Passive House Networks: How Can They Deliver?

Civ. eng.-arch. Erwin Mlecnik, PHP vzw
Gitschotellei 138, B-2600 Berchem, OTB Research Institute for Housing, Urban and Mobility Studies, Delft University of Technology
PO Box 5030, NL-2600 GA Delft
Tel: (+32) 3 / 2350281, Fax: (+32) 3 / 2710359
e-mail: erwin.mlecnik@passiefhuisplatform.be

1 Summary

This paper examines experiences with the diffusion of the passive house concept, applied to the situation of ‘emerging’ countries like Belgium and the Netherlands. Adopter categories considering the passive house concept are defined. A marketing study based on Rogers’ theory of diffusion of innovations highlights the characteristics of actors leading to technological and process innovation. The paper draws conclusions on the preferred role of passive house networks.

2 Introduction

Researchers have been working on a scientific framework for diffusion of innovation since the 1950’s. An early milestone is the work of Rogers [1962] describing methodologies for diffusion research that even now are still being used, although in modified forms. The newest edition of this work is dated 2003. Rogers [2003] defines diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system.

Rogers’ scientific framework of innovation diffusion has also been used by researchers, working on the diffusion of energy saving technologies, e.g. in the Netherlands by van Hal [2000]. In the Netherlands, Dieperink et al. [2004] provided an analytical framework for the diffusion of energy saving innovations in industry and the built environment. Egmond et al. [2006] further also described a strategy to increase diffusion of energy-related innovations into the mainstream of housing associations.

In the last decade more attention is also given to the social, organisational and institutional context of diffusion of innovations (e.g. Shove [1998]). Energy transition management has also been defined as a new direction in the Dutch Energy policy [Loorbach et al., 2008] and in the Flemish transition platform of sustainable living and construction [Duwobo 2004]. For the diffusion of the passive house concept in the Flanders Region, transition and innovation diffusion experiments included, for example, the setup of a thematic platform in the construction industry [Mlecnik 2003] to stimulate the active dissemination of the passive house concept as an innovation. Elements of the social marketing activities of this platform
included target-specific information provision, the approach to include as many actors as possible (especially opinion leaders), and the reinforcing of motivation as well as building up a regional and communal identity.

Meanwhile the Flemish Passive House Platform has evolved from 18 founding members in 2002 to more than 300 members at the end of 2008, of which 158 can be characterized as enterprises, organisations and institutes. This paper identifies and records the characteristics of the innovators and the early adopters of the passive house concept and discusses the possible future role of passive house networks, from the perspective of diffusion theory. For this study we used the existing passive house networks in Belgium and in the Netherlands as a source of information, and companies and institutes as a unit of study.

From Rogers’ theory [2003] we expect to be able to classify members into ‘adopter categories’ (innovators, early adopters, early majority, late majority and laggards) on the basis of innovativeness, the degree to which the company or institute is relatively earlier in adopting the passive house concept than other members. In the framework of this theory the passive house networks can be defined as ‘diffusion networks’, with ‘change agents’ operating interventions.

The following questions are addressed in this paper. What are the characteristics of and differences between the innovators and early adopters in socio-economic status, personality variables and communication behaviour? What is expected to be the future role of passive house networks to be able to reach an early majority?

3 Research methodology

Ten introductory interviews were performed amongst the current members of the Belgian Passive House Platform (PHP) and the Dutch foundation Passiefbouwen.nl, focusing on: What are the characteristics of the member? How is the collaboration with the network? How is information obtained during a building process? What kind of information and initiatives are still missing? What are the observed needs for the future? From these answers detailed questionnaires were set up and distributed to all members focussing on: perceived attributes of the passive house concept (relative advantage, compatibility, complexity, trialability and observability); type of innovation-decision (optional, collective, authority); communication channels (e.g. mass media or interpersonal); nature of the social system (e.g. its norms, degree of network interconnectedness, etc.); extent of change agents’ promotion efforts.

The questionnaire addressed the following issues with both open and closed questions:

- Background variables of the company (11 items): yearly turnover, number of employees, company profile (5 items), competition from other companies, profile considering promotion of passive houses (3 items)
• Background variables of the interviewees: general environmental behaviour (4 items)
• Passive house market of the company: real offer (4 items), competition experience (2 items), offer related to other products/services (3 items)
• Social marketing: cooperation with passive house networks (6 items), wishes concerning passive house networks (10 items)
• New markets: use of technology or services in renovation (13 items)
• Innovation: willingness to innovate (2 items), knowledge about innovation and energy grants (3 items), suggested actions for passive house networks (2 items)

In total 38 companies and institutes provided useful information. They represent different types of companies that were categorized in micro-enterprises, small and medium enterprises, large enterprises and others (knowledge institutes, non-profit organizations,..).

4 Analysis

The analysis of the research results shows characteristics of the innovators and of the early adopters and some followers (early majority). Different professionals differ in their speed of accepting innovations (adoption speed). We noted that most members of passive house networks consider passive house technologies as a trigger to have more activity in the low energy housing market, not necessarily only passive houses.

4.1.1 The innovators

The innovators are vision driven and expect to get a jump on the competition, not by lower product cost but by faster time to market, more customer service, or some other business advantage. They are prepared to champion the passive house concept against resistance and to bear bugs and setbacks that accompany innovation. This group includes mostly micro- or small enterprises, e.g. the passive house design offices, engineering offices, contractors, installers and deliverers involved in the first demonstration projects.

The innovators accept a radical discontinuity between the old methods and new ones, e.g. one of the founding companies of PHP was a seller of air-conditioning transforming his business to sales of heat recovery systems; another HVAC installer transformed his business to selling passive house windows. Data show that some of the innovating companies already redirected their products and services almost completely towards the passive house concept.

4.1.2 The early adopters

A group of ‘early adopters’ [Rogers 2003] or the ‘early market’ [Moore 1999] can be characterized, that first changes behaviour after evaluating the results of the innovators. Some larger companies appear in this group (about 24 % of the respondents), but most are small enterprises, trying to find a niche market. These companies expect to get a head start on other companies, and they learn from the innovators to redefine their business
opportunities: e.g. an architect involved in a passive house demonstration project developed a company providing ‘insulation and airtightness services’. A former employee of a woodwork provider for a passive house project started a company which builds passive houses. An employee involved in custom fabrication of I-trusses for passive wall construction now delivers whole building systems for passive houses.

4.1.3 Reaching an early majority

After the early adopters, the rest follow, step by step: Rogers [2003] defines this respectively as the early majority, the late majority and the laggards, Moore [1999] as the mainstream market. Moore argues that a ‘chasm’ in attitude between the early market actors causes a clear difference in the willingness of these different groups to adopt innovations.

The mainstream actors differ in their approach, in that they aim for a productivity improvement for existing operations, and thus continuity of old ways. This can, for example, be seen from product-related passive house developments by individual companies, like the ‘multi-comfort-house’ (thermal insulation related) and the ‘massive passive house’ (brick related).

Egmond et al. [2006] argue that the mainstream actors will buy and use innovative products as part of a problem-solving application. An illustrative example of this is that a major PVC window manufacturer in Belgium bought a German window factory with passive house windows in its portfolio to solve the problem of fast production for a new niche market. A large Belgian company, for the moment distributing only natural ventilation systems and sunshades, does not yet see the need to offer specific passive house technology and considers the associated risk too high.

Larger companies take more time and seem less flexible to engage in passive house development, but they can provide large interconnectedness. Also, they tend to observe the experiences of small companies and wait for strategic decisions in general policy development. Once a policy or grant is in place, they also tend to engage preferably in larger projects.

In theory, the early majority should make up about one third of the construction industry, so we can say that a full early majority is not yet reached at this stage. To reach a majority adoption of the passive house concept, increasing peer pressures are necessary, as well as economic incentives. A late majority will also only be convinced when the weight of system norms favours the passive house concept.

4.1.4 The future role of passive house networks

A new agenda of communication needs considering the diffusion of passive houses was set up based on the research results and reflecting the work of Rogers [2003] in considering the innovation-decision process.
The task of the passive house network representative is to expose the individual (or other decision making unit) to the existence of the passive house concept so he/she can gain knowledge and understanding of how it functions. However, the credibility of the change agent relies on only recommending innovations with beneficial consequences. Examining these benefits requires that the passive house network exerts quality controls which ensure that the application is safe and effective.

The change agent can stimulate persuasion and a favourable attitude towards the innovation by providing detailed information. In this phase peer-to-peer contacts with like-minded or respected individuals are most important, e.g. contacts with people that were in a similar situation, or with more experienced opinion leaders. The change agent can help the individual engage in activities that lead to a choice to adopt the innovation, e.g. providing or directing that individual to further personal training.

The change agent can help the individual (or other decision making unit) with the implementation, e.g. directing them to established or certified professionals. The change agent should be the gate-keeper of this information, with established, and preferably international, procedures.

Confirmation should take place when the individual (or other decision making unit, e.g. the grant awarding government) seeks reinforcement of the passive house decision already made: this can be approached with project certification.

5 Conclusion

The members of passive house networks nowadays can mainly be characterized as innovators and early adopters. Rogers generalised that relatively earlier adopters are larger-sized units [Rogers 2003, p. 298], but this seems not to be the case for the adoption of the passive house concept. Companies with rapid innovation diffusion towards full market development of passive house technologies and services can be mainly characterized as micro-enterprises or small enterprises. This is in line with Rogers’ other statement that the more persons involved in making an innovation-decision, the slower the rate of adoption.

One means of speeding the rate of adoption is to alter the unit of decision so that fewer individuals are involved. So we notice that passive house initiatives started by business owners tend to be adopted faster than initiatives started by middle management or administration personnel. The greatest innovation response to passive house network effort occurs when opinion leaders and micro-enterprises adopt.

Passive house technologies and services are very marketable on a regional level but the role of the passive house network as a ‘change agent’ and formal gate-keeper should not be underestimated. For passive house networks it is important to define ‘interventions’ as coherent objectives to bring about behaviour change in order to
produce identifiable outcomes. The paper lists some of the objectives for the future role of passive house networks.

In the past the passive house networks excelled in heterophilous\(^1\) communication because of their set-up as interdisciplinary networks, where members enjoy communicating because of their shared common meanings, beliefs and mutual understanding of the passive house concept. However, to diffuse the concept to different target groups, more homophilous peer-to-peer communication involving targeted opinion leaders is required, e.g. real estate organisations addressing real estate agents, architect’s associations addressing architects, teachers addressing students, contractors explaining how to build to contractors,..

6 References


---

\(^1\) Heterophily is the degree to which pairs of individuals who interact are different in certain attributes [Rogers 2003]. Heterophily is the opposite of homophily.