

Analyses Implementation ISO 9001 Quality Management System in Indonesian and Romanian Construction Company

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Abstract: The Indonesia is facing a serious quality management system shortage problem. Lack of management principle and inadequate quality (Koskela, 1993). For company ISO certification, one aspect is caused of fault the quality management standard usage from all level management (Speech of Prof. Puti Farida Marzuki, ITB) explained that construction management is needed to ensure the efficiency and productivity of a construction project to meet the expectations and requirements established. For fulfill those aspect the leader of company need to give consideration to all level management. Some literature and data analysis found that there are many correlation between Organizational Structure performance and Quality Management System which impact some quality problem. This studies based on perspective of Romanian Law for construction quality (LAW NO 10/1995-On Quality in Construction), UU RI No 18/1999 Indonesian construction company and their relationship with the ISO 9001-2008 practices. This research analyze Indonesian and Romanian approach method to fulfill the requirement, finds out the implementation with principles of ISO 9001-2008, the mistake from some records both countries performance during implementing of ISO 9001, the quality result by level implementation with their non-conformity and customer satisfaction. Literature approach will be considered in this project. Questionnaire surveys, interview approach will distributed to select representative participants in Indonesia (Java Company Construction Area) and Romania (South East and South Company Construction Area) in order to collect responses in some QMS implementation case contract. The results will analyses and support for maximum potential design quality for Indonesia and Romania by considering the new standard of ISO 9001-2015 standard.

Key words: QMS • Level Implementation • Obstacle • Romania • Indonesia

INTRODUCTION

Nowadays, In Indonesia development construction execution was found many failure construction. One of them caused by the construction execution method and techniques do not comply with the specified quality standard. Indonesia is lack of quality concern both for the attendant quality processes, practices and procedure. Substandard quality is currently subject to serious scrutiny by both the Indonesian government and the construction industry (ICA, 2010; Secretariat of BPKSDM, 2009). Indonesian contractor are not capable of giving

customer satisfaction in line with the espoused values of ISO 9001. Project owners and end-users often lodge complaints to local government agencies relating to the poor quality of products and project outcomes from Indonesian constructors, some of which are reported in Indonesian newspapers (Pontianak Post Online 2006). Those are some problems which can effect construction market and Indonesian competitiveness in Asean Economic Community and Economic Development. However, Organizational construction domestic cannot support for compete with international standard stated Rizal Tamin (2011). As a proof of the weakness of the

Indonesian construction innovation is more foreign contractors working in Indonesia rather than national contractors, comment from Head of Indonesian Technical Expertise Community (PPI) Booby G.U. Therefore we need to increase the quality of construction system in Indonesia.

In comparison with Indonesia, in Romania which also developed country has the great majority of national construction work are done by local contractors and their principle is that implementing a quality management system can support sustainable development in Romanian SMEs (TitaAngheluta, Bucharest Academy, 2012). This condition can show us there is something that must be evaluated for our quality construction system. This study will combine and obtain general opinion concerning the implementation of quality management system principles of construction in Romania and Indonesia. The Indonesian Government has enacted specific regulations and adopt the ISO 9001 standard. Romanian also has its regulation namely LAW NO 10/1995-On Quality in Construction and also adopt the ISO 9001. This study aims to measure quality improvement for organization in Construction firm both of two country. Therefore, this paper examines the implementation of ISO 9001 for both of two countries.

This paper answer the difference regulation and implementation with ISO 9001-2008 Principle with their level implementation which caused some obstacle and made continuous problem because of lack of some aspect to analyze what should both country develop to improve the quality effectiveness by taking consideration analyses with ISO 9001-2015 Principle. The scope of this Research will analyze construction stages from *Contractor Company*. The data will take generally but the scope analyses for improvement as the level and problem in site will back to ISO Principle. In this research writer will focus on eight principles ISO9001-2008.



Fig. 1: ISO 9001-2008 Principle

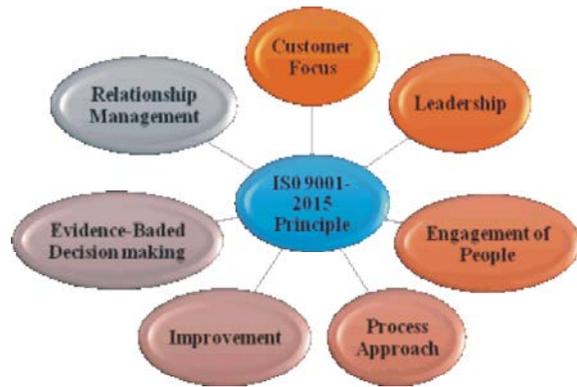


Fig. 2: ISO 9001-2015 Principle

Methodology Approach: This research use quantitative and literature approach. The literature approach is a qualitative study from various sources such as literature reviews of International standard (ISO 9001-2008 and ISO 9001-2015), Romanian (LAW NO 10/1995) and Indonesian (UU No 18/1999), project characteristics, the existing construction projects in Indonesia and Romania, who else are responsible for quality for construction and theoretical studies related to the principle topic in construction organizational structure in terms of construction quality. Writer also analyze the Romanian and Indonesian participant responsibilities for quality in construction and their duties in terms quality assurance or quality control by issuing some case construction factor.

Furthermore, the preliminary study were used to refine the questionnaire and hypothesis of the research plan in order to develop a comprehensive survey. Literature study are analyzed to obtain thoroughly figure of the development condition of construction project in Indonesia and Romania. Based on the analysis result, it is expected to find the specific issues that are the root of the problem in construction quality. It analyze the point solution if the standard use the new version (2015).

Quantitative research approach are collected by questionnaires information about implementation principle quality management systems (QMSs) ISO 9001-2008, the problem and aspect and the readiness to face 2015 version. Questionnaire form from Indonesia, the respondents take place in Java (Bekasi, Jakarta, Bandung, Solo and Surabaya). Questionnaire form from Romania take place in South East part (Iasi, Vaslui, Neamnt, Suceava, Botosani) and South part (Bucharest

and Vrancea) Some questionnaire is distributed to Quality Management Representatives (QMRs), Project Managers and Project/Site Engineers of some construction project, who already execute and experience about this case. It has less revisions because we need providence and a well-validated survey instrument. The questions are primarily based on literature review analyses which present some existing records Romanian and Indonesian mistake both in design, execution, or maintenance related to QMS in the structural organization construction sector. This paper will give the consequences generally of mistake or non-conformity and how each country solution for those problem to fulfill the client needs. Questions in the survey were classified as either "closed-ended?" or "open-ended?". Since most of the questions sought opinions or a subjective measurement, the formats of such questions were based on an unbalanced itemized rating scale. For example, 4=fully implemented, 3=not so fully implemented, 2=minimally implemented, 1=yet to be implemented. The itemized rating scale provides flexibility in the number of points in the scale as appropriate (e.g. 2,3,4, etc.).

Quantitative data analysis involves both looking at the general trends in the data and fitting statistical models to the data. The numbers and percentages as a descriptive analysis will be the first undertaken to provide an overview of the development phase of contractors QMSs. The parametric test in this case is a scale of measurement which be treated as interval Scale. The distribution of the data is normal and the assumption of homogeneity of variance is not violated. The overall data will use statistical analysis with program package SPSS (Statistical Program for Social Science) version 9.0. A computer application program package of analysis of statistical data. The results depict the current status of the QMSs implementation under ISO 9001-2008 including the levels of the existing QMS implementation and the levels of obstacles that affect QMSs implementation during QMSs implementation with comparison of both country will be analyzed with Independent T-Test to compare the level by percentage with 95% confidence interval. This T-test was focused on testing the difference between means of two variables.

Result Analyses: This section gives some result analyses of: (1) Rapprochement method in Romania and Indonesia

requirement of implementation with ISO 9001-2008 principle. This section examines method which undertake by each country in order to implement the 8 QMSs Principle. (2) Investigation of current implementation of QMS-ISO 9001-2008 in Indonesia and Romania. This section will give the comparative result between Romanian and Indonesian existing level of implementation based on the 8 principle ISO 9001-2008 (3) Most influencing obstacles which impact by the existing status implementation of 8 principles. The details will be collected from some aspect which are in site. Following analysis match together and also based on comparison with existing theory in literature review is focused on meeting those three factors (rapprochement method, current and level implementation and the influencing obstacles) combine with unconformity condition and the customer satisfaction in order to make the general opinion conclusion the importance of good implementing 8 principle of ISO 9001-2008 and some analyses literature review for the new standard 2015 version.

Respondents Profile: Research shows that just over 90% the majority in Romanian respondents is high level implementation (QMS-r and Project Manager) and approximately more than 50% high level respondents in Indonesia. They are high level in understanding the QMS in their company. Respondents are more than 50% just over 16 year experiences in Indonesia, but just under 50% respondent in Romania on that ages. Although respondents in Romania are less experience, the position of respondents are more than 90% QMS-r (High Level). Those position and the working experience of respondents are high knowledge about QMS, making the questionnaire qualified and objective from the respondent point of view. From three type of the company (Public, Private, Foreign) in the survey, respondents in Indonesia most of the companies are private companies with just over three quarter. It is same as in Romania, it shows around 80% companies are private companies.

Current Implementation and Motivation: In current implementation of quality management system, the survey shows 81% company in Indonesia response "yes" in reference that it is needed to employ the consultant and in Romania 63% company response "Yes", So just over one quarter companies are without consultant in Romania.

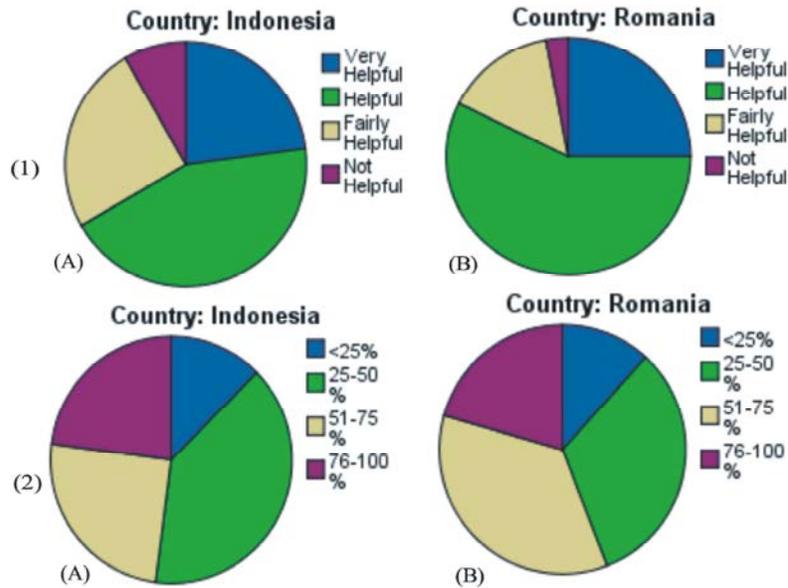


Fig. 3: (1) Consultant Role. (a) Indonesian, (b) Romanian, (2) Percentage of Consultant Involvement in the establishment of the company’s QMS documentation (a) Indonesia, (b) Romania

The diagrams above show record of consultant enrolment and also the score involvement of their implementation in relation to the documentation. The graph were drawn the majority of respondent in Indonesia 43.8% said helpful, 22.9% said very helpful, 25% said fairly helpful and 8.3% said did not helpful. Pie chart (1) survey shows more than three quarter said helpful and it supports why companies in Indonesia were employed the consultant, because they point it will helpful. Otherwise the picture (2A) drawn that Indonesian is low for the document implementation. It shows just 25-50% had been implemented 40% respondents and the total percentage show non-implement. There were 63% respond in Romania which say “yes” and with this response the graph shows 57% which respond helpful with 25% said very helpful, 14.7% said fairly helpful and 2.9% said did not helpful. Although Romania employed fewer than Indonesia, the implementation of documentation requirement approximately more than 51-75% implement is considerably bigger than Indonesian.

Nowadays, in current implementation there are four approach, those are every division/sub-division prepared the draft of the documents, Quality Assurance Team developed the documents, the consultant developed the documents, Quality Assurance Team and the consultant developed the documents. Research indicates in

Indonesia 41.7% approach of those companies were undertaken by every division/sub-division prepared the draft of the documents and 33.3% by Quality Assurance Team and the consultant developed the documents. In Romania, the table point out the similarity percentage of Quality Assurance Team developed the documents with 44.1% and also Quality Assurance Team and the consultant developed the document with 44.1%. This survey point out that QA team mainly develop the QMS Documentation in Romania but in Indonesia it shows that all division take a part in operation process besides the QA team and consultant. In fact it was good application if all participants in that project take responsibility.

Regarding the motivation of each country, Quality Management System can be objective and subjective point of view. So it is normal if one country to another has different point why they use ISO certification according to the leader of the company. From the survey Romania construction companies answered as providing certified and improvement of professional service and product quality for client trust more over for external motivation but mainly for image enhancement and client satisfaction. Indonesia construction companies answered for company reputation and disciplined documents for competitiveness construction sector which is included for internal motivation but mainly for competitiveness.

Table 1: Implementation 8 Principle Quality Management System in Romania and Indonesia

No	QMS-ISO 9001-2008 Principles	Indonesia				Romania			
		Mean	SD	95% CI	LoI / Rank	Mean	SD	95%CI	LoI/ Rank
1	Customer focus	3.17	0.81	2.94-3.42	3 (1)	3.9	0.35	3.81-3.98	4 (1)
2	Mutually beneficial supplier relationships	3.02	0.89	2.81-3.29	3 (3)	3.81	0.4	3.71-3.90	4 (2)
3	Leadership	2.88	0.94	2.64-3.21	3 (5)	3.59	0.58	3.45-3.73	4 (6)
4	Systems approach	2.94	0.99	2.60-3.23	3 (4)	3.5	0.61	3.35-3.65	4 (8)
5	Continual improvement	2.83	0.83	2.62-3.08	3 (7)	3.56	0.56	3.43-3.71	4 (7)
6	Process approach	2.83	0.88	2.56-3.13	3 (6)	3.68	0.56	3.54-3.81	4 (5)
7	People involvement	2.79	0.87	2.60-3.09	3 (8)	3.74	0.51	3.61-3.86	4 (4)
8	Factual approach to decision making	3.04	0.77	2.83-3.33	3 (2)	3.76	0.46	3.65-3.88	4 (3)

Notes: $p=0,009$, $p<0.05$ Level Implementation (LoI): 4(3.51-4.00), 3(2.51-3.51), 2(1.51-2.5), 1(<1.50)

The data is a representative of two population data and random sample (each unit in the population has an equal probability of being selected in the sample). They represent their implementation of 8 Principle of Quality Management System as the main analyses of this research. For level implementing, the survey will be analyze with percentage range rating with 95% confidence of interval from 1 sample t-test by using SPSS, those are “1”= ‘yet to be implemented’, “2” = ‘minimally implemented’, “3” = ‘not so fully implemented’, “4” = ‘fully implemented’. The data from this sample shows in Indonesia all of ISO 8 Principle implemented in the level

“3” which is “not so fully implemented”. For Romania the result indicated level “4” which is “Fully Implemented”. The survey indicates small standard deviation which means the data drawn close to the mean with standard deviation < 1. So it can be concluded as appropriate data or meet assumption model using. Confidence interval shows the cut-off point for mean and helps the writer in order to rank the level implementation and mean comparison. From t-Test the data sample show 0.009 or 0.9% from 5% as the null hypothesis which indicates it is statistically significant at level 0.05 level.

Influencing Obstacle:

Table 2: The Influencing Obstacle which Impact Quality Management System Implementation

Obstacle	Experienced	
	Indonesia	Romania
Lack of strong motivation from all levels of management.	Sometimes	Sometimes
Difficulty in understanding ISO 9001 Terminology from Head until Site Engineer	Sometimes	Rarely
Time for activity reports completion of an internal and external audit.	Rarely	Rarely
Failure in disseminating the requirements of the company’s QMS to all organizational level	Rarely	Rarely
Lack of a well-designed reward system	Sometimes	Rarely
Internal communication processes between participants	Rarely	Rarely
Poor external communication exists	Sometimes	Rarely
Uncertainty exists with the effectiveness and/or suitability of sub-contractors and suppliers quality systems.	Sometimes	Rarely
Lack of identified funding in the company for implementing QMS	Never	Never
Lack of time required to complete the application and writing document	Rarely	Rarely
High cost implementation	Rarely	Rarely
No time that is used in investigate audit system.	Never	Rarely
Leadership commitment is not followed up with work program	Rarely	Rarely

For the influencing obstacle which impact Quality Management Implementation From the 13 categories of obstacle, in Indonesia 5/13 are sometimes experience, 6/13 are rarely experienced and 2/13 are not experienced. The most influencing obstacle may occurred lack quality are lack design reward system and uncertainty exist with

effectiveness and/or suitability of subcontractors and suppliers quality system. In Romania 1/13 are sometimes experience the most influencing obstacle which give more portion of lack quality are 11/13 are rarely experienced and 1/13 is not experienced. The most influencing problem is lack of strong motivation from all level management.

The aspect that may impact construction process:

- From the human aspect resources the first aspect that may impact the lack of quality is Unskilled Labor. Both countries have this problem. It is possible to analyze the unskilled labor may cause the lack of strong motivation from all level management, the 1st rank problem in Romania, because they do not fully understand their role and goal of the works with excellent and effective way from the head. This also evoke the people do not understand to ISO requirement in Indonesia.
- From Management aspect poor coordination among parties impact the uncertainty exist and effectiveness sustainability with external parties and also disseminating ISO in Indonesia and poor disseminating information to parties involved cause lack motivation in all level management
- From Documentation aspect, In Indonesia the change in design and in adequate cause lack design reward system because there are more overtime to work to reach the project needs but forget to give reward to parties and adequate things may lead to dissatisfaction the client needs. This aspect also the same point in Romania that lead to lack of time completion.
- From material aspect time of delivery material give many impact of problem in both country. Especially in Indonesia this cause the uncertainty exist effectiveness sustainability with external parties.
- From the execution aspect Indonesia should take consideration to improve the equipment in order to minimize the overtime of workers in site. On the other hand it indicate that Romanian equipment is met but the effectiveness of use should work with effective arrangement site layout.

Records of non-Conformity:

Table 3: Records of Non-Conformity

Non-Conformity	Experienced	
	Indonesia	Romania
Unapproved Design Drawings	Never	Rarely
Unfollowed Method Statement	Rarely	Never
The approved Inspection and Test Plan (ITP) was not followed.	Rarely	Never
Unfollowed Documentation Approved	Rarely	Never
Different Material Approved	Never	Never+
Material Test Failure	Never	Never
Design Failure	Rarely	Rarely
Unavailable Documentation to Cover an Activity	Rarely	Rarely

The unconformity survey indicates that Indonesia is around 75/100 conformity with all the eight specific categories and Romania has higher level with 86/100 scale of conformity. This shows that higher implementation level of principle may lead to less unconformity things. The aspect that each country should build and improve are: Indonesia should improve the availability documentation to cover activities and Romania should minimize the design failure.

Records of Customers Satisfaction: Research indicates from 3 categories of customers (Government, Private and Foreigner) major customers in both countries said “YES” that the companies have tool to record the meeting of their customer expectation. This tool made by company or contractor center office and communicate with the customers. Company usually use customer satisfaction survey. Furthermore, those survey shows that customers in Indonesia are “satisfied” with company service and result of construction and customers in Romania are “very satisfied” with the overall services and also indicates customers in Indonesia are “neutral” to promote the companies to other customers or developers and in Romania are “like” to promote the companies to other customers or developers with the overall services.

Table 4: Other Customer Satisfaction Area

Area Satisfaction	Country	
	Indonesia Mean	Romania Mean
Overall quality work and customer service	3.89	4.32
Cost	3.73	3.97
Ability to meet needs and timing of response client needs	3.71	4.25
Schedule	3.69	4.49
First Use experience	3.77	4.6
Usage Experience	3.6	3.54
Flexibility of Proposal	3.69	4.44
Flexibility of Terms and Agreement	3.52	4.28
Field Supervision Responsiveness	3.73	4.46
Quality of Work Completed	3.9	4.63

Notes : Level (LoS): Very satisfied (5-4), Satisfied(4-3),Neutral(3-2), Dissatisfied, (2-1),Very dissatisfied(1-0)

From the overall eight principle survey indicates that “Customer Focus” is the first rank implementation in both countries. This applying principle make them satisfy with their work. Romania should increase usage experience satisfaction which possible by minimize the change and adequate in design as the high aspect that impact the problem. Indonesia also should increase in flexibility terms

and agreements satisfaction that might be improve by improve the respond in change in order to build the process flexibility and speed.

Analyses the Barrier and Aspect That Impact the Unconformity with ISO 2015 Principle Solution: Below is the most influenced problem and the solution from this standard.

- Indonesia: lack design reward system and effectiveness and sustainability with suppliers. Those aspect need organizational knowledge. In order to know the internal sources needs (intellectual property, knowledge, lesson, training and other reward system) and also external sources needs (standards, gathering knowledge from customers or external providers and the results of improvements in processes).
- Romania: lack strong motivation all level management. In 2015 “Leadership Principal is the point to solve this problem. The Top management shall demonstrate leadership and commitment. Because this leader will communicate the importance of effective quality management. This individual should ensure that QMS achieves its intended results by considering also the risk. He shall engaging, directing and supporting persons to contribute the effectiveness.

Aspect that may impact the problem and the solution from QMS 9001-2015 Principle:

- *Human Unskilled Labor.* The knowledge or organizational knowledge shall be maintained and available to necessary things. The knowledge is just possessed by skilled person in their field.
- *Professional Management.* In Indonesia: coordination among parties. This aspect is one of the point in 2015 that is the organization roles, responsibilities and authorities. They should know the relevant roles are assigned and understood within organization. So the coordination will easier manage because they know their part. In Romania: disseminating information: This aspect is the point of communication. They shall determine the internal and external communication relevant to QMS. When, whom, how and who to communicate.
- *Documentation.* Change in design and design inadequate. This is one point of Planning. When planning for quality of this aspect, the organization shall consider the issues and requirement that may happen and determine the risk and opportunity that

need, to be address to prevent, or reduce, undesired results which one of them is inadequate design and also give assurance that QMS can achieve its intended result although many design changes. This opportunity may lead to flexibility of decision making that give opportunity which can lead the client satisfaction, but also considering to the purpose of the changes and their potential consequences, availability of resources other aspect of planning of changes.

- *Material.* Slow delivery material is the aspect that is also impacted by lack schedule and become lack material. In this point, the monitoring and measuring resources should be taken seriously. Calibrated, verification, or anything to providing confidence because in this standard is not only the internal should present the conformity but also the external measurement standard will minimize.
- *Execution.* In Indonesia: Equipment limitation. In resources general point on 2015, organization shall determine and provide the resources needed for the establishment, implementation with considering the capabilities and constraints on existing internal resources. And external providers. In Romania: ineffective equipment use. Control of externally provided processes, products and services is needed. They shall ensure that externally provided processes, products and services conform to requirements with re-evaluation of external providers.

For non-conforming output organization shall ensure the outputs that do not conform to their requirements are identified and controlled to prevent their unintended use or delivery. This aspect apply not only for product but also services with several action such as correction, segregation, informing the customer and obtaining authorization.

In 2015 standard, company must have tools to know customer perceptions of needs and expectation. Such as survey, meeting, market share analyses and others. The result must be evaluated.

This final project seek to compare the implementation of ISO 9001-2008 Principle in Indonesia and Romania for effectiveness work and increasing the quality. Research found that:

- Indonesia and Romania use same standard system as one of tools to develop the quality that is ISO 9001-2008 Quality Management System, beside each country rules different for one to another. Those things is according to their point of thinking and

value of country. Indonesia with their motivation more over for internal point that is company reputation and competitiveness and Romania with their goal for external point that is image enhancement and client satisfaction. Romania use quality team to develop the documents but less using quality consultant than Indonesia but for documentation Romania has bigger percentage implementation than Indonesia.

- The existing level of ISO 9001-2008 Principle in Indonesia is 3/4 “Not so fully implement and Romania is higher with 4/4 “Fully Implement”. Customer service is the first rank principle which they implement. On the other hand the last rank implement are people involvement in Romania and system approach in Indonesia.
- The overall obstacle in Indonesia and Romania from survey are in “Rare” level problem with 6 from 11 score for Indonesia and 11 from 13 score for Romania. However, the most worse obstacle to fix to increase quality in Indonesia are about design reward system and effectiveness sustainability sub-contractor or supplier and Romania is lack of strong motivation from all level management. The obstacle are caused by some aspect and survey indicates that Indonesia is more experienced than Romania. In Indonesia influenced by unskilled labor, poor coordination among parties, change in design, slow delivery material and limit of equipment and, Romania caused by unskilled labor, poor disseminating information, change in design, slow delivery material and ineffective equipment use.
- According to the survey Indonesia is satisfy the client needs and Romania is really satisfy them. Point 1-3 with around 75% conformity in Indonesia and 86% conformity in Romania show that better implementation of ISO 9001-208 Principle may lead to less percentage of problems or obstacles, higher conformity and bigger satisfaction. So, the effectiveness of company is also according to their applying and implement the standard. Romania is higher level implementation than Indonesia make the overall project went better. However both country still in half level for quality. They are more “sometimes” experienced level for overall influenced aspect. So, The Risk-based Thinking and others guide from new ISO 9001-2015 standard may path to minimize the problem, because it will indicate the risk and opportunities from beginning and preventive action and predict lead to higher satisfaction.

CONCLUSION

ISO Principle implementation Indonesia is “Not so fully” and Romania is “Fully”. Indonesia should increase the system approach regarding design reward system and sustainability with external parties, than Romania in people involvement regarding motivation all level management. So, less unconformity and fulfill client needs is impact of good implementation.

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