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The impact of the *digital divide* on the perceived interest of an e-Marketplace to support healthcare and social care services

Isabel Miranda[a]*, Maria Manuela Cruz-Cunha[b,d], João Varajão[c,e], Ricardo Simoes[b,f]

[a]Municipality of Guimarães, 4800 Guimarães, Portugal
[b]Polytechnic Institute of Cávado and Ave, Campus do IPCA, 4750-810 Barcelos, Portugal
[c]University of Minho, Campus de Azurém, Guimarães 4800-058, Portugal
[d]CGIT Research Centre, University of Minho, Guimarães 4800-058, Portugal
[e]Algoritmi Research centre, University of Minho, Guimarães 4800-058, Portugal
[f] Institute for Polymers and Composites—IPC/I3N, University of Minho, Campus de Azurém, Guimarães 4800-058, Portugal

Abstract

In a Europe increasingly aging, it is now recognized the importance and potential of the service industry for *ageing well* based on information and communication technologies (ICT), as exemplified by the electronic market of social services and health care, the *GuiMarket*, proposed by the authors. However, this new range of services requires that individuals have advanced digital skills to fully participate in society. Based on the results of a survey made on a sample of 315 individuals, this paper discusses the importance granted *GuiMarket* and the intended frequency of use, concluding there is a close relationship between ICT access and use that respondents anticipate making of *GuiMarket* and alike services.

Keywords: GuiMarket; e-Marketplace; healthcare; social care; digital divide; ageing well.

* *E-mail address:* isabel.miranda@cm-guimaraes.pt

1. Introduction

The authors developed a study aiming the definition and implementation of an e-marketplace for healthcare and social care and well-being services in a municipality of the North of Portugal with circa 160,000 inhabitants, 54,000 of which in its urban area. The project, called *GuiMarket*, was developed envisaging people with special needs (elderly or with temporary or permanent disabilities), their caregivers, their family and institutions, besides the fact that most of the services to be provided by this e-Marketplace can be used by the inhabitants in general.

Literature suggest that Assistive Technologies and Information and Communication Technologies (ICTs) may improve quality of life, extend length of community residence, improve physical and mental health status, delay the onset of serious health problems and reduce family and care-giver burden [for example 1, 2-4].

The effectiveness and efficiency in the delivery of social and health care services and the well-being of the users of these services is based on a correct coordination between the offer (the service providers: individual professionals and organizations) and demand (individuals and organizations) to address to their specific needs and expectations. The services include the so-called physical care, such as domestic work, home care, personal care services and wellness, physiotherapy, nursing services, transport, catering, among others.

There is a wide range of assistive technologies that can contribute to this purpose, such as portals and search engines. The proposed electronic market is an integrative environment, able to identify the needs of the users passed through a platform and the allocation of service providers to meet these needs, integration and management, performance monitoring and evaluation, and the enforcement of commitments. However, the full exploitation of an electronic service of this nature depends on the broader access to ICT and the ability to use them.

This article discusses the relevance and interest of this e-Marketplace as an interface between providers of health care and social care services and their users, based on the results of a broad study of needs and expectations of potential users, relating them to the access and ability to use information technology. One goal of the study was to confirm the existence of a relationship between the *digital divide* and the motivation of the population for the utilization of such service, as well as their willingness to use it.

The article is organized as follows. Section 2 presents a brief literature review and framework of the aspects under study, and section 3 briefly introduces the proposed electronic market. Section 4 presents the methodology of the study and the research questions, which are discussed in section 5. The paper concludes with a final discussion and conclusions in section 6.

2. Background: *Digital divide* and ageing of populations

Europeans live longer than ever, but demographic ageing has its downsides. According to the "Ageing Report" [5], by 2060 one in three Europeans will be over 65; the population aged 65 will almost double, rising from 87.5 million in 2010 to 152.6; and the number of people in the 80-and-over age group is projected to almost tripling from 23.7 million in 2010 to 62.4 million in 2060.

The rate of health care expenditure is rising fast in almost all OECD countries, causing increasing concern among politicians [6]. Growing demands on welfare services due to an ageing population is leading policy makers to suggest the use of ICT as a support to a cost-effective delivery of social and health care [7].

One of the goals of the reforms in the European Healthcare systems over the last two decades has been to make them more demand oriented. Several studies as well as official documents evidence that Internet and telecommunications technologies and infrastructures may contribute significantly to health care system performance [8-12].

The industry for *ageing well* must invest and innovate at a European level and scale – in close cooperation with users and consumers [5]. And all of us must get smart and feel empowered to integrate ICT-products and services for *ageing well* in our private lives and professional practice.

Over 50% of Europeans use the internet daily but 30% never did! Moreover, disabled persons face particular difficulties in benefiting fully from new electronic content and services. As ever more daily tasks are carried out online, everyone needs enhanced digital skills to participate fully in society.

The Digital Agenda [13] is well aware of this issue. The *digital divide* refers to the differences among individuals, enterprises, regions and countries in terms of access and utilization of ICT [14-18].

3. GuiMarket

GuiMarket is an e-marketplace of healthcare and social care resource providers to facilitate the matching between users looking for service providers and individuals / institutions offering their resources, in a context of geographical proximity. *GuiMarket* facilitates the matching between the services providers (the offer side) and the individuals or entities that look for services to satisfy their needs (the demand side), in a context of geographical proximity.

As a consequence it is expected to assure more flexibility and quality of live to individuals that for any reason (incapacity temporary or permanent, age, etc.) should stay at home can find in the platform many of the services that they require for their day-to-day life. A wide set of services can be offered, and were already identified in a parallel study.

4. Methodology and sample

The authors conducted an extended study throughout the months of April and May 2012 in different parishes of the municipality of Guimarães - parishes of urban, industrial and rural characteristics - in order to identify: The importance perceived by the inhabitants of the municipality regarding the deployment of an e-Marketplace of health and social care services; The expected utilization of the proposed e-Marketplace; The services that the residents recognize as more relevant (or more necessary).

The results of the study allow to understanding the feasibility of the solution and the types of services to offer, considering the development of a platform prototype for validating the use of this innovative solution in the field of social assistance in the form of an e-marketplace of social services and health and welfare services.

Table 1. Respondent demographics

Characteristics		N	%
Age groups	< 30 years old	51	16.2
	30 - 39	74	23.5
	40 - 49	59	18.7
	50 - 59	68	21.6
	60 - 69	44	14.0
	70 or more	19	6.0
	Total	315	100.0
Level of education	Illiterate	11	3.5
	Incomplete primary education	157	49.8
	Complete primary education	59	18.7
	Secondary education	49	15.6
	Higher education	39	12.4
	Total	315	100.0
Owning a computer and Internet access at home	Have a personal computer at home	243	77.1
	Has Internet access	223	70.8
	Does not have Internet access but has someone to help to solve a problem if there is the need of Internet access	31	9.8
Frequency of Internet utilization	Never	131	41.6
	Rarely	16	5.1
	Sometimes	49	15.6
	Often	41	13.0
	Everyday	78	24.8
	Total	315	100.0

Alongside the study intends to analyze the extent to which the access and use of ICT affects the project. Understanding the dependence of the perceived interest on the platform and the sample characteristics (such as age, educational level, owning a personal computer and Internet access, among other possibilities), that is, the relationship with the digital divide.

The methodology consisted of gathering information from a stratified random sample of residents of a number of parishes on the perceived interest of the electronic marketplace, its expected use and the services deemed most relevant, together with the demographics of the sample considering age, education, internet access, possession of a computer and internet usage. The information collection was performed at different times of day and different places of each parish, to encompass a high diversity of people and also to fulfill the defined stratification by age. It was used a semi-structured interview based on a questionnaire with open questions and closed questions.

The sample is layered beginning at the age of 18. Of the 333 interviews, 18 could not be considered. Some demographic data of respondents is summarized in Table 1. It should be noted that it was a prerequisite for being respondent, to be currently or have already been a caregiver, or cohabit with people with special needs.

5. Research questions and discussion

Based on the objectives of the project, several research questions were identified and several tests of hypotheses were made. In this article the following hypotheses are examined: H1: There is a relationship between demographic characteristics of the sample and the importance granted to *GuiMarket*; H2: There is a relationship between demographic characteristics of the sample and the expected use of *GuiMarket*; H3: There is a relationship between access to ICT (possession of personal computer, internet access, and be internet user) and the importance recognized to *GuiMarket*; H4: There is a relationship between access to ICT (possession of personal computer, internet access, and be internet user) and the expected use of *GuiMarket*.

5.1. Importance granted to GuiMarket and the demographic characteristics

As shown in Table 2, the degree of importance is associated with the age of respondents ($\alpha < 0.05$). The younger (<40 years) attribute a higher degree of importance. Additionally, and despite nearly all respondents considered the creation of *GuiMarket* as "important" or "very important", the degree of importance is associated with the level of qualifications of the respondents ($\alpha < 0.01$), noting that the holders of higher level qualifications give greater importance. Thus, hypothesis H1 is validated.

5.2. Expected utilization of GuiMarket and the demographic characteristics

The intended use, or frequency of expected use is related to the age of respondents ($\alpha < 0.01$) and with the educational level ($\alpha < 0.01$), validating hypothesis H2. Noteworthy the youngest are those who intend to use services more frequently, as do the inquired with higher qualifications.

Table 2. Correlation with the demographic characteristics (age and qualifications)

		Age groups	Level of education
Importance granted to GuiMarket	Spearman's Correlation Coefficient	-0.141*	0.282**
	Sig. (2-tailed)	0.012	0.000
Expected utilization frequency	Spearman's Correlation Coefficient	-.209**	0.278**
	Sig. (2-tailed)	<0.001	<0.001
N		315	315

* correlation is significant at 5%
** correlation is significant at 1%

5.3. Relationship between the use of Guimarket and digital exclusion

The results obtained and presented in table 3 allow the confirmation of the hypothesis H3 and H4. The importance assigned to *GuiMarket* directly depends on the fact that having a computer at home with internet access and depends on being internet user or having someone who can access for themselves. Likewise, to own a personal computer and being an internet user is determinant in the intended frequency of use.

The *digital divide* is translated by not owning a personal computer with internet access, or not being an internet user. It is reflected into a lower importance recognized to *GuiMarket* and in a lower intended frequency of use.

Table 3. Correlation with access to ICT

		Has a computer at home	Has Internet connection	Is an Internet user	Has an Internet user nearby
Importance granted to GuiMarket	Spearman's Correlation Coefficient	0.125*	0.161*	0.297**	0.167**
	Sig. (2-tailed)	0.026	0.04	<0.001	0.003
Expected utilization frequency	Spearman's Correlation Coefficient	0.173**	0.127**	0.300**	0.363**
	Sig. (2-tailed)	0.002	0.0025	<0.001	<0.001
N		315	315	315	315

* correlation is significant at 5%
** correlation is significant at 1%

6. Conclusions

The results demonstrate a relationship between the variables level of qualification and age and, on the one hand, the importance recognized to an e-marketplace as *GuiMarket*, and on the other, the use that respondents intend to do of *GuiMarket*. The younger and the holders of higher levels of qualifications are the ones that classify the service as "very important". If in a Europe increasingly ageing, the importance and the potential of the service industry for *ageing well* based on ICT is recognized, this study demonstrates that the issue of the *digital divide* cannot be diverted from the priorities of the European agenda. The expected impact of such products and services on the well-being and quality of life of the population continues to depend of the access to ICT.

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