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Abstract

Despite the high interest from many researchers on B2B e-marketplaces, there has been a limited empirical investigation on their post-adoption stage. Based on literature dealing with their e-business model and building on emerging concepts in B2B e-commerce, this paper aims at assessing the influence of various factors on firms’ level of use of B2B e-marketplaces. Specifically, three basic domains are investigated: a) firms’ internal environment, b) their external environment and c) the characteristics of the B2B e-marketplace. A conceptual framework is developed and examined on data collected from 112 firms that currently use Greek B2B e-marketplaces. These are analyzed through factor analysis and multiple discriminant analysis. Findings show that factors from all the categories examined impact on firms’ level of use with the domain concerning the characteristics of the B2B e-marketplace having the highest influence. The results also provide interesting insights and useful hints to both researchers and practitioners.

Keywords: B2B e-marketplaces, B2B e-commerce, post-adoption stage, level of use, e-business models

1. Introduction

The widespread of the Internet and electronic networks has led to sharp changes in the way firms conduct trading activities with their business partners, as new and highly innovative e-business models have emerged. One of the most important incidents in enterprising relations has been the appearance of the e-business model of B2B e-marketplaces, which was firstly introduced in the beginning of 1990s and offered a vital solution to the market’s crucial demands for alternative communication and collaboration e-business processes.

As a result of its rapid proliferation from the early years, despite the bust which followed this euphoria (Scott and Scott, 2004; Zhang and Bhattacharyya 2010), B2B e-marketplaces have received considerable attention in diverse scientific fields, such as Information Systems’ (IS) research (Bailey and Bakos 1997; Bakos 1998; Premkumar 2003), Supply Chain Management (SCM) (Eng 2004; Grieger 2003), Operational Research (Lee et al. 2006) and others. Thus, the various survey initiatives have provided quite an abundant and much diversified literature, as the different perspectives they have been approached by various researchers have led to differences regarding the formulation of an explicit definition (Hadaya 2008; Wang and Archer 2007). Therefore, a B2B e-marketplace can be: an electronic procurement solution (Segev et al. 1999), an internal organization information system (Bakos 1991), an exchange (Bandyopadhyay et al. 2006; Dai and Kauffman 2000; Ordanini 2006), a medium that cultivates the transactions between intelligent agents (Schmid et al. 1998), etc. Regarding this research paper, B2B e-marketplaces are defined as

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“intermediaries that allow multiple buyers and suppliers to meet on an electronic platform that rests on the Internet infrastructure in order to exchange information about products/services, conduct transactions online and adhere to other value-added services; constituting an increasingly important application for Information Technology (IT)” (Choudhury et al. 1998; Hadaya 2006).

According to Koppius (2002), they have been three basic scientific streams concerning the business-oriented study of B2B e-marketplaces. Specifically, in the first stream, B2B e-marketplaces are compared with two basic electronic coordination mechanisms: electronic markets and electronic hierarchies in order to examine how IT influences the final choice of each mechanism. Moreover, in this stream B2B intermediaries are also compared with other non-electronic (traditional) markets (Bakos 1991; Christiaanse and Markus 2003). According to Hadaya (2008), the starting point of this scientific stream was Bakos’ (1991) examination of how, by reducing search costs, e-market systems affect prices, sellers’ profit and buyers’ welfare, as well as Malone et al.’s (1987) comparison between electronic markets and electronic hierarchies. Concerning the second stream, it covers B2B e-marketplaces’ study from an institutional point of view, by identifying their value proposition, their roles, as well as their business functions and the characteristics that define their structure (Dai and Kauffman 2002; Hadaya 2008; Kaplan and Sawhney 2000; Ordanini et al. 2004). According to this stream, B2B e-marketplaces can be distinguished based on four basic characteristics: a) the types of goods they trade, b) their ownership model, c) the price discovery strategy they support and d) their core service offerings (Hadaya 2008).

Finally, the third stream covers the surveys that examine the factors that hinder or drive firms’ adoption (Eng 2004; Yu 2007; Zhu 2002) and issues related to how to operate B2B e-marketplaces (Hazra et al. 2004; Lee et al. 2006). Additionally, in this scientific stream, surveys concerning the identification of B2B e-marketplaces’ critical success factors (Choudhury et al., 1998; Fairchild et al. 2004) and strategies that can be implemented to increase their competitive advantage (Le 2002; Saeed and Leitch 2003; Standing et al. 2006) are also included (Hadaya 2008).

To date, however, the vast majority of surveys on B2B e-marketplaces have anchored on Roger’s (1995) diffusion of innovation theory and have limited their focus to the adoption stage of the assimilation process, where firms make the decision whether to accept them (Hadaya 2008). On the contrary, this survey aimed to partly address the gap on this field by examining B2B e-marketplaces on their post-adoption stage and provide practical implications of their utilization. Specifically, this study examines the factors that influence firms’ level of use of Greek B2B e-marketplaces through the investigation of three basic domains: a) firms’ internal environment, b) their external environment and c) the characteristics of the B2B e-marketplace.

The paper is organized as follows. In section 2, there is an explanation of the description of the variables that are included in the proposed conceptual framework, which was developed for the scope of the study, as well as its relevant hypotheses formed; based on literature review. This is followed by Sections 3 and 4, which describe the applied methodology and present the survey’s results correspondingly. The final section concludes with a discussion commenting on the data gathered, paper’s contribution, its limitations and recommendations for future research directions.

2. Conceptual Framework and Research Hypotheses

To our knowledge, the post-adoption stage of B2B e-marketplaces regarding the examination of firms’ level of use is limited to only five empirical researches (Hadaya 2006, 2008; Son and Benbasat 2007; Rao et al. 2007; Truong 2008). However, none of them has examined in detail firms’ active participation in a B2B e-marketplace; as they all focused on specific factors without testing thoroughly the three aforementioned variable domains, which are a) firms’ internal environment, b) firms’ external environment and c) the characteristics of the adopted B2B e-marketplace. As a consequence, a combined approach of these domains is established aiming to provide a holistic view of B2B e-marketplaces’ after their adoption.

Based on extant literature review of B2B e-Marketplaces’ business model and emerging
concepts of B2B e-commerce, eleven related variables of these domains and their corresponding hypotheses are developed and presented in the succeeding paragraphs. In specific, the internal environmental factors studied are a) funds’ availability, b) organizational e-readiness, c) top management strategic support and d) products’ characteristics and demand uncertainty, the external factors are a) governmental pressure, b) partners’ pressure and c) competitive pressure, whereas the factors concerning B2B e-marketplace’s characteristics are a) B2B e-marketplace’s mission and provided e-services, b) operational rules, c) ownership status and d) profile and extent of participating firms; and are stated as follows.

Funds’ Availability

It is generally accepted that the adoption and use of B2B e-marketplaces require the analogous experience and knowledge from the involved firms. Specifically, enterprises should be crewed with expertise and skilled staff in order to have a seamless and effective use of the applied e-services (Melville et al. 2004; Ravichandran and Lertwongsatien 2005; Wang and Cheung 2004). However, due to relevant scarcity, firms should spend substantial financial resources in order to educate their current workforce to the B2B e-marketplace’s specific requirements or to be crewed with the necessary employees (Bradford and Florin 2003; Lee C.-P. et al. 2007).

Furthermore, according to previous studies, the capability to spend money is considered as one of the most important factors for the adoption and use of e-business applications (Caldeira and Ward 2002; Pflughoeft et al. 2003; Wymer and Regan 2005). There have been many circumstances where firms were not able to cover such expenses and as a consequence they lagged behind compared to their competitive business environment. For example, van Akkeren and Cavaye (1999) reported that many firms considered as too costly to hire e-business consultants. As a result, it can be assumed that the more financial resources a firm have, the higher the use of the B2B e-marketplace.

Taking into consideration the above literature, in this study, it is considered as “funds’ availability” “the firm’s intention to invest providing additional financial resources for its technical and advisory support, as well as for its crew with the required skilled staff in order to take advantage of the provided B2B e-marketplace services”. Hence, the arguments presented above lead to the first hypothesis.

H1: Funds’ availability provided by the firm positively influences the level of B2B e-marketplace use.

Organizational e-Readiness

Many researchers have confirmed that the adoption and level of use of e-business services rely heavily on firm’s existing IT infrastructure (Gengatharen and Standing 2005; Hadaya 2006; McCole and Ramsey 2005; Premkumar and Ramamurthy 1995; Stockdale and Standing 2004; Wang and Cheung 2004; Zheng and Wang 2008). Characteristically, Hadaya’s (2008) study on B2B e-marketplace post-adoption stage proved that there is a positive relationship between technological infrastructure and the level of B2B e-marketplace use. However, as it was previously mentioned, the mere presence of such an infrastructure is not enough; as enterprises should be able to provide substantial financial resources and be crewed with the relevant staff in order to take advantage of the IT capabilities (Gengatharen and Standing 2005; Joo and Kim 2004; Koch 2002; Lee CP et al. 2007; Stockdale and Standing 2004; Wang and Cheung 2004). For example, Rao et al. (2007) and Truong (2008) confirmed the positive relationship between employees’ experience in IT issues and the level of B2B e-marketplace use.

Taking into account the above literature, in this paper, it is considered as “organizational e-readiness” “the level of firm’s capability in technological, financial and human resources in order to take advantage of the provided B2B e-marketplace services”. Thus, the arguments presented above lead to the second hypothesis.


Top Management Strategic Support

Firm’s strategy is a vital factor for its e-business success and has been thoroughly examined by various researchers (e.g. Chaffey 2008; Levenburg et al. 2006; Teo and Too, 2000). For example, Daniel et al. (2004) referred that the applied e-business strategy affects not only firm’s possible
participation in a B2B e-marketplace, but also the
type of the intermediary adopted.

Nevertheless, firm’s strategy is strongly related to
top management, as the latter is responsible for the
selection, delimitation and application of
enterprise’s e-business plan. Many studies have
confirmed that the use of e-business applications is
positively related to the level of firm’s top
management support (Chong and Pervan 2007;
Morgetharal 2001; Premkumar and Ramamurthy
1995; Tsao and Lin 2004). Additionally,
Gengatharen and Standing (2005) mentioned that
top management support is a critical element for
the implementation of a B2B e-marketplace
initiative. Taking into consideration the above literature, in
this study, it is considered as “top management
strategic support” “the series of actions taken by
highly ranked employees in order the enterprise
being able to take advantage of the provided B2B
e-marketplace services”. Hence, the arguments
presented above lead to the third hypothesis.

H3: Top management strategic support positively
influences the level of B2B e-marketplace use.

Products’ Characteristics and Demand Uncertainty

The exchange of products through a B2B e-
marketplace is the main reason for the adoption
and use of a B2B intermediary. It is broadly
accepted that each participant is interested for
certain goods with specific characteristics in order
to fulfill its business needs. As a consequence, the
wide diversity of firms’ intentions has been a topic
of interest in e-business and many researchers have
investigated the influence of products’
characteristics on various B2B e-commerce aspects
(Al-Qirim 2004; Doolin et al. 2003; Huang et al.
2004). For example, Homs (2001) confirmed that
the particular characteristics of the products of
each industry play an important role for the
However, Malone et al. (1982) were the first who
examined products’ characteristics from a different
perspective. Specifically, they investigated that
there is a negative impact of products’ description
complexity on e-business applications’ adoption.
According to these researchers, the complexity of
products’ description refers “to the amount of
information needed in order to specify the
attributes of the products in enough detail to allow
participants to make a trade” (Malone et al. 1982).
On the other hand, apart from complexity of
products’ characteristics, the level of provided e-
services is greatly influenced by the demand.
According to Claycomb et al. (2005) and Grewal et
al. (2001), the demand uncertainty is a deterrent
factor for enterprises’ trade through an e-business
initiative. Additionally, Choudhury et al. (1998)
diagnosed that the level of B2B e-marketplace
adoption is negatively influenced by the level of
demand uncertainty, whereas Son and Benbasat
(2007) also confirmed the negative impact of
demand uncertainty on the adoption and the extent
of B2B e-marketplace use.

Taking into consideration the above literature, in
this study, it is considered as “products’
characteristics and demand uncertainty” “the
amount of information provided for the description
of products’ characteristics and the level of
demand uncertainty from transaction to transaction
taking place in the B2B e-marketplace”. Thus, the
arguments presented above lead to the forth
hypothesis.

H4: Products’ characteristics and demand
uncertainty negatively influence the level of B2B
e-marketplace use.

Governmental Pressure

The investigation of governmental pressure on
firms’ adoption and use of e-business applications
has been broadly examined by various researchers
(Kuan and Chau 2001; Wagner et al. 2003; Zhu et
al. 2004). For example, Chau and Jim (2002) and
Zhu et al. (2003) confirmed that the use of e-
services is greatly influenced by the governmental
pressure. Similarly, Kuan and Chau (2001) and
Wang and Cheung (2004) proved that perceived
governmental influence on firm’s adoption of e-
services is greatly on adopters compared to non-
adopters.

According to Kuan and Chau (2001) and Oxley
and Yeung (2001), government can support
relevant actions with three different ways. First, by
instituting relevant laws; second, by providing
specific incentives, mostly economic; and third, by
adopting IT infrastructure and skilled workforce in
order to develop analogous e-services and trade
online with the firms.
To date, however, there has not been any study that has confirmed the impact of governmental pressure on B2B e-marketplace post-adoption stage concerning the level of intermediary’s use. Some researchers, such as Gengatharen and Standing (2005), Joo and Kim (2004) and Stockdale and Standing (2002), have approved governmental influence on B2B e-marketplace pre-adoption and adoption stages; whereas Yu (2007) verified that the level of governmental pressure positively influences the continuance of B2B e-marketplace utilization.

Taking into account the above literature, in this paper, it is considered as “governmental pressure” “the level of governmental support that a firm receives through the institution of an analogous legal framework, as well as the provision of relevant motives in order to take advantage of the provided B2B e-marketplace services”. Thus, the arguments presented above lead to the fifth hypothesis.

\( \text{H5: Governmental pressure positively influences the level of B2B e-marketplace use.} \)

**Partners’ Pressure**

Many studies have investigated the impact of partners’ pressure on adoption and use of B2B e-commerce (Al-Qirim 2004, 2007; McCole and Ramsey 2005; Pflughoeft et al. 2003; Stockdale and Standing 2004; Wagner et al. 2003; Zhu et al. 2003). The vast majority of them have confirmed partners’ positive influence on e-business applications. Concerning the business model of B2B e-marketplaces, the most important studies have been Hart and Saunders (1998), Kioses et al. (2006) and Wang et al. (2006) efforts; which all of them confirmed partners’ positive influence on firms’ e-services adoption. However, there is a limited investigation on post-adoption stage where only Hadaya’s (2006, 2008) researches have confirmed partners’ impact on B2B e-marketplaces’ level of use.

In general, partners’ pressure tends to be multidimensional, as it may comprise from one to three sub-factors; a) the level of firm’s dependency on its partners, b) the buying power over its partners and c) the level of influence from its partners. However, it should be mentioned that every researcher may include one or more of these sub-factors to its investigation. For example Claycomb et al. (2005) and Kioses et al. (2006) examined one sub-factor, whereas Hadaya (2006) combined all of them.

Taking into consideration the above literature, in this study, it is considered as “partners’ pressure” “the level of firm’s influence from its partners in order to take advantage of the provided B2B e-marketplace services”. Hence, the arguments presented above lead to the sixth hypothesis.

\( \text{H6: Partners’ pressure positively influences the level of B2B e-marketplace use.} \)

**Competitive Pressure**

Another broadly examined external factor in B2B e-commerce examination is the pressure exerted from firm’s competitors. Consequently, many researchers have investigated the impact of competitive pressure on firm’s e-commerce behavior (Al-Qirim 2004; Chang and Cheung 2001; Chong and Pervan 2007; Grandon and Pearson 2004; McCole and Ramsey 2005; Pflughoeft et al. 2003; Wagner et al. 2003; Wymer and Regan 2005; Zhu et al. 2003). Regarding B2B e-marketplaces’ adoption stage, the most prominent studies have been Joo and Kim (2004), Son and Benbasat (2007), Wang et al. (2006) and Yu (2007) efforts, which all of them confirmed competitors’ positive influence on their adoption. Concerning the post-adoption stage, Hadaya’s (2006, 2008) both studies confirmed the impact of competitive pressure on B2B e-marketplaces’ level of use.

However, it should be mentioned that competitive pressure has been approached by two basic different perspectives. The most prominent is based on the influence exerted from competitive enterprises which force firm to use e-services in order not to lag behind (Ordanini 2006; Rask and Kragh 2004; Standing et al. 2006; Zhu et al. 2004). The other perspective refers to the utilization of such e-services because of firm’s mimetic behavior (Grewal et al. 2001; Teo et al. 2003).

Taking into consideration the above literature, in this study, it is considered as “competitive pressure” “the level of influence exerted from competitive enterprises to the firm in order to take advantage of the provided B2B e-marketplace services”. Hence, the arguments presented above lead to the seventh hypothesis.
H7: Competitive pressure positively influences the level of B2B e-marketplace use.

B2B e-Marketplace’s Mission and Provided e-Services

B2B e-marketplace’s mission and provided e-services are regarded as basic elements of its business activity. According to Brunn et al. (2002), Alt and Zimmerman (2001) and Pateli and Giaglis (2004), both of them determine not only B2B e-marketplace’s position in its industry, but also they can partially specify the level of its success.

In specific, B2B e-marketplace’s mission denotes the strategic role of the platform. It may also indicate the level of added value that B2B e-marketplace is possible to provide to its members. Furthermore, it specifies in which buyers and suppliers is targeted, the geographic area covered, its future intentions, etc. Without a clearly determined business plan B2B e-marketplace is inevitable to thrive (Brunn et al. 2002). Similarly, Cohan (2000) stated that it is vital for every e-business model to clearly specify its scope.

Concerning provided e-services, they range from low complexity functions, such as e-catalogues and statistic reports, to fully integrated collaborations services, such as e-procurement and CRP (Continuous Replenishment Program) facilities. Each B2B e-marketplace is intended to provide the highest levels of functionality in order to increase its members’ base and as a result its liquidity and profit. According to Gengatharen and Standing (2005), Kim and Ahn (2006), Kollmann (2001), Le (2002), O’Reilly and Finnegan (2005) White et al. (2007) and Yu (2007), the level and range of provided e-services can influence the adoption and therefore the use of a B2B e-marketplace. Moreover, the B2B intermediary should aim at providing highly customized functions in order to satisfy every involved firm’s demands and as a consequence minimize every possible withdrawal of its platform (Buyukozkan 2004).

Taking into consideration the above literature, in this study, it is considered as “B2B e-marketplace’s mission and provided e-services” “the level of firm’s perceived satisfaction from B2B e-marketplace’s mission and provided e-services”. Hence, the arguments presented above lead to the eighth hypothesis.


Operational Rules

B2B e-marketplace’s operational rules, namely the legal and regulatory framework which defines the basic axes of the intermediary’s functionality, are considered as fundamental elements for its smooth operation. Particularly, operational rules clearly specify key functional issues, such as: registration and application principles, pricing policy, accessibility rights, alternative payment options, etc. According to Ramsdell (2000), involved firms’ agreement to the B2B e-marketplace operational rules is vital for its success. For example, the adoption of a wrong pricing policy can create competitive disadvantage to the B2B e-marketplace (Miller 2001; Karpinski 2001). Similarly, the demand for a high e-service fee without a clear business reward may discourage a firm to use the B2B intermediary (Kollmann 2001). Especially, the SMEs are extremely vulnerable to the applied pricing policy due to their limited financial resources (Stockdale and Standing 2004).

Concerning the available payment options, it is believed that it is much preferable for a B2B e-marketplace to provide various payment options in order to satisfy every involved enterprise. For example, small firms are discouraged to adopt a B2B e-marketplace when they have to pay in advance for a service; without having the ability to explore its usability at first (Korchak and Rodman 2001).

Similarly, the limited accessibility rights can exclude the entry to the strategic partners of an enterprise; resulting to the withdrawal of the enterprise as well. Thus, the B2B e-marketplace must carefully examine all the relevant parameters in order to enlarge its member base and as a result its profitability.

Taking into consideration the above literature, in this study, it is considered as “operational rules” “the level of firm’s perceived satisfaction from the provided legal and regulatory framework that defines B2B e-marketplace’s functionality”. Hence, the arguments presented above lead to the ninth hypothesis.
**H9**: Operational rules positively influence the level of B2B e-marketplace use.

**Ownership Status**

Ownership status is considered as one of the key elements of e-business models. Alt and Zimmerman (2001), Brunn et al. (2002) and Pateli and Giaglis (2004), in their studies, referred to its significance for the smooth operation of every type of e-business initiative. Concerning the B2B e-marketplaces, Gengatharen and Standing (2005) confirmed the high impact of the owners and administrators to their success. Similarly, Chung et al. (2001), Kathawala et al. (2002), Ramsdell (2000), Sculley and Woods (1999) and Turban et al. (2008) referred to the vital role of ownership status to B2B intermediaries. Specifically, B2B e-marketplace holders should provide reliability to all the involved members; guarantee the smooth operation of the provided functionality and minimize opportunistic actions (Gengatharen et al. 2005; Ramsdell 2000; Ratnasingam et al. 2005; Stockdale and Standing 2002).

Taking into consideration the above literature, in this study, it is considered as “ownership status” “the level of firm’s perceived satisfaction from the management and actions of the B2B e-marketplace owners”. Hence, the arguments presented above lead to the tenth hypothesis.

**H10**: Ownership Status positively influences the level of B2B e-marketplace use.

**Profile and Extent of Participating Firms**

B2B e-marketplace’s ability to incorporate and maintain a large number of firms on its e-business model is considered as a vital factor for its success, as the larger the participants’ base the more possibilities the B2B e-marketplace has to gain profit (Andrew et al. 2000; Brunn et al. 2002; Fairchild et al. 2004; Ramsdell 2000; Turban et al. 2008). On the other hand, the large members’ base is also a benefit for the involved enterprises; as every participant has various available business options to transact. According to Brunn et al. (2002), the value that a B2B e-marketplace offers to its members is proportionally increased by the analogous enlargement of its members’ base. As a consequence, many B2B e-marketplaces provide in public the total number of their enrolled firms in order to attract new entries (Son et al. 2006).

Additionally, the participation of internationally successful firms plays a pivotal role in the B2B e-marketplace’s success (Son and Benbasat 2007). These firms are characterized for their high business activity. This is the main reason why B2B intermediaries try to convince these firms at first; aiming that these can force their partners to adopt the provided e-services (Brunn et al. 2002; Farhoomand and Lovelock 2001; Kalakota and Robinson 2001). For example, Stockdale and Standing (2003) confirmed that the firm which has more buying power can convince its partners to adopt e-business services.

Taking into consideration the above literature, in this study, it is considered as “profile and extent of participating firms” “the perceived significance to the participants of the existence of large number and worldwide leading enterprises in the B2B e-marketplace”. Hence, the arguments presented above lead to the eleventh hypothesis.

**H11**: Profile and extent of participating firms positively influence the level of B2B e-marketplace use.

To examine firms’ active involvement in B2B e-Marketplaces, a multi-level participation model is developed aiming to capture the different levels of use. Specifically, a three-level participation approach is utilized following a process applied by Grewal et al. (2001) and Son and Benbasat (2007). The participation level of an enterprise is classified as: a) trial stage, when the firm has conducted a few transactions and is still evaluating the pros and cons of this mean of doing business, b) low-use stage, when it has used B2B e-marketplaces, but not as many as to being considered as an important part of its business activity; or c) commitment stage, when the firm has made a full commitment, because using the provided B2B e-marketplace services has become an important part of its operations. Details of the three participation levels are provided in the Appendix. Furthermore, in accordance with previous research studies (Fichman and Kemerer 1997, Son and Benbasat 2007), it is assumed that there is a linear progression through the three participation stages.
Internal Factors

- Funds’ Availability
- Organizational e-Readiness
- Top Management Strategic Support
- Products’ Characteristics and Demand Uncertainty

External Factors

- Governmental Pressure
- Partners’ Pressure
- Competitive Pressure

Level of B2B e-Marketplace Use

Characteristics of the Applied B2B e-Marketplace

- B2B e-Marketplace’s Mission and Provided e-Services
- Operational Rules
- Ownership Status
- Profile and Extent of Participating Firms

Figure 1: Proposed Conceptual Framework “B2B e-MarkFLU”

Taking into consideration the aforementioned eleven research hypotheses and after being combined with the three-level participation approach, the proposed “B2B e-MarkFLU” (B2B e-Marketplace: Factors affecting firms’ Level of Use) conceptual framework is formulated (Figure 1).

3. Research Methodology

To test the B2B e-MarkFLU framework (Figure 1) and the associated hypotheses proposed above, an electronic questionnaire was developed and administered from July 2009 until February 2010 to all the active enterprises participating in Greek B2B e-marketplaces; namely suppliers, buyers and firms that use the intermediary both as suppliers and buyers (dual role). Specifically, its questions were designed on the basis of a comprehensive literature review and prior surveys approved for their validity and reliability. At this point, it is worth to be mentioned that despite the fact that Greek B2B e-marketplace industry is rather small, it can be characterized by considerable activity compared to the size of its total market. According to Kioses et al. (2006), the value of their transactions up to the end of 2005 definitely exceeded 2 billion Euros, with more than 750,000 transactions; whereas recent estimations refer that it has risen to 3.5 billion Euros until the end of 2009.

Regarding questionnaire’s distribution, each B2B e-marketplace took the responsibility to send it to its members. The respondents included namely CEOs, CIOs and Sales Managers. Nevertheless, prior to its distribution, the first draft of the questionnaire was pretested in order to identify possible problems in terms of clarity and accuracy. Particularly, four academics and two practitioners reviewed the items’ classifications to ascertain the precision of the instructions and the content validity. Moreover, a pilot test using a sample of ten firms helped to identify possible problems in terms of clarity and accuracy. Respondents of the pilot test were asked to provide feedback and suggestions for improvement when instructions or questions were not clear, as well as to answer the whole questions by following the provided directions. Thus, the feedback from the pilot testing was very useful in redesigning and refining the questionnaire.

Out of the 1,100 questionnaires e-mailed to all the active population, a total of 112 firms replied representing a response rate of 10.18%. This response rate appears to be typical compared to...
similar research studies taking place in the specific scientific field (Grewal et al. 2001; Hadaya 2008; Le et al. 2004; Rao et al. 2007; Yu 2007).

Additionally, the dataset was examined for potential bias by contrasting early with late respondents, following a method suggested by Armstrong and Overton (1977). This method has been widely adopted in e-commerce research (Claycomb et al. 2005; Le et al. 2004; Levenburg et al. 2006; Molla and Licker 2005; Rao et al. 2007; Zhu and Kraemer 2005). Early respondents were defined as those who had completed the questionnaire within the initial ten days, while late respondents were those who completed the survey after this period; being motivated by a follow up e-mail notification. The comparison was made with respect to three questions concerning their demographic data: a) the number of employees, b) the 2008 annual turnover and c) the period of the first participation in the B2B e-marketplace. No such bias was revealed in terms of the number of employees ($\chi^2=3.952$, df=5, $p=0.556$), the 2008 annual turnover ($\chi^2=2.058$, df=3, $p=0.56$) and the period of the first participation in a B2B e-marketplace ($\chi^2=5.154$, df=3, $p=0.161$); as the differences between the two groups were statistically non-significant applying the chi-square statistics at the significant level of 0.05.

In order to test the proposed conceptual framework, a data analysis was conducted in two stages. The first step employed factor analysis using principal component analysis (PCA) and orthogonal rotation (VARIMAX) in order to test the data validity and reliability, followed by multiple discriminant analysis in order to examine the eleven hypotheses. According to Hair et al. (2006), the results of factors analysis are appropriate variables for subsequent application to other statistical techniques, that is discriminant analysis. Furthermore, these methodology steps have been previously applied in relevant scientific researches (Joo and Kim 2004; Molla and Licker 2005; Premkumar and Ramamurthy 1995).

3.1. Sample characteristics

The demographic profile of respondents presented in Table 1 indicates that 87 (77.7%) were suppliers, 14 (12.5%) were buyers and 11 (9.8%) firms using B2B e-Marketplaces both as buyers and suppliers (dual role). The majority of the respondents (70 - 62.5%) were conducting business not only in Greece, but also abroad; whereas 42 (37.5%) have limited their operation to the Greek territory. Additionally, it is worth to be mentioned that 40 (35.7%) firms preferred to take advantage of the provided functionality by participating to more than one B2B e-marketplace.

Concerning the provided e-services, Greek B2B e-marketplaces offer a plethora of them, ranged from low complexity functions, such as e-catalogues and statistic reports, to fully integrated collaborations services, such as e-procurement and CRP facilities. The main scope of each B2B e-Marketplace is to provide to its members the highest levels of functionality in order to help them streamline their business processes. Moreover, it is generally accepted that the higher levels of firms’ participation leading to more profit for the B2B e-marketplace. In this survey, the majority of respondents (60 – 53.3%) preferred to take advantage of e-auction functions in order to buy/sell products and services. A considerable number of firms used e-ordering (36 – 32.1%) and e-invoicing (31 – 27.7%), followed by CRP, e-payment and e-procurement services (19 - 17%, 19 – 17% and 17 – 15.2% correspondingly), whereas the least used e-service recorded has been statistic reports (13 – 11.6%) (Table 1). The comprehensive demographic characteristics of the sample are presented as follows (Table 1).
Table 1
Profile of the responding enterprises

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Firms’ Participating in a B2B e-Marketplace as:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>supplier</td>
<td>87</td>
<td>77.7</td>
</tr>
<tr>
<td>buyer</td>
<td>14</td>
<td>12.5</td>
</tr>
<tr>
<td>dual role (supplier and buyer)</td>
<td>11</td>
<td>9.8</td>
</tr>
<tr>
<td><strong>Business Activity:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>only in Greece</td>
<td>42</td>
<td>37.5</td>
</tr>
<tr>
<td>abroad</td>
<td>70</td>
<td>62.5</td>
</tr>
<tr>
<td><strong>Active Participation in:</strong></td>
<td></td>
<td></td>
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<tr>
<td>1 B2B e-Marketplace</td>
<td>72</td>
<td>64.3</td>
</tr>
<tr>
<td>&gt;1 B2B e-Marketplace</td>
<td>40</td>
<td>35.7</td>
</tr>
<tr>
<td><strong>Number of Employees:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-20</td>
<td>19</td>
<td>17</td>
</tr>
<tr>
<td>21-50</td>
<td>16</td>
<td>14.3</td>
</tr>
<tr>
<td>51-100</td>
<td>12</td>
<td>10.7</td>
</tr>
<tr>
<td>101-200</td>
<td>10</td>
<td>8.9</td>
</tr>
<tr>
<td>&gt;200</td>
<td>17</td>
<td>15.2</td>
</tr>
<tr>
<td>unanswered</td>
<td>38</td>
<td>33.9</td>
</tr>
<tr>
<td><strong>2008 Annual Turnover (€):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;10 millions</td>
<td>35</td>
<td>31.3</td>
</tr>
<tr>
<td>10 millions - 50 millions</td>
<td>19</td>
<td>17</td>
</tr>
<tr>
<td>&gt;50 millions</td>
<td>20</td>
<td>17.9</td>
</tr>
<tr>
<td>Unanswered</td>
<td>38</td>
<td>33.9</td>
</tr>
<tr>
<td><strong>Period of Firm’s first Participation in a B2B e-Marketplace:</strong></td>
<td></td>
<td></td>
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<tr>
<td>2001-2003</td>
<td>27</td>
<td>24.1</td>
</tr>
<tr>
<td>2004-2005</td>
<td>25</td>
<td>22.3</td>
</tr>
<tr>
<td>2006-2009</td>
<td>12</td>
<td>10.7</td>
</tr>
<tr>
<td>Unanswered</td>
<td>48</td>
<td>42.9</td>
</tr>
<tr>
<td><strong>Applied e-Services (multiple-choice question):</strong></td>
<td></td>
<td></td>
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<tr>
<td>e-auctions</td>
<td>60</td>
<td>53.3</td>
</tr>
<tr>
<td>e-ordering</td>
<td>36</td>
<td>32.1</td>
</tr>
<tr>
<td>e-invoicing</td>
<td>31</td>
<td>27.7</td>
</tr>
<tr>
<td>CRP</td>
<td>19</td>
<td>17.0</td>
</tr>
<tr>
<td>e-payments</td>
<td>19</td>
<td>17.0</td>
</tr>
<tr>
<td>e-procurement</td>
<td>17</td>
<td>15.2</td>
</tr>
<tr>
<td>statistic reports</td>
<td>13</td>
<td>11.6</td>
</tr>
</tbody>
</table>
3.2. Operationalization of the variables

For each independent variable, a multiple-item scale is developed aiming at tapping the underlying theoretical dimension where each item is measured based on a 5-point Likert scale, ranging from 1-“strongly disagree/ not at all” to 5-“strongly agree/ to a great extent”. Wherever possible, existing items which were proven to be reliable and valid are adapted from previous research studies; otherwise, new items are developed. In specific, six items are used to measure “top management strategic support” and “B2B e-marketplace’s mission and provided e-services”, five items are applied to measure “organizational e-readiness” and “competitive pressure”, four items are used to measure “governmental pressure”, three items are applied to measure “funds’ availability”, “products’ characteristics and demand uncertainty”, “partners’ pressure”, “operational rules” and “ownership status”, whereas two items are used to measure “profile and extent of participating firms”. Details of the scales are provided in the Appendix.

Regarding the dependent variable, as it was previously mentioned, a three-level participation approach is applied in order to capture the different levels of firms’ B2B e-Marketplace use; following a process applied by Grewal et al. (2001) and Son and Benbasat (2007). These participation levels are: a) the trial stage, b) the low-use stage and c) the commitment stage; and enterprises were asked to choose one out of the three categories that best described their perceived active involvement in a B2B e-Marketplace business model (Appendix).

3.3. Validity and reliability of measurement instrument

Following Hadaya’s (2008) and Premkumar and Ramamurthy’s (1995) approach, three separate factor analyses for the multi-indicator items are performed representing the internal, the external and the B2B e-Marketplace’s characteristics variable domains. Specifically, the factor analysis using PCA and VARIMAX is applied in order to test the validity of the variables, classify and reduce questions into sub-variables when possible; and calculate factor loadings.

Nevertheless, in order to test the appropriateness of the data for factor analysis, several measures are applied in advance to the entire population of the three matrixes. In particular, Bartlett’s tests of sphericity (p = 0.000) confirm the statistical probability that the correlation matrixes have significant correlations among the variables, whereas the results of Kaiser-Meyer-Olkin (KMO) measures of sampling adequacy are 0.852, 0.835 and 0.854 correspondingly, which are meritorious. Additionally, the measures of sampling adequacy (MSA) values all exceed 0.50 for both the overall tests and each individual variable (Hair et al. 2006). All these measures indicate the suitability of factor analysis to the three variable domains.

By applying the Kaiser eigenvalues criterion separately to the aforementioned variable domains; four, three and four factors extracted that collectively explain 74.396%, 71.035% and 74.664% of the variance in all items correspondingly (Table 2). Regarding construct validity, which testifies how well the results obtained from the use of the measure fit the theories around which the test is designed (Crabbe et al. 2009), it is tested by the use of two broadly applied tests, convergent and discriminant validity. In specific, “convergent validity is demonstrated if the items load strongly (>0.50) on their associated factors, whereas discriminant validity is achieved if each item loads stronger on its associated factor than on any other factor” (Hair et al. 2006). Table 2 shows that all items have loading greater than 0.50. Additionally, they load stronger on their associated factors than on other factors. Thus, convergent and discriminant validity are demonstrated. The eleven factors proved to be relatively easy to interpret, owing to the strong variable loadings (Table 2). Finally, construct reliability is assessed using Cronbach’s alpha. Table 2 also shows that all values ranged from 0.736 to 0.937; exceeding the limit of 0.70 (Hair et al. 2006).
Table 2:
Validity and Reliability Analysis

<table>
<thead>
<tr>
<th>Factors</th>
<th>Factors’ Coding</th>
<th>Number of Items</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Cronbach’s alpha</th>
<th>Eigenvalues</th>
<th>Variance Explained</th>
<th>Cumulative Variance</th>
<th>Minimum Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Internal Environmental Factors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Funds’ Availability</td>
<td>F1</td>
<td>3</td>
<td>2.74</td>
<td>1.19</td>
<td>0.937</td>
<td>7.711</td>
<td>45.358</td>
<td>45.358</td>
<td>0.816</td>
</tr>
<tr>
<td>Organizational e-Readiness</td>
<td>F2</td>
<td>5</td>
<td>3.24</td>
<td>1.01</td>
<td>0.927</td>
<td>1.993</td>
<td>11.726</td>
<td>57.084</td>
<td>0.709</td>
</tr>
<tr>
<td>Top Management Strategic Support</td>
<td>F3</td>
<td>6</td>
<td>2.87</td>
<td>0.87</td>
<td>0.889</td>
<td>1.683</td>
<td>9.897</td>
<td>66.981</td>
<td>0.553</td>
</tr>
<tr>
<td>Products’ Characteristics and Demand Uncertainty</td>
<td>F4</td>
<td>3</td>
<td>3.31</td>
<td>1.05</td>
<td>0.736</td>
<td>1.261</td>
<td>7.415</td>
<td>74.396</td>
<td>0.682</td>
</tr>
<tr>
<td><strong>External Environmental Factors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Governmental Pressure</td>
<td>F5</td>
<td>4</td>
<td>1.82</td>
<td>0.79</td>
<td>0.870</td>
<td>5.040</td>
<td>42.004</td>
<td>42.004</td>
<td>0.688</td>
</tr>
<tr>
<td>Partners’ Pressure</td>
<td>F6</td>
<td>3</td>
<td>3.13</td>
<td>0.93</td>
<td>0.829</td>
<td>2.065</td>
<td>17.210</td>
<td>59.213</td>
<td>0.793</td>
</tr>
<tr>
<td>Competitive Pressure</td>
<td>F7</td>
<td>5</td>
<td>2.67</td>
<td>0.83</td>
<td>0.850</td>
<td>1.419</td>
<td>11.822</td>
<td>71.035</td>
<td>0.703</td>
</tr>
<tr>
<td><strong>Characteristics of the B2B e-marketplace</strong></td>
<td>F8</td>
<td>6</td>
<td>2.97</td>
<td>0.82</td>
<td>0.853</td>
<td>6.850</td>
<td>48.927</td>
<td>48.927</td>
<td>0.502</td>
</tr>
<tr>
<td>B2B e-Marketplace’s Mission and Provided e-Services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operational Rules</td>
<td>F9</td>
<td>3</td>
<td>2.97</td>
<td>0.91</td>
<td>0.853</td>
<td>1.320</td>
<td>9.425</td>
<td>58.352</td>
<td>0.661</td>
</tr>
<tr>
<td>Ownership Status</td>
<td>F10</td>
<td>3</td>
<td>3.21</td>
<td>0.91</td>
<td>0.889</td>
<td>1.195</td>
<td>8.532</td>
<td>66.884</td>
<td>0.683</td>
</tr>
<tr>
<td>Profile and Extent of Participating Firms</td>
<td>F11</td>
<td>2</td>
<td>3.64</td>
<td>1.01</td>
<td>0.932</td>
<td>1.089</td>
<td>7.779</td>
<td>74.664</td>
<td>0.890</td>
</tr>
</tbody>
</table>

4. Results
The proposed B2B e-MarkFLU framework and its hypotheses are analyzed using multiple discriminant analysis. Specifically, the simultaneous estimation method is selected and applied; compared to stepwise estimation approach, “as it is more preferable when, for theoretical issues, the researcher wants to include all the independent variables in the analysis” (Hair et al. 2006).
However, some basic assumptions are tested regarding the use of discriminant analysis before data were analyzed. At first, the normality of the distribution is examined. The results indicate that overall the normality assumption can be realistically accepted. Second, the correlation matrix of all the independent variables is examined
in order to check for possible multi-collinearity
problems (Table 3). Despite the fact that strong
correlations are observed between some of the
variables, none of them is significantly close to
0.90 (Hair et al. 2006). As a consequence, no
multi-collinearity problem is detected. Finally,
Box’s M test is applied in order to verify the
similarity of the dispersion matrices of the
independent variables among the groups (Hair et
al. 2006) (Table 4).

The results from the discriminant analysis show
that only the first function has statistically
significant elements concerning the relationship
between the eleven independent variables and the
dependent variable (Table 5). Moreover, this
function explains 86.3% of the total variance.

As a consequence, the study produces a model that
is satisfactorily significant in discriminating the
three levels of firms’ B2B e-Marketplace use. Specifically, the standardized discriminant
coefficients and discriminant loadings for the
independent variables are presented in Table 6.
Following Hair et al. (2006) guidelines, variables
with discriminant loadings greater or equal to 0.4
are identified as significant contribution to the
function and acceptable. Nine out of the eleven
variables are found to exceed the cut-off value and
they are, in descending order, a) B2B e-
marketplace’s mission and provided e-services, b)
top management strategic support, c) ownership
status, d) funds’ availability, e) governmental
pressure, f) competitive pressure, g) profile and
extent of participating firms, h) organizational e-
readiness and i) operational rules. Moreover, these
variables also have high discriminant coefficients
indicating that they are important discriminators by
both criteria. As a result, hypotheses H1-H3, H5
and H7-H11 are supported, whereas hypotheses H4
and H6 are rejected. Mean and standard deviation
from the three participation levels are also
presented in Table 6 aiming to provide a better
understanding of the discriminant analysis results.

### Table 3:
Correlation matrix of research independent variables

<table>
<thead>
<tr>
<th></th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
<th>F5</th>
<th>F6</th>
<th>F7</th>
<th>F8</th>
<th>F9</th>
<th>F10</th>
<th>F11</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>F2</td>
<td>.532</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>F3</td>
<td>.600</td>
<td>.563</td>
<td>1.000</td>
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<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>F4</td>
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<td>.294</td>
<td>.191</td>
<td>1.000</td>
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<tr>
<td>F5</td>
<td>.300</td>
<td>-.034</td>
<td>.384</td>
<td>-0.11</td>
<td>1.000</td>
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<td></td>
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<td></td>
</tr>
<tr>
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<td>.376</td>
<td>.165</td>
<td>.243</td>
<td>1.000</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>F7</td>
<td>.301</td>
<td>.185</td>
<td>.430</td>
<td>.283</td>
<td>.417</td>
<td>.458</td>
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<tr>
<td>F8</td>
<td>.467</td>
<td>.372</td>
<td>.668</td>
<td>.325</td>
<td>.370</td>
<td>.494</td>
<td>.561</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F9</td>
<td>.409</td>
<td>.254</td>
<td>.561</td>
<td>.173</td>
<td>.276</td>
<td>.386</td>
<td>.491</td>
<td>.582</td>
<td>1.000</td>
<td></td>
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</tr>
<tr>
<td>F10</td>
<td>.415</td>
<td>.182</td>
<td>.508</td>
<td>.231</td>
<td>.321</td>
<td>.356</td>
<td>.459</td>
<td>.639</td>
<td>.559</td>
<td>1.000</td>
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</tr>
<tr>
<td>F11</td>
<td>.286</td>
<td>.086</td>
<td>.352</td>
<td>.093</td>
<td>.233</td>
<td>.243</td>
<td>.301</td>
<td>.506</td>
<td>.396</td>
<td>.510</td>
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</tbody>
</table>
### Table 4
Box’s M test

<table>
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<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Box’s M</td>
<td>181.830</td>
</tr>
<tr>
<td>F Approx.</td>
<td>1.130</td>
</tr>
<tr>
<td>df1</td>
<td>132</td>
</tr>
<tr>
<td>df2</td>
<td>1.311E4</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.147</td>
</tr>
</tbody>
</table>

### Table 5
Wilks’ Lambda

<table>
<thead>
<tr>
<th>Test of Functions</th>
<th>Wilks’ Lambda</th>
<th>Chi-Square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 through 2</td>
<td>0.636</td>
<td>47.086</td>
<td>22</td>
<td>0.001</td>
</tr>
<tr>
<td>2</td>
<td>0.931</td>
<td>7.397</td>
<td>10</td>
<td>0.688</td>
</tr>
</tbody>
</table>

### Table 6:
Multiple Discriminant Analysis Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Discriminant Coefficient</th>
<th>Discriminant Loading</th>
<th>Level 1: trial stage Mean (SD)</th>
<th>Level 2: low-use stage Mean (SD)</th>
<th>Level 3: commitment stage Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>0.128</td>
<td>0.559</td>
<td>2.14 (1.18)</td>
<td>2.64 (1.07)</td>
<td>3.34 (1.17)</td>
</tr>
<tr>
<td>F2</td>
<td>0.305</td>
<td>0.432</td>
<td>2.78 (0.98)</td>
<td>3.21 (0.96)</td>
<td>3.62 (0.99)</td>
</tr>
<tr>
<td>F3</td>
<td>0.212</td>
<td>0.739</td>
<td>2.41 (0.78)</td>
<td>2.73 (0.71)</td>
<td>3.48 (0.92)</td>
</tr>
<tr>
<td>F4</td>
<td>-0.298</td>
<td>0.069</td>
<td>3.29 (0.95)</td>
<td>3.28 (1.07)</td>
<td>3.41 (1.11)</td>
</tr>
<tr>
<td>F5</td>
<td>0.274</td>
<td>0.505</td>
<td>1.45 (0.52)</td>
<td>1.77 (0.76)</td>
<td>2.19 (0.85)</td>
</tr>
<tr>
<td>F6</td>
<td>-0.095</td>
<td>0.317</td>
<td>2.80 (1.02)</td>
<td>3.12 (0.87)</td>
<td>3.39 (0.92)</td>
</tr>
<tr>
<td>F7</td>
<td>0.153</td>
<td>0.493</td>
<td>2.37 (0.76)</td>
<td>2.56 (0.74)</td>
<td>3.09 (0.92)</td>
</tr>
<tr>
<td>F8</td>
<td>0.349</td>
<td>0.746</td>
<td>2.50 (0.83)</td>
<td>2.85 (0.67)</td>
<td>3.53 (0.78)</td>
</tr>
<tr>
<td>F9</td>
<td>0.260</td>
<td>0.422</td>
<td>2.61 (1.13)</td>
<td>2.93 (0.72)</td>
<td>3.33 (0.99)</td>
</tr>
<tr>
<td>F10</td>
<td>0.395</td>
<td>0.680</td>
<td>2.56 (0.96)</td>
<td>3.19 (0.73)</td>
<td>3.70 (0.90)</td>
</tr>
<tr>
<td>F11</td>
<td>0.122</td>
<td>0.472</td>
<td>3.23 (1.08)</td>
<td>3.56 (0.97)</td>
<td>4.10 (0.89)</td>
</tr>
</tbody>
</table>

Furthermore, another important test is to examine the ability of discriminant functions to classify accurately. The detailed classification results are presented in Table 7. The overall proportion of correct classifications is 56.3% which is characterized as mediocre, but at the same time as normal due to the significantly unequal cell sizes of the three participation levels (Hair et al. 2006).

### 5. Discussion and Conclusion

The major objective of this study was to examine the impact of various factors on firms’ level of use of B2B e-marketplaces through the development and examination of a conceptual framework entitled “B2B e-MarkFLU”.

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Table 7
Classification Accuracy of the Multiple Discriminant Analysis

<table>
<thead>
<tr>
<th></th>
<th>Level 1: trial stage</th>
<th>Level 2: low-use stage</th>
<th>Level 3: commitment stage</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1: trial stage</td>
<td>17 (77.3%)</td>
<td>3 (13.6%)</td>
<td>2 (9.1%)</td>
<td>23 (100%)</td>
</tr>
<tr>
<td>Level 2: low-use stage</td>
<td>17 (28.8%)</td>
<td>26 (44.1%)</td>
<td>16 (27.1%)</td>
<td>59 (100%)</td>
</tr>
<tr>
<td>Level 3: commitment stage</td>
<td>6 (19.4%)</td>
<td>5 (16.1%)</td>
<td>20 (64.5%)</td>
<td>31 (100%)</td>
</tr>
</tbody>
</table>

To our knowledge, no empirical research exists has investigated the post-adoption stage of B2B e-marketplaces by examining systematically the three basic domains; that is a) firms’ internal environment, b) their external environment and c) the characteristics of the B2B e-marketplace. The findings of the research offer strong evidence in support of the proposed research framework. Moreover, the results have important implications for both researchers and practitioners. The theoretical and managerial implications, as well as the study’s limitations and future directions are described below.

5.1. Theoretical Implications

The survey’s findings indicate that firms get influenced by all the investigated domains. However, the factors concerning the characteristics of the B2B e-marketplace are regarded as the most important of the three categories, because of their higher impact on the involved enterprises. Thus, despite the fact that previous researches acknowledged the vital role of external environment on firm’s adoption of B2B e-marketplaces, this study reveals that the specific features of each intermediary play a more important role in the post-adoption stage. Consequently, B2B e-marketplaces that invest on members’ perceived satisfaction and continuously improve their functionality and offer unequivocal and tempting solutions have much more chances to keep and increase their firms’ base; and as a result their liquidity and profit.

Additionally, the results confirmed that the external factors also have the lowest impact as a category. These findings give us the support that no matter how much pressure do the firms get from their external environment, the actual use of the B2B e-marketplace is mainly based on the specific characteristics of the intermediary and the influence exerted from their internal business environment.

Concerning the internal factors, they do reveal their significance on B2B e-marketplaces’ level of use. Particularly, three out of the four hypotheses were confirmed, where “top management strategic support” and “funds’ availability” revealed considerably high influential level. Additionally, both of them indicate the vital role the top management have in the way its firm approach its B2B e-marketplace involvement.

Regarding the rejection of H4, it indicates that enterprises mainly exchange commodities that are highly standardized or they have a deep knowledge of the specific characteristics of them; therefore they do not get discouraged from the possible low amount of the provided information. Moreover, non-statistical significance of the demand uncertainly, contrary to Son and Benbasat (2007) research, reveals that firms take advantage of the B2B e-marketplace in order to trade products regardless of the available quantities. Furthermore, they may don’t use the intermediary for specific products, but for every item that they believe it is worth to be exchanged. Therefore, the absence of certain products does not influence the level of B2B e-marketplace use.

Finally, the rejection of H6 may reveal the rationale of firms’ actual participation in a B2B e-marketplace. Particularly, enterprises possibly adopt and use the provided e-services in order to find new partnerships and not to transfer their existing business partners to a new e-trade environment. Analogous findings were revealed in Son and Benbasat (2007) research; contrary to Hadaya’s (2006, 2008) surveys where the positive
influence of partners’ pressure on firms’ level of use was confirmed.

5.2. Managerial and Scientific Implications

The study has several important implications for every involved entity; that is B2B e-marketplaces, currently involved firms, future participants, as well as government. First, it provides to the B2B e-marketplace valuable information and a clear picture of the impact of several factors on its level of use and its post-adoption stage as a whole. B2B e-marketplace top management can evaluate these results and follow certain business strategies in order to improve its functionality and as a consequence enlarge its firms’ base and increase its profit. For managerial standpoint, the findings of this study suggest that firms tend to be more affected by intermediaries’ characteristics. As a result, B2B e-marketplace’s provision of a tempting e-trade business environment with highly customized e-services may enhance even more the prosperity of its e-business model. Additionally, the entrance of a large number of firms with international status is certain that it will have a positive affect on B2B e-marketplace’s success. Second, current users have scientifically confirmed evidence of their influence in the use of B2B e-marketplaces. Based on these findings, their may alter their present participation in order to get benefitted more from the provided functionality. Third, non-participants that are indecisive about the possible adoption of a B2B e-marketplace have a thorough view of the way modern B2B e-marketplaces operate; and they can avoid many obstacles which are difficult to be predicted in a potential entrance. Forth, government gets informed about one of the most prominent existing B2B e-business models. Thus, it may follow analogous e-business strategies by enacting certain laws in order to facilitate B2B e-marketplace’s procedures aiming at improving competitiveness, pushing even more firms to adopt and use intermediaries; and as a consequence acquire administrative and economic benefits.

Furthermore, the results have significant scientific implications as well. Specifically, the proposed conceptual framework, as well as survey’s results could be used by other researchers who investigate the post-adoption stage of B2B e-marketplaces. For example, the impact of several factors on B2B e-marketplace’s level of use, which have found in this large-scale survey, might be useful for other scientists in order to develop and support their own theoretical or empirical study. Finally, the multi-item questionnaire developed could be applied in future studies, as it has passed various reliability and validity tests.

5.3. Limitations and Future Research Directions

Despite the fact that the aforementioned results provide meaningful implications, the survey has three limitations that need to be recognized. First, since the study conducted in firms participating in Greek B2B e-marketplaces, it may limit the generalizability of the results to Greece-based enterprises and those in similar institutional contexts. Therefore, caution must be exercised when generalizing these findings to firms operating in different cultural and institutional environments. Second, despite the strong efforts taken place in order to improve the low response rate of buyers and dual role participants, dissimilar number of the entities involved responded to the survey. Consequently, the results pertain to a greater extent to suppliers than any other involved entity. Third, the answer to the questionnaire only from CEOs, CIOs and Sales Managers may bias the study, even though these people selected because they had the knowledge and the experience required in order to provide more accurate information than any other employee in their enterprise.

Further tests and refinements of the proposed B2B e-MarkFLU framework would be extremely useful in advancing the knowledge of the factors that influence B2B e-marketplaces’ level of use. Future research could proceed in several directions. First, the survey could be conducted in other countries with different degrees of institutional and cultural variation. As a consequence, the results provided may raise valuable information for cross-country comparisons. Second, the possible collection of sufficient responses from buyers and dual role firms would improve our research survey, as it could offer the opportunity for a discrete examination of the three involved entities. Such a procedure may provide a deeper and much richer understanding of the B2B e-marketplace level of use. Third, the proposed framework could be examined from different perspectives; such as firm’s size, applied e-services, horizontal versus vertical B2B e-marketplaces, etc.; in order to reveal possible differences, as well as similarities...
concerning the possible impact of the hypothesized factors. Fourth, a longitudinal study with repeated data collection would provide more conclusive evidence about the power of the survey. Fifth, the potential confirmation of other influential factors that could be added to the research framework, it is certain that it would offer a more holistic view of the post-adoption stage of B2B e-marketplace and may provide additional important insights into the scientific community and practitioners as well.

References


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Appendix: Measurement items

(Apart from “Participation Level”, where firms were asked to choose one out of the three categories that best described their perceived active involvement in a B2B e-Marketplace; a five-point Likert scale is used as follows: 1=strongly disagree/ not at all, 2=disagree/ to a small extent, 3=neither agree nor disagree/ to a moderate extent, 4=agree/ to a considerable extent, 5=strongly agree/ to a great extent)

Participation Level (PL)

Trial Stage
- We have registered in the B2B e-marketplace, but we are still searching for its usefulness
- We have scarcely made transactions via the B2B e-marketplace
- We are still evaluating the pros and cons of B2B e-marketplace services in order to ascertain their usefulness for the firm

Low-use Stage
- We have made a few transactions via the B2B e-marketplace
- Doing business via the B2B e-marketplace has still not become an important part of our business operations

Commitment Stage
- We are making transactions via the B2B e-marketplace whenever necessary
- Doing business via the B2B e-marketplace is an important part of our business operations

Funds’ Availability (FA)

Your firm intends to provide additional substantial resources for the use of the B2B e-marketplace services, concerning the…

FA1: human resources support
FA2: educational-advisory support
FA3: technical support

Organizational e-Readiness (OER)

Your firm is currently prepared for the use of the B2B e-marketplace services, concerning its…

OER1: IT resources
OER2: human resources
OER3: financial resources
OER4: previous experience
OER5: Your firm is familiar with the B2B e-commerce applications

Top Management Strategic Support (TMSS)

TMSS1: The basic business aims of your firm are carried out through the use of B2B e-marketplace services
The use of B2B e-marketplace services…
TMSS2: is a strategic decision for your firm
TMSS3: is a priority for your firm’s e-commerce strategy
TMSS4: The resources (IT, human and financial) that your firm uses for the utilization of the B2B e-marketplace services are significant

Top management of your firm…
TMSS5: supports the use of B2B e-marketplace services
TMSS6: is experienced in B2B e-marketplace services

Products’ Characteristics and Demand Uncertainty (PCDU)

PCDU1: The products that your firm sell/buy through the B2B e-marketplace require a large amount of information to be described
The volume of products that your firm sell/buy through the B2B e-marketplace…
PCDU2: fluctuates a lot over time
PCDU3: is difficult to accurately estimated for the next transactions

Governmental Pressure (GP)

GP1: Government supports the use of B2B e-marketplace services
GP2: Government guarantees with an analogous legal framework e-business transactions
Government supports the use of B2B e-marketplace services by providing…

GP3: educational-advisory support

GP4: financial assistance or other relevant incentives

**Partners’ Pressure (PP)**

PP1: Your partners prompt your firm to use the B2B e-marketplace services

PP2: Your partners support the use of B2B e-marketplaces services for your business transactions

PP3: Your partners use the B2B e-marketplace services

**Competitive Pressure (CP)**

CP1: Your competitors have benefited from the use of B2B e-marketplace services

CP2: Your competitors use the B2B e-marketplace services

CP3: The competition have influenced your firm to use B2B e-marketplace services

CP4: Firms of your industry use B2B e-marketplace services

CP5: Firms of your industry have benefited from the use of B2B e-marketplace services

**B2B e-Marketplace’s Mission and Provided e-Services (MPS)**

MPS1: B2B e-marketplace’s scope conforms to your firm’s utilization

MPS2: Your firm is content with the number of the products provided in the B2B e-marketplace

MPS3: Your firm is content from the quality of the products provided in the B2B e-marketplace

MPS4: The B2B e-marketplace is experienced and up-to-date to the characteristics of your industry

MPS5: Your firm is satisfied from the number of the provided e-services

MPS6: Your firm is satisfied from B2B e-marketplace’s security mechanisms

**Operational Rules (OR)**

Your firm is satisfied from the B2B e-marketplace, concerning the applied…

OR1: terms & conditions

OR2: payment options

OR3: pricing policy

**Ownership Status (OS)**

The ownership status of the B2B e-marketplace…

OS1: guarantees the smooth operation of the provided e-services

OS2: provides reliability to all the involved members

OS3: Your firm trusts the administrators of the B2B e-marketplace

**Profile and Extent of Participating Firms (PEPF)**

PEPF1: The participation of a large number of firms in the B2B e-marketplace is significant for your firm

PEPF2: The participation of worldwide leading firms in the B2B e-marketplace is significant for your firm