

SUCCESSFUL USER ENGAGEMENT IN THE CONSTRUCTION SECTOR BASED ON PERFECTION PROJECT CASE STUDY

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Summary

“Perfection” stands for a European Coordination Action on performance indicators for health, comfort and safety of the indoor environment. The long-term aim of the project is to help enable the application of appropriate building design and technologies to improve the impact of the indoor built environment on the human well being. “Perfection” focuses also on (1) ensuring the important user engagement in terms of obtaining and using the achieved results, namely a framework with a set of indicators concerning the overall quality of buildings’ indoor environment called the KIPIs - Key Indoor Performance Indicators, as well as on (2) making the innovations successfully adopted into the social system. Proposed actions benefiting from the *User Engagement* and the *Diffusion of Innovations* concepts are thus proposed for the “Perfection” project ensuring the potential users’ contribution, transfer of knowledge, awareness creation, wide dissemination and in result successful adoption and usage of the Perfection innovations.

Keywords: user engagement, “Perfection project”, indoor performance indicators, indoor environment quality, innovation diffusion, sustainable building, KIPI, wider socio-economic context.

Full paper

1. Introduction

People spend more than 85 percent of their time indoors where they are regularly exposed to pollutants, irritants, and chemicals that can cause and worsen health conditions, such as allergies, asthma, respiratory disease, cancer, bacterial infections, and many others. Indoor environmental quality (IEQ) is a critical environmental health and safety issue and everyone is affected. It is important to be aware also that health effects may be experienced immediately after exposure or even years later; they may also be linked to whether the exposure has happened once only or has been experienced repeatedly.

In recent years different approaches have been developed in the EU with regards to the assessment of the indoor environment and building sustainability, one of them being a 3-year “Perfection” project realized under the European Union's Seventh Framework Programme. The acronym “Perfection” represents the full project’s title: Coordination Action for Performance Indicators for Health, Comfort and Safety of the Indoor Environment. 11 project partners from Belgium, Finland, Poland, Greece, Czech Republic, France, Germany, Israel, Italy, the Netherlands and the United Kingdom recognized the work done so far and are convinced that some kind of unification of the existing indicators – across the EU at least – is needed. Learning from each other, implementing sustainable building solutions and setting a common agenda with a more user-orientated approach is believed to be the way forward. The project consortium is supported also by an extensive network of experts (33 organizations from 29 countries) representing industry, academia and research to ensure the needed depth and width.

Understanding of how the indoor environment affects individuals, the role of potential hazards and how to control them can often help prevent or resolve building-related health, comfort and safety issues. However, the users need to have clear metric of the impact of, for example, new

technologies on the indoor performance. In order to monitor and report on the performance of the indoor environment, a set of key performance indicators is a necessity. The “Perfection” project aims to deliver such a framework with a set of indicators concerning the overall quality of the indoor environment (focusing on health and comfort, safety, security, usability and positive stimulation, adaptability and serviceability and other features that could improve the well-being of people living, working or visiting a building) and to present these findings in a user-friendly way. This framework that lists most important indicators to describe indoor performance is called the Key Indoor Performance Indicators (KIPIs). The KIPI framework consists of four main categories (health & comfort, safety & security, usability & positive stimulation, adaptability & serviceability), each one of them being divided into two sub-categories which are composed of three to five KIPIs. The current version of the KIPI framework consists of 31 indicators [recent update: April 2011]. It provides a benchmark of buildings against a standard performance level. It can be used for a purpose of design assessment (for new buildings or when renovation works have been planned but not yet executed to evaluate if the required performance levels will be met) and in operation assessment (for existing building to evaluate the current status and identify possible actions to improve the performances). The online KIPI tool, currently in its test version, is available on www.indoorperformance.net.

Basing on the work done in the “Perfection” project the paper will discuss important actions that need to be taken in order to successfully ‘diffuse’ innovation and engage users so as to make them adopt the novel product/service quicker and with more confidence. Engaging process should be initiated with actions aiming at reaching the wide category of users, creating awareness among them and guaranteeing bigger usability of the innovation. The focus of this paper is on the “Perfection” project and thus on users identified for the project’s innovations, namely: building industry stakeholders, building users and policy makers. The idea behind is to look for activities that would inform them about the project and its outcomes, actively engage in contributing to project progress and encourage to promote further in Europe the idea e.g. through using the tool. A user engagement methodology if combined with the innovation diffusion concept, which will be discussed at the beginning of this paper, will ensure a successful adoption of the “Perfection” results, widely acknowledged and applied.

2. Diffusion of Innovations

It is necessary to establish first the context of what an innovation is and how it can be spread. Therefore a better understanding of innovation acceptance/rejection and conditions of successful implementation of innovations into the social system will be presented followed by its’ usage in the “Perfection” project.

2.1 Diffusion of Innovations theory

The Lisbon strategy launched in March 2000, was intended to make the European Union the world’s most competitive and dynamic economy. In December 2006 the European Council stated that innovation is “vital to ensuring that Europe is able to respond effectively to globalization and to benefit from it”. Innovativeness is a key to achieve this goal because it helps companies conquer new markets or stave off competition. An innovation – which by definition consists of the successful production, assimilation and exploitation of novelty in the economic and social spheres – comes in many different forms, ranging from an invention arising from R&D to efforts to adapt production procedures, tap new markets, use new organisational approaches or create new marketing concepts.

It is important to notice that an innovation only needs to be perceived as new by the potential adopters. It does not necessarily mean something newly learned. An individual/group can be aware of existence of an idea/practice/product, but e.g. has not developed any attitude towards it as yet, has not considered its utility or made a decision of adoption or rejection. For instance, in “Perfection” the set of indoor environment quality indicators that form KIPI framework is provided. Probably all of them have been described before (under the same or slightly different names), but the novelty of the project is to put them in a new framework and suggest a process that the users can follow to assess the buildings.

It is recognized that even great innovations resulted from R&D activities are rarely becoming well-known and successful as such. Research and development of an idea/practice/product is only one step in a long-lasting process of spreading an innovation beyond laboratories and offices. Moreover an idea/practice/product may change during the process of the adaptation in order to meet the users' needs and expectations. A degree to which an innovation is changed or modified by a user in the process of its adoption and implementation is called re-invention.

An innovation can be successful only if it is implemented. This dynamic process happening in a social context is known as innovation diffusion:

“a process by which an innovation is communicated through certain channels over time among members of a social system”(E. Rogers, 1995, (in:) S. Nutley, H. Davies, I. Walter, Learning from the Diffusion of Innovations, Research Unit for Research Utilisation, Oct 2002)

The process of an innovation's adoption can be characterised as a decision-making process, where three types of knowledge are important in moving potential users from “denial”/“resistance” through awareness and on to adoption:

<p>Awareness knowledge</p> <p>(awareness that an innovation exists, knowledge of its key properties, understanding of how the innovation relates to current practices)</p>	<p>How-to knowledge</p> <p>(information necessary to use an innovation properly)</p>	<p>Principles-knowledge</p> <p>(information dealing with the functioning principles underlying how the innovation works)</p>
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The process of diffusion is considered to revolve around four key elements: an idea or innovation, channels of communication to spread knowledge of the innovation, time during which diffusion takes place and a social system of potential adopters in which this occurs (context). Moreover four main aspects of innovation itself and its environment have been defined as key points for innovation success/failure, which influence change over time:

1. Innovation attributes - relative advantage which may refer to economic advantage, social prestige, convenience, satisfaction, etc.; compatibility to existing values of an individual/group; simplicity when the idea behind or know-how is easy to understand; trialability when an innovation can be tested/experimented first; visibility which results in the dissemination of the idea). The greater the perceived attributes are, the quicker the diffusion of innovation is likely to happen.
2. Adopters' characteristics - classifications of the members of a social system on the basis of their innovativeness understood as the extent to which an individual or other unit of adoption is relatively early in adopting new ideas. Five different categories of adopters are identified: innovators, early adopters, early majority, late majority, and laggards.
3. Promoters' characteristic which include opinion leaders and change agents. Opinion leaders are members of a population that possess higher status and level of inventiveness. They have a vital role in encouraging peers (e.g. late adopters) – yet unconvinced – to take up an innovation. By employing a new solution they make its effects visible and, thus, help to overcome caution about the risks and costs of adoption. Change agents on the other hand proactively work on innovation success and are responsible for creating the demand for a particular solution through reducing barriers to its application, convincing adopters and providing support in innovation-decision process.
4. Communication channels - means by which messages get from one individual to another. E. Rogers made a distinction between interpersonal (where messages originate from local sources) and mass media channels (where messages originate from cosmopolitan sources), where the most effective communication channels seem to vary depending on the nature of the innovation and the size of the potential audience. Mass media communication channels are usually more effective when there are large numbers of potential adopters and low levels of complexity. Mass media and cosmopolitan channels are also relatively more important at the knowledge stage, particularly for earlier rather than for later adopters (awareness-raising campaigns). In contrast, interpersonal and local channels are relatively more important at the persuasion stage. The use of opinion leaders, who are 'near-peers', seems to be particularly important in persuading others to adopt. Over time face-to-face communication becomes also more influential once the awareness about an innovation has been raised and the adoption of

new products or behaviours involves the management of risk and uncertainty.

2.2 Diffusion of Innovations in the “Perfection” project

The innovation proposed by the “Perfection” project can be seen in two ways. First of all, after reviewing existing indicators used in design and construction of the built environment, it offers a new framework that lists most important indicators to describe indoor performance - the Key Indoor Performance Indicators (KIPIs). The second aspect is an online tool, based on KIPI framework, (www.indoorperformance.net) which allows users, producers and designers to assess the products, buildings and technologies. It can be used both for the purpose of design and operation assessment. Ideally, by using the tool a benchmark of buildings against a standard performance level can be created. The intention is to provide an assessment method which relates as much as possible to the performance indicator and not to the assumptions for technological solutions that have been applied in the design/construction. The KIPI tool also serves as a user interaction portal with the “Perfection” methodology.

How should the KIPI framework and assessment tool be promoted to become a successful innovation?

Bearing in mind the theory presented above we need to focus first on the context of the project. The “Perfection” is an international project where international experts are involved. Therefore the KIPI framework and the assessment tool, both of which will be offered as the project’s outcomes, have a potential to become a European (at least) standard. This would help with the idea of unification of existing assessment methods of indoor environment performance and increase the benchmarking aspect of the KIPI tool.

In order to make this goal achievable the project partners engage potential users through ‘testing’ the KIPI framework, asking for the feedback resulting from its practical applications and improving the framework to make the concept as good as possible. This perfectly fits with so-called ‘reinvention’ that Everett Rogers, a professor of rural sociology who published “Diffusion of Innovations”, believes to be crucial for an innovation’s diffusion. The success of an innovation (i.e. KIPI framework and KIPI tool) depends on how well it evolves to meet the needs of more and more demanding and risk-averse individuals. A good way to achieve it is to make users into partners, ask them for feedback and continuously improve the product/concept, what in other words means “to engage”.

Another suggestion is to focus the promotion on benefits and additional value gained from using the KIPI framework/online tool. Apart from already mentioned standardisation of the assessment methods, it also offers a support for users to improve indoor performance quality. The educational value of the KIPI concept can help with raising awareness of all key indicators that should be taken into account while assessing/designing/renovating indoor environment. The users can also find out more about how the indoor performance quality can be defined and measured and what the examples of the relevant technologies are. The already existing indoorperformance.net portal can serve as e-learning platform to spread the word about project’s approach, KIPI methodology and practical applications of the KIPI framework. The incentive to use the “Perfection” tool is thus to show to the end-user the direct gains or indirect benefits (regulatory adaptation, ethical approach, positive branding) of sustainable building design. Because the quality of indoor environment affects practically everybody, the project can reach very broad categories of users who may benefit from taking up the innovations offered by the “Perfection”. In any case, the target groups that should be considered include policy makers, product developers, builders, designers, media, as well as the wide public/society.

The conclusions drawn from the theoretic approaches suggest that an innovation can be successful if - first of all - people know about its existence and when the new product/concept is relatively advantageous, simple, compatible, triable and brings visible benefits. Moreover, the promotion strategy should change over time and respectively address all five groups of adopters that vary in their attitudes towards a specific innovation. Using appropriate communication channels is as well important issue for achieving success in adopting the new technology.

What are the incentives and barriers in the successful adoption of new designs and technologies?

One of the tasks of the Polish Partner – ASM Market Research and Analysis Centre Ltd. was to

identify in the “Perfection” project barriers and incentives towards implementing new designs and technologies. Most of them refer to the specific technologies, but some are generic enough to apply to the KIPi concept as such and therefore could be used in the promotional activities to present innovation’s attributes/benefits.

First of all the KIPi framework and tool offer free of charge assessment method of the buildings and can be used in all phases of building design, construction, renovation, etc. They comply with existing policies/regulations/standards and the results of the assessment conducted by the users (the number of points gathered while using the KIPi tool) can help with formulation of a voluntary certification system. The decisions based on the assessment results can be cost-effective or lead to other economic incentives (e.g. the impact of positive stimulation on the productivity). The method seems to be easy to use, convenient and can be adjusted to assess different types of the buildings (e.g. offices, hospitals, schools). It focuses on individual’s needs and positive impact on users’ wellbeing. The concept can be also perceived as a holistic approach as it covers all aspects of indoor environment – from health and comfort, through security and safety, to positive stimulation, usability, adaptability and serviceability. The incentive is also the already described above international dimension of the KIPi concept which has a potential to become a recommended standard in the assessment of the indoor performance quality that is used across the boundaries.

The promotion of expected and proven benefits is very important and different aspects need to be highlighted depending on the priorities of a targeted group. Getting to know what different target groups want and how a product/concept can meet those needs is usually a solid fundament to build the promotional activities on. However, we cannot underestimate the necessity to talk also about the barriers. This is especially crucial to successfully work with critical groups of adopters (late majority and laggards). Presenting the barriers in an honest way, suggesting the ways to overcome them and inviting users to provide feedback about a product/concept is a key in developing a pro-innovative attitude.

In terms of the KIPi framework and assessment tool the barriers that may be considered are:

1. Lack or low awareness among potential users → This could be tackled with awareness raising campaign and involving credible peers (experts in the field).
2. Currently under development/in a test phase, which may discourage users/designers that are looking for ready-to-use and proven methods → After the end of the project the tool will be available in its final version (amended in line with the users’ feedback).
3. Uptake is limited because not required by law → The project can promote the KIPi framework and the assessment tool as a voluntary standard (possibility of developing/incorporating it into the certification/award system) and depending on the uptake it has a potential to become a recommended method across EU (or wider).

Moreover, according to a survey conducted for the European Commission in 2003, the most important barriers to the commercialization of innovations include: customers’ uncertainty about security and quality of new products; their lack of competence and ability to use these products; their lack of knowledge about the biggest societal challenges as well as insufficient incentives to the use of innovative solutions in handling these challenges. Although several years have gone, these are still echoed among the barriers identified by the “Perfection” project. Knowing them in advance can help to create a more user-friendly environment for adopting new designs and technologies.

The way of promoting the “Perfection” results should also acknowledge the wider socio-economic context of the EU and the Member States. In the ‘after-crisis’ economy the innovations and innovativeness are considered to be the best way forward. The European Commission is formulating, influencing and, where appropriate, implementing policies and programmes to increase Europe’s innovativeness. The Commission is trying to make sure innovation is thoroughly understood and approached comprehensively, thereby contributing to greater competitiveness, sustainability and job creation. However in the recent publication ‘Making Innovation Work’ P. Zerka analyses so-called ‘European paradox’ where a high R&D input translates into a low rate of successful commercialization. He states that in order to make innovation work in Europe, the demand side of innovation should be taken into the fore, both at the country and the EU level. In this approach new ‘systemic models’ are gaining ground, according to which supply (especially

R&D spending) and demand (policies) incentives are interdependent and should both be present throughout the whole cycle of the innovation development. In other words to make innovation flourish the focus on technological base and development via R&D funding is not enough. We also need to think about deployment strategies belonging to the demand side, which until recently has been neglected. Previously the scientists and policy makers used to focus on mechanisms that stimulated R&D spending and the share of GDP spent on R&D, together with the number of patents granted, served as basic measure of innovation. As P. Zerka states this situation started to change at the beginning of the century and new policies aim to balance the supply and demand side of innovation by introducing direct (e.g. tax incentives, demand subsidies) and indirect support (e.g. awareness building, training and education, foresights, or support for voluntary labels). Financial incentives, raising awareness activities, conformity with existing regulations and certification/award systems have also been identified in the "Perfection" project among incentives that support the adoption of new technologies.

3. User engagement

By engaging the users the project Consortium means first of all to reach the end-users (occupants, owner buildings, other actors in the building construction chain), to create awareness and guarantee bigger usability of prototype tool. The "Perfection" target groups have been defined as following: building industry stakeholders, building users and policy makers. The idea is not only to reach them but also actively engage in using the KIPi tool and contributing to its development.

The "User Engagement" conceptual model shows the engagement as a process in which the KIPi tool user initiates the engagement (point of engagement), continues and sustains their involvement, disengages with the application and potentially reengages (possibly several times). In each stage different attributes appear, some being more and some less important. Nevertheless, while creating, updating and developing the KIPi tool or another innovation its creators need to have in mind the most crucial ones: attention, aesthetics, interest, challenge, control, motivation, novelty, feedback but also flow, aesthetic experience, play, and information interaction which all influences and facilitates engagement. For instance, the engagement of users with regard to the online portal is pursued by the KIPi tool where four general advantages of the KIPi portal can be identified and highlighted. Namely, the features of the Portal clearly indicate that the service may lead to more reasonable, knowledge-based decisions related to a building performance, better communication between services suppliers and their clients, promotion of best practices (healthier, safer and more comfortable internal building environment) as well as smoother information exchange.

Below a more detailed description of ways to engage concrete user groups is proposed, based on the "Perfection" project. The engagement of those groups was pursued in the project by coherent and wide dissemination activities, two policy-oriented workshops (Cracow 2009; Paris 2010) and two research-oriented workshops (Helsinki 2010; Prague 2011). Apart from past events a business oriented workshop is planned during "Greek Money Show" in Thessaloniki on the 25-29 November 2011.

3.1 Building industry stakeholders

This group varies greatly as it embraces numerous professions such as engineers, designers, building materials producers as well as contractors and developers. In other words, into this category fall representatives of occupations that are entitled to take decisions concerning a particular building (or its elements) and its performance from the earliest stage of its life cycle. Decisions require choice and choice based on inadequate knowledge, unsupported assumptions or intuition can lead to fatal consequences. It is especially true in sectors where, as in the case of construction market, the consequences of any decision have long-term character and, therefore, are of a high risk. One way of minimizing the risk is a good information flow or, more precisely speaking, information exchange. World-class companies cope with this issue through the use of benchmarking methodology (process).

The "Perfection" tool is not able to support the user to go through a whole benchmarking process, as it involves long-term and a complex procedures. Nevertheless, it can serve as a study cases library (database) that provides the user with the access to the best practices on the market. After all, comparing a particular building or product against most successful running undertakings is a best way to improve the performance quality of one's own 'branch'. In this respect, goals of this

part of “Perfection” project and benchmarking assumptions do not differ. In both cases, it is expected to engage key stakeholders whose solutions may act as a basis (models) for identifying gaps in performance for other “new” stakeholders who have just entered the market. Secondly, it is supposed to abolish concerns related to changes introducing as it shows successful undertakings. Moreover, it encourages excellence through popularization of best practices. Thus, the “Perfection” tool – acting both as a database and information exchanging channel – poses a decision support tool, at large. And internet access turns it into ever-expanding source of data on products conforming to the “Perfection” standards in respect of health, comfort, safety and accessibility. This can be achieved by report generated on the basis of users’ opinion on particular solutions applied in building already published in the portal.

Furthermore, internet base tool not only enables producers to compare performance of their products but also facilitates publishing their own solutions if they emerged to be successful.

3.2 Building Users

“Perfection” project aims to support a more user-oriented approach in the field of buildings construction. Indeed, bearing in mind that citizens of developed countries spend approximately 85% of their time in different types of buildings, their feelings about variety of aspects concerning those buildings cannot be ignored.

Through the research that was conducted within the project a set of parameters of utmost importance were collected, defined and subjected to further specification: health, comfort, safety, security, usability, positive stimulation, adaptability, serviceability. All those factors became not only a theoretical frame for building/product specification but also, thanks to the tool, users may in this scope evaluate buildings they occupy and products they deploy. Moreover, access to information on already applied solutions and reports concerning performance of particular buildings allows to take more conscious and knowledge-based decisions concerning users’ own real properties. Such attitude towards an end-user-role is also applied for more practical and general reason: involving end-users in the new technology/concept creation and evaluation allow for its better understanding and higher level of acceptance. This, on the other hand, stimulates the development of the construction sector towards sustainable building solutions as aware clients tend to present more sophisticated demands.

3.3 Policy makers

The last but not least important group that the “Perfection” tool is dedicated to is made up by decisive persons in the area of construction related policy. The primary objective of involving this group is to provide it with access and possibility to comment on the assessment model elaborated within the project. More important reason, applicable to all aforementioned groups, is that the tool plays a role of library of best practices in the construction area. But while in suppliers’ case the aim is to benchmark their own products and in users’ one – knowledge broadening for own purpose, in the policy makers’ instance it would have more significant consequences. Initially, it means creating awareness of new solutions/technologies to be applicable in order to improve buildings performance. Consequently, it would have an impact on refurbishment and designing in public building domain and which may be possibly extended through introducing respective laws and regulations. Therefore policy makers should be also regarded as potential accelerator of sector development. Moreover, two-way communication is enabled by high level of user support built in the portal which includes knowledge and technical aspect as well as direct contact to the portal administrator which allows to deepen information when required.

4. Conclusions

Nowadays it’s very difficult to make people engage with products or change their behaviour, especially with regard to the construction sector where marketing/promotion strategies are almost invisible. An effective way though to motivate people is first of all to (1) credibly address real issues in their lives which in the case of the “Perfection” project means in general to improve the indoor built environment on the human well being and secondly (2) by being engaging enough to be noticed. For this reason, a user engaging KIPI tool has been created which can trigger interaction,

transfer of knowledge, raise awareness and diffuse innovation. Taking into account all relevant features of User Engagement and Diffusion of Innovations concepts and introducing them in one coherent strategy the envisaged innovations are likely to be successfully adopted into the social system.

The conclusions of this paper and work done in the “Perfection” project lead us to several recommendations that can be taken into consideration while implementing new designs and technologies:

1. The project recognises that user engagement supported by activities related to innovation diffusion is one of the possible and effective direction in the construction sector towards quicker and wider uptake of new designs and technologies.
2. Benefits, incentives of the new products/services should be well identified and emphasized in the actions directed to all type of user groups.
3. The application of new and innovative designs and technologies that can improve the quality of the indoor environment is sometimes hindered by existing standards and regulations or by the conservatism of the sector. On the other hand, the uptake of such designs and technologies may be accelerated by incentives developed by the authorities. This suggests that balancing of the demand and supply side is crucial to entrench the innovations and benefit from them.
4. The raising awareness activities should be addressed to all (almost everyone is affected by the quality of indoor environment), but fit for purpose i.e. reflecting the differences of target groups – e.g. policy makers, professionals, society – and their attitude towards innovation.
5. The promotion should help people to learn that cost-saving aspect needs to be considered as a longer-term benefit. The short sighting and focus on the benefits gained ‘here and now’ were often mentioned as a barrier to implementation of new technologies. It may be helpful to show how a new technology/method works in comparison to ‘old’ methods and/or what benefits can be achieved compared to ‘do nothing’ option.
6. The voluntary labelling (certificates/award systems), if supported by the government and widely recognized by the professionals, may also contribute to the uptake of e.g. green buildings concept. The KIPI assessment tool has also the potential to become or contribute to one of these labels.
7. Each product/concept needs to evolve to have a chance of becoming successful. The reinvention (continuous improvements of the product via users’ feedback) is a key to make it work in a way the users expect it to. This also means changing the innovations from producer-driven to user-driven to ensure that users’ needs are fully met and developing positive attitude among the adopters.
8. Although most standards are based on ‘average person’ concept, it is becoming vital to apply these standards in a way to make a building user-friendly and sustainable for individuals (e.g. individually controlled and easy to use ventilation systems, lighting, accessibility without unnecessary assistance).
9. Understanding how the indoor environment affects wellbeing and therefore impact on behaviour can lead to increasing the openness to new designs and technologies that positively influence the indoor performance quality.

These recommendations concentrate on ensuring the successful adoption of the new design and technologies in the case of “Perfection” project. However these actions can be also applied in different cases in the construction sector where adoption of innovations are considered. The starting point is not only to inform the user about the product/service but also to engage with it and/or change his/her behaviour. For this reason Perfection partners concentrated its efforts also on the important user engagement in terms of obtaining, diffusing and application of the achieved results.

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