DOCUMENT MANAGEMENT

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ABSTRACT

The Document Management is the activity that defines the organizational level in a company. This report proposes the Documented Information Discussion Groups (DIDG) methodology that can be used in an established Document Management System in order to improve the quality performance in the maintenance and updating of documented information. This methodology also works as an action plan to prevent potential failures and their potential effects as duplicated documents, low quantity of updated documents or the lack of interest to review the existing documentation.

Key words: **Document, management, discussion, methodology, maintenance, updating, information, system, failures, quality, performance.**

RÉSUMÉ

La Gestion Documentaire est l'activité qui définit le niveau organisationnel dans une entreprise. Ce rapport propose la méthodologie Documented Information Discussion Groups (DIDG) qui peut être utilisée dans un système de gestion de documentation déjà établi afin d'améliorer la qualité dans la performance de la maintenance et la mise à jour d'information documentée. Cette méthodologie est également utilisée comme plan d'action pour prévenir de potentiels échecs et leurs effets, tels que des documents dupliqués, une faible quantité de documents mis à jour ou le peu d'intérêt dans la révision de la documentation actuelle.

RESUMEN

La Gestión de Documentos es la actividad que define el nivel organizacional que posee una empresa. Este informe propone la metodología Documented Information Discussion Groups (DIDG) que puede ser utilizada dentro de un sistema de gestión de documentos ya establecido con la finalidad de mejorar la calidad en el desempeño del mantenimiento y actualización de los documentos. Esta metodología es igualmente útil como plan de acción para prevenir potenciales errores o falencias y sus efectos, tales como documentos duplicados, baja cantidad de documentos actualizados o el poco interés en la revisión de la actual documentación.

ACKNOWLEDGMENT

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ACRONYMS

QPO: Qualité et Performance dans les Organisations

MIM: Mémoire d'Intelligence Méthodologique

ISO: International Organization for Standardization

UTC: Université de Technologie de Compiègne (University of Technology of Compiègne)

GDP: Gross Domestic Product

EU: European Union

IATF: International Automotive Task Force

QMS: Quality Management System

DMS: Document Management System

FMEA: Failure Mode Effect Analysis

DIDG: Documented Information Discussion Groups

OEE: Overall Equipment Effectiveness

INTRODUCTION

This report is based in some of the methodologies learned as a student in the Master's degree in Quality, in French called *Master Qualité et Performances dans les Organisations (QPO)* at the University of Technology of Compiègne (UTC) in France.

In 2016, I decided to apply to the Master's degree in Quality after getting an industrial engineering diploma at the Andres Bello University in Chile which gave me the skills, tools and the knowledge of applied sciences, mathematics, engineering methods for complex system integration and operations. As an Industrial engineer what we usually do is to improve systematic processes in manufacturing and production systems through the use of statistical analysis, interpersonal communication, planning, quality control, operations management, computer simulation and problem solving.

In that time, I was very interested in a better understanding of Quality Management and everything about it. Once I was accepted to UTC, I came to France to get the professional know-how in Quality.

I strongly believe, that the creation of Quality methodologies are the perfect tools to create impact and to establish the sense of higher purpose for a group of people.

Quality is also about the continuous improvement of everything (an action, a process, a procedure, the performance, the profitability, a simple document, etc.) that can create value to the final product in order to satisfy the customers, as well the users.

As the final step to finish the Master program, I had the opportunity to apply theory to real situations, I spent six months of internship in the Quality Department of a carmaker supplier company.

The Document Management internship, it was in accordance with my professional project, it allowed me to get to know the documents related to the business activity, the information flow and the complex task of supporting and keeping a clean, an effective and efficient Document Management System.

Inside an organization we can find all kind of documentation such as the procedures, processes, methodologies, requirements, standards, predetermined file forms, templates, and so on. They are all useful information, both internally and externally to guide and to support specific activities.

In view of the above, the creation of a right document is considered key for the performance success of a specific activity, but the elimination or modification of a document is just as important, particularly when this one is done with its life cycle.

The proposed methodology in this report is done to identify documents that can be shortened, simplified or to be eliminated because they are not useful or do not comply with the International Standards anymore. The objective is the reduction of the quantity of documents, also to make easier the document management and to make faster the transfer of information and knowledge.

CHAPTER I: The Automotive Industry and The Opportunity to Improve the Document Management System

The Automotive Industry

The Global automotive market's demand is likely to remain stable in the economy. In the *Figure 1,* we can see China's outlook remaining stable to positive, the U.S. showing some signs of softening, and European markets continuing on a moderate growth trend. Visibility remains low in markets such as Brazil, Russia, and India because of likely volatility and macroeconomic uncertainty. These markets account for less than 8% of the global vehicle sales, while China alone represents one-third[1].
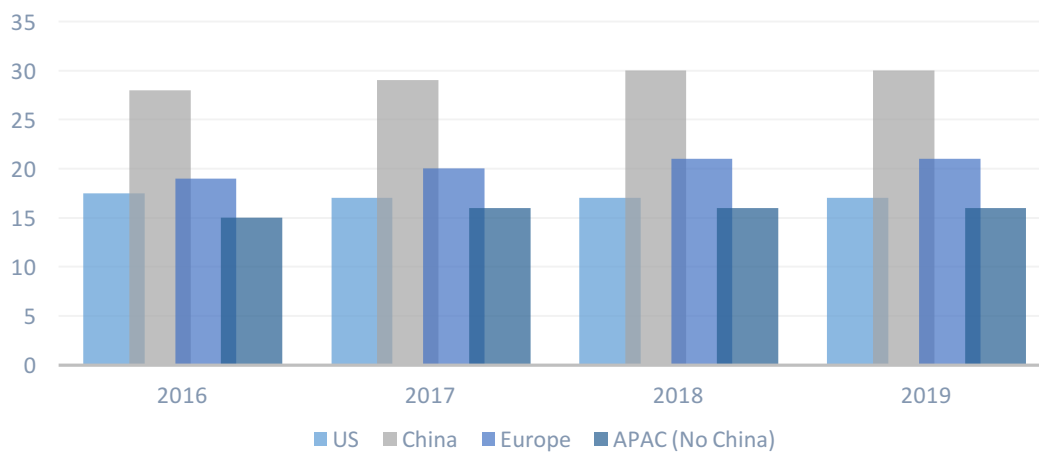
Figure 1 Vehicle Sales in millions for 2016-2019[1].

The European Union automotive industry has become crucial for the European economy. The sector provides jobs for 12 million people: Manufacturing accounts for 3 million jobs, sales and maintenance for 4.3 million, and transport for 4.8 million. Also it has an important multiplier effect of upstream industries such as steel, textiles, chemicals, technology, and R&D [2].

The light vehicles sales growth exceeded 4% in the majority of the months in 2017, far surpassing the global expectations for the EU's GDP (1% -2%).
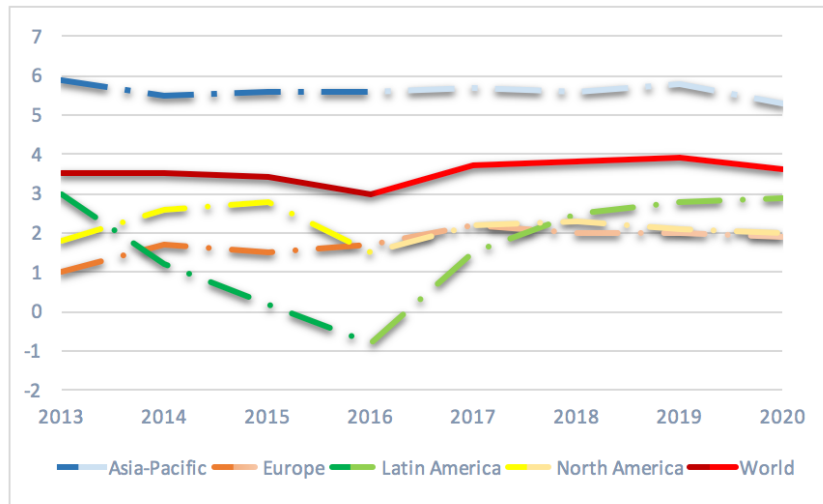
Figure 2 Global Real GDP Growth in %, 2013-2020 [1].

In spite of the fact that the Global and European market seem to have a comfortable economy. Every year becomes more complicated to keep this stability. As the cost of technology in vehicles increases, profit from vehicles sales is likely to deteriorate considerably. Volume growth and higher margins that can be commanded by areas such as moving fast in order to avoid being left out of the new automotive technology, procurement of an excellent quality management system, digital services and mobility will allow the organizations to enjoy healthier margins [3].

The Carmaker Suppliers

Carmakers tend to keep strategic parts (engine, transmission and body) manufacturing in-house therefore require suppliers for a large number of other parts.

The relationship between carmakers and their suppliers, previously more in carmaker's favour, has changed significantly over the past decade, we can see that is reflected in their current sales (*Figure 3*). Suppliers that originally provided ready-made parts have moved towards greater customization, tailoring products to the needs of specific companies[3]. This means a customer-centric business model.
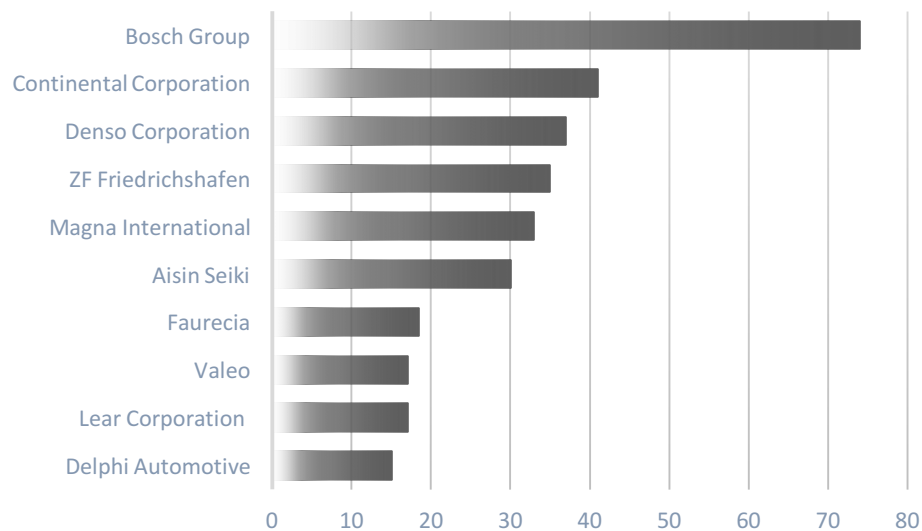
Figure 3 Global Net sales of car part suppliers 2016 [3].

This business model finds the most profitable opportunities of growth. This is about understanding which is the real value that clients are looking for, the analysis of the profiles and to predict the customer behavior.

The Quality Document Management System

The organizations are increasingly better equipped to manage the documentation and action plans [4], as can be seen in the statistics from the *Baromètre de la qualité 2017 report,* the use of many tools as the technology, the digitalization, the connection networks, intranets and variety of software and applications are becoming increasingly common to store information and database.

12 %
Process Management

38 %
Reporting

43 %
Electronic Document Management

20 %
Risk Management

26 %
Workflow

42 %
Action Plan Management

27 %
Project Management

20 %
No tools
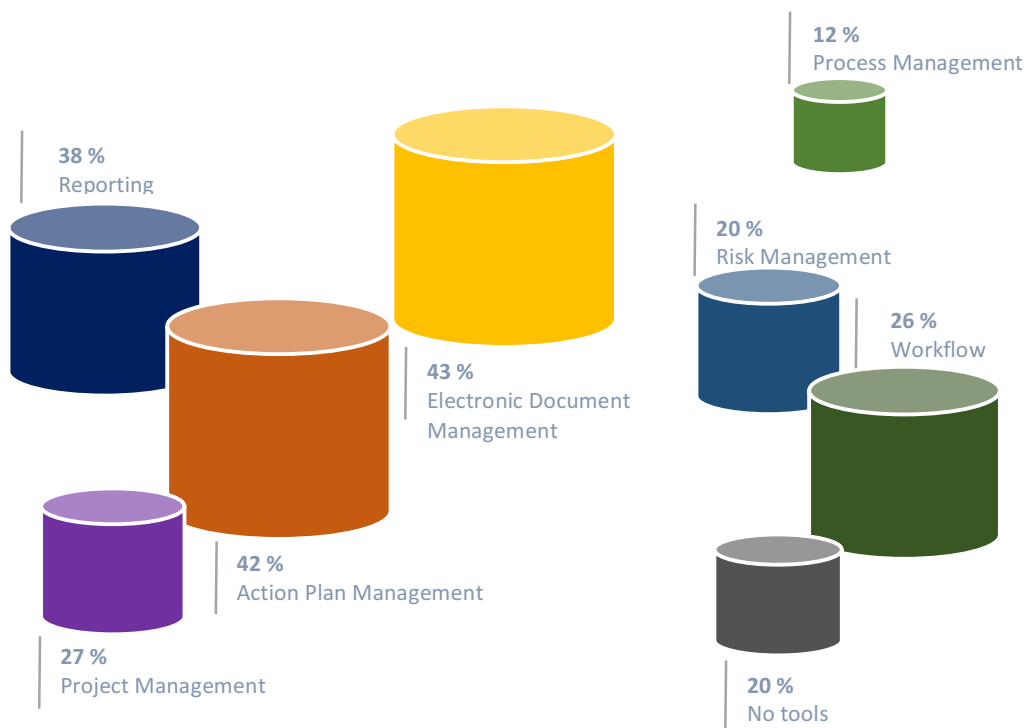
Figure 4 Specific tools to support the Quality assurance [4].

The documentation system has a fundamental role because it includes principles, processes, instructions, methodologies, reports and results of all the activities that are executed every day.

A lot of companies are still using classic and bureaucratic tools, which don't usually give to their documentation processes the added value that it should have. There is not much importance to the modelling of the documental process [4], which could reduce significantly labor time.

The Documentation Requirements

The standardization of the Document Management System (DMS) is based on the implementation of good practices which will ensure the enormous benefits for the organizations. This process helps the companies to achieve their targets taking into account all the interested parts.

Policy and Strategic Objectives: Business Value Alignment, Quality Manual, Quality policy statement.

Defined Processes, performance measures that define the value identified.

Operating Procedures, Work Instructions

Control and Maintenance, Tests, training programs, checklists, forms

Records, operational information

Figure 5 Quality Documented Information Pyramid. Source [Author]

The ISO 15489: 2001 Management of documents, part 1 and 2 was the first one written ISO procedure of management of documents. Taking as document definition, *all the information created and received, such as evidence or information from an organization in the performance of their functions*.

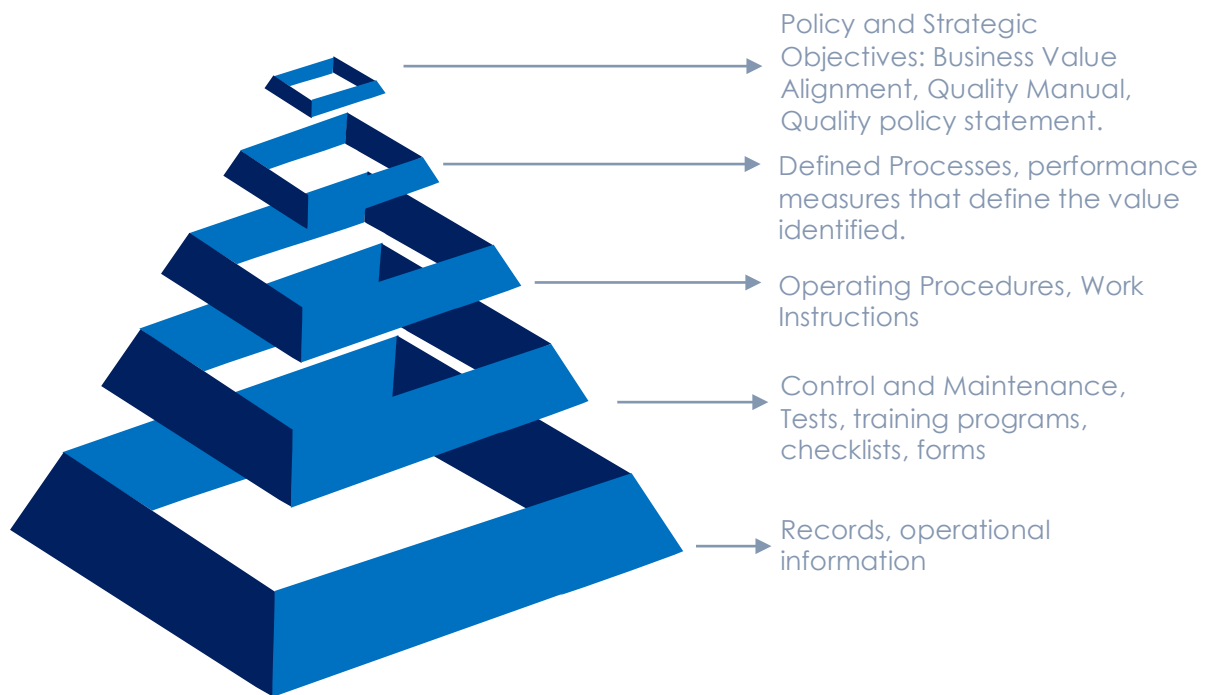Eventually the Standards evolved in line with operational modalities, new quality methods and technology. A few years later the ISO 30300 and the ISO 30301 appears, which can be applied to a different sectors or different company sizes and it supposes to line up the technical guidelines, documental processes and the management systems standards as the ISO 9001[5].

Companies in the automotive sector use the International Automotive Task Force (IATF) 16949 who was published in October 2016, cancelling and replacing ISO/TS 16949: 2009 (3RD edition). The main purpose of this standard strongly related and aligned to the ISO 9001: 2015 is the development of a Quality Management System (QMS) that provides for continual improvement, emphasizing defect prevention and the reduction of variation and waste in the supply chain[6].

The verbal forms to read the IATF are similar to the others ISO:

- ✓ "shall" means a requirement;
- ✓ "should" means an advice/recommendation;
- ✓ "may" means a permission/something tolerated;
- ✓ "can" means a possibility or a capability

In the chapter 7, the requirement **7.5** Documented Information who comes directly from the ISO 9001: 2015, the **General** tells us:

"The organization's Quality management system shall include:

   a) *Documented information required by this International Standard;*

   b) *Documented information determined by the organization as being necessary for the effectiveness of the quality management system.*

Note   The extend of documented information for a quality management system can differ from one organization to another due to:

   - *The size of organization and its type of activities, processes, products and services;*

   - *The complexity of processes and their interactions;*

   - *The competence of persons."[7]*

Even if the Note doesn't specify the extent of documented information inside the organizations, it is advisable to have a clean and clear document system, and also important, a controlled number of documents. That will help people to better know all the documented information that they should know.

It's also relevant to mention the requirement **7.5.3.2** which is about retention and disposition and it says:

"For the control of documented Information, the organization shall address the following activities, as applicable:

   a) *Distribution, access, retrieval and use;*

   b) *Storage and preservation, including preservation of legibility;*

   c) *Control of changes (e.g. version control);*

   d) *Retention and disposition.*

Documented information of external origin determined by the organization to be necessary for the planning and operation of the quality management system shall be identified as appropriate, and be controlled.

Documented information retained as evidence of conformity shall be protected from unintended alterations."[7]

As can be seen, according to the ISO 9001, the retention of the documented information must be controlled carefully, in order to prevent operational errors.

The Challenge found

Each company has their own document management system, culture and procedures to perform all their functions. Record maintenance is not an exception. Generally, to update the documented information, the process owner has all the responsibility for all the documents contained in his process document system.

Something that should be an easy task can become tedious and time-consuming. Even if the process owner has the authority to ask somebody to review certain documents, there is not much motivation and employee's initiative to do it.

The root cause was found by using the principle of Failure Mode Effect Analysis (FMEA). The principle was simplified and adapted for this activity. The cause is taken as the opportunity to improve the quality performance and to add value to the review and update of the documented information.

The FMEA was developed by reliability engineers in the late 1950s to study problems that might arise from malfunctions of military systems. It involves reviewing as many components, assemblies and subsystems as possible to identify failures modes, and their causes and effects[8].

In this case the process is the records maintenance and the identified Potential Failure Modes are written down in the following notes:

Figure 6 Potential Failures Modes. Source [Author]

In the table below you can see the FMEA simplified. This was a helpful tool to clarify the potential and significant root cause which in turn increases the potential failure mode.

Process	Potential Failure Mode	Potential Effect of Failure	Severity	Potential Cause	Probability of occurrence	Risk Priority Number
Records Maintenance	Low quantity of updated documents	Not right information in the document system		not having a motivating maintenance methodology to do the review and update of the documented information		
	Unnecessary information	Loss of employee's work time				
	Duplicated documents	Loss of potential storage				
	Undervaluing document preparation	Document has not compliance with internal requirements				
	Difficulty to find the right information	Operational errors				
	Lack of interest to review the existing documentation	Weak company culture				
	Documentation created just to be understood for the creator	Difficulty to understand information				
	Poor cooperation between departments	No information sharing				

Table 1 FMEA simplified table. Source[Author]

Risks Assessment

The risks assessment is the hardest part, because it will always depend on the personal criteria used by the individual analyzing risks. In this case the Risk Assessment matrix has been reduced in order to make it easier and simpler to understand, the factor Detection (D) was not taken into account and each risk has two important factors:

P   Probability of occurrence

S   Severity, it describes the potential losses or level of the caused damage

Each considered factor is measured with the following discrete scale,

Scale	1	2	3	4	5
P	Impossible	Unlikely	Even chance	Likely	Certain
S	Very low	Low	Moderate	High	Very high

Table 2 Risk factors scale. Source [Author]

and after calculating each risk with the FMEA simplified equation,

$$Risk = P \cdot S$$

Finally, the risk assessment matrix reveals that the highest score should be R = 25 and the matrix looks like the followed figure,
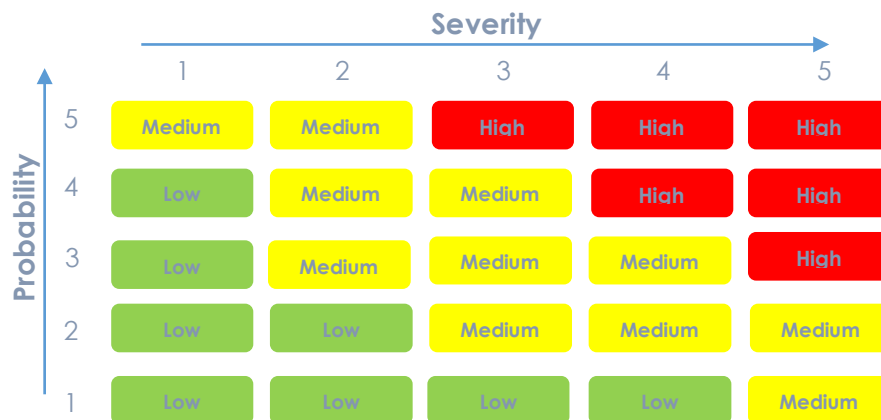
Figure 7. Risk Assessment Matrix. Source [Author]

For example, the potential failure mode "duplicated documents", most of the time it has a likely Probability of occurrence (4) and in the majority of cases a very low Severity (1), which means a final risk score of 4, then you can confirm in the matrix that is a low risk failure. Normally you should address the high risk failures (with a risk score between 15 to 25) as a priority.

Finally, returning to the Potential Root Cause "not having a motivating maintenance methodology to do the review and update of the documented information", this latter was chosen as a global root cause, due the fact that it covers all the Potential Failure Modes.

CHAPTER II: Documented Information Discussion Groups as a motivating records maintenance methodology

Documented Information Discussion Groups (DIDG)

The Potential Root Cause identified: "not having a highly motivating maintenance methodology to do the review and update of the documented information", it has turned into the opportunity to propose this particularly solution, the implementation of Documented Information Discussion Groups with the purpose of having short debates to learn and to discuss different kinds of subjects about the company documented processes, procedures and information. The employees from different areas will have the chance to fortify their knowledge and to participate in the review and update of different documents depending on the groups in which they have signed up for and their professional skills. Over the course of time, the improving of the existing procedures and instructions should be part of the company culture and this will raise a fast adaptation to technological advancement.

The DIDG methodology is based in the Teorya Resheniya Izobreatatelskikh Zadatch (Theory of Inventive Problem Solving) better known as the TRIZ theory, created by the Russian engineer Genrich Altshuller in the 1980s[9]. TRIZ tells us that the evolution of technological progress follows a number of predictable patterns and most of the solutions do not come from a new methodology, but they do come from the new use of an old methodology. TRIZ also includes forty inventive principles and five basic principles as an innovative way of looking at problems and solutions[10].

The five basic principles which make you look at problems in a different way are[11]:

1. The Ideal end result: Temporarily gets people to think "out of the box" to achieve an ideal end result.
2. Less is more: It is not necessary to invest a lot of money in a good idea. It is better to make use of existing resources.

3. Encourages breakthrough design.
4. Search for fundamental contradictions
5. Technology forecasting: It allows to establish the direction of the project.

Particularly, the proposed DIDG methodology approach has the quality of taking a number of challenges, one of them is the difficulty of integration and transfer of knowledge between members of the company, DIDG methodology can facilitate interaction, exchange and debate between the employees from different areas and different levels of the organization. People usually are looking to be of a part of a team, a club or a membership. There are people who want to keep studying and learning different subjects, but sometimes they don't have much time out of work to enrich their knowledge. The DIDG methodology will help people have better ideas, strongest opinions and diverse perspectives to create, modify, and contribute to the company procedures based on argumentation, not in perception.

The DIDG methodology includes a few consecutive activities, nothing too complicated and difficult to apply, the mean idea is to Keep It Short and Stupid as the KISS principle by Kelly Johnson[12].

In the following diagram you can see step by step the process of DIDG methodology application for your organization.

DIDG Methodology

Figure 8 DIDG Methodology. Source [Author].

Find interested people to create the DIDG

1

The group must take a quiz to know their level of the documented information knowledge. The members of the group should propose their innovative ideas, recommendations, modifications or changes for the procedures and existing documentation.

Finally, as a team, they will agree to present the better proposition as a draft. It does not necessarily have to be another document. It can also be some innovative way of learning and passing this information

Find an interesting mediator with a high level knowledge of the subject for each discussion group.

2

4

6

3

5

Classify all the documented information by subjects, captivating topics and priority (risk level), configure a plan to evaluate the performance, capacity, productivity and quality

Create a simple platform where people from different areas can see the schedules by subjects and sign up for a discussion group

Make an attractive programme including name of the subject and the list of documents to be discussed and make it public.

Note Try to organize short time discussions, a short list of documents and groups of different kinds of people

CHAPTER III: Performance Evaluation and Analysis of Results

Performance evaluation

To evaluate the efficiency of the quality performance improvement in the review and update of the documented information after the implementation of DIDG methodology, it is recommendable to use an adapted metric tool based on the Overall Equipment Effectiveness (OEE) principle.

The OEE is usually used to measure the efficiency through three critical manufacturing performance components[13],

P — Performance, means the speed at which the task runs as a percentage of its designed speed

A — Availability is the uptime or operation time available in percentage

Q — Quality is good units produced as a percentage of the total units started.

And its simple equation is,

$$OEE\,\% = P \cdot A \cdot Q$$

While the equation components seem not to be individually significant, the OEE % result is going to be the indicator that will allow you to see the continuous improvement, in addition this will help you taking decisions in the document management system. Now you will see a concrete example of how to calculate OEE %,

Theoretical units of modified documents	Theoretical time: **1h** Theoretical units/h: **4/h** Objective: **4/h**	**100%**
AVAILABILITY	The real time destined to work: **45 min** Which means **3units/h**	**75%**
PERFORMANCE	The real finished units: **2**	**67%**
QUALITY	From the total of finished units, just **1** is a good unit	**50%**
OEE	$P \cdot A \cdot Q$	**25%**

Figure 9 OEE Calculation. Source[Author]

Quality has to be measurable, is the reason why it is necessary to have an indicator that shows you the efficiency level of the performance. The goal will always be the optimization of the use of resources.

In the last example you can see a very low efficiency work with a 25 % OEE, normally it's defined as an excellent performance a % OEE between an 85% to 100%. Most of the companies regularly work with a 75 % OEE, which is acceptable.

For being able to perceive performance results of the implementation of DIDG methodology, it depends of how many discussion groups you have, and how much

time you are ready to invest in this activity. It should not take so long to see changes, approximately three months or less.

In conclusion, the key purpose is to prevent the potential failures and their effects that may appear due to the potential global root cause within the document management system.

From the other perspective, it will be always a good idea to implement methodologies that help and contribute to the cooperation between the different departments in the organization.

On the economic side, it is probable that managers ask the questions:

- Will the DIDG methodology help to increase the business profits?
- Will the DIDG methodology help to reduce costs?

The answer to the first question is not, the methodology is not made to aim this part of the business, but the answer to the second question is YES!!, it will help to reduce costs through the reduction of operational errors and the prevention of potential failures and their effects.

" Quality is certainly not an act, it is a habit " [14].

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