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An Empirical Research on E-Marketplace Basic Functions

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Abstract. This research is to show that functions are the indispensable elements for e-marketplace construction, and that basic functions in particular are able to meet the demand for highly interoperable and cost-effective e-marketplaces. Specifically, this research relies heavily on historical literature event methodology by studying existing electronic marketplaces through thousands of research papers, ranging among 1,221 articles published in journals and conferences over the period of 1986-2012. Based on the basic functions generated from the function published year and the function counted quantity, this research eventually shows that e-marketplace designers, facilitators, buyers, and sellers will be able to construct and select a suitable e-marketplace automatically for their diverse purposes.

Introduction

Electronic marketplace (EMP) [1] is a very important research area in the development of electronic commerce technology. It is an inter-organizational market information system, or a common business information space that allows the participating buyers and sellers of various business contexts to exchange information such as prices and product offerings and to conduct business such as contract fulfillments and service provisions [4].

Although EMPs in general are now more mature and stable, the increasing demand for online business calls for even higher interoperability, which also drives the need for more cost-effective EMPs [5]. The current lack of such a highly interoperable and cost-effective EMP model is caused by the fact that EMP designers or facilitators do not have a standard EMP function framework to construct different types of EMP, which conforms to a variety of requirements specified by the users of EMPs. To address these demands, this paper proposes and empirically validates a model to build EMPs based on their components, that is, EMP basic functions.

To conduct the research, this paper aims to study basic EMP technical functions based on the assumption that a highly interoperable and cost-effective EMP model in functional view can be built through a massive literature survey. Specifically, a key concern in research is how to generate a method to detect core EMP functions precisely and classify them appropriately. In response to this concern, this paper introduces a functionality framework as an EMP construction standard so that basic EMP functions can be empirically explored and classified through research findings.

The next section will first describe the theoretical foundation of this research, following an existing EMP functionality framework used to classify core EMP functions and a historical event methodology. The section on methodology proposes the research methodology of this paper, where data gathering, detection and chronological classification are elaborated. Then, the section on research model and hypotheses will construct the theory of this paper, where the relationship between basic EMP functions and two variables of function published year and function counted quantity is discussed. The section on data analysis studies the data generated on the theoretic model with a test of validity and reliability. In the last two sections, limitation of the research is given, and finally the conclusion is drawn with some implications.

Theoretical Foundation

Internet enables companies to implement new business models that strengthen their competitive edge [6]. Ngai [8] presents a non-exhaustive literature review of classification for Internet marketing for e-commerce. As a specific type of e-commerce application, EMP gains a great number of researches in recent years. Büyüközkan from Turkey studied the performance of an EMP on four phases of transactions [9]. Wang and Archer made an EMP classification on a buyer-supplier relationship perspective [10]. Stockdale and Standing propose to select an EMP based on a content analysis approach [11]. Guo [5] argued that EMP participants will select an appropriate EMP based on cost and efficiency of obtaining the EMP functionalities (setup, maintenance, use and integration).

It is obvious that both performance analysis and user selection of EMP relate to EMP functions such that any EMP is made of functions for participants to use. Although existing researches on EMP more or less have discussed and touched EMP functions, it is not clear that what and how many EMP functions should be included in an EMP that is constructed for either a generic EMP or a designated EMP. A systematic method must be provided to study this issue.

To lay a solid theoretic foundation for studying EMP functions, this section will depict how EMP functions should be aligned in an EMP functionality framework and what EMP functions should be deemed basic. To enable this study, a historical event methodology will be discussed for deriving basic EMP functions. Such basic functions can either to construct generic EMP or personalized EMP for individual needs and convenience [12].

Functionality Framework Analysis. An electronic market (e-market) is an Internet-based economic arrangement for the exchange of goods, information and services. Differently, EMP is a technical infrastructure of e-market [13]. Its participants are facilitators of EMP, buyers, sellers, and regulators from government. EMP provides useful functions for e-market users to participate and use for conducting electronic business [1]. The simplest example of EMP could be an online shop or a web portal that brings buyers and sellers together to buy or sell [14].

In general, EMP functions can be outlined in a generic functionality framework shown in Fig.1, which was proposed by Guo [15]. In the highest level, this framework consists of business functions and infrastructural functions. Business functions are for e-market users to conduct electronic business (i.e. business transactions) and make business analysis (i.e., business analytics [16]), while infrastructural functions provide protection to both EMP itself and its participants (i.e. information security and legal support). They are also responsible for correct and efficient information exchange.

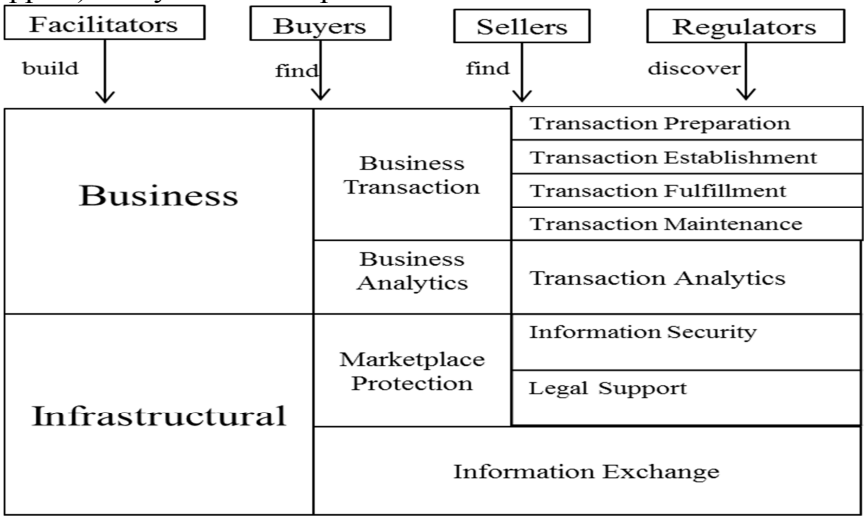

Figure 1. A generic EMP functionality framework (Source in [15]).

Particularly, business transaction functions reflect the requirements of e-market users for completing a business transaction cycle. Business analytics functions satisfy the requirements of e-market users for analyzing and forecasting business in e-markets. Information security functions emphasize the security of EMP itself, applications and user information. Legal support functions allow government to govern EMP and its above e-markets and provide both EMP facilitators and

e-market users to conform to laws and regulations. Finally, information exchange functions are solely provided and implemented by EMP facilitators. It guarantees that both technical and business information can be exchanged without obstacles and interoperable between a variety of different systems.

EMP Basic Functions. Obviously, a generic EMP functionality framework is not enough. For example, how many functions should be included in transaction preparation (as shown in Fig.1) and deemed to be basic in this function category? To answer this question, an empirical research must be conducted.

Looking back, early studies indicate that EMP is a media that fosters market-based exchanges between agents in all transaction phases [17]. They regard EMPs as digital intermediaries that align vertical industries [18]. This implies integration functions from both system-wide to application-wide integration. While more business functions are realized in EMP, component-based development of EMP was advocated [19]. It defined key functions for overall architecture to strike an effective compromise between "make" and "buy". The "make" and "buy" separate technical functions from business functions. Modern EMPs tend to provide dynamic personalized content presentation than static presentation [20], for example, one-to-one marketing.

The evolution of EMP shows that basic functions of EMP though exist at a certain time, they constantly change. This implies that basic EMP functions must be captured based on time.

Historical Event Methodology. FFJR in 1969 introduced an event methodology, which made a methodological revolution [22]. Later, this method has been widely used in the disciplines to illustrate significant development trends with time line [23]. Event methodology defines comparative-historical analysis process as the sequences of events occurring within cases over time to explain large-scale outcomes [24]. It now has, in fact, become a standard method of measuring some patterns. By this method, historical research has been defined as the systematic and objective location, evaluation and synthesis of evidence in order to establish facts and draw conclusions about past events [25]. The values of the historical literature research have been categorized by Joseph and Kerber [26] as follows:

- It enables solutions to contemporary problems to be sought in the past
- It throws light on present and future trends
- It stresses the relative importance and the effects of the various interactions found within all cultures
- It allows for the revaluation of data in relation to the selected hypothesis, theories and generalizations that are presently held about the past

The historical event study shows that it is an effective way to evaluate the impact of information in the past. To illustrate the usefulness of historical event methodology, Table 1 shows the historical events, occurred in the years, which affect the EMP functionality and adaptability development [27].

TABLE 1: HISTORICAL EVENTS RELATED TO EMP DEVELOPMENT

Year	Event
1970s	Electronic Data Interchange (EDI) and Electronic Funds Transfer (EFT) were both introduced in the late 1970s.
1982	The Boston Computer Exchange, a marketplace for used computer equipment started in 1982, was one of the first known examples of e-commerce.
1984	EDI, or electronic data interchange, was standardized through ASC X12. This guaranteed that companies would be able to complete transactions with one another reliably.
1990	Tim Berners-Lee wrote the first web browser, World Wide Web, using a NeXT computer.
1992	CompuServe offers online retail products to its customers. This gives people the first chance to buy things off their computer.
1994	Netscape arrived. Providing users a simple browser to surf the Internet and a safe online transaction technology called Secure Sockets Layer. E-commerce really began to accelerate with the introduction of security protocols and high speed internet connections such as DSL.
1995	Two of the biggest names in e-commerce are launched: Amazon.com and eBay.com.Widespread of Web to advertise products, first banner ads.
1997	Dell.com was the first company to record a million dollars in online sales by the end of 1997.
1998	DSL, or Digital Subscriber Line, provides fast, always-on Internet service to subscribers across California. Global ecommerce company, PayPal, began its services.
1999	Retail spending over the Internet reaches $20 billion, according to Business.com.
2000	The U.S government extended the moratorium on Internet taxes until at least 2005. The dot-com bust.
2001	Amazon.com launched its first mobile commerce site. B2B transactions online became one of the largest forms of e-commerce with over $700 billion dollars in sales.
2004	The Payment Card Industry Security Standards Council (PCI) was formed to ensure businesses were meeting compliance with various security requirements.

Methodology

Based on the above-mentioned historical event methodology, this section introduces an approach called Historical Literature Event Methodology (HLEM) to study the development of basic EMP functions in the past several decades and the possible influence on the future selection of basic EMP functions. In this method, the basic functions of EMP are collected by conducting a massive chronological literature survey through rating historically-occurred EMP functions. Specifically, more than 1,000 articles published in the EC and IS journals and conference proceedings over the period of 1986 to 2012 have been analyzed. The specific HLEM procedure can be given in several parts in the rest of this Section.

Gathering Historical Data. A collection of EMP functions are collected based on a study of a series of journal and conference papers. Since it is hard to be limited to a specific field because of the multidisciplinary nature of EMP, the relevant papers are scattered across different journals. Several databases were selected in the study, namely, ACM portal, IEEE Xplore, Gale Database, Cambridge Journal Online, Emerald, Scopus, SpringerLink, Google scholar and EBSCO Host. Most of the papers from the above databases lie in the field of e-commerce and information systems. The search terms of the literature are some specific descriptors designed towards EMP, which are electronic marketplace (e-marketplace), electronic marketplace types, e-catalogue, electronic procurement, e-payment, e-shop, electronic logistics, security electronic market, cybercrime and so on. We assume that it is appropriate to use journal and conference papers to derive new findings.

Detection of EMP Functions. To have a better understanding of the gathered raw EMP functions, a three-stage process has been adopted to select the EMP functions. First, a quick and careful scan is made on the title, abstract and introduction of gathered papers. Second, papers are filtered and dropped if they are not related to the topic of EMP functionality. Third, the heatedly discussed EMP functions of the underlying are marked. Our strategy is to find as many articles as possible in the very beginning but to be scrutinized by human sharp observation.

To arrange the detected EMP functions in a proper category, this paper adopts the generic EMP functionality framework as a set of leveled classifiers. In fact, due to the completeness of this EMP functionality framework, it is appropriate to regard it as a standard category of EMP functions. For example, the function of quality inspections can be well placed in the transaction fulfillment category while the functions of inquiry offers and contracting can be put in the category of transaction establishment.

Chronological Classification. Besides the categorization of EMP functions, this paper chronologically weighs and classifies detected EMP functions. This provides an excellent overview on the evolution of EMP function development as time passes. A chronological classification by weight provides a good understanding on the changes of EMP functions, which affects the construction of EMP in the orientation of functionalities. Fig. 2 shows the distribution of 1221 articles published by year from 1986 to 2012. These data results make a big contribution to the later work of function development analysis.

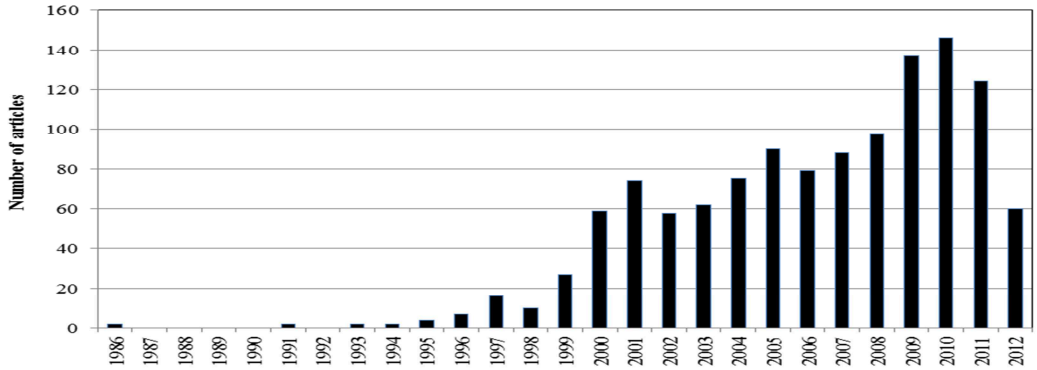

Figure 2. Distributions of articles by year.

Research Model and Hypotheses

While success measures of EMP construction are made in many ways, EMP researchers and facilitators struggle to determine whether these measures are proper, and whether a set of previous success measures can continue to be successful for EMP participants while EMP functions are changing chronologically. This triggers a research problem such that whether success measure of EMP construction by functions can satisfy the needs of business exchange based on the highest value components of EMP participants [19]. Currently, there is little research to support finding proper EMP functions due to reasons of large scale of EMP functions and function dynamics. To resolve this issue, this paper proposes a transformation process model, shown in Fig. 3, to weigh the empirical data on EMP functions from the papers. This model comprises two parts. First, the raw functions of EMP are filtered from the surveyed papers. Second, two variables of raw EMP functions (i.e., function published year and function counted quantity) will hypothetically lead to the desirable basic EMP functions. By this model, the basic EMP functions can be found and sifted based on their weights.

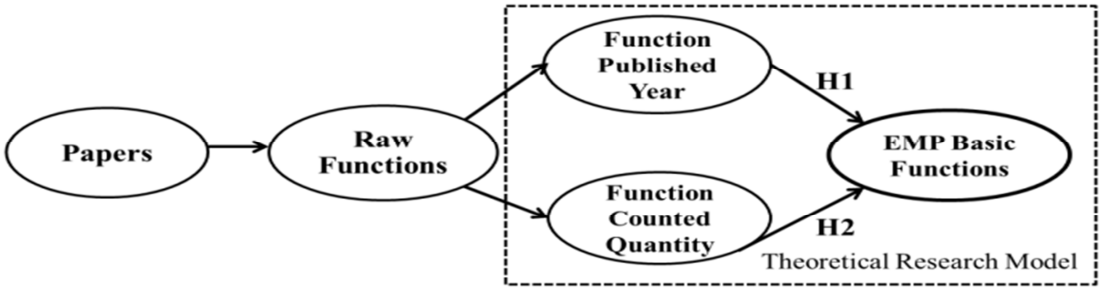

Figure 3. Transformation process model.

EMP Basic Functions. A leveled functionality framework [15] is necessary for EMP to be constructed on a set of basic functions. An EMP basic function is a tested function that proves to be indispensable for a certain business purpose. Particularly, EMP basic functions can be aligned in specific categories familiar to business users. It also allows EMP participants to select the only-needed EMP basic functions to construct personalized EMP that is highly flexible and adaptable to participants' specific needs [29]. To realize these two points, EMP basic functions must first be found out.

In the following two subsections, we make the hypothesis that EMP basic functions are affected by two variables.

Function Published Year. H1: Function published year is directly related to the EMP basic functions.

In the 1960s, very early on in the history of electronic commerce, exchanging long-distance electronic data was its main purpose. In these early days, users consisted of only very large companies, such as banks and military departments [30]. Nowadays with the exponentially growing use of the Internet, tablet devices and smart phones, the conversation between businesses and consumers has become more engaging, making it more convenient for transactional exchanges online.

The changes of Internet-based business by time outdate some old EMP functions and meanwhile proliferate many new EMP functions. Thus, EMP functions of published years reflect the start, development and termination of using the functions. Thus, EMP basic functions relate to EMP function published year.

Function Counted Quantity. H2: Function counted quantity is positively related to EMP basic functions.

Quantitative research associates with a number of different approaches to data collection. Data collected at a single point of time can discover the ways and degrees to which variables relate to each other [31]. In our HLEM method, the different quantities of raw functions provide different weights of EMP functions and imply the importance to be selected as EMP basic functions.

Specifically, raw functions of each or all published years are computed by their occurrence number in the period from 1986 to 2012, similar to the approach of Beardsworth for the quantitative analysis of the communication content of media such as newspapers [32].

Data Analysis

Data Findings

EMP Functions Found. Based on our aforementioned methodology, Table 2 shows there are 77 existing EMP functions occurred in a number of times in sequence. The result utilizes almost all the accessible databases from the literature data sources, facilitating an effective analysis of the hypothetical relationship among the variables.

TABLE 2: NUMBER OF EMP FUNCTIONS FROM 1986 TO 2012

Functions	Quantity	Functions	Quantity	Functions	Quantity
Search	64	Help	15	Product channel analysis	7
Payment	60	Availability	15	Vocabulary integration	7
Social networking systems (sourcing)	57	Duties and taxation	14	Acceptance	7
Confidentially	56	Transportation	14	Marketing channel analysis	7
Product recommendation	52	Product sharing information	14	Inquiry	7
Billing	47	Quality inspection	14	Supplier analysis	7
Credit management	39	Catalogue(sourcing)	13	Currency exchange	6
Valued-add services	39	Return	13	Jurisdiction	5
Buying products and services	36	Business process integration	13	Customs clearance	5
Offer	34	Intellectual properties	13	Collaborative design	5
Selling products and services	31	Counteroffer	13	Insurance	5
Contracting	30	Trademark protection	12	Claim	4
Integrity	29	Privacy protection	12	Price comparison	4
Advertising	24	Social networking systems(marketing)	11	Online robot(after-sales services)	4
Information standardization	24	Tracking	11	Marketplace-made regulations	4
Service integration	23	Instant message	10	Social networking systems (after-sales services)	3
Document integration	21	Product review	10	Supplier comparison	3
Systems integration	20	Product comparison	9	Supplier comparison	3
Catalogue(marketing)	19	Application integration	9	License agreement	2
Auction	19	Tendering(Inc.RFQ)	8	Demand and supply forecast	2
Call center	18	Customer tracking	8	Replacement	2
Online robot (helpability)	18	E-police	8	Product review analysis	2
Cybercrime	17	Financing	8	Warehousing	2
Other laws and regulations	16	Digital copyright declaration	8	FAQ	2
Order management	16	Customer behavior analysis	8	Supplier credit management	1
Consumer protection	16	Repair	7		

Frequency of Occurrence in All EMP Functions. As shown in the Eq.1 and Eq.2, the frequency F of an EMP function $i \in I$, is the occurrence N of a function i in a single year $j \in Y$ divided by the number of times of all functions occurred for all the number of years Y = 27, where Y is an ordered year list from1986 to 2012. And the data range of function frequency should be between 0 and 1. Therefore we deal with data results with the divisor expanding the ten times.

$$F(i,j) = N_{ij}/N. \tag{1}$$

$$N = \sum_{1986}^{2012} \sum_{1}^{i} N_{ij} \quad i \in I, j \in Y\ . \tag{2}$$

Classified EMP Functions and Frequencies Curves. Following Guo's functionality framework [15], the EMP basic functions, which are found, are classified in Table 3, where additional function service level and function application level are added. The function service type level makes participants better understand EMP service category for further locating a particular EMP function. The function application level is for participants to locate a desirable EMP function.

By years, old EMP functions may change. The change tendency curve of each function frequency with the year can be described in these eight figures below, denoted as Eq.3

$$F_i = F(i, j). \tag{3}$$

In this paper, the tendency curves of the basic function set in function classification level 3 are summarized vertically in eight stages, which are further explained by the empirical results of function application level. Specifically, the eight stages consist of transaction preparation stage (Fig.4), transaction establishment stage (Fig.5), transaction fulfillment stage (Fig.6), transaction maintenance stage (Fig.7), transaction analytics stage (Fig.8), information security stage (Fig.9), legal support stage (Fig.10) and information exchange stage (Fig.11). The curves reflect the changes of EMP basic functions in terms of importance.

TABLE 3: CLASSIFIED EMP FUNCTIONS

Function Classification Level 1	Function Classification Level 2	Function Classification Level 3	Function Service Type Level	Function Application Level
Business	Business Transaction	Transaction Preparation	Marketing	Catalogue
				Advertising
				Social Networking Systems
				Product Recommendation
			Sourcing	Search
				Catalogue
				Product Channel Analysis
				Social Networking Systems
				Supplier Comparison
				Price Comparison
				Product Comparison
				Supplier Credit Management
			Helpability	Online Robot
				Help
				Product Review
				Product Sharing Information
		Transaction Establishment	Selling and buying	Selling Products and Services
				Buying Products and Services
			Value-added services	Value-added Services
			Auction	Auction
			Inquiry	Inquiry
			Negotiation	Offer
				Counteroffer
				Acceptance
			Contracting	Contracting
			Tendering	Tendering(Inc. RFQ)
		Transaction Fulfillment	Payment	Billing
				Payment
				Financing
				Currency Exchange
			Logistics	Warehousing
				Transportation
				Tracking
			Customs clearance	Customs Clearance
			Inspection	Quality Inspection
			Insurance	Insurance
		Transaction Maintenance	After-sales Services	Order Management
				Call Center
				Online Robot
				FAQ
				Instant Message
				Social Networking Systems
				Repair
				Replacement
				Return
				Claim
	Business Analytics	Transaction Analytics	Marketing Analysis	Customer Tracking
				Customer Behavior Analysis
				Marketing Channel Analysis
			Procurement Analysis	Supplier Analysis
				Product Comparison Analysis
				Product Review Analysis

			Credit Analysis	Credit Management
			Forecast	Demand and Supply Forecast
Infrastructure	Marketplace Protection	Information Security	Security Implementation	Availability
				Integrity
				Confidentiality
			Security Monitoring	E-police
		Legal Support	Government Laws &Regulations	Privacy Protection
				Intellectual Properties
				Duties and Taxation
				Consumer Protection
				License Agreement
				Cybercrime
				Jurisdiction
				Trademark Protection
				Digital Copyright Declaration
				Other Laws and Regulations
			Marketplace Regulations	Marketplace-made Regulations
	Information Exchange		Homogeneous Information	Information Standardization
			Heterogeneous Information	Systems Integration
				Application Integration
				Service Integration
				Business Process Integration
				Document Integration
				Vocabulary Integration
				Collaborative Design

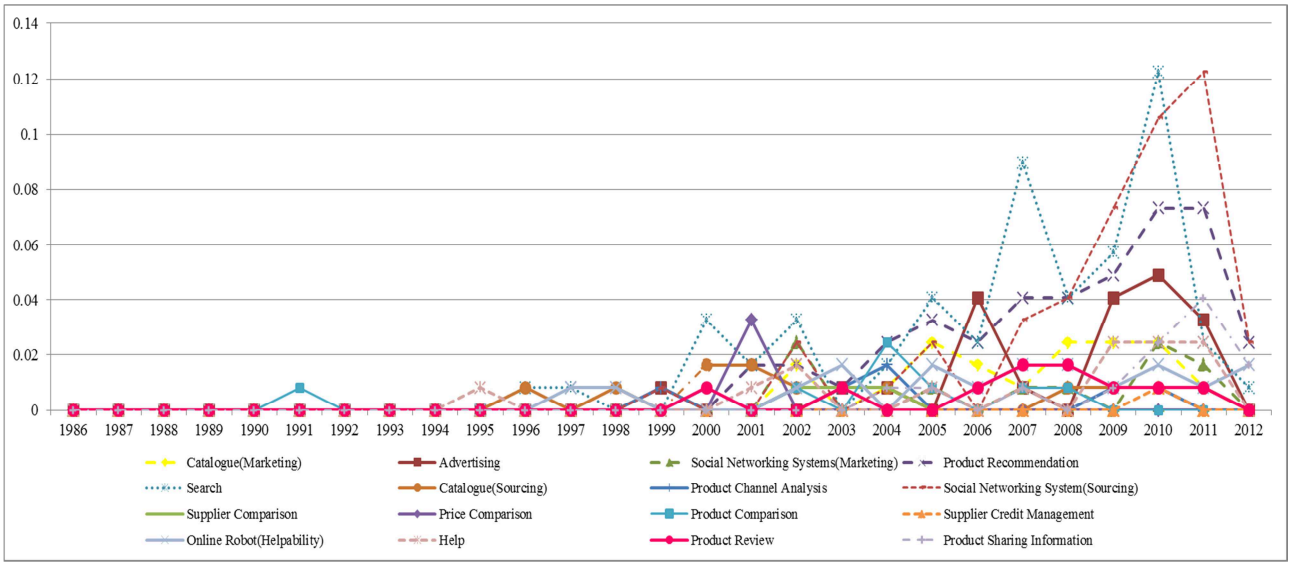

Figure 4. Transaction preparation level function tendency curves.

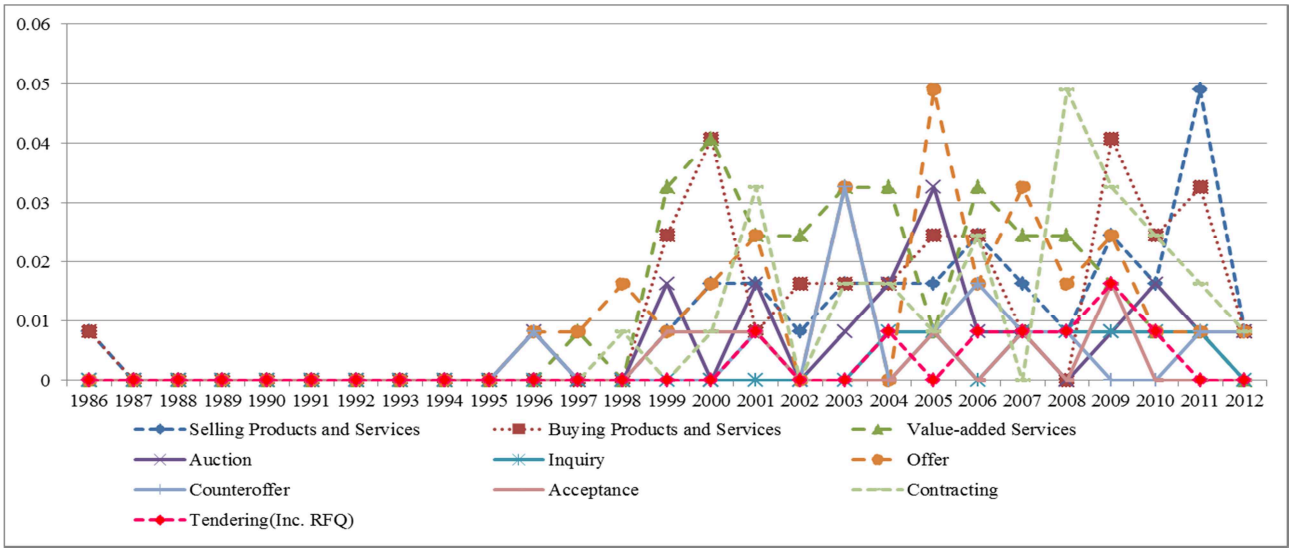

Figure 5. Transaction establishment level function tendency curves.

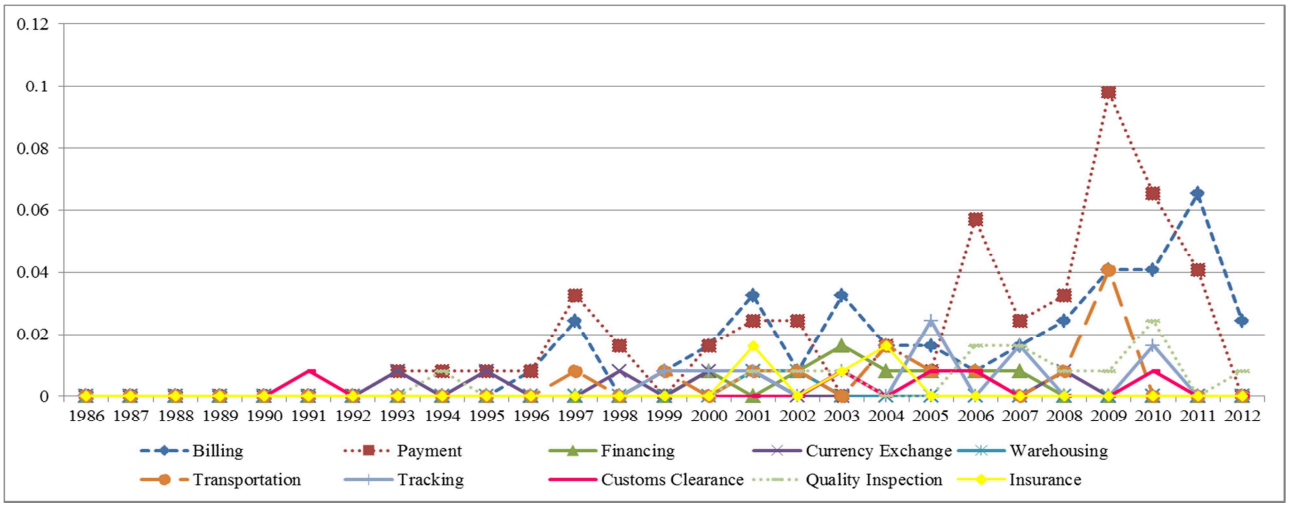

Figure 6. Transaction fulfillment level function tendency curves.

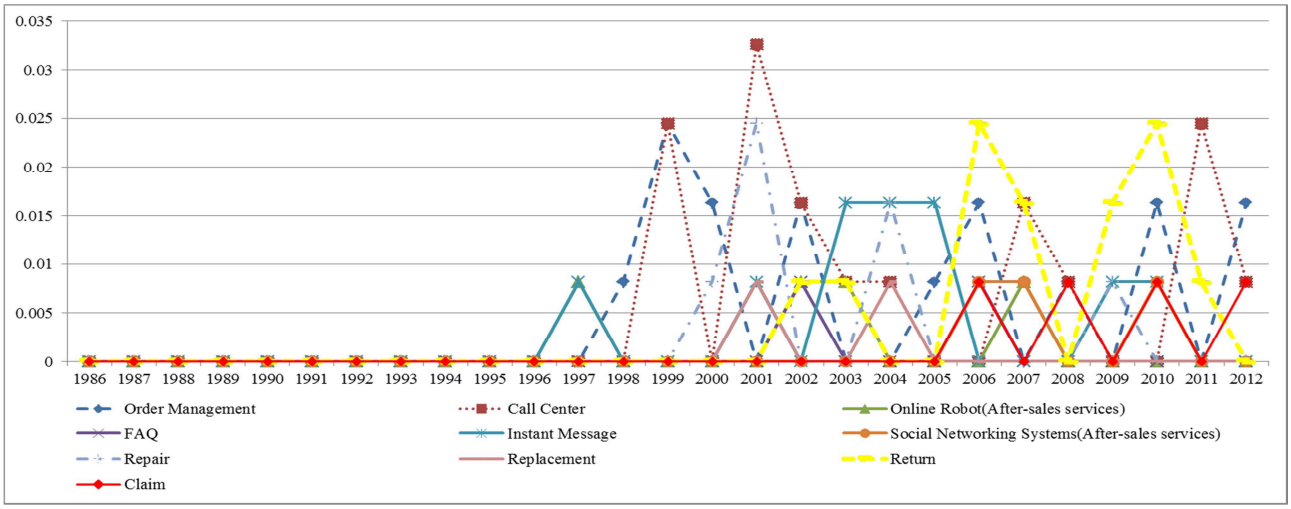

Figure 7. Transaction maintenance level function tendency curves.

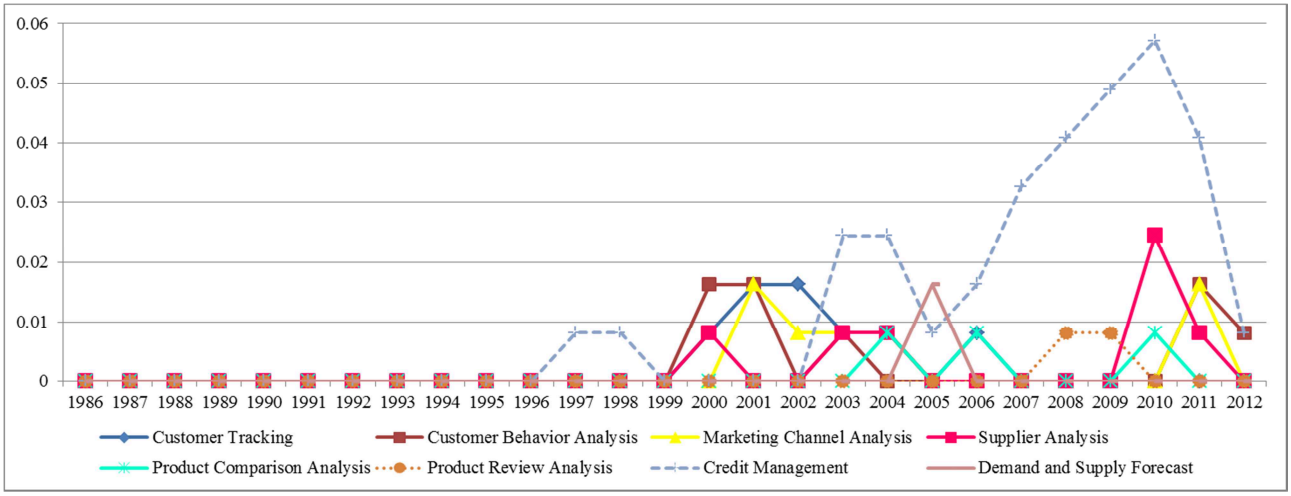

Figure 8. Transaction analytics level function tendency curves.

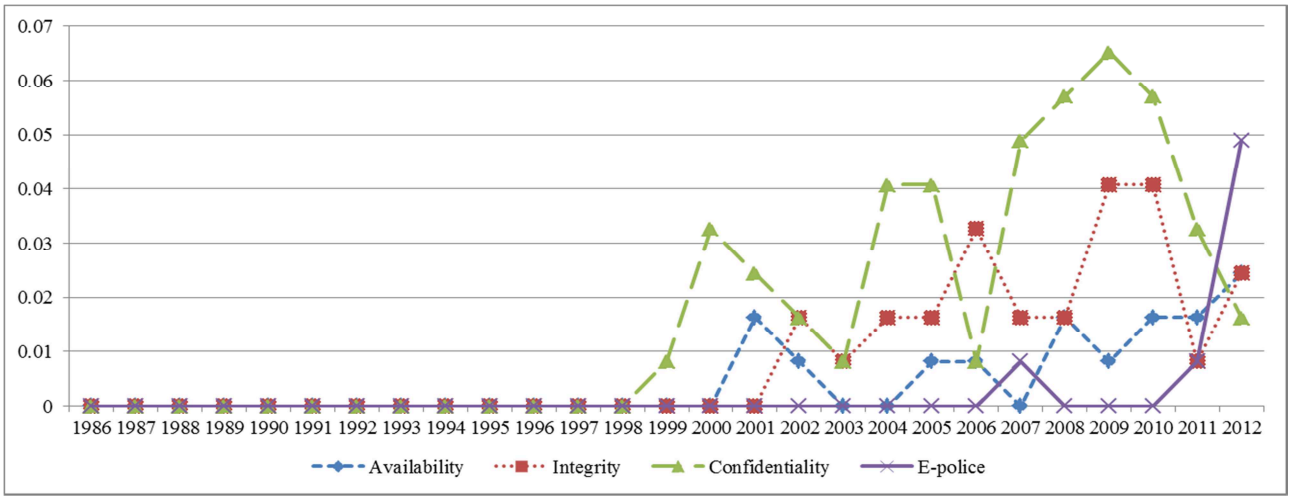

Figure 9. Information security level function tendency curves.

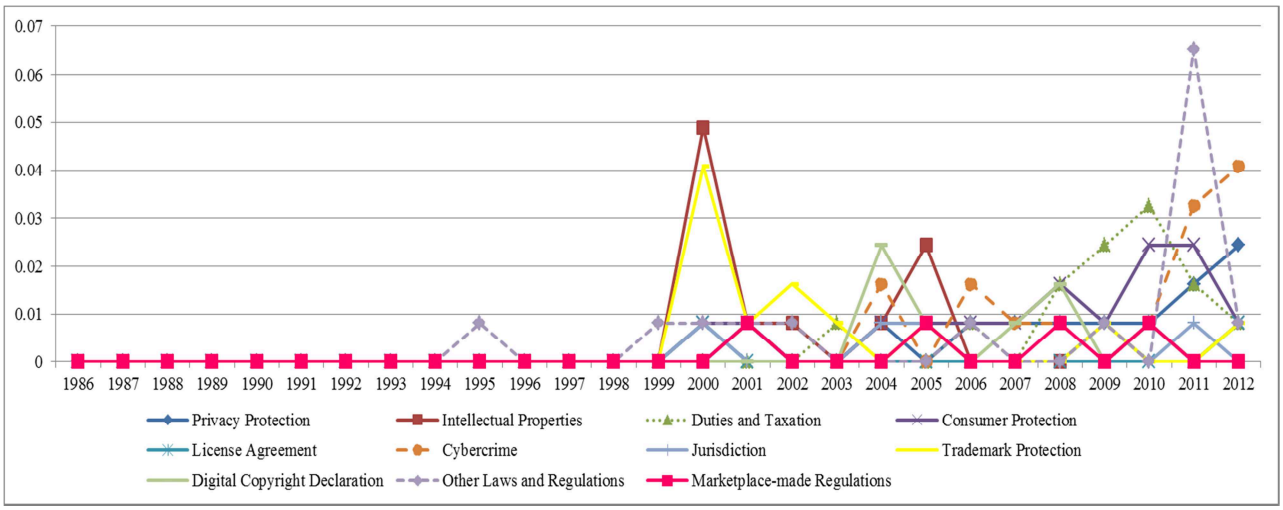

Figure 10. Legal support level function tendency curves.

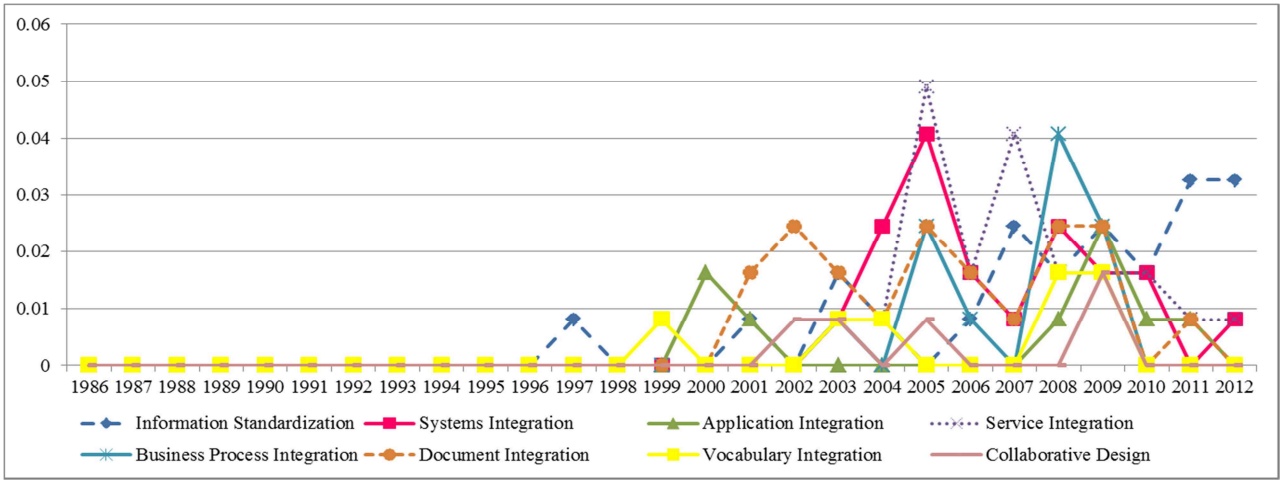

Figure 11. Information exchange level function tendency curves.

Data Validity and Reliability. The validity and reliability tests of our data were processed by IBM SPSS Statistics 20. Following the predecessors' experiences, we choose four appropriate statistics methods to illustrate them. Firstly by looking at our data, the frequencies procedure is a good measurement to show validity of our hypothesis with some original measure elements.

As can be seen from Table 4, the significant level testing (α=0.05) can be calculated with the mean ($\bar{X}$), the standard error of mean ($\sigma_{\bar{X}}$) and the hypothetical overall average (μ_0=0), which are denoted as Eq. 4 below.

$$Z = \frac{\bar{X}-\mu_0}{\sigma_{\bar{X}}} \tag{4}$$

The results of Z value is 9.379. From statistical Z table, it can be known that if the $|z| \geq 2.58$, p-value ≤ 0.01 will get. As a result, every scale item is statistically significant at the extremely significant level of 0.01.Additionally, the distribution of all data which presented in the Fig.12 is normal. Obviously the null hypothesis is rejected and the alternative hypothesis is supported.

TABLE 4: STATISTICS BY NUMBER OF FUNCTIONS

N(amount)	Valid	77
Missing		0
Mean		15.86
Std.Error of Mean		1.691
Median		12.00
Std.Deviation		14.836
Skewness		1.700
Std.Error of Skewness		.274
Kurtosis		2.413
Std .Error of Kurtosis		.541
Minimum		1
Maximum		64
Percentiles 25		6.50
50		12.00
75		19.00

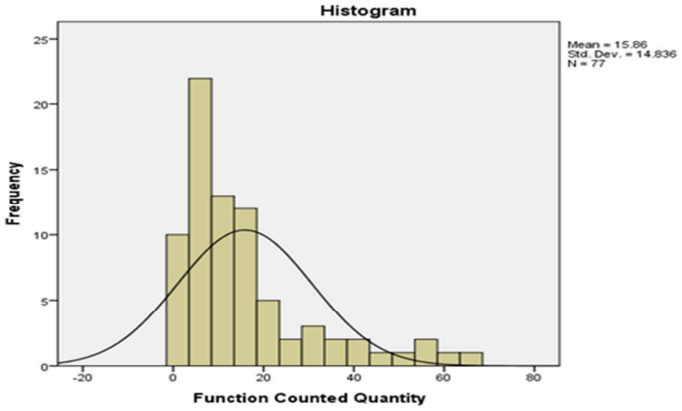

Figure 12. The normal curve on histogram.

Secondly, one sample t-values indicated even more adequate convergent validity. The distribution of t-value testing reflects its effects to examine the mean difference between the sample and the test value. Calculate the confidence interval about value of the one sample t-test, by using Eq. 5:

$$\bar{x} - t_{\frac{a}{2}}\sigma_{\bar{x}} < \mu < \bar{x} + t_{\frac{a}{2}}\sigma_{\bar{x}} \tag{5}$$

As shown in Table 5, the confidence interval of sample is between the values of 12.437 to 19.003. It is almost the same with the value of 95% confidence interval having little error. Moreover, the calculated value is greater than the population mean, and then we will reject the null hypothesis and accept the alternative hypothesis.

TABLE 5: ONE-SAMPLE TEST

	Test Value=0					
	t	df	Sig. (2-tailed)	Mean Difference	95%Confidence Interval of the Difference	
					Lower	Upper
Function Counted Quantity	9.379	76	.000	15.857	12.49	19.22

TABLE 6: RELIABILITY STATISTICS

Crobach's Alpha	Crobach's Alpha Based on standardized items	N of Items
.958	.963	77

This two-step approach demonstrated that the scales had good convergent validities. That is, we can reach the conclusion that from the two variables of function published year and counted quantity, the basic functions can be found.

We conducted a confirmatory factor analysis to test the measurement model with its reliabilities. As shown in Table 6, the value of Cronbach's alpha was over 0.7, indicating that the scales had good

reliabilities [33]. Thus the scales had good convergent reliabilities. In a nutshell, on the basis of these analytical data, H1 and H2 can be supported.

Limitations

There are some limitations to consider regarding the results. First, we offer the results of EMP basic functions only according to the empirical literature review. In fact, the combinations of literature review and case study research findings will be more comprehensive to reflect the typical customer requirements and inherent functionalities for a successful EMP [34]. Therefore, we strongly encourage future research to conduct case study as well as literature study. A second limitation is the fact that the sample is still not huge enough to cover all the related data that are selected by observations. Future research should include more databases and some text mining software to study them.

Conclusion and Implications

The empirical literature review findings sort out the EMP basic function set for a successful EMP and identify the presence of the right kind of function classification levels. Employing the historical literature event methodology to collect required historical data and adapting Guo's functionality framework primarily designed as a technical classification approach [15], this paper is able to establish interrelationship between EMP basic functions and function published year as well as function counted quantity. This study also helps to meet the customer requirements when constructing a new EMP with personalization.

The analysis of this paper has several implications for the development of EMPs. First, the empirical data obtained in this paper through the massive literature survey is extremely valuable to future EMP research. Second, the EMP basic functions found in this study can be directly applied to technically building EMP construction model. Third, it provides a guideline of how to adjust EMP basic functions for any given EMP construction model.

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References

[1] Y. Bakos, The emerging role of electronic marketplaces on the Internet, Communications of the ACM Vol.41, No. 8 (1998), p. 35–42.

[2] J. Guo, A term in search of the infrastructure of electronic markets, in: Volume 2 of Research and Practical Issues of Enterprise Information Systems II, IFIP volume 255, edited by L. Xu, A M. Tjoa and S. Chaudhry, Springer, Boston (2007), p. 831-840.

[3] M. Grieger, Electronic marketplaces: A literature review and a call for supply chain management research, in: European Journal of Operational Research, Vol. 144 (2003), p. 280-294.

[4] J. Y. Bakos, A strategic analysis of electronic marketplace, in: MIS Quarterly, Vol.15, No. 4 (1991), p. 295–310.

[5] J. Guo, Business-to-Business electronic marketplace selection, in: Enterprise Information Systems, Vol.1, No.4 (2007), p. 383-419.

[6] C. Dussart, Internet: the one-plus-eight "re-volution", in: European Management Journal, Vol.18, No.4 (2000), p. 386-397.

[7] J. Walsh and S. Godfrey, The Internet: a new era in customer service, in: European Management Journal, Vol.18, No.1 (2000), p. 85-92.

[8] E.W.T. Ngai, Internet marketing research (1987-2000): a literature review and classification, in: European Journal of Marketing, Vol. 37, No. 1/2 (2003), p. 24-49.

[9] G. Büyüközkan, A success index to evaluate e-Marketplaces, in: Production Planning & Control: The Management of Operations, Vol.15, No.7 (2004), p. 761-774.

[10] S. Wang and N. P. Archer, Strategic choice of electronic marketplace functionalities: a buyer-supplier relationship perspective, in: Journal of Computer-Mediated Communications, Vol. 10, No. 1, article 11 (2004).

[11] R. Stockdale and C. Standing, A framework for the selection of electronic marketplaces: a content analysis approach, in: Internet Research, Vol.12, No.3 (2002), p. 221-234.

[12] S. Wang, N. P. Archer, and W.P. Zheng, An exploratory study of electronic marketplace adoption: a multiple perspective view, in: Electronic Markets, Vol.16, No.4 (2006), p. 337-348.

[13] J. Guo, Z. Hu and Z. Gong, Technical construction methods for e-marketplace, in: Proc. ICEC, ACM Press, Taipei (2009), p. 366-369.

[14] L. C.S. Barradas and J.J. Pinto-Ferreira, P2P infrastructure for tourism electronic marketplace, in: *Virtual Enterprises and Collaborative Networks*, volume 149 of Proc. IFIP, France (2004), p. 461-468.

[15] J. Guo: *E-Marketplace Technology*, 4th draft (University of Macau 2010), p. 15-20.

[16] R. Kohavi, N. J. Rothleder and E. Simoudis, Emerging trends in business analytics, in: Communications of the ACM, Vol.45, No. 8 (2002), p. 45- 48.

[17] B. F. Schmid and M.A.Lindemann, Elements of a reference model for electronic markets, in: Proc. 31st HICCSS Conf., USA (1998), p. 193–201.

[18] Q. Z. Dai and R. J. Kauffman, Business models for Internet-based e-procurement systems and B2B electronic markets: an exploratory assessment, in: Proc. 34th Annual Hawaii International Conf. System Sciences, Hawaii (2001), p. 1-10.

[19] The e-Marketplace Revolution: Creating and Capturing the Value in B2B e-Commerce, Booz Allen& Hamilton Inc., USA (2001).

[20] D. Chatterjee and V. Sambamurthy, Business implications of web technology: an insight into usage of the World Wide Web by U.S. companies, in: Electronic Markets, Vol.9, No.1/2, Spring (1999), p. 126-131.

[21] M. J. Cronin, in: *Global Advantage On the Internet: From Corporate Connectivity to International Competitiveness* (Van Nostrand Reinhold, NY 1996).

[22] J. J. Binder, The event study methodology since 1969, in: Review of Quantitative Finance and Accounting, Vol.11, No.2 (1998), p. 111–137.

[23] D. G. Wildgoose, A. Johnson, and R. B. Winstanley, Glass/ceramic/refractory techniques, their development and introduction into dentistry: a historical literature review, in: The Journal of Prosthetic Dentistry, Vol. 91, No. 2 (2004), p. 136-143.

[24] J. Mahoney, Comparative-historical methodology, in: Annual Review of Sociology, Vol. 30 (2004), p. 81-101.

[25] W. R. Borg, in: *Educational Research: An Introduction* (Longman, London 1963).

[26] J. E. Hill and A. Kerber, in: *Models, Methods, and Analytical Procedures in Education Research* (Wayne State University Press, Detroit 1967).

[27] The History Of Ecommerce: How Did It All Begin, on http://www.mivamerchant.com/blog/the-history-of-ecommerce-how-did-it-all-begin

[28] History of E-commerce, on http://www.slideshare.net/anu070886/history-of-e-commerce

[29] E. Loukis, D. Spinellis and A. Katsigiannis, Barriers to the adoption of B2B e-marketplaces by large enterprises: lessons learned from the hellenic aerospace industry, in: Information Systems Management, Vol. 28, No. 2 (2011), p. 130-146.

[30] The History of E-commerce, The Early Years, on http://www.slideshare.net/Anjiyaa/the-history-of-ecommerce

[31] A. Bryman, in: *Quantity and Quality in Social Research* (Routledge, London 1992), p.11-12.

[32] A. Beardsworth, in: *Analyzing Press Content: Some Technical and Methodological Issues*, edited by H. Christian (Sociology of Journalism and the Press and Keele University Press 1980), p. 371-395.

[33] J. C. Nunnally, in: *Psychometric Theory*, 2nd ed. (McGraw-Hill, NY 1978).

[34] J. L .Hopkins and D. F. Kehoe, The theory and development of a relationship matrix-based approach to evaluating e-marketplaces, in: Electronic Markets, Vol. 16, No. 3 (2006), p. 245-260.

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