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Building Automation, an Acceptable Solution to Dependence? Responses Through an Acceptability Survey About a Sensors Platform

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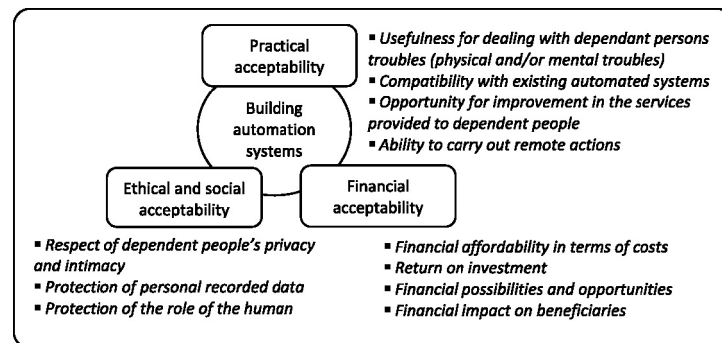[b] *University d'Orléans – IUT de Bourges, Département Carrières Sociales, VALLOREM, 63, avenue maréchal de Lattre de Tassigny, 18000 Bourges, France*

Highlights

- A building automation system is acceptable as it meets practical aspects.
- The acceptability appears to be very closely related to ethical and social considerations.
- Some financial aspects influence the acceptability.

Graphical abstract

Abstract

Background: In response to the increasing dependence issue and the spectacular development of automated applications, our research aims at answering the following question: Is building automation an acceptable solution to dependence? Under which conditions is building automation perceived as acceptable by organisations caring for dependent people? To answer those questions, we based on the CoCaPs project, which is a French national supported research project with the ambition to develop a low-cost sensors platform capable to provide enriched information about people's behaviour inside a building and aiming at better controlling energy and improving people's security and comfort. We had the opportunity to join the project team with the task to undertake a usage investigation.

Methods: In this context, we interviewed 26 professionals involved in organisations dedicated to dependent people (nursing homes for dependent elderly people, nursing homes for dependant disable people, home-care organisations). All interviews were recorded and the completely verbatim of the interviews data were transcribed and analysed manually.

Results: The data analysis revealed that surveyed people mainly react positively to the presentation of the sensors platform developed by the CoCaPs project team. However, surveyed people pointed out to a number data of criteria about acceptability related to automated systems dedicated to dependent persons.

Conclusion: Our results suggest that an automated system is acceptable by the target organisations under various practical, ethical, social and financial criteria. Our research thus also demonstrate the importance to adopt a social-technique approach that means to consider simultaneously social and technical dimensions in any system development

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1. Introduction

Population ageing in Western societies, such as France, will inevitably increase the number of dependent people. According to INSEE estimates for 2060, 23.6 million people living in France would be over 60-years old (1 in every 3) and 200 000 persons would centenaries. In 2060, 16.2% of the French population would be 75 years of age or older (compared to 9.3% in 2016). People's dependence in thus a major issue in France. Efficient and long-lasting solutions had then to be found. Among the existing solutions to dependence, some specific organisations such as nursing homes and home care organisations are dedicated to the care of people with a great dependence (dependent elderly people and dependent disable people). As an illustration, in France in 2011, among nursing homes for elderly persons, 74% are dedicated to dependent ones.

To address the dependence issue, building automation also suggests concrete solutions while proposing sophisticated applications dedicated to the loss of autonomy. More than ever, in the hypermodern and hyperconnected society where we are living, this use of building automation in the dependency care sector may raise legitimate questions and still a subject of debate. If automated applications can technically be easily used by organisations dedicated to dependent persons, it is important to keep in mind that the introduction of a new technique or any innovative solution in a professional context may upset and even transgress an established order [1,2] while transforming practices, individual and collective conduits, habits, professional relations within those organisations. It may generate grey areas [3] and raise ethical and political issues [4].

This immediately raises the issue of the acceptability of automated applications. Is building automation an acceptable solution to dependence? Under which conditions is building automation perceived as acceptable by organisations caring for dependent people? To answer those questions, we based on the CoCaPs project, which is a French national supported research project with the ambition to develop a low-cost sensors platform capable to provide enriched information about people's behaviour inside a building and aiming at better controlling energy and improving people's security and comfort. We had the opportunity to join the project team with the task to undertake a usage investigation. In this context, we interviewed 26 professional involved in organisations dedicated to dependant people (nursing homes for dependent elderly people, nursing homes for dependant disable people, home-care organisations).

The conceptual and theoretical framework supporting usage investigations is presented in Section 2. In Section 3, the research design is described while providing information about method and materials. The results and main findings for our research are presented in Section 4.

2. Conceptual and theoretical framework

2.1. Involvement of users in innovation processes

Many studies have been addressed the change in the technical approach that was happened in 1970's–1980's and that is fully in line with the strengthened role of users into innovation processes such as development process of automated applications. For a long time, the history of techniques appears as an ongoing narrative relating the successive development of technical objects. This development falls under a linear process of improvement, which is independent of any social and cultural context. As from the 1970's, studies from historians [5,6] had leaved this traditional perception while studying the links between sciences, techniques and society. This stream of research investigate the "social fabric" of knowledge and techniques [7,8]. In this approach, users seem essential actors in the development process of any technique. Largely diffused nowadays, this social-technique approach leads on to questions related to the usages to which technical objects and systems are put. In this context and in response to the wide diffusion of ICT (information and communication technologies), a branch of sociology has focused on usages and a new field of sociology, called "sociology of usages", was developed in the 1990's. This sociology has been deeply influenced by the other sociology fields (sociology of family, of labour, of firms . . .) which observe a same trend supported by the social groundswell for active individualisation and characterised by both the erosion of traditional, authoritarian, hierarchical, patriarchal models and the emergence of more participative models. The literature in sociology of usages thus reveals a process of active participation engaging all users who appear as creative and the social reactions with the introduction of new techniques [9].

Progresses have also been made in the way of understanding innovation. For most of the 20th century, the schumpeterian approach to innovation – with reference to Schumpeter's works [10,11] – dominates and views innovation simply as a "mechanical" product from science and technology. This approach – described as a "producer" model [12] – highlights a model based on unilateral development of innovations where entrepreneurs [10] and research engineers [11] are at the forefront of innovations. In this model based on a linear diffusion of innovations, users are thus passive actors [13]. It was only as from the last decades of the 20th century that a stream of research has emerged and developed around the issue of Sciences and Technology Studies (STS) thereby modifying approaches related to innovation processes. Thus, in the 1980's, more interactive approaches of innovation have developed [13]: those aim to provide a better presentation of reality and of the complexity of innovation processes which are dynamic, uncertain and