hypothesis failed to get rejected. Security of online transactions is felt important by the people in India, who intend to book railway tickets online, and is significant to create consumer trust for online transaction or reservation of long distance railway tickets. Hence, the various factors related to security of online transactions have to be maintained properly and improved in the desired direction to earn or create consumer trust. This would induce people more into buying railway tickets online in India.

Hypothesis 2: Consumer / user data privacy and safety develop trust to reserve railway tickets online in India.

Regression analysis was performed with the user data privacy and safety as the dependent variable, and individual comfort to disclose private information, sharing credit / debit card number,

protection given by the website to personal information, and maintaining privacy of personal data as independent variables. On entering the variables in a single block, it was found that 52% of the variance in trust based on online transaction security is explained by all the other constructs ($R^2 = .520$, F Value = 92.060, $p < 0.01$). All the four dimensions offered significant contributions with their respective t values and the associated level of significance (see Table 5).

The hypothesis failed to get rejected. Consumer / user data privacy and safety factors of people in India, who intend to book railway tickets online, significantly develops trust for online transaction. Hence, the various factors related to consumer data privacy and safety have to be managed with full integrity and confidentiality to induce people more into buying railway tickets online in India by earning their trust in the online reservation system.

Hypothesis 3: Guarantee return policies create trust to reserve railway tickets online in India.

Table 5: Model Summary for Trust related to Data Privacy and Safety on Online Buying Behavior

Model 1	R	R Square	F	Sig.
	.551	.520	92.060	.000
Items Measuring Data Privacy and Safety (DPS)	Item Tot. Correlation	Standard Coeff. (Beta)	t	Sig.
Constant			.000	1.000
I do not hesitate to enter my private information. (DPS1)	.743**	.405	8.112	.000
I am worried about giving out my credit card number. (DPS2)	.462**	.397	21.993	.000
This site provides guarantees for not publishing of	.787**	.350	15.337	.000
This site keeps privacy for personal data. (DPS4)	.667**	.360	17.568	.000

a Predictors: (Constant), DPS1, DPS2, DPS3, DPS4

b Dependent Variable: Data Privacy and Safety (DPS)

Regression analysis was performed with the guarantee return policies as the dependent variable, and guarantee of bonded transaction, and guarantee of return policies as independent variables. On entering the variables in a single block, it was found that 43.4% of the variance in trust based on online transaction security is explained by all the other constructs ($R^2 = .434$, F Value = 47.167, $p < 0.01$). Both the dimensions offered significant contributions with their respective t values and the associated level of significance (see Table 6).

Table 6: Model Summary for Trust related to Guarantee Return Policies on Online Buying Behavior

1.3 Model 1	R	R Square	F	Sig.
	.498	.434	47.167	.000
1.4 Items Measuring Guarantee Return Policies (GRP)	Item Total Correlation	Standardized Coefficients (Beta)	t	Sig.
Constant			.000	1.000
This site guarantee bonded transaction. (GRP1)	.880**	.562	10.	.000
This site provides guaranteed return policies. (GRP2)	.884**	.572	3.989	.000

a Predictors: (Constant), GRP1, GRP2

b Dependent Variable: Guarantee Return Policies (GRP)

The hypothesis failed to get rejected. Expectations of people in India based on guarantee return policies, who intend to book railway tickets online, is significant to develop trust for online transaction. Hence, the factors mentioned above have to be managed properly and improved in the desired direction to induce people more into buying railway tickets online in India.

Hypothesis 4: Perceived image of the company / website develops trust to reserve railway tickets online in India.

Regression analysis was performed with perceived image of the company / website as the dependent variable, and reputation of the website, trustworthiness of the website, and mode of data extraction by the website as independent variables. On entering the variables in a single block, it was found that 40.1% of the variance in trust based on online transaction security is explained by all the other constructs ($R^2 = .401$, F Value = 21.345, $p < 0.01$). All the three dimensions offered significant contributions with their respective t values and the associated level of significance (see Table 7).

Table 7: Model Summary for Trust related to Perceived Image of Website on Online Buying Behaviour

Model 1	R	R Square	F	Sig.
	.451	.401	21.345	.000
1.5 Items Measuring Perceived Image of Website (PIW)	Item Tot. Correlation	Standardized Coefficients (Beta)	t	Sig.
Constant			.000	1.000
This website (IRCTC.COM) has good reputation. (PIW1)	.878**	.390	5.067	.000
This web site is trustworthy and honest. (PIW2)	.895**	.397	0.212	.860
This website does not use unsuitable methods to collect my personal data. (PIW3)	.804**	.375	7.113	.000

a Predictors: (Constant), PIW1, PIW2, PIW3

b Dependent Variable: Perceived Image of Website (PIW)

The hypothesis failed to get rejected. Perceived image of the website by the people in India, who intend to book railway tickets online, is significant to develop trust for online transaction. Hence, the factors mentioned above have to be managed and maintained properly to earn consumer / user trust in the online reservation system that would induce people more into buying railway tickets online in India.

6. ANALYSIS OF DEMOGRAPHICS:

Based on the analysis of background information of the survey respondents, the samples were further classified on the basis of gender and age groups. Then suitable statistical techniques were applied to capture the cross – sectional comparisons of buyers' trust creating attributes imperative to online buying intention of railway tickets in Indian context.

6.1. Analysis based on Gender:

Out of a total number of 327 respondents covered in the survey, 234 were male and 93 were female members. The analysis of descriptive and dispersions were calculated in addition to independent t – test to examine gender wise differences of trust based attributes on online buying intention, if any (see Table 8). The results of independent t – tests showed that for all the critical online trust parameters of buyers / users namely Security of Online Transaction, Data Privacy and Safety, Guarantee Return Policies, and Perceived Image of Website had no significant differences among male and female respondents. Therefore, it can be inferred that so far as these critical online

trust creating attributes are concerned in the context of online reservation of railway tickets in India, they stand equally important and given due importance by both male and female buyers of long distance railway tickets. The univocal importance of buyers' trust related attributes has to be considered accordingly as because it implies that all these trust based attributes related to online buying intention are of generic significance irrespective of gender (see Table 8).

Table 8: Comparative Analysis of Consumers' Trust Factors Based on Gender

Constructs	Gender	Mean	SD	F	Sig. (p)	t value	Sig. (2)
Security of Online Transaction (SOT)	Male	3.1944	.9052	.271	.603	.820	.413
	Female	3.2849	.8981				
Data Privacy and Safety (DPS)	Male	3.1955	.6952	.053	.818	.399	.690
	Female	3.2285	.6662				
Guarantee Return Policies (GRP)	Male	3.2158	.8871	4.280	.039	1.093	.276
	Female	3.3172	.6985				
Perceived Image of Website (PIW)	Male	3.2735	.9317	.563	.453	1.057	.292
	Female	3.3907	.8936				

6.2. Analysis based on Age Group:

The total number of 327 respondents was classified under five different categories namely 15 – 20 age group, 20 – 30 age group, 30 – 40 age group, 40 – 50 age group, 50 – 60 age group, and 60 + age group. Analysis of variance (ANOVA) was applied to find out age group wise differences on critical trust creating attributes of online buying intention (see Table 9). The results of ANOVA analyses showed that for two of the online trust creating factors there were significant differences, whereas for the rest the differences were not found significant.

For online trust creation based on the construct of Security of Online Transaction, no significant difference was found among the various age groups with $F(4, 322) = 2.714$, $p > 0.001$. Whereas for the construct Data Privacy and Safety, a significant

Table 9: Comparative Analysis of Consumers' Trust Factors Based on Age Group

Constructs	Occupation	df	Mean Square	F	Sig.
Security of Online Transaction (SOT)	Between Groups	4	2.166	2.714	.030
	Within Groups	322	.798		
	Total	326			
Data Privacy and Safety (DPS)	Between Groups	4	2.598	5.844	.000
	Within Groups	322	.445		
	Total	326			
Guarantee Return Policies (GRP)	Between Groups	4	1.844	2.681	.032
	Within Groups	322	.688		
	Total	326			
Perceived Image of Website (PIW)	Between Groups	4	3.192	3.895	.000
	Within Groups	322	.820		
	Total	326			

difference was found among the various age groups with $F(4, 322) = 5.844$, $p < 0.001$. For the construct Guarantee Return Policies, no significant difference was found among the various age groups with $F(4, 322) = 2.681$, $p > 0.001$. Whereas for the construct Perceived Image of Website, a significant difference was found among the various age groups with $F(4, 322) = 3.895$, $p < 0.001$. These mixed findings about various online trust creating factors for different age groups of consumers can be attributed to the fact that the above trust related factors have got different implications for various age groups of buyers. People belonging to lower age brackets are more used to online transactions, and like any other online utility services also prefer to reserve long distance railway tickets online. Because of their more familiarity and comfort level, they are easily convinced to share their personal data and the modus operandi of online reservation through the railway website. On the other hand, buyers belonging to the higher age brackets, may not possess adequate faith in the basics of online transactions, and hence like any other online services (e.g. online banking, online payment of insurance premium / telephone or electricity bills) might not be so inclined to buy railway tickets online in India. Again some of them, who might seek the service of any travel agents to reserve tickets online, express doubts and anxiety to share confidential information / code with such agents in the process of online reservation. So keeping in mind all such distinct possibilities, the concerned Indian railway authority can go for segmented

analysis in deciding the customer relationship strategies to earn or generate trust for buyers in various age groups.

Whereas for trust factors like Security of Online Transaction and Guarantee Return Policies, there were no significant differences found among the various age groups. These findings can be attributed to the fact that these are the factors important enough for all types of buyers belonging to various age groups, who reserve / intend to reserve railway tickets online in India. Hence, all such factors have to be considered with due importance while deciding the marketing, promotion, and customer relationship strategies by the Indian railway (see Table 9).

7. A BUSINESS INTELLIGENCE FRAMEWORK FOR ONLINE BUYING BEHAVIOUR BASED ON TRUST

In the proposed BI framework a Knowledge Management (KM) approach is used for effective decision support system.

7.1 Link between Business Intelligence (BI), Knowledge Management (KM) and Data Mining (DM)

There is a link between BI, KM and Data Mining (DM). BI is a broad category of applications and technologies of gathering, accessing, and analyzing a large amount of data for the organization to make effective business decisions (8, 51). Typical BI technologies include business rule modeling, data profiling, data warehousing and online analytical processing, and DM (28). The central theme of BI is to fully utilize massive data to help organizations gain competitive advantages.

Knowledge Management (KM) is a set of practices of the creation, development, and application of knowledge to enhance performance of the organization (50, 4, 14, 46, 52, 38, 41). Similar to BI, KM improves the use of information and knowledge available to the organization (47). However, KM is distinct from BI in many aspects.

Generally, KM is concerned with human subjective knowledge, not data or objective information (10). The majority of models used in the KM field, such as the tacit and explicit knowledge framework for a dynamic human process of justifying personal belief toward the truth (37), are typically non-technology oriented. Although KM has not evolved out of a set of formal methodologies, KM competently deal with unstructured information and tacit knowledge which BI fails to address (29).

Data Mining (sometimes called Knowledge Discovery in Databases process or KDD) is the process of discovering new patterns from large structured data sets as well as unstructured dataset. Data Mining is the computer-assisted process of digging through and analyzing enormous sets of data and then extracting the meaning of the data. Data mining tools predict behaviors and future trends, allowing businesses to make proactive, knowledge-driven decisions. Data mining tools can answer business questions that traditionally were too time consuming to resolve. They scour databases for hidden patterns, finding predictive information that experts may miss because it lies outside their expectations.

7.2 Integrating Trust Driven Decision Process Model and Data Mining

DM is considered to be useful for business decision making, especially when the problem is well defined. Because of this, DM often gives people an illusion that one can acquire knowledge from computers through pushing buttons. The danger of this misperception lies in the over-emphasis on “knowledge discovery” in the DM field and de-emphasis on the role of user interaction with DM technologies in developing knowledge through learning. There is a lack of attention on theories and models of DM for knowledge development in business. Conventional theories and models in this area ought to be re-examined and developed in such a way that a distinction is made between two important variables: DM centered information and business centered knowledge.

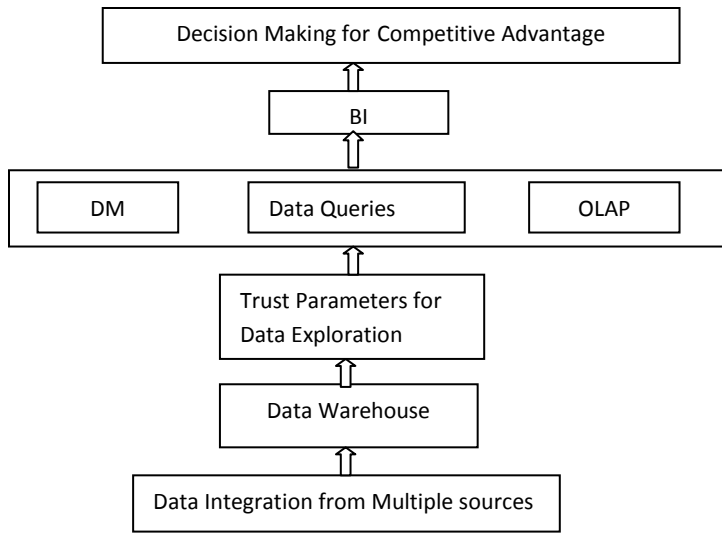
The primary limitation in traditional data mining theory is its limited real world application in two aspects. First, people often find that “knowledge” gained from DM does not always lead to an action in all situations, particularly when the piece of “knowledge” is hard to apply. It fails to recognize the roles of business insiders in developing their knowledge for coordination of actions for business.

The proposed “Trust Driven Decision Process Model for Online Buying” is an attempt to fill the limitation of traditional data mining. The model is empirically tested and gives useful insights for checking out the trust in online buying. Data mining can be done based on the trust parameters suggested and decision makers can use the information for competitive advantage. The integration of trust driven decision process model for online buying with data exploration and query makes data mining relevant to genuine BI. The knowledge work done by trust parameters can be generally described in the perspective of unstructured decision making. To be ready for action, a decision maker searches appropriate information, evaluates alternative actions pertinent to this information, and choose the action that is best supported by the information. In the DM context, DM results can be a set of information for the decision maker in making unstructured decisions.

7.3 A BI Framework for Online Buying Behaviour Based on Trust

The technical view of BI usually centers on the process of applications and technologies for gathering, storing, analyzing and providing access to data to help make better business decisions. Business Intelligence software (figure 2) queries and analyzes, information from data warehouse using techniques such as data mining (DM), data query and online analytical processing (OLAP). Data ware house integrates and transforms data pulled from multiple sources such as operational data base, customer database, market research database, legacy system, customer relationship management (CRM), enterprise resource planning (ERP), online transaction data processing (OLTP), web server, mail server, call logs, emails, surveys, consumer forums, consumer feedback etc.

**Figure 2: A BI Framework for Online Buying Behaviour
Based on Trust**



8. CONCLUSION:

Although the number of individuals buying products and services online continues to increase in India, managing the dynamics of this behavior has often been a research question. What leads a buyer to shop online is a matter that has evoked a lot of interest although the findings from research are loose, fragmented and disintegrated. Similarly present BI models do not give attention on theories and models of DM for knowledge development in business. Online transactions are characterized by anonymity, lack of physical interaction, lack of control, great deal of uncertainty and potential opportunism. Online trust plays a key role in creating satisfied and expected outcomes in online transactions. This paper is an attempt to conceptualize 'trust' as a concept paramount for online buying. The paper starts with the concept of trust, then goes on to explain the concept against the background of online buying. Thereafter, the determinants of online trust have been conceptualized and tested. Finally a framework for BI based on trust factors – Security of Online Transaction, Data Privacy and Safety, Guarantee Return Policies, and Perceived Image of Website is proposed. Online retailers need to understand the basic issues that would help develop trust amongst buyers in online buying process.

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