An approach to "National Annex to ISO 19650 -2"

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AN APPROACH TO "NATIONAL ANNEX TO ISO 19650-2"

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Abstract: In the UK the objective of BIM mandate in 2011 was to develop a strategy for introducing and implementing BIM Level 2. PAS 1192-2:2013 was published by BSI and came into effect from February 2013, focused specifically on project delivery and provided specifications for the information management requirements and digital transformation of the built environment. The ISO 19650-1 and ISO 19650-2 were published in January 2019 based on BS 1192 + A2 2016 and PAS 1192-2:2013, providing the international standards and supporting information management process. For certain requirements detailed in ISO 19650-2, each region/country can define and add its own recommendations in the form of National Annex. The aim of the research is to explore the ISO national mirror committee's interpretation of the "National Annex to ISO 19650-2" content. An overview of the literature is discussed and a survey was conducted to verify the concept. The results of the survey are analysed and recommendation is given. Future researches need to be conducted to approach this concern.

Keywords: BIM, ISO 19650-2, ISO 19650 series, PAS 1192 series.

1. INTRODUCTION

The initiative of the UK government in 2011 by publishing *construction strategy* is now considerably advanced. An international working group with the leading role of the UK has created ISO 19650-1 and ISO 19650-2. The ISO 19650-1 outlines the concepts and principles for information management according to BIM and ISO 19650-2 defines the requirements and standards for information management within the context of the delivery phase of assets. As the international working group was not able to agree on certain items such as container naming and classification system, the National Annex was added to ISO 19650-2 to define the standards, which enables each region/country to use standards that are already in place. The construction industry is going through a significant change by implementing the new standards. The aim of the research is to explore the ISO national mirror committee's interpretation of the "National Annex to ISO 19650-2" content.

2. LITERATURE

In 2011, the Construction Strategy was published by the UK Government with the aim of reducing the cost of public sector assets by up to 20% by 2016. To achieve this strategy, BIM level 2 was required for all centrally-procured government projects in the UK. The strategy was an initiative for adoption of BIM Level 2 for government projects (BIM Level 2, 2019a)

Hence the initial aim was to drive the public sector to work at BIM Level 2, it had an impact on private sector as well, due to its benefits which including:

- Reduction in CAPEX, delivery and operational costs
- Reduced risk
- Improved carbon performance
- Predictable planning

2.1 BIM Level 2

BIM Level 2 maturity is a series of domain and collaborative federated models. The models, consisting of both 3D geometrical and non-graphical data, are prepared by different parties during the project life-cycle within the context of a common data environment. Using proprietary information exchanges between various systems, project participants will have the means necessary to provide defined and validated outputs via digital transactions in a structured and reusable form.

BIM Level 2 requires all project and asset information, documentation and data to be electronic, which supports efficient delivery at the design and construction phases of the project. At the design stage, designers, clients and end users can work together to develop the most suited design and test it on the computer before it is built. During construction BIM enables the supply chain to efficiently share precise information about components which reduces the risk of errors and wastes (BIM Level 2, 2016).

2.2 PAS 1192

In 2011, the UK Government's BIM Level 2 initiative resulted in publication of a series of national standards and publicly available specifications, became known as the UK 1192 series and define BIM Level 2 in the UK (Shillcock, 2019). PAS stands for *Publically Available Specification*. PAS 1192-2:2013 was developed to support BIM adoption in the UK. It was developed from British Standard BS 1192, published on 2007. BS 1192:2007 is part 1 of PAS 1192-2:2013. It provides a uniform framework for collaborative working and information in a BIM Level 2 environment. The PAS 1192-2:2013 describes requirement for attaining building information modelling (BIM) Level 2 during the project delivery phase (BIM Task Group, 2016).

PAS 1192 framework sets out the requirements for the level of model detail (the graphical content), model information (non-graphical content, such as specification data), model definition (its meaning) and model information exchanges (McPartland, 2017).

BIM Level 2 suite of documents according to BIM Level 2 (2019b):

BS 1192: 2007 + A2: 2016 (withdrawn, superseded by BS EN ISO 19650, in 2018)
PAS 1192-2: 2013 (withdrawn, superseded by BS EN ISO 19650, in 2018)
PAS 1192-3: 2014
PAS 1192-4: 2014
PAS 1192-5: 2015
PAS 1192-6: 2018
BS 1192-4: 2014
BS 8536-1: 2015
BS 8536-2: 2016

2.3 Transitioning from PAS 1192 series to ISO 19650 series

According to Shillcock (2019) as the benefits of PAS 1192 series was recognized internationally by owners and clients, the requirement for an international standard became evident. The international organizations from different countries demanded from *International Organization for Standardization* (ISO) to elevate the UK 1192 series at an international level. That was the start of ISO 19650 series, "*forming an international series of standards creates a level playing field for organizations and suppliers from around the world to compete, innovate and collaborate, regardless of where those companies are located".*

The ISO 19650 series has benefits for large multinational organizations as for years these organizations have struggled to accommodate the various requirements from their partners and stakeholders. ISO 19650 series helps these organization to create a unified approach across each of their regions, "w*ith dozens of countries involved in the process, each with varying cultural and legal constraints, producing a common way of working at an international level isn't a quick or easy task" (Shillcock, 2019).*

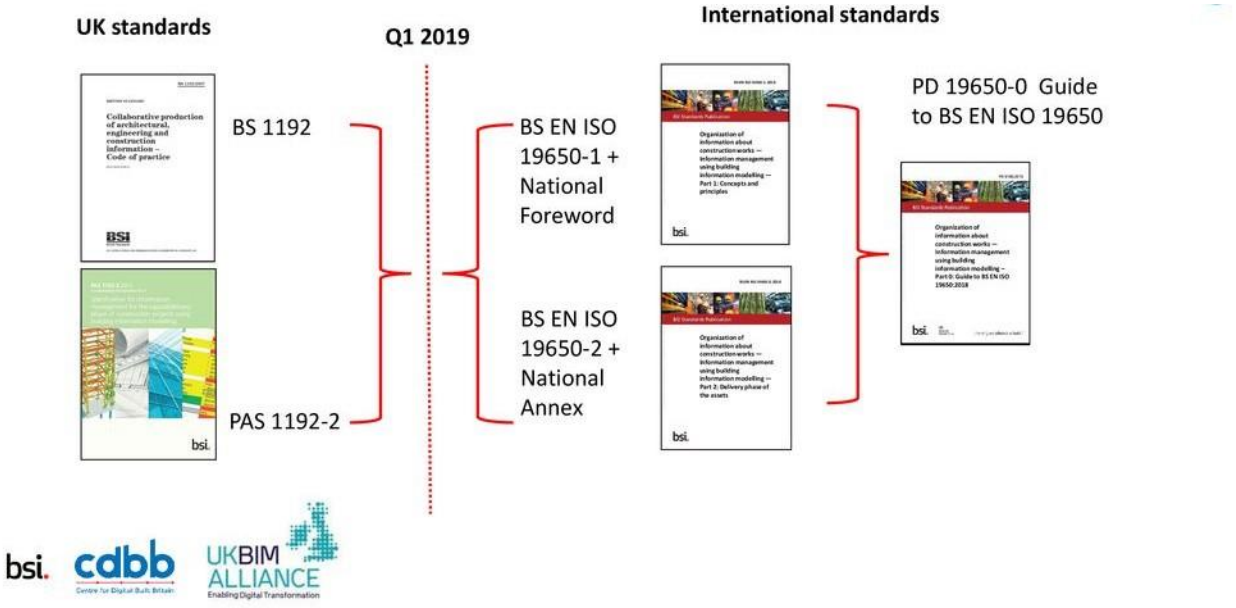

Figure 1: Transition and Associated Suites of documents Afterwards Q1 2019 in the UK (Source: cdbb, Center for Digital Built Britain, 2018a)

In the UK, BS-1192:2007 + A2: 2016 and PAS 1192-2:2013 are withdrawn and are superseded by BS EN ISO 19650-1 and BS EN ISO 19650-2. CEN, the European Committee for Standardization also would adopt the ISO 19650 series as European Standards *(Shillcock, 2019).*

Figure 1 illustrates the standards replacing BS 1192:2007 and PAS 1192-2:2013 in the UK. PD 19650-0:2019 is the transition guidance for the existing BS 1192 and PAS 1192-2 users to understand the changes made between the UK's existing standards and the ISO documents which are to replace them.

The initial draft of ISO 19650-1 is based on the concepts and principles of three documents. The concept of principles behind the collaborative production of information and the CDE (Common Data Environment) from BS 1192:2007, the concepts and principles of the effective management of information from PAS 1192-2 and PAS 1192-3. Figure 2, illustrates all the standards in use in the UK afterwards Q1 2019.

The initial draft of ISO 19650-2 is based on the activities and tasks within the information management process for the delivery phase of assets from both BS 1192:2007 and PAS 1192-2:2013. "*With ISO 19650-1 and ISO 19650-2 now published, the focus has moved on to the management of information during the operational phase of assets, and the adoption of a security-minded approach to the management of information relating to sensitive assets"* (Shillcock, 2019).

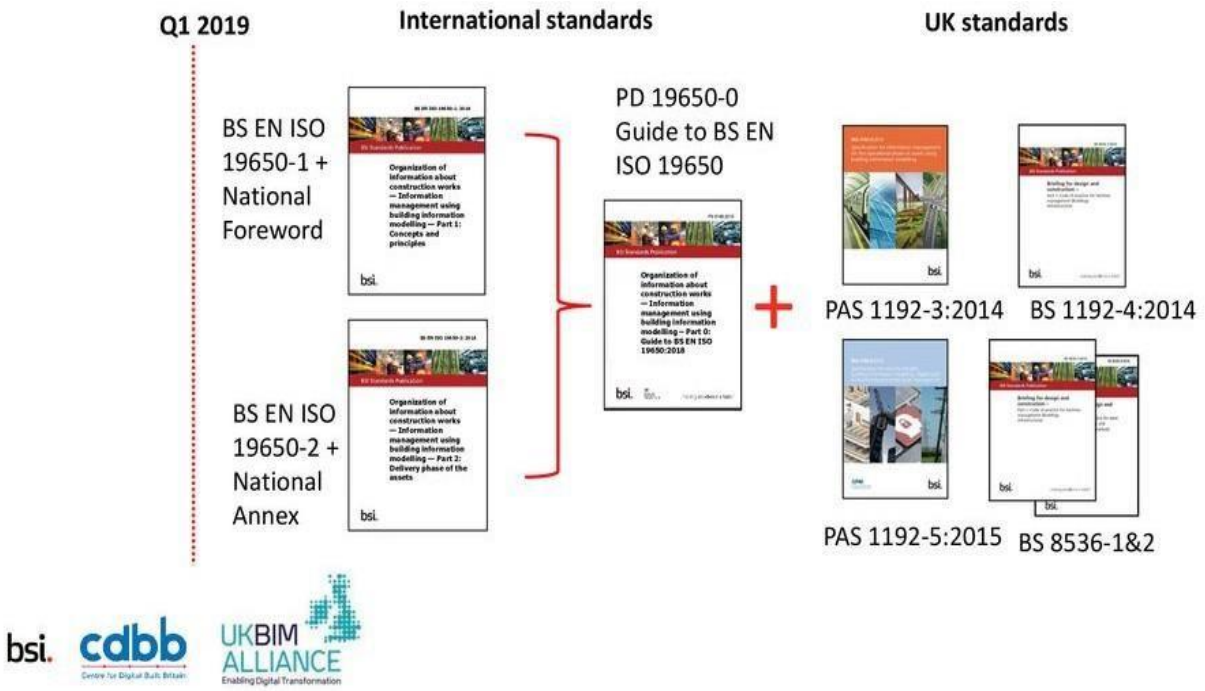

Figure 2: The UK BIM Standards, afterwards Q1 2019 (Source: cdbb, Center for Digital Built Britain, 2019)

"Using PAS 1192-3 and PAS 1192-5 as a baseline, the international working group is currently drafting ISO 19650-3 and ISO 19650-5. We hope that they will be published in early 2020, at which point PAS 1192-3 and PAS 1192-5 will be withdrawn" (Shillcock, 2019).

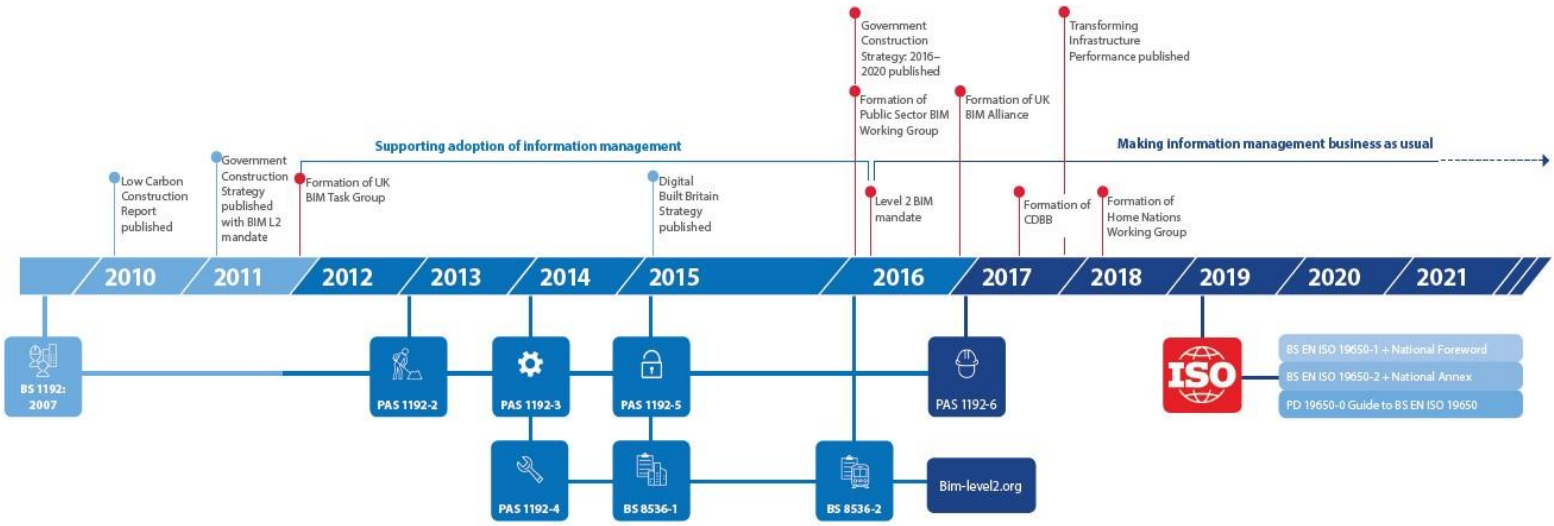

Figure 3: Timeline of Information Management (Source: cdbb, Centre for Digital Built Britain, 2018b)

2.4 National Annex

The ISO national mirror committee related to BIM is ISO/TC 59 / SC 13, which is the committee for "*Organization and digitization of information about buildings and civil engineering works, including building information modelling* (*BIM*)". ISO definition for committee (International Organization for Standards, n.d.):

- a Technical Committee (TC), which develops standards in a certain sector or industry;
- a Subcommittee (SC), which addresses a specialized area within a TC;
- a Project Committee (PC), which is created to develop one standard, after which it is disbanded

To get international consensus on the standardized conventions and codification, a National Annex was established to include region/country specific requirements. In fact, the ISO 19650-2 defines the requirement and the National Annex define the standards to be used to meet the requirements specific to a region. For instance, within ISO 19650-2 there is a requirement for information management to be classified, for the UK National Annex the classification system is Uniclass 2015 however for the US National Annex is supposed to state the classification system as Ominclass. This allows flexibility for each region/country to use the standards that are already in place (Shillcock, 2019).

Another issue was naming conventions, ISO 19650-2 requires each information container to have a unique ID, and the international working group (the group who developed ISO 19650-series) did not accept the convention defined by BS 1192:2007 which is a UK standard. "*The addition of a National Annex enabled the standards to be completed so that they meet the needs of different regions. But in doing so, I believe we failed as a working group to create a truly common approach. This is because organizations who work in different regions will still need to comply with local standards, which adds unnecessary overheads, such as continuously educating teams and maintaining multiple configurations in the common data environments, for example"* (Shillcock, 2019; Operam, 2019).

The National Annex in fact in the case of the multi-national projects can create concerns, for instance when a company is working on an international project, instead of using a common naming convention, the project would have different naming convention depending on the region/country. That results an administration overhead. Another complication is the information shared between teams in different countries using the national Annex of each country needs their containers ID to be mapped (Operam, 2019).

According to Operam (2019) with naming conventions the biggest challenge are the people and everybody thinks their way and their convention is the best. "*The preference would be to adopt a serialized number approach. Either at an asset level, a national level, or ideally, an international level. This approach would mean that any additional information, such as project, originator and location would still be available. But instead added as metadata attributed to each information container".*

Ford (2019) mentions the differences to container naming (container maybe models, drawings, etc. in the ISO 1650-2) and classification of the BS EN ISO 19650-2 and National Annex which is the UK country-specific. Ford in the article explores the concern about metadata and container which is worth to read it, however that level of detail is not the subject of the paper.

3. METHODOLOGY

Prior to undertake a research it is significant to understand the nature (approach) of the research (deductive, inductive) and its relation to the practice (Gray, 2004). Easterby-smith *et al.* (2008 as cited in Saunders *et al.*, 2009) defines the importance of research approach:

- It enables to take more informed decision about the research methodology, which is not just the techniques by which data are collected and analysed,
- It enables to think about the research methodologies and research choices in continuation and relation with the research approach, whether the researcher is interested to understand why something is happening (inductive), rather than being able to describe what is happening (deductive)
- It enables to adapt the research design to cater for constraints.

The aim of the research is to explore the ISO national mirror committee's interpretation of the "National Annex to ISO 19650-2" content. The deductive approach was chosen as the aim of the research was to describe what is happening and moves towards hypothesis testing (Gray, 2004). To achieve the aim of the research, the survey methodology was chosen as the heart of survey is to attempt to identify something about a population. Due to the difficulty of arranging interviews with the participants, the questionnaire data collection method via email was chosen. The questions of the survey were designed with both closed-ended and open-ended questions. For the interpretation of the result of the survey, qualitative method of analysis was the most suitable method, as the aim of the research is to explore how the ISO national mirror committees interpret the new situation and what is their approach to "National Annex to ISO 19650-2" content.

The first objective of the questionnaire aimed to collect data in relation to lack/existence of any official document(s) prior to ISO 19650 series publication in the countries. The second objective was to explore the content of National Annex. The rational for these two objectives is based on the aim of the research. As the aim of the research is to explore the ISO national mirror committee's interpretation of the "National Annex to ISO 19650-2" content, there is a need to know if the countries have been already familiar with the PAS 1192 series which is the foundation of ISO 19650-2 series. Then move forward to second objective which is how the mirror committees in each country interprets the "National Annex to ISO 19650-2". The survey was sent to twenty members of ISO national mirror committees around the globe and the result will be discussed in detail in the next section.

4. RESULT AND FINDINGS:

4.1 Result

The questionnaires were sent via email to twenty ISO national mirror committees, a total of eleven responses were received. It means more than 55% responses to the survey. There were two types of questions; closed-ended and open-ended, mostly the closed-ended questions were answered. The countries who participated in the survey; Belgium, Canada, Denmark, Germany, Israel, New Zeeland, Norway, Philippine, Poland, Portugal and Singapore. The result can be divided into two categories as per literature, the first category absence/existence of official document prior to ISO 19650 series publication, and the second one was to explore the content of National Annex.

Denmark was the only country that had a Danish legislation prior to ISO 19650 series. However, for the rest of the countries it means 90% of respondents, ISO 19650 series is the first official document related to information management. Two countries mentioned that certain organizations in their country used PAS 1192 series as the reference document for BIM implementation.

Among eleven countries replied to the questions, only four countries will write a National Annex, it means only 35% of participants. Three countries have not yet decided to write a

National Annex (30%) and four others will not develop one (35%). It means a total of 65% of participants had not decided to write a National Annex by September 2019 or would not write a National Annex. The countries that had not decided or will not write a National Annex, did not give any explanation of the reason of their decision.

Two European countries were look forward to publishing the document CEN/TR (European Committee for Standardization) Guidance for ISO 19650-1 and ISO 19650-2 which is currently being developed, and then based on the Guidance they will decide on further action.

4.2 Findings

As it was mentioned previously the aim of the research is to explore the ISO national mirror committee's interpretation of the "National Annex to ISO 19650-2" content. The objective of the survey was to collect data for two categories, the first one was absence/existence of official document in relation to BIM implementation prior to ISO 19650, and the second one was to explore the content of National Annex.

In relation to the first objective, the result of the survey demonstrated that for 90% of the participants, ISO 19650 series is the first official document for BIM implementation. Only Denmark had a Danish legislation prior to ISO 19650 series. PAS 1192 series was used by different organizations around the globe, however it was not a standard. ISO 19650 series have become an international standard since January 21, 2019 and it will be used as the official and legal document around the globe. .

In the UK, PAS 1192 series was developed by the industry and through the years the professionals became familiar with the concept and especially how to interpret it. In the UK, in relation to BS EN ISO 19650 series, two guidance were published by the UK BIM Alliance to help individuals and organisations to understand the fundamental principles of BIM according to BS EN ISO 19650 Part 1 and 2 (BIM Level 2, n.d.). The two guidance are:

- Information management according to BS EN ISO 19650, Guidance part 1: Concept
- Information management according to BS EN ISO 19650, Guidance part 2: Process for Project Delivery

Furthermore, the European Committee for Standardization is going to develop a Guidance for ISO 19650-1 and ISO 19650-2 which will be used by the European Union (EU) countries. However, the countries out of the EU do not have a guidance. The ISO 19650-1 and ISO 196502 as standards are the same for all the countries, only National Annex, is specific to a region/country. A guidance covering the common part can be used by all the countries. This concern can be the subject of the future research, as at present it is not clear which organization's responsibility is to develop a guidance for all the countries around the globe.

The second objective of the survey was to explore the approach of the mirror committees regarding the content of National Annex. The result of the survey shows that 65% (seven

countries) of participants had not decided to write a National Annex by September 2019 or would not write a National Annex. Among the remaining 35% (four countries) who will develop a National Annex, only two countries defined the content of their National Annex, which was similar to the UK National Annex and the two others did not give information about it. Two European countries are look forward to publishing the European Committee for Standardization (CEN/TR) guidance for ISO 19650-1 and ISO 19650-2 which is currently being developed, and then based on the Guidance they will decide on further action in relation to the National Annex. As the result of the survey demonstrates the percentage of the countries develop a National Annex is low (35%) and two European countries are look forward the guidance by European Committee for Standardization. Similar to the first objective of the survey, the need for a guidance came to the surface. The objective of the second category was to discuss the content of National Annex, however the result proved that to write the content, there is a need for guidance, even if each region/country can write its own National Annex.

Although there were no direct questions concerning the guidance, the result of the survey demonstrated a need for guidance by countries participating in the survey. As in the future the remaining ISOs of ISO 19650 series will be published, the need for guidance can become to the surface. As it was mentioned above, there is no organization responsible for developing guidance for the countries around the globe, however the future researches need to be conducted and approach this subject.

5. CONCLUSION

The introduction of the ISO 19650 series is going to have a significant impact on the whole construction industry globally. If until now PAS 1192 series was the reference for BIM Level 2 especially in the UK, now ISO 19650 series creates a new era in the construction industry. The global construction community now refers to these series for the digital transformation of the built environment.

The aim of the research was to explore the ISO national mirror committee's interpretation of the "National Annex to ISO 19650-2" content. The research started by an overview of the literature which covered BIM Level 2 and PAS 1192 series impact on construction industry in the UK and globally, followed by the transitioning from PAS 1192 to ISO 19650 series. The ISO 19650-1 and ISO 19650-2 were published in January 2019 based on BS 1192 + A2 2016 and PAS 1192-2:2013, providing the international standards and supporting information management process. For certain requirements detailed in ISO 19650-2, each region/country can define and add its own recommendations in the form of National Annex. The publication of ISO 19650-1 and ISO 19650-2 means the adaptation of the first official document for managing information over the whole life cycle of a built asset using BIM. However, the series needs to be interpreted by the ISO national mirror committees around the globe. To verify the new concept of managing information using BIM, a survey was conducted. The result of the survey demonstrated that to better interpret ISO 19650-1 and ISO 19650-2, a guidance is needed. As for the 90% of participant the series is the first official document in relation to information management. Furthermore, the remaining of ISO 19650 series will be

published and the lack of guidance can slow down the integration of the series by construction industry around the world.

The subject of the research is new for the industry and in the future there will be more information concerning this subject. However, the research about the subject is recommended as the construction industry is going through the fundamental transformation. The research regarding the challenges that ISO international mirror committees and international community went through during the adaptation of the ISO series as well as the need for guidance is recommended.

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