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Building a terminological tool as implementation instrument of the sustainable built environment

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The Sustainable Built Environment, as corollary to Sustainable Development, is a EU policy priority whose implementation is legally stipulated for all EU countries. As for the Romanian specific terminology employed by decision makers, there are critical inconsistencies pertaining to mistranslations or fluctuating translations of standardized English terms. This article outlines the purpose and objectives of the envisaged project, highlights its interdisciplinarity, and displays the steps to be taken in developing a terminological tool that is meant to be of use to linguists, scientists and field specialists alike.

Keywords: *sustainable built environment, glossary, terminology*

1. Introduction

In 1987, The *Bruntland* Report "Our Common Future", introduced for the first time the concept of sustainable development: *"The development that meets the needs of the present without compromising the ability of future generations to meet their own needs"* (WCED 1987, 27). The concept was developed as a response to current problems, such as the accelerated reduction of non-renewable energy resources (coal, oil, natural gas) and pollution, especially the increase of greenhouse gas emissions. In the long run, the implementation of the concept of Sustainable Development is expected to have a positive and global impact on the quality of life and on the economic and social development. EU's main strategic priority for development consists in identifying clean, efficient, feasible solutions, economically and socially acceptable, for energy production and consumption. This means that particular attention has to be paid to the development of the Sustainable Built Environment as the energy consumption in the built environment represents 40% of the world energy demand.

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The measures to be taken in order to obtain a sustainable built environment are regulated by the laws in force which encourage the use of renewable energy sources and the energy performance of buildings (in EU, Directive 2012/27/UE, Directive 2010/31/UE, Directive 2009/28/CE, Directive 2002/91/CE; in Romania, Law no 159/2013, Law no 220/2008). To summarize, the quoted directives stipulate that, starting from 1 January 2019, all new buildings occupied or owned by public authorities have to be buildings with almost zero energy consumption (from conventional sources) (nZEB), and by the end of 2020, all newly built constructions must be nZEB. These directives have been recently reviewed and amended and new sequential stage deadlines were proposed for implementing the directives up to 2050 (Law no. 101/2020). The obligation to implement these directives by the due date is indisputable, and the responsibility for this action falls on all the stakeholders: authorities, architects, real estate developers, builders, university teaching staff and students, future practitioners of jobs in this field. All the stakeholders will have to observe the above mentioned implementation deadline and, consequently, will need a substantial and reliable common specialized vocabulary, which will facilitate the communication among them as well as the correct and fully-informed transfer of concepts to the general public (the ultimate beneficiary of the implementation of the sustainable built environment) and the acceptance by the general public.

In this context, an analysis of the Romanian translation of the EU Directives currently in force reveals it to be generally correct; however, it also shows terminological inconsistencies in the Romanian version, the lack of certain terms or their incorrect transfer into Romanian, which can be partially explained by the relative novelty of the field in the Romanian context. For example, even the structure nZEB (Eng. Nearly Zero Energy Building) is taken over and defined in Romanian in two different ways, in two different legislative sources: (a) *"building whose energy consumption is almost close to zero = very high energy performance building, whose energy demand from conventional sources is almost zero or is very low and is mostly fulfilled from renewable sources"*, (Law no 159/2013) and (b) *"building whose energy consumption is almost close to zero = a building with very high energy performance"*, (Directive 2012/27/UE). Although they define the same concept, the translation versions are different and both of them suggest that we are dealing with a building which consumes almost no energy (from any source), when, actually, nZEB (Nearly Zero Energy Building) refers to a Building whose energy consumption *from conventional sources* is almost zero.

In fact, one of the recommendations in the final report of the ENTRANZE consortium project, Policies to Enforce the Transition to nearly Zero-Energy Buildings in the EU-b28, is: *"Consistency in terminology and timing between*

Directives and CEN standardisation procedures should be further enhanced"(2012, 6), resulting from the identification of a terminological inconsistency, among others: *"Moreover, there is a lack of consistency in the terminology, e.g. the term deep renovation should be clarified and quantitatively defined. At the moment there are two terms used: 'deep renovation' in EED and 'major renovation' defined and regulated by EPBD. Due to the lack of a definition for deep renovation in the EED, confusion often happens between the two terms. Consequently, in the next EED recast the term 'deep renovation' has to be properly defined or, alternatively, replaced by 'nZEB renovation' which can be immediately linked to the national nZEB definitions already in place"* (2012, 46).

Thus, at the same time as the actual implementation of the sustainable built environment, it is important to develop a homogeneous terminological framework, commonly agreed upon by all stakeholders, which will influence decisively the degree of understanding and acceptance by the general public, but also by all the key-stakeholders involved in the actual implementation of the sustainable built environment. Consequently, the aim of this research project is to fill a terminological gap by developing a single terminological platform adapted to the scientific progress in general, and to the stakeholders' needs in particular, an enterprise with immediate social, economic and technological impact, materialized in the increase of the public level of acceptance relative to EU and Romanian directives currently in force, as well as in the improvement of communicability.

The main difficulty, but also the great advantage of this initiative, refers to its high level of interdisciplinarity, which supposes the corroboration and integration of the latest data in various fields: linguistics (terminology, translation studies, lexicography), sustainable development (product design and environment, renewable energies), computer sciences, constructions and architecture.

As for the current state of the art in the field to which the project topic is subsumed, three distinct aspects are worth mentioning: (a) the research performed in the area of sustainable built environment (written mostly in English and published in prestigious international scientific journals, in specialized conference proceedings or in other domain-specific publications) does not include the analysis of the currently employed terminology, (Hosseini and Kaneko 2012; Fernando and Sauma 2013; Martinez-Val 2013; Vişa 2014; Boian 2007); (b) the terminological and lexicographic studies and instruments, in print format (Naftanailă and Naftanailă 2000, Niculescu 1963, Niculescu 2001), or electronic format (Trilingual Dictionary of Constructions and Architecture, English-Romanian Technical Dictionary), cover various technical fields, but not that of *sustainable built environment*; (c) there are monolingual glossaries in the area of sustainable development both in Romanian (Glossary of terms: Development Resources, Glossary of Environment, Glossary of

terms – Sustainable Plastics, Glossary of terms – Green Buildings), and in English (The USA Glossary of Green Buildings, The Glossary of Green Buildings, The Counsellors Glossary of Eco-constructions). For all these resources, internet links are provided in the reference section.

Regarding corpora as terminological resources, starting from the 80s, there have been various attempts to extract terms for bilingual glossaries from parallel corpora, (Chen 1993, Kay and Röscheisen 1993; Melamed 1997a; Melamed 1997b), which became increasingly easy with the emergence of electronic corpora and automatic extraction instruments (Wu and Xia 1994). However, in most specialized fields, parallel corpora are difficult to compile (because of the lack of direct translations) and are quantitatively non-representative. As a result, bilingual glossaries were built by extracting data from comparable corpora, (Munteanu 2006, Robitaille et al. 2006; Morin et al. 2007; Yu and Tsujii 2009). In this area, a complex study is presented in the FP7 *Accurat* project (http://www.accurat-project.eu/), which deals with techniques for exploiting comparable corpora to supplement the data obtained from parallel corpora in specialized fields, idea focusing on the advantages of comparable corpora in the domains and languages where few parallel corpora are available (Munteanu and Marcu 2005; Lu et al. 2010; Abdul-Rauf and Schwenk 2011). A large-scale project exploring the advantages of comparable corpora, automatically compiled from the Internet (using the Babouk platform), is *TTC – Terminology Extraction, Translation Tools and Comparable Corpora* (http://www.ttc-project.eu/) whose objective was to develop monolingual and bilingual terminological instruments in the field of renewable energy and IT, in seven languages: English, French, German, Spanish, Latvian, Russian and Chinese (without direct reference to sustainable built environment).

2. Aims of research

The main purpose of our research is the development of a complex terminological instrument in the field of sustainable built environment, capable of ensuring the harmonization, uniformization and regularization of specific terminology, and, simultaneously, of increasing the acceptance level relative to the implementation of new field technologies, both among stakeholders and within the society – the ultimate implementation target.

To the end of achieving this purpose, a first objective will be that of developing an En-Ro glossary as an inventory of all the terminological variants encountered in En and Ro domain-specific written documents. We estimate the number of En written texts to be larger than Ro similar texts, which would result in

misbalanced data. To prevent this situation, we intend to: (a) compile a parallel En-Ro corpus consisting of original En texts and their Ro translations, e.g. official, legal texts in the field of sustainable built environment, their automatic alignment, the term extraction, with the preservation of direct access to original larger contexts. Because of the reduced number of such texts and their translations, the parallel corpus will not be sufficiently representative, and, consequently, (b) compile a comparable corpus made up of similar texts in the field of sustainable built environment, e.g. texts from specialized sites, conference proceedings, etc., and their extraction with the preservation of access to larger contexts. In both cases, the term extraction will be performed manually. The results will be a bilingual glossary and two monolingual glossaries, which, when merged, will generate a bilingual glossary in the field of sustainable built environment, including the En standard terms and several Ro variants, widely-circulated in the written medium. The innovative character here is subsumed to the methodology of developing such an instrument for the language pair involved and for the domain covered – sustainable buildings – an area which has never been linguistically explored in Romania, even though Romania's status of EU member would require such an action.

The second research objective of the project aims at developing the linguistic framework which will, on the one hand, integrate and interpret the data yielded by achieving the first objective, and, on the other hand, blueprint the development of the third objective, by means of consultations with team specialists and with beneficiaries. The potential bottleneck of the second objective – the difficult management of the high number of Ro terminological variants and their inherent meanings – will be minimized through consultation and negotiation with all the stakeholders. Thus, starting from the standardized En terms identified as problematic at transfer (with multiple equivalent, overlapping other equivalent, or with no equivalent), and after rounds consultations within the group of linguists and sustainability specialists, a list will be generated consisting of explanatory descriptions in Ro. The list will be the source of an ample questionnaire devised so as to elicit the terms that the respondents employ for the concepts described by the explanatory definitions. The questionnaire will be administered to the project beneficiaries, and we estimate the data will cover not only the terminology circulated in the written medium but in the spoken one as well (potentially different results). The innovative aspect consists in bringing together all the stakeholders, in view of reaching linguistic agreement, an action meant to ensure the high degree of acceptance relative to the concrete terminological solutions effected by the end of the project.

The third research objective envisages the construction of a bilingual terminological e-dictionary (with inherent definition in Ro) in the field of sustainable built environment. We assess as challenging the harmonization of the terminological solutions proposed as correct with the already circulated terminological variants, and we plan to minimize the challenge as follows: (a) several consultation meetings will be organized within the reunited groups with a view to building an explanatory monolingual dictionary (Ro) by reducing the terminological solutions previously obtained in the previous activities, by including coherent explanations, subsequently formulated as lexicographic definitions (agreed in the linguists group); (b) the Ro entry-words (already in the dictionary) will be matched with the En counterparts in the bilingual glossary, and eliminating the redundancies in the initial glossary. The result of this stage is a perfected version of the bilingual glossary; (c) the newly obtained glossary will be integrated in the explanatory monolingual dictionary, and the final domain-specific electronic product will be issued – the bilingual terminological dictionary with inherent definitions in Ro, in the field of sustainable built environment. The originality of this product is conveyed by its complexity (built by merging a glossary and a dictionary), by the domain it covers, and by the stages followed to its construction, involving dialogue and reaching consensus within working groups, and also between these groups and beneficiaries, due to the fact that, given the field dynamics, it is imperative to consider aspects pertaining to the recommended usage, as well as to the applied usage.

3. Potential impact of research

The project has the potential to influence significantly the scientific fields it stems from. Through the working methodology and terminological instruments it develops, this project will impact the field of linguistics (more precisely: terminology, lexicography, translation studies); the project puts forward an interactive model for the development of dynamic linguistic tools, a model which can be replicated each time we strive for a rapid implementation and conceptual and terminological acceptance on a large scale, which is the case of new highly specialized scientific fields. At the same time, the area of sustainable development will benefit from this terminological resource which can be used as such by the direct beneficiaries of the project, by university teaching staff and students.

In addition, we anticipate that the socio-economic impact of the project will be notable; the fact that the proposed terminological tools were generated by consensus guarantees the stakeholders' acceptance. Once accepted and

implemented, the linguistic instruments will influence considerably the actual implementation of the legislation in force in this field. The correct understanding of the terms by the stakeholders, and thereupon, by the general public, will result in openness towards this type of buildings and in the acceptance of the idea itself without the legal constraint related to the expiration of the implementation term. Another socio-economic effect is the increasing openness of the general public towards the financial incentives offered by the state and by banks (*green credits*), which currently go unnoticed. Last but not least, *Transilvania* University of Braşov intends to create sustainable development programs adapted to the particularities of each faculty. The linguistic sustainability promoted by this project enforces and supports such an initiative, and could become an example of good practice.

4. Research methodology

For each particular objective, several investigation methods and tools can be traced. Thus, in view of achieving the first objective, our working tools are parallel and comparable corpora, some of the most reliable instruments when it comes to term extraction for glossary and dictionary compilation. Given the language pair involved (En-Ro), the data extraction from the corpora will be performed manually, for the following reasons: (i) due to the novelty of the field, and its high degree of specialization, a terminological list must be generated from scratch; (ii) we identify both lemmas and morphological variations; (iii) we identify word-to-word, word-to-structure or acronym-to structure counterparts; (iv) as the Romanian field terminology is so variable, no clue in the form or the meaning of the English term could ensure the identification of all its Romanian counterparts; (v) the quite manageable size of the corpora (a parallel corpus made of publicly available legal texts and a comparable corpus balanced in size relative to the number of available Romanian specialized texts). The result of corpora processing and data integration will be a bilingual glossary in the field of sustainable built environment. In order to achieve the second objective, our methodology focuses on consultations between linguists and sustainability specialists, and the principal methodological tool will be the questionnaire.

Although the overwhelming majority of specialized glossaries and dictionaries are not drafted consensually, we integrate the questionnaire as essential working instrument because only by directly consulting the parties involved in the implementation per se of sustainable built environment, one is certain to attain rapid and securable acceptance of the specialized terminology

proposed eventually. To attain the third objective, we shall concentrate on collaboration between teams, on workshops, which represent the foundation of the results of this project – the monolingual explanatory dictionary, the bilingual glossary and the bilingual terminological dictionary (with inherent definitions).

The main challenge of the project, which is simultaneously the triggering factor of the entire enterprise, is the novelty of the domain of sustainable built environment. Several secondary challenges branch out: (i) the impossibility of identifying a relevant number of written texts for terminology extraction in view of compiling the bilingual glossary. In order to mitigate this risk, we rely on supplementing the parallel corpus with a comparable corpus and extending the text search for the comparable corpus (in particular for the Romanian texts) to other sites and sources offered by fellow professors. (ii) the difficulty faced by beneficiaries (authorities, real estate developers, general public) in comprehending the direct link between the terminological implementation and the law implementation per se. As mitigation factor, we count on supplementing the number of consultative meetings and workshops; (iii) the impossibility of reaching linguistic agreement, which can be solved via successive consultations with Romanian or foreign linguists who are not involved in the project.

5. Conclusion

This research project is meant to fill a terminological gap by developing a single terminological platform, adapted to the scientific progress in general, and to the stakeholders' and professionals' needs in particular, an enterprise with immediate social, economic and technological impact, materialized in the increase of the public level of acceptance relative to the EU and Romanian directives currently in force, as well as in the improvement of communicability. The scientific impact of the project lies in the innovative character (with respect to complexity and domain) of the proposed tool – a bilingual terminological e-dictionary, with inherent Romanian explanations. In developing such a tool, the concrete involvement of the stakeholders is an innovative action, which ensures a high degree of acceptance relative to the proposed terminological solutions, as well as a major social impact on the population, as ultimate implementation beneficiary.

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