

E – Commerce Trends and Future Analytics Tools

Premkumar Balaraman^{1*} and Sabarinathan Chandrasekar²

¹MBA Department, SRM University, No.1, JN Salai, Vadapalani Campus, Chennai - 600026, Tamil Nadu, India; premkumar.b@vdp.srmuniv.ac.in

²CSE Department, SRM University, No.1, JN Salai, Vadapalani Campus, Chennai - 600026, Tamil Nadu, India; sabarinathan.c@vdp.srmuniv.ac.in

Abstract

Background/Objectives: The main aim of the paper is to assess the changing trends in E – Commerce, and to explore the futuristic enabling Information technologies and tools of E – Commerce. **Methods/Statistical Analysis:** The study is qualitative and descriptive in nature and most of the data is based on secondary sources of survey data. Such an approach is adopted in the study as the area of research is very broad and sources of data are also spread across multiple locations. Since this research paper is based on exploratory study and secondary data, content analysis is done. **Findings:** From the various sources of secondary data on E – Commerce trends, it is found that Information technologies have changed the ways of doing business and disrupted many business value chains. Customer Centric approaches (product designs, pricing), collaborative web content, glocalization, big data analytics are some of the emerging paradigm shift in E Commerce. The impact of Social commerce and Ubiquitous (Mobile) commerce on E – Business and especially online purchasing cannot be ignored by both B2C and B2B categories of Business models. Broadly the emerging analytics on E - Commerce can be classified into data analytics, network analytics and mobile analytics. The market is flooded with innovative products for managing, processing, and analyzing big data. Big data has helped businesses identify events before they occur ('predictive analytics'). Also, successful adoption of advances in technology has played a key role in development of new channels for payment initiation, improved authentication and efficient processing of payment systems. **Improvements/Applications:** Alternate use of big data analytics includes tax evasion prevention, smart transportation, congesting pricing, smart cities, disaster warning systems, smart agro supply chains, e banking, e healthcare, energy conservation, etc.

Keywords: Analytics, Big Data, E – Commerce, Payment Systems, Social Commerce

1. Introduction

The growing inventions and innovations in technology have impacted the way of doing Electronic business. The varied inventions have led to different data formats and conventions of communicating and sharing data over the global business and user community. Though many standardization efforts were attempted, data problems still persists and prevents e-business in achieving its fullest potential. In the globally connected world we face hurdles in managing business processes with different data exchange formats, vocabularies and structures. The rise of social networks, the mass adoption of mobile devices and the sheer breadth of global companies is

transforming how consumers research products and make purchase decisions.

1.1 Objective of The Study

- To assess the changing trends in E – Commerce and its impact on Business models.
- To explore the futuristic enabling Information technologies and tools of E – Commerce.

1.2 Research Methodology

The study is qualitative and descriptive in nature and most of the data is based on secondary sources of survey data. Such an approach is adopted in the study as the area of

* Author for correspondence

research is very broad and sources of data are also spread across multiple locations. To arrive at the larger picture on E- Commerce Trends and its enabling technologies and tools, analyzing the existing survey data and specific successful case studies of Business Information Systems would give a better result in finding the answers to the research question framed.

1.3 E Commerce Trends

The two concepts e-business and e-commerce are often mixed up. E-business can be understood as the ability of a firm to electronically connect, in multiple ways, many organizations, both internally and externally, for many different purposes. E-business covers the application of

Internet technology (internet, intranet, extranet) in all aspects of the business world. This includes, apart from e-commerce processes, for example Internet and service providers, and providers of market places and reversed auctions. The Five e-commerce marketing trends¹ that dominated in 2015 is summarized in Table 1.

E Commerce Trends in 2014 according to James Gagliardi, Vice President of Digital River, is summarized in Table 2².

2. Business Models and E - Commerce Enablers

A business model is a representation of a firm's

Table 1. E-commerce marketing Trends 2015

S.No	Trend	Explanation
1.	Prominence of Content Marketing	Only original and informative content shall be ranked high in Search Engines (SEs)
2.	Merging of SEO And Social Signaling	Online Ad rates shall be impacted highly only by consumer relevant content extracted by SEs and also with high content sharing by consumers.
3.	Diversification of Social Media Marketing	With increasing Social media channels like instagram, line, etc. apart from FB and twitter, brands will have to diversify their networks.
4.	Increase in Mobile Marketing	With increased usage of Mobiles, development of user friendly and error free mobile Apps, mobile marketing will explode.
5.	Growth in Remarketing Ads	Cross-device advertising enables the product to follow the customer effectively by using innovative advertising platform like Atlas (FB).

Table 2. Ecommerce Trends in 2014 and the future

S.No	Trend	Explanation
1.	Glocalization	Globalization of consumer preferences and the localization of the purchase experience (localizing payment methods, currency support as well as marketing and merchandising campaigns)
2.	Ensuring Compliance in a Complex Legal World	Company will have to manage the legal hurdles of regulation with local knowledge and strict business practices. Eg; Singapore Government enforced companies to comply with its Personal Data Protect Act in 2014.
3.	Importance of the BRIC Countries	The buying power and connectivity of the BRIC market is growing. In terms of smart devices, the International Data Corporation (IDC) predicts that shipments to BRIC countries will overtake more developed markets in 2014.
4.	Social Commerce Evolves	Social media networks will increasingly be the initial point of contact and research. Companies will actively encourage buyers to make purchases and talk about goods on their favorite social networks. As social media analytics evolve, companies will seek better ways to measure the ROI from their social efforts.
5.	Big Data and Analytics	Big Data and analytics will evolve beyond segmentation for email lists. E-commerce merchants will collect and analyze data to discern shopping patterns that have predictive value and to understand consumer experiences in digital and physical contexts.
6.	New monetization models	Game commerce and Software-as-a-service (SaaS) provide new ways for businesses to engage and reward their users for using the application. Whole, data driven business models will aim to personalize what might otherwise be an impersonal online experience.
7.	B2B Replicates B2C Successes	B2B companies will increasingly provide the same convenient shopping experience for their business customers similar to B2C. In addition, they will also offer videos, graphics and interactive content, all which have been effective in B2C e-commerce

underlying core logic and strategic choices for creating and capturing value within a value network³. From the Malone et al., classification of 16 Business Models⁴ we infer that seven categories are independent in nature (Like Entrepreneur, Inventor, Human creator, Intellectual landlord) and the remaining models are dependent or secondary in nature (Like Financial trader, IP trader, IP broker and HR broker). The infrastructure necessary for e-commerce companies to exist, grow, and prosper can be termed as e-commerce enablers: the Internet infrastructure companies. They provide the hardware, operating system software, networks and communications technology, applications software, Web designs, consulting services, and other tools that make e-commerce over the Web possible. The Table 3 on the e-commerce enablers throws light on the type of companies and their role in ecommerce⁵.

Table 3. E-Commerce Enablers

S.No.	Infrastructure	Players
1.	Hardware: Web Servers	IBM, HP, Dell, Sun
2.	Software: Operating Systems, Server Software	Microsoft, Redhat Linux, Sun, Apache
3.	Networking: Routers	CISCO, JDS Uniphase, Lucent
4.	Security: Encryption Software	Verisign, Checkpoint, Entrust, RSA
5.	E – Commerce Software Systems (B2C, B2B)	IBM, Microsoft, Ari-ba, Broadvision, BEA Systems
6.	Streaming and Rich Media Solutions	Real networks, Microsoft, Apple, Audible
7.	CRM Software	Oracle, SAP, E.piphany
8.	Payment Systems	Verisign, Paypal, Cyber-source
9.	Performance Enhancement	Akamai, Kontiki
10.	Database Systems	Oracle, Microsoft, Sybase, IBM
11.	Hosting Services	Interland, IBM, Webintellects, Quest

3. Social Commerce

According to⁶ Social commerce involves multiple disciplines, including marketing, sociology and psychology, and computer science. Social networking on web portals is one of the fundamental pillars that led to the

rapid explosion of social commerce and user participation is key to its survival. Also the supplementary and enabling technologies of social commerce are Cloud Computing, Web 2.0 and others. Social Commerce is defined⁷ as an Internet-based commercial application, leveraging social media and Web 2.0 technologies which support social interactions and user generated content in order to assist consumers in their decision making and acquisitions of products and services within online marketplaces and communities.

Enabling Technologies of Social Commerce are Web2.0, Social media, Cloud Computing and SOA. Social media applications are designed by using the principles of social media design, namely the three building blocks: Identity (or individual), Conversation (or interaction), and Community. Content based Advertising, highly targeted searches and personalized recommendations indirectly makes it possible the accomplishment of long tail marketing concept in reaching customers of niche markets⁸.

There is no standardized version on the definition of Social Commerce⁹ presented a framework that integrates six key elements. These include research themes, social media, commercial activities, underlying theories, outcomes and research methods. The framework identifies social media and commercial activities as two fundamental elements of social commerce. For the research themes, they list user behavior, firm performance network analysis, adoption strategy, business models, enterprise strategies, website design, social processes, and security and privacy policy.

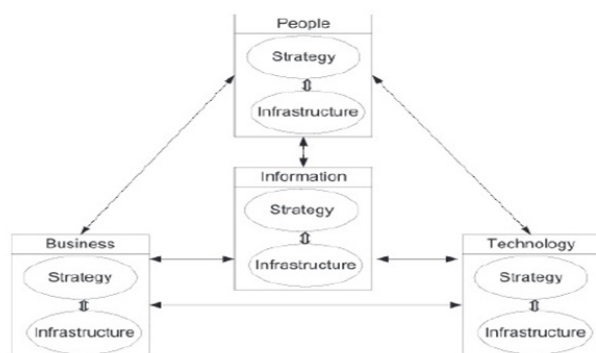
According to Wang and Zhang there are lot of unexplored areas of research on how social commerce will impact businesses and there seems very small level attention being given by the business community¹⁰. explores the concepts of social commerce, the behavior of consumers in social commerce, business models and revenues models of social commerce; The Facebook social network commerce was used as an example to explore the social commerce concept models, classifications of social commerce, revenue model and limitation of social commerce¹¹.

Social commerce differs from e-commerce in many aspects¹², including business models, value creation, customer communication and connection, system interaction, design, and platforms as summarized in Table 4.

Table 4. Differences between social commerce and e-commerce

Aspects	E Commerce	Social Commerce
Business Models	Traditional, R & D, Products, Services, Business / Process Oriented,	Purely Technology enabled (Web 2.0, SOA, Cloud Computing)
Value creation	Limited to Enterprise and Business partners	Participatory and Collaborative
Value Chain	Limited	More Actors, participant motivation
Customer Connection, Communication,	Limited Customer to Customer / Business Communication	Involves Online Communities, increased customer collaboration
System Interaction	One way browsing, pushes information	More vent for Customer expression, information sharing, content creation by all online actors
Design	Focuses on Product / Service Views, navigation, search	User centered design, focuses on web 2.0 centric parameters (Tags, Rank, Review, Comment)
Platform	Web 1.0 (B2C), EDI (B2B)	Web 2.0, SOA, Cloud Computing
Legal Issues	Emphasized within agreed upon policies	Still in formative stages on policy matters

Use a four-component model to analyze the various facets of social commerce movement¹⁰. In view of the multi-disciplinary nature of social commerce, the model emphasizes people and information, in addition to technology and business. People are viewed as the driving force for socialization, commerce, technological advancement, and information creation and use. In social commerce, people may be individual consumers and sellers, be in small or large groups, or be in identifiable user communities that benefit from the technologies. Zhou, Zhang and Zimmermann propose a research framework with an integrated view of social commerce that consists of four key components similar to Wang and Zhang et. al.: business, technology, people, and information¹³. The framework helps us understand the development of social commerce research and practice to date (refer Figure 1)].

**Figure 1.** Integrated View of Social Commerce (Adapted from Zhou, Zhang and Zimmermann, 2013).

4. Analytics

In the initial years of dot com explosion era in 2000s, search engines and directory systems for locating web content formed the crux of data analytics and giving importance to aspects like web spidering, site ranking, and search log analysis. Whereas in the off late social media era i.e., post adoption of large social media giants like Facebook (FB) and Twitter, customer opinions and sentiment analysis techniques are frequently adopted¹⁴. Business analytics and data mining have become increasingly important in business communities and government sector respectively in the last ten years. Emerging analytics research opportunities encompassing big data analytics, network and mobile analytics—all of which can contribute to BI&A 1.0, 2.0, and 3.0.

4.1 Data Analytics

Data mining and statistical analysis are the founding pillars of Business Intelligence & Analytics (BI & A) technologies. Relational DBMS, data warehousing, OLAP and BPM are some of the mature commercial technologies that support BI&A¹⁵. When it comes to handling large data (Big Data in petabytes), instead of putting tiresome efforts and resource on large data sets, it is practically advisable to focus on small data sets based on which the large data sets can be estimated and predicted. Under these situations Apriori algorithms, probabilistic approaches and multivariate techniques are utilized (clustering, regression, association analysis)¹⁶.

4.2 Text and Web Analytics

Text analytics techniques are mainly used for information extraction and opinion mining. NER (named entity recognition) for classification of data and topic modeling algorithms are currently researched in a very large way¹⁷. With Social media and its impact on various aspects of business and day to day life, large amounts of data produced from blogs, social forums, and networking websites can be analyzed using Web Analytics¹⁸. The corporate can extract valuable insights on products, services, customer feedback, and the government can attempt to tap public opinion on societal needs and feedback on government reforms and programs. Ananthi and Jayanthi confirm these possibilities of extracting meaningful opinions to make better decisions using text mining from unstructured text¹⁹ like social media.

4.3 Network Analytics

Community detection in social networks is possible by utilizing graph partitioning algorithms to identify dense sub graphs representing user communities. Tools like UCINET are widely used for large-scale network analysis and visualization²⁰. Similarly ERGM is a network analytic tool available to the academic community²¹. Network analytics tools like these listed enables to identify criminal and terrorist networks, trust and reputation networks and much more. On the predictive capability of network analytics, using link mining, one seeks to predict links between nodes of a social network (network of customers, end users with collaboration, product adoption) or email group.

4.4 Mobile Analytics

The m-commerce (Mobile commerce) platform goes hand in hand complementing and competing with e-commerce platforms. Though both look similar in functionality, the technical requirements and analyzing methods are totally different in interaction styles and value chain²². The estimated Mobile Ads in monetary value for the year 2016 is found to \$10.8 billion according to e Marketer²³. The maturing mobile development platforms such as Android and iOS have contributed to the rapid development various mobile pervasive applications, from disaster management to healthcare support. The major advantage of mobile analytics research is that mobile devices and apps are location-aware and being activity-sensitive. And

this unique feature has led to development of various m health and m learning systems and applications.

5. Big DATA

Big data analysis is not only for larger companies but also small companies in the view point of Mrinal Chatterjee, Vice president of shopclues.com²⁴. Some key uses of big data and analytics for online retailers includes, Personalization, Logistics (Customers expect to know the exact availability, status, and location of their orders), Customer Service, Managing Fraud (Larger data sets help increase fraud detection, but it requires the right infrastructure, to detect fraud in real-time), Dynamic Pricing (Online retailers need dynamic pricing to stay competitive). A price recommendation engine requires taking data from multiple sources, such as competitor pricing, product sales, regional preferences, and customer actions, Predictive Analytics (Big data has helped businesses identify events before they occur. This is called 'predictive analytics'). With increasing small shopping malls and small business which are also using web based purchase channels, the possibilities of analyzing user behavior, strategy formulation, daily best price recommendation, etc. can also be explored using statistical analytics tools like R based on associations rules, classification analysis, and RFM (Recency, Frequency, Monetary value) analysis²⁵.

5.1 Need for Big Data

The two major sources of big data in health sector are genomics driven big data (genotyping and gene sequencing data) and payer-provider big data (electronic health records related to insurance and patient data)²⁶. Big Data is heterogeneous data generated from various data sources like sensors, internet transactions, videos, click streams, any digitally transmitted, stored or generated which can run up to petabytes. Analysis of this Big Data can lead to scientific discovery, new insights that can lead to economic progress, better health and living. As a fact to prove the same, the 2012 NSF BIGDATA3 program by the US Government is one such venture to explore Big Data beneficially for mankind²⁷. In India the usage and application of Big Data Analytics is still in very nascent stage. Some of the likely and needed sectors in India of Big data analytics include agriculture, banking, governance

and healthcare²⁸. For example in a country like India with agriculture as the backbone, with precision farming and predictive analytics, farmers can get most up-to-date farming and propagation techniques, pest control knowledge, and can also track the whole process from production, distribution to consumption.

5.2 Big Data Market and Vendors

Massively Parallel Processing (MPP) and No SQL Databases are the major categories of vendors for handling structured data. But in today's growing complexity of Big Data (texts, comments, sensor data, emojis, videos, pictures, audio, etc.) Hadoop offers the best possible choice. Hadoop is mostly like a Backbone or backend technology which needs to be accessed and supported by front end tools. Revolutionary new platform for large scale, massively parallel data access is the fundamental pillar of Big Data Concept²⁹. Ad hoc and one-time extraction, parsing, processing, indexing, and analytics are the unique features of Hadoop like DBs. Oracle, IBM, and Microsoft have all adopted Hadoop including the open source Apache Spark³⁰. Some of the E Commerce vendors like Amazon and Google supply the customers with inbuilt Big Data Capabilities like product catalog, historical pricing, analytics, integration of data with other sources at ease, etc.

6. Ubiquitous Commerce

Mobile commerce is heading for advanced fourth generation (4G) mobile systems. However, rapid development of ubiquitous computing technology can implement and complement the 4G mobile systems. It enables anticipation that ubiquitous computing technology creates the new commerce, so called ubiquitous commerce. The six characteristics of ubiquitous commerce service³¹; Embeddedness, Mobility, Nomadicity, Proactiveness, Invisibility and Portability are the basic and essential features.

Fourth Generation mobile systems have characteristics of ubiquitous & seamless connection, high data rate, openness, and network convergence. Ubicomp is characterized by two main attributes: ubiquity: interaction with the system is available wherever the user needs it; and transparency: the system is non-intrusive and is integrated into the everyday environment^{32,33}.

7. Recent Innovations in Payment Systems

According to Harish Natarajan, in the report on findings from the World Bank survey on innovations in retail payments over the last five to six decades shows the following trends³⁴:

- Successful adoption of advances in technology has played a key role in development of new channels for payment initiation, improved authentication and efficient processing;
- Development of new payment needs like at transit payments, Internet auction sites, and social networking sites recently, and a need for expanding financial inclusion also have led to creation of new payment mechanisms; and,
- Payments infrastructure created for one payment product have been successfully leveraged for other payment products – like using Automated Clearing Houses (ACH) for online banking enabled payments and successful leveraging of infrastructure created for credit cards by debit cards.

Electronic cheques and bank transfers involving higher value transactions are significant features of business-to-business (B2B) segment and whereas cash / card based low value transactions are significant features of business to consumer (B2C) segment. According to BIS (2012) report on innovations in retail payments, one way to categorize innovations in retail payments is to look at the payment process³⁵. Typically, the overall payment process or payment scheme is described as a four-party system consisting of the payer, the payer's PSP, the payee and the payee's PSP as depicted in Figure 2.

8. Futuristic E Commerce Technology - Cloud Computing

Cloud computing can be seen as the development of Parallel Computing, Distributed Computing and Grid Computing. Youseff et al. (2008), defines cloud computing³⁶ as collection concepts in several research fields like Service Oriented Architectures (SOA), distributed and grid computing. In Cloud Computing, the three complementary services, Hardware-as-a-Service, Software-as-a-Service (SaaS) and Data-as-a-

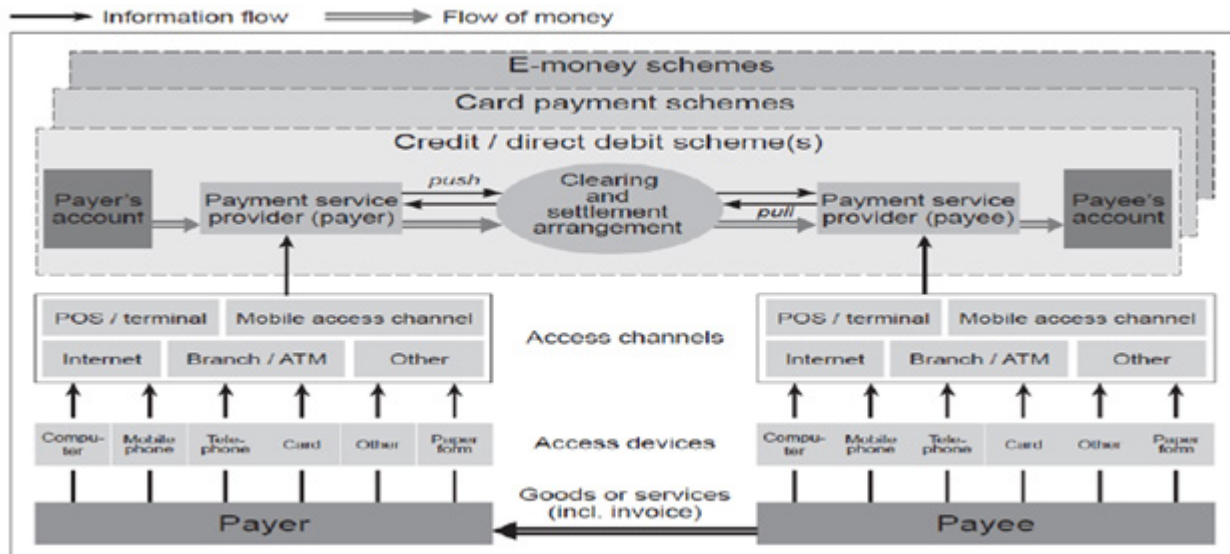


Figure 2. Payment Process in Retail and Online Sales.

Service (DaaS); together form Platform-as-a-Service^{37,38}. There arises complexity in selling the Cloud service in the market place, as the traditional business value chain which is more like product based approach does not suits cloud computing in which many actors are involved³⁹.

9. Conclusion

With global explosion in Big data, application and utilization of Big Data Analytics tools is not only limited to E commerce and Business decision making, it can also be expanded to Government and Society (G2C, G2G) centric practical applications, utilities and decision making (McKinsey Global Institute, 2011), like tax evasion prevention (National Tax Service, United States), Congestion pricing (London, UK public transportation), intelligent transportation information system (Japan), Safety Monitoring, disaster sign information (Seoul)⁴⁰.

In India the recent impetus given by the Government of India for compulsory AADHAR (Citizen) card and proposed investments for building (IT enabled) smart cities across India is a welcome sign for utilizing the power of Big data analytics for citizen benefit, energy efficiency and better governance. With increased pollution levels in cities and the need to reduce Greenhouse gases, smart cities are the ideal solutions for the future generation to utilize regional natural resources for the energy conservation, smart water management and mitigation of waste⁴¹.

Smart cities utilize the idea of Internet of Things (IOT). Internet of Things attempts to integrate the various city sub systems of transportation, security, governance, public utilities like water, waste, gas, power management and other physical infrastructure to bring the operational efficiency. IOT technologies include⁴² Smart Cards, RFID, QR Codes, EPC, IPv6, Sensors, Actuators, Wi-Fi, Bluetooth, ZigBee, NFC, GIS, GPS, Social Media, BI, Ambience Intelligence, Cloud15, Tele Medicine, web 3.0, Big Data Analytics (BDA) etc.

The generation of big data may be growing exponentially and advancing technology may allow the global economy to store and process ever greater quantities of data, but there may be limits to our innate human ability—our sensory and cognitive faculties—to process this data torrent. Also the human capital and training needed for handling big data related work activities faces huge shortages in the near future.

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