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# SME E-BUSINESS DEVELOPMENT: AN INTERACTION BASED APPROACH

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# **SME E-BUSINESS DEVELOPMENT: AN INTERACTION BASED APPROACH**

*Research paper*

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## **Abstract**

*E-business stage/maturity models for SMEs have been criticized for their predominantly technocentric and rather mechanistic character, not suited for this kind of firms. Based on a conceptual and qualitative research, the paper proposes an e-business development model to factor in the interaction sparked by the coming together of technology and organization. Given that e-business is distinguished by different levels of supplier/customer information exchanges, the model (tested in three small firms) envisages five digital and non digital interaction levels so that small business owners can better understand and evaluate the interplay of organization and technology in relation to business opportunities.*

*Keywords: E-business, SMEs, maturity model, non-linear stage model, digital and non-digital interaction, ICT competences*

## 1 Introduction

The past decade has seen Information Systems (IS) research address the adoption of e-business by small and medium-sized enterprises (SMEs). Thereby the literature shows a broad range of e-business definitions. Some equate it to e-commerce (Poon & Swatman 1999; Daniel & Wilson 2002; Rao et al. 2003; Magal et al. 2008), while other ones (Willcocks et al. 2000; Martin & Matlay 2001) rank e-commerce as merely one stage of the e-business stage model proposed or analysed. In this paper, we follow the definition of Taylor et al. (2004) and Zheng et al. (2004) and consider e-commerce as only a part of e-business. We also follow (Robeiro & Love 2003), who define e-business to be where “economic value creation and information technology (IT) come together and enable inter-organizational connectivity”. However, different from these latter authors, we replace the term ‘connectivity’ with the term ‘interaction’ to better convey the organizational nature of the exchanges. On the whole the IS studies identify several common factors and show that the implementation of an e-business model is primarily customer-driven, with smaller firms positioned at the early stages of the adoption sequence (Levenburg & Magal 2005). Improvements in competitive positioning have been observed when e-business investments are coherent with the SME’s environment, strategic objectives and technology management capabilities (Raymond & Bergeron 2008). According to research based on a survey of North American and European SMEs (Johnston et al. 2007), while Internet business solutions are adopted to improve performance and generate tangible financial benefits, these are unevenly distributed across regions, industries, technologies and firm size. This evidence has led researchers to suggest adopting a staged approach to maximize SME performance gains (ibid.). The level at which a firm has already incorporated e-business into its traditional operations is an important and decisive factor that spurs the scholars to advise adopting a maturity or stage (the two terms are used interchangeably in the literature) model to evaluate future e-business investments. In fact, while e-business can potentially keep competitive pressure in check, reduce costs and improve performance (Oliveira & Martins 2010), project implementation often suffers delays or failures (Kapurubandara & Lawson 2007; Magal et al. 2008). Thus, SMEs looking to invest in full-fledged e-business are offered stage models to serve as roadmaps. The aim of these models is to give the firms a yardstick with which to measure the specific conditions of each step of their digital journey and to identify the relative barriers and/or facilitators (Rao et al. 2003).

Some authors have questioned whether the use of stage models by SMEs is appropriate, claiming that these are not only too generic, i.e., incapable of responding to the diverse nature and needs of each firm, but also lack the support of empirical evidence (Alonso-Mendo et al. 2009). Moreover, other research suggests that there may be no sequential path to e-business adoption after all (Levy & Powell 2003).

The debate is important for at least three reasons. First, despite its ups and downs, the fact that the global economy has been recovering from the worst crisis in decades has led international organizations to study the key SME growth drivers, given that these form the majority of the world’s economic organizations and are fundamental to job creation and social cohesion. Financial inclusion and skill development and training are at center stage (OECD 2013a; OECD 2013b). Competence growth in information and communication technology (ICT) is included in a vast array of entrepreneurial, managerial, social, and technical skills that all need to be developed (Ashurst et al. 2011). Second, research shows clearly that ICT affects a multitude of sectors and activities and, even more importantly, makes other sectors more productive (Kretschmer 2012). Finally, a growing number of public decision makers are incorporating e-government and ICT-based policies into their action on an increasing scale (OECD 2011).

In this context, in which effective conceptual tools are needed to support the entrepreneurs, consultants, and policymakers, this paper sets out to first review the current literature debate in order to identify the pros and cons of the use by SMEs of stage (or maturity) models to implement their e-business

strategies. The authors then seek to surpass the techno-centric approaches that dominate the relevant literature by introducing a development model for SMEs to address and bring out their capabilities in e-business. The proposed model factors in the interaction sparked by the coming together of technology and organization.

The overall theoretical underpinning of the model is Orlikowski's principle of 'entanglement in organizational practice' of technology (Orlikowski 2007). The term 'interaction' broadly encompasses all the exchanges needed to coordinate the relevant actors, resources, and activities. Organization theory uses different approaches to shed light on the question of coordination and integration but, for the purposes of this paper, the processes of coordination indicated by Van de Ven et al. (1976) and Grandori and Soda (1995) seem to be particularly suited for SMEs, as argued in section three below. The relevant research on maturity models is based on the work of Poepelbuss & Simons (2011) and, for SMEs in particular, on research by Rao et al. (2003).

The paper is structured as follows. After this introduction, the second section provides the background literature, presenting a brief overview of the relevant literature regarding the e-business stage (or maturity) models, and identifying the strengths and weaknesses of the stage models developed specifically for SMEs focusing on the critical points of specific interest to this paper. The third section introduces a development model for SMEs to address and bring out their capabilities in e-business. In the following section three cases are presented to exemplify how the model can shed light on the approach of SMEs (particularly the smaller firms) to e-business. The model and its implications are discussed in the last section which includes final comments on the work done.

## 2 Background literature

Investments in technology represent often crucial decisions for small and medium sized enterprises (SME), especially for their potentially large impact on firm competitiveness (Grant et al. 2014). At the same time, investments in IT, related to the e-business adoption, are resulted in tangible financial benefits in customer development and e-marketing (Johnston et al. 2007). Hence, the e-business management is key in minimizing risks and in achieving a positive outcome (Janssen et al. 2003).

### 2.1 e-Business stage models: a brief literature analysis

A significant part of the literature regarding e-business in SMEs uses maturity (or stage) models. They suggest that an appropriate adoption and implementation of e-business is related, mainly, to the adoption of specific sets of digital technologies acquired in a sequence of steps. Based on the description of the prevailing scope of e-business this literature is grouped in the following three categories: integration-aware models, customer-aware models, and interaction-aware models.

- Integration-aware models (such as Poon & Swatman 1999; Martin & Matlay 2001; Willcocks et al. 2000) mainly focus on the technological integration of internal and external systems. In these models e-commerce is usually just one stage of e-business implementation. They have the aim of spurring SMEs to use the Internet to integrate their internal and external systems (i.e., e-mail, web presence, supply chain integration, etc.). Their primary focus is on the adoption of technology, hence their basic value is the "capacity to offer a simple means of benchmarking ICT activity" (Beckinsale & Ram, 2006:850)
- In customer-aware models (such as Chaston et al. 2001; Burgess et al. 2005) e-commerce is the main focus but it is only one aspect of the e-business operations of the firm. These models target predominantly customer-side communication and web-site development. The main aim is to provide guidelines to SMEs that want to exploit digital technology to enhance customer relations. The basic idea is to develop the firm's website to enable customers to select products and services, transmit purchase orders and make online payments. Unlike the integration-aware models, these models address exclusively the e-commerce planning and development stages but no successive e-business steps.

- In interaction-aware models (such as Rao et al. 2003; Daniel & Wilson 2002; Magal et al. 2008) digital technology supports the interaction of multiple actors. In this category, e-business maturity models have the same key objective: to guide SMEs in the adoption of e-business applications that increase the efficiency and effectiveness of the firm's interaction with all its stakeholders, not just its customers. However, only few of them (such as Rao et al. 2003) include the organizational implications into the interaction perspective by acknowledging the existence of non-technological facilitators (e.g.: the firm's commitment to leverage e-business to achieve its strategic goals) and barriers (e.g.: costs, employee resistance to IS use).

## 2.2 Discussion on e-business stage models: comments and criticisms

A growing number of authors have questioned whether the use of stage models by SMEs is appropriate, claiming that these are not only too generic, i.e., incapable of responding to the diverse nature and needs of each firm, but also lack the support of empirical evidence (Alonso-Mendo et al. 2009). Moreover, other research suggests that there may be no sequential path to e-business adoption after all (Levy & Powell 2003). Martin and Matlay (Martin & Matlay 2001) argue that the stage model-based approach is misdirected and likely to fail. According to Zheng (Zheng 2004), stage models (e.g., that of Willcocks et al. (Willcocks et al. 2000)) are more relevant and useful for large firms rather than SMEs. Indeed, such models do not take account of the variety and uniqueness of smaller firms. As Taylor and Murphy (2004) argue – that the maturity models take exclusively a technological approach to the adoption of e-business. Moreover, the models often assume a sequential and progressive engagement with e-business information technology. Given the business diversity of SMEs, we need to improve our understanding of how these firms recognize and develop business opportunities generally, and not just the ones that might or might not be associated with a particular set of technologies (Taylor & Murphy 2004). Indeed, Levy et al. (2003) argue that e-business adoption cannot be modelled as a sequential process precisely because SMEs might decide to implement only certain Internet applications, in line with their growth and business value goals. Also Zheng et al. (2004) argue that e-business adoption by SMEs depends mainly on their strategic focus, on the owner's knowledge of IT opportunities and on customer pressure, rather than on the requirements of a specific stage.

In short, the fact that SMEs tend to adopt technology in a discontinuous way, taking a non-linear, stage-by-stage progression path (Fillis et al. 2004), means it is necessary to build more realistic models to overcome mechanistic approaches.

## 3 A non-linear, interaction-based development model for e-business

The main aim of the proposed non-linear development model is to incorporate the interactions of the organization. As mentioned in the introduction, the term 'interaction' broadly encompasses all the exchanges needed to coordinate the relevant actors, resources, and activities. The model (see Figure 1, below) focuses on five aspects: (1) integrating interaction, (2) marrying technology to the organization, (3) newly defining e-business, (4) integrating interaction intensity, and (5) dividing interaction into three areas.

Integrating interaction. It refers to the need of integrating the digital and the non-digital modes of interaction<sup>1</sup> used by the individuals, teams and units of an organization to communicate internally and externally in the pursuit of the firm's business objectives. The concept of interaction is indeed relevant

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<sup>1</sup> Figure 1 shows only the digital levels of the interaction; the figures shown in section 4 below "Three examples of application of the model" incorporate also the non-digital levels of interaction.

in organization theory which uses different approaches to shed light on the question of coordination and integration. The aims of this paper suggest to draw on the processes of coordination indicated by Van de Ven et al. (1976) and Grandori and Soda (1995) to show why this concept is particularly relevant for SMEs. The former authors, in further developing the work of Thompson (1967), tackle coordination mechanisms at the unit level, taking account of task uncertainty, interdependence and unit size to conclude that the use of group coordination (mutual adjustments based on scheduled or unscheduled meetings) is higher and more effective when the unit size is smaller and uncertainty and interdependence are higher. This situation is typically that of an SME, the average size of which is below 10 employees and has a workflow that is basically an arrangement where ‘the work is undertaken jointly by unit personnel who diagnose, problem-solve and collaborate in order to complete the work’ (Van De Ven et al. 1976: 325). The latter authors, Grandori and Soda (1995), in taking stock of network theories and frameworks, underscore that: ‘In order to maintain long-term cooperation, repeated sequential communications, decisions and negotiations must take place’ (p. 194). Of course, networks are of the utmost importance to complement the limited resources and capabilities of small firms and to enhance their scope of innovation (Gardet & Fraiha 2012: 216). This emphasizes the crucial dimension of ‘interaction’ in SMEs, the cornerstone for developing their relational capital via the exchanges (based on cooperation and trusting attitudes) with other organizations and individuals (partners, suppliers, clients, institutions). Furthermore, the literature argues that ‘relational capital’ is a key aspect of industrial districts because it fosters collective learning (Capello 1999) and innovation (Capello & Faggian 2005; Molina-Morales & Martinez-Fernandez 2006). Other researchers find that social capital (with its fundamental relational aspects) can positively affect the effectiveness of decision making in small firms (Jansen et al. 2011). Other qualitative research underlines the relevance of social network relationships in open innovation contexts, particularly for spin-off SMEs (Padilla-Melendez et al. 2012). More generally, the specific nature of SME innovation is strictly correlated to their ability to respond to the changing needs of the market by forging close relationships with clients (Whitley 2000), which entails a high level of client interaction.

Marrying technology to the organization. The model marries technology to the acts of organizing (and vice versa) and, specifically, to achieving the firm’s strategic goals. In other words, the existing business models can only be improved on if the focus is “redirected away from ICT as an end in itself towards ICT as a means to an end, i.e., realizing business opportunities, generating profits and creating wealth” (Taylor and Murphy, 2004: 288).

Newly defining e-business. Building the model on the view that technology is not an end in itself but a complement to the business and organizational activities allows for a redefinition of e-business as the pursuit by the relevant internal and external actors of different levels of (digitally supported) interaction with the aim of exchanging information and knowledge significant to the objectives and operations of the business.

Integrating interaction intensity. Taking into account potentially different levels of technically feasible and organizationally rewarding interaction involving diverse types of actors, the model emphasizes not only the number of actors and ‘areas’ (better defined below) involved in the interaction processes, but also the intensity of their interactions. For example, a ‘low’ level of interaction identifies a situation where only one party to the exchange has access to the information or knowledge and has no or little power to intervene on either the content or the method of interaction. At the other end of the scale, the ‘complete’ level of interaction encompasses most of the relevant actors (employees, suppliers, customers, public administrations, etc.) that a firm has to deal with in the pursuit of its business and which might play an active role in its processes. However, the ‘low’ level must perforce be preceded by a ‘basic’ level of interaction to underscore how the firm’s internal levels of interaction do matter to e-business as these are prerequisite to more effective interaction with the external actors. Indeed, it is reasonable to presume that higher levels of interaction in information and knowledge exchanges with external actors can be achieved only when the internal actors have already reached an adequate level of interaction among themselves. The point here is that the internal actors must become accustomed to

using the techniques that improve social interaction and collaborative work, especially when ICTs are involved.

Dividing interaction into three areas. The identification of these areas follows the user interaction spaces classification provided by Kim et al. (2011): the business-to-employee-to-business space (for business organization, its employees and its partners such as suppliers and distributors), the business-to-employee-to-consumer space (for business organization, employees and consumers), and the business-to-employee-to-employee space (for business organization and its employees). The key interaction areas of the model are defined as follows: the ‘input interaction area’ (where the SME relates to individuals and organizations that supply intermediate goods and services); the ‘output interaction area’ (the management of customer relations); and the ‘core interaction area’ in which the firm’s processes transform the relevant inputs into significant outputs. The higher the number of actors and the degree of active participation, the more complex the technical and organizational implications become. Conversely, it is not unusual to find that one individual (i.e. the owner) manages all supplier and client activities of the smaller firms (i.e., both input and output interaction areas).

The five levels of the proposed model do not represent a sequence but the interrelated actions undertaken by a firm to implement e-business. The actions may be subject to change over time because entrepreneurs tend to change their objectives, in line with the evolution of the business environment and advanced ICT becoming available.

The time factor and the non-sequential nature of the interaction levels of the (non-linear) model better reflect how an SME may want to go about its business. Typically, it maintains a flexible approach to adapt its level of interaction to the opportunities that arise with different partners.

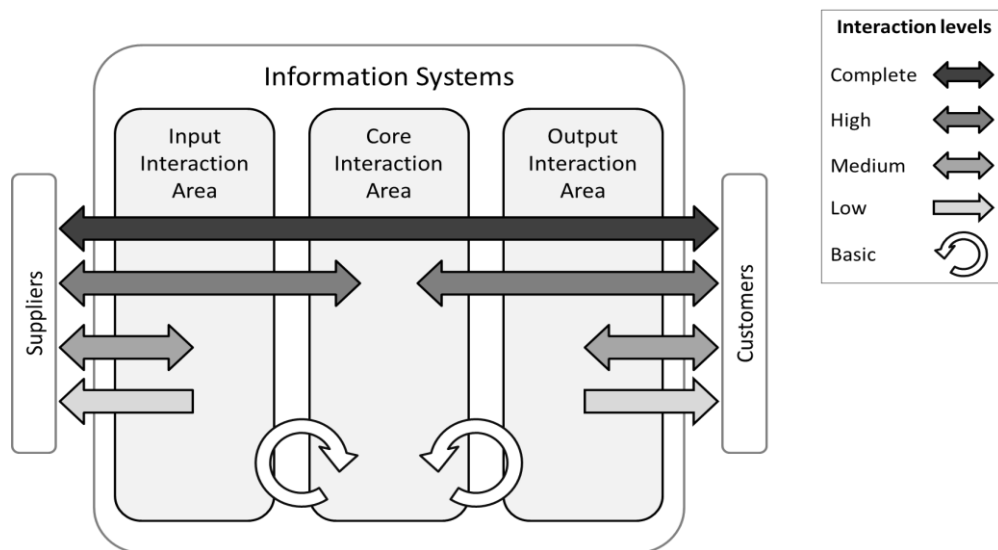


Figure 1: The interaction-based development model for e-business.

Most stage models are mechanistic because they split the development of an SME’s e-business into sequential steps. Instead, the non-linear model developed here leaves room for the decision-makers (entrepreneurs and public authorities) to interpret a given situation based on the previous (and possible future) evolution of the interplay of ICT and organizing activities (including strategy and policymaking) and to identify the best, most rewarding level of interaction. Here a supportive rather than a prescriptive model is proposed. According to Levy and Powell (2003: 181) ‘SMEs are unlikely to follow a stages model’ because entrepreneurs decide to ‘adopt Internet’ on the basis of the expected business value rather than on a given maturity level. The ‘levels of interaction’ of the proposed model are ‘markers’ that enable an entrepreneur to make sense of prior experiences and/or to select the e-business solution appropriate for her organization and objectives.

In what follows the four levels of interaction (beyond the ‘basic’ one) are described:

- Low level: minimal interaction with each actor communicating exclusively ‘one-way’ in one of the three (input, core and output) areas. Information is published and accessible to authorized individuals or organizations. Examples are website brochures for customers or online supplier order forms with transactions completed via traditional methods.
- Medium level: this level concerns a specific area of the firm but the interaction is ‘two-way’. Examples: i) interactive website functionalities for customers in the ‘output area’ (e.g.: chat, forum to exchange information on products or services); ii) intranet for firm employees; and iii) online procedures to exchange information on goods or services provided by suppliers in the ‘input area’.
- High level: at this level there is a two-way interaction among subjects that operate in two different areas (core and input or core and output). Examples: i) an e-commerce portal used by customers to buy products or acquire services that requires the core area to complete the sale process (billing, payment and delivery); ii) the firm has software modules that allow suppliers to interact with the procurement office to finalize the purchasing process.
- Complete level: two-way interaction involving several actors and all areas. For example: i) an e-commerce application that enables customers to buy personalized products and that creates an internal information flow while simultaneously generating an order to be transmitted to one or more suppliers; both the purchase and the sale are completed in the core area, while customers can track the progress of their order; ii) supply chain management systems when the firm is a link in the value chain.

The model allows for different interaction levels in both a single area and between different areas. Indeed, a high interaction level can involve two areas (e.g., when e-commerce functionalities require a high level of actor interactions only in the core and output areas), while the others remain at a low or a medium level.

Further, the model is not subject to a preconfigured set of technologies: it is not dominated by the “how” and the “where” of infrastructure and application management. Thus, the firm can adopt the kind of technology better suited to support a chosen level of interaction.

#### **4 Three examples of application of the model**

Three cases of application were analysed to exemplify the use of the interaction-based model where: ‘interaction’, ‘interaction levels’ and ‘interaction areas’ seemed appropriate perspectives from which to address an SME e-business development.

The three cases were identified based both on the institutional data used by the two authors for their ongoing research and on the following criteria: i) the firm had been in business for at least ten years and had a substantial business history; ii) its sales are distributed evenly among a significant number of clients (with respect to total revenue); iii) at least one of the three firms operates in the ICT industry; and iv) the SMEs employ ten or less people (inclusive of the business owner). Only Italian firms (given fictitious names in the paper) were sampled: a small real estate development company (Case Study 1); a small software house (Case Study 2); and a restaurant (Case Study 3). In the first half of 2013, the authors held interviews (guided by the model) with the founders and business owners of the three SMEs, although in Case Study 1, the founder (the father) of this family run business delegated one of the other owners (his son) as the respondent.

A reminder, here, that the figures shown below represent both the digital and non-digital levels of interaction relative to the three firms, and not solely the digital interaction as represented in figure 1 above.



#### 4.1 Case Study 1- 'Constructa'

'Constructa' is a small, family-owned firm that operates in urban development, in particular, residential and commercial building projects, and has been in business for thirty years. The family, specifically, the founder and his two sons (the entrepreneurial group or 'EG'), are assisted by three full-time employees (secretary and two accountants or 'Staff') and five professionals, for whom Constructa is their major client (core professionals or 'CP').

In order to define the three case-specific interaction areas, it was necessary to identify the firm's core activity phases:

1. Preliminary Investigation Phase (PIP). Once the town planning office has approved a urban development project, a geographical site is identified and an intense level of interaction engages Constructa with the relevant local government departments to obtain the legal permits; this entails a great deal of red tape and the long, drawn-out process is managed personally by the EG assisted by the office staff.
2. Design Phase (DP). The work of this phase is mandated to the CPs, also responsible for contacting and organizing a range of experts specialized in area such as urban planning, geology, archaeology, architecture, structural design, and safety management. In this phase, the design development and construction documents are prepared.
3. Building Phase (BP). This is the phase in which the different contractors are selected and hired for each work area (e.g., water, sanitation, electrical systems); the contractors are managed by the site manager under the supervision of an architect (CP), usually the one responsible for the design phase.
4. Sales Phase (SP): property sales are managed by an external agency, which sometimes starts the sales campaign before the building work is completed to accommodate any buyers who wish to customize their new property.

The success factor of Constructa is its interaction with the local government in the PIP and its method of coordinating the CPs (who manage the contractors during the next phases in the Input Interaction Area) and the sales agents (Output Interaction Area). The Core Interaction Area managed by the EG and the Staff is made up of the interaction with the town planning officers, CP coordination and providing the sales agent with the necessary information and support.

The four core activity phases of Constructa's business operations define the levels of interaction that connect the different areas and actors, besides the digital tools that complement them. As shown in Figure 2, below, the digitally supported level of interaction never rises above 'medium'. In fact, all the firm's communications and interactions are basically non-digital (phone or face-to-face meetings).

As indicated in Figure 2, Constructa uses the e-mail across all three interaction areas (to exchange draft contracts or projects with suppliers, i.e., the professionals, experts and contractors, for internal staff correspondence and for client correspondence). The Output Interaction Area is where the sales agent interacts with the potential buyers through the launch of the project website used to showcase the property. The website provides contact information, the project's history, directions to the site location, property information and images, and any other facilities that might be offered. The website is basically one-way interaction ('low' interaction level) even though potential buyers are given the option of sending the property agent their contact telephone number. Constructa does not believe a corporate website would add value to the business.

The Core Interaction Area envisages the higher use of digital tools: an ad-hoc software application for accounting and a file-sharing system. More recently, a shared electronic calendar was adopted by the EG and the CPs for appointments, meetings, deadlines, and contact information in response to the need for timely information to coordinate activities effectively. Previously, the founder and main scheduler would sometimes forget to pass on relevant information, causing inefficiencies and some

missed opportunities. It was therefore necessary to remedy this glitch and the secretary is now responsible for getting his schedule and posting it on the electronic calendar.

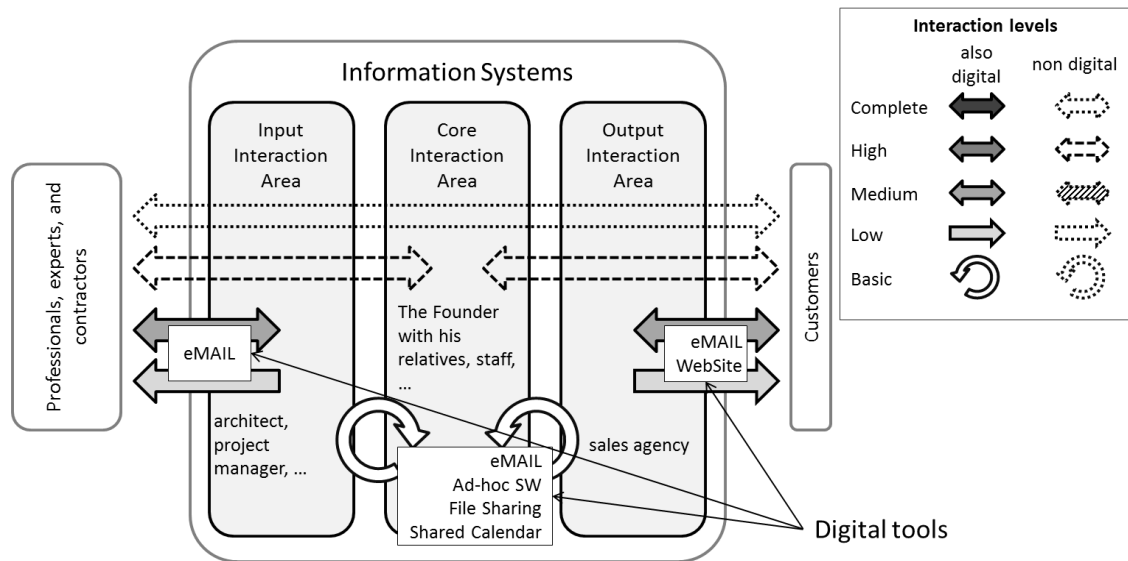


Figure 2: Constructa - digital and non-digital interaction levels

Given that Constructa relies mostly on non-digital interaction (i.e., face-to-face or phone communication), the use of paper is important. For example, during the building phase the contractors use a construction site ledger to record all the activities relative to the Input Interaction Area. There is almost no direct interaction between the suppliers and the buyers: the ‘complete non-digital interaction level’ is reached only when a building is sold prior to completion, making it necessary to outsource the buyer’s customization requirements to a specific contractor.

The digitally complemented interaction is based on simple tools (email, accounting management tools, file-sharing and office automation) with the firm’s internal skills related to their use, while external consultants are used for ICT administration, configuration and upgrade. The resources (servers, PCs and other IT equipment) are located at corporate headquarters. Only the web server (for hosting the project websites) and the mail server are provided by an ICT service provider.

#### 4.2 Case Study 2- ‘Softer’

‘Softer’ provides ICT training and software development services. Launched in the early 2000s, its initial focus was on training (partner of Sun and then Oracle). After five years Softer started to develop proprietary software applications (first for B2B then for B2C) using the innovative technologies taught in its courses, with the dual aim of enhancing its teaching activities and of pursuing new business opportunities. In 2010, Softer decided to base its development activities and training on Apple, with a growing interest in mobile apps. Presently the firm employs a total of six people (developers and instructors) plus a part-time accountant and an accountancy consultant to prepare the financial statements (a ‘cloud’ application developed internally serves both of them).

The interview concerned the owner who personally manages key client sales, leveraging his technical and teaching expertise. He assigns the smaller potential clients (especially for the mobile apps market) to five part-time sales agents paid on a commission basis. Two types of interaction take place in the Output Interaction Area: i) the owner’s interaction with the key clients and sales agents (the latter use an e-calendar for their business appointments); ii) the instructors’ interaction with the students. The former consists of face-to-face meetings, phone calls and e-mail correspondence; the latter work in the classrooms organized at the clients’ premises. Products and services are showcased on the company’s website and on the pages of the most visited social networks (e.g., Facebook, Google+). In the Output

Interaction Area (see Figure 3), the digitally supported interaction does not rise above the ‘medium’ level, while the non-digital interaction hits the ‘complete’ level only when the design and the clients of Softer’s training courses create further opportunities for Apple.

The Core Interaction Area is where the new training courses and the new software are developed. The traditional white board is the main driver of employees’ interaction, on which these latter post different coloured sticky notes with information on the matters discussed in the daily meetings; video conferences are used occasionally to bring agents or external colleagues into the discussion. The Agile approach taken by Softer means that the software it develops is organized by weekly objectives so the firm perceives no need for a shared calendar or planner. The e-mail is used to track exchanges of information and two servers support software versioning and document and file-sharing.

The employer is the main actor in the Input Interaction Area, responsible for managing relations with Apple and other corporations that might be interested in a business agreement and hardware and software procurement, using the telephone and the e-mail or sometimes the Internet. However, small orders for specific needs can be placed by the employees so long as the supplier is known and reliable.

As summarized in Figure 3, the Softer case study attests that, despite the firm having the appropriate ICT competences the owner finds face-to-face interaction to be more effective than innovative cooperative work tools: its business aims often call for resolving installation, management and updating issues. Interestingly, during the interview, Softer’s owner showed a proprietary mobile app the firm had developed specifically for restaurants marketed through its sales agents. The app enables the customer to view the seating areas of the restaurants that bought the app, choose a table and book it via the Internet. At the time of the interview, the mobile app had been adopted by about 70 restaurants across ten of Italy’s major cities. Case Study 3 is based on the analysis of the e-business of one of those restaurants.

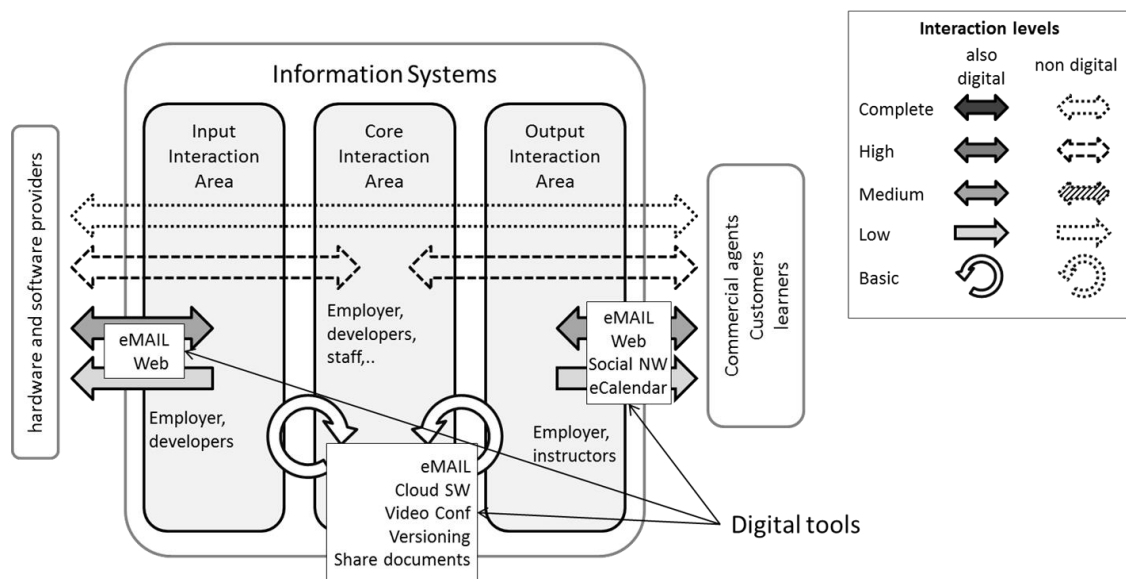


Figure 3: Softer - digital and non-digital interaction levels

#### 4.3 Case Study 3 – ‘Bistrot’

‘Bistrot’ is a small restaurant that has been run by the same two partners for 27 years. One partner is the chef (with one/two assistants) while the other manages the dining room and two serving staff (three at peak times). The interviewee was the latter partner. Bistrot is located in the city’s historical centre and can seat up to 60 customers in winter and about 100 in late spring and summer when the garden is open. The cuisine is typical to Northern Italy and is based on the traditional recipes of the chef’s home town. The eatery adopts a friendly style of interaction to relate to its customers, hence the

partner and dining room manager first describes the variety of dishes on the menu and the restaurant’s philosophy of serving only authentic fare and then leaves the waiter to key in the order on a handheld device and transmits it to the kitchen. The restaurant website gives its location and a description of the cuisine in Italian and English and the customer can use a smartphone app to make a reservation. The app displays the restaurant’s dining arrangements and indicates the vacant tables and number of seats, alerts the partner via his smartphone when a customer makes a booking and is then used to confirm the table reservation and to update the seating plan. The respondent explained how useful the app is during the tourist season, when travellers from different countries often choose restaurants after checking the reviews posted by the specialized tourism and travel websites (e.g., Trip Advisor), with the app crossing the language barriers that often crop up on the phone. Even Bistrot’s Italian clientele choose the app over the telephone (although this remains a firm favourite) when they are part of a group that wants to decide the booking together instead of leaving just one person to call the restaurant.

Figure 4, below, shows how the interaction of the chef with suppliers in the Input Interaction Area is non-digital, although the level qualifies as ‘medium’ due to the frequent questions and suggested menu options. Further, the Core Interaction Area and the Output Interaction Area are connected by ‘digital high’ interaction levels due to the combined presence of the personal and the digital (handheld devices) and the fact that the booking app enables communication with non-Italian speaking customers or potential customers.

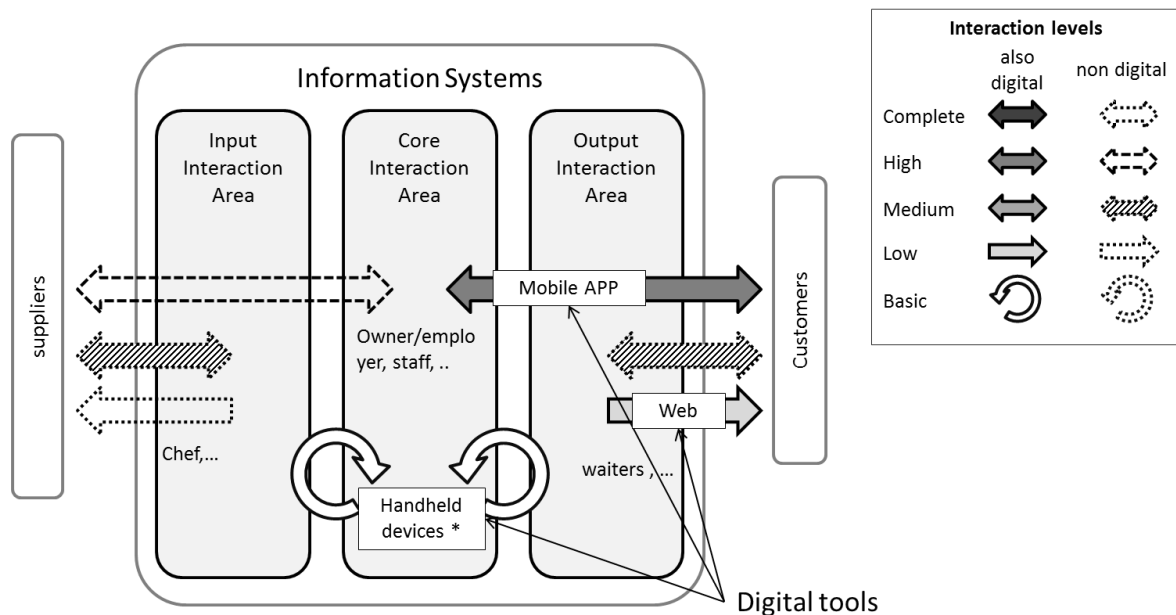


Figure 4: Bistrot - digital and non-digital interaction levels

## 5 Discussion and conclusions

The authors have formulated a non-linear, interaction-based development model for SMEs in order to complement previous techno-centric models focusing mainly on a mechanist perspective of e-business maturity models. E-business is conceived as a multi-level ICT-supported interaction between the relevant (internal and external) actors of an SME. With its interpretive and supportive design the proposed non-linear model aims at guiding business owners and advisors in implementing an SME e-business strategy that effectively meets business needs. Even though it is developed to better support the process of digitization of smaller firms, the proposed model is actually an enterprise model for SMEs based on interaction levels: the main supportive literature is cited in the subsection ‘integrating interaction’ above. Here, its usefulness in complementing other approaches is briefly shown by reference to

the work of Osterwalder and Pigneur (2011) and to the Viable System Model literature (Beer 1984; Hoverstadt & Ward 2010). The first authors are concerned with the identification of the key components of a business model, which constitute their Business Model Canvas, and with the iterative process that allows for an appropriate model to be built. They warn entrepreneurs not to stop at their initial business model but to “iteratively adapting [it] in response to customer feedback” (p. 71) — which indeed underlines the role of the ‘output interaction area’ in this paper. Of the complex architecture and evolution of systems that are viable, that is “capable of independent existence” explained by Beer (1984:7), one basic rule is of interest here: the way a system, with its subsystems, *interacts with its environment* is key to his viability (paraphrased, *ibid* p. 14). Within the systemic approach, Hoverstad and Ward (2010) highlight the interactive and generative character of organizations: “organisations have multiple purposes which are emergent properties of the system. For us to understand how the organisation works as a system, we need to be able to model multiple purposes, how these interact and how they have been generated by the system, are being generated currently and are likely to be created in the future.” (p. 4). In this paper, the proposed model is non-linear exactly because it acknowledges the fact that the interactions of the firm both within itself, among its subsystems, and with its environment generate emerging needs and purposes; these may give rise to novel levels of interaction and digitization. Finally, Hoverstad and Ward (*ibid*. p. 5), drawing on the work of Humberto Maturana (2002) on structural coupling, underscore that the identity itself of a system (e. g. an individual, a firm) can be viewed through the relationships it engages with other entities: “When one system is an important part of the environment of another system and vice versa the second system forms an environmental element for the first, clearly when one system changes the other will tend to change too.”... “The definition of identity then is by reference to the key relationships the system has with its environment.” In the model proposed in this paper the importance of mutual influence among actors (actually ‘systems’) is in fact acknowledged in the subsection ‘integrating interaction intensity’ above depicting four possible interaction levels (low, medium, high, and complete) in the relationships engaged by an SME.

In sum, the three cases show how the model downsizes the role of technology to refocus the decision-makers on the relationship between business aims, organizational capabilities and communication requirements, a highly important issue for an SME that operates a flexible operating structure. The proposed model helps the business owners to clarify and better understand what kind of interaction levels exist between the relevant actors in the pursuit of the firm’s goals and to identify the best mix of digital and non-digital communication methods to support their work. In other words, the model redirects the focus of the entrepreneur from the search of a technology per se to a more meaningful question: “What business and organizational requirements are needed to build a more effective and efficient relationship (i.e., an appropriate level of interaction) with my clients and suppliers? Consequently, what are the critical ICT enabling features and competences?”. Indeed, the cases show that familiarity with IT is not decisive in adopting (or in extending the use of) e-business: Softer resorts less than Bistrot to digital supports. The three small organizations seem to be ‘interaction driven’ rather than ‘digital technology driven’ in their approach to e-business.

Policy makers can use the model to sidestep the technological bias when assessing the current state of play of e-business development in the SME universe and, hence, to aid the formulation of the actions needed to support the SMEs in developing a digitally oriented business.

Finally, as further step, it could be interesting to investigate how the levels of digital interaction depicted in the proposed model (Figure 1) are related to variables such as the industry in which the SME operates and the firm size.

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