PROCEDURE FOR THE DESIGN OF A MANAGEMENT CONTROL SYSTEM IN AN ORGANIZATION OF RESEARCH, DEVELOPMENT AND INNOVATION

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ABSTRACT

The organizations claim the incorporation of new tools to manage efforts, resources, skills and adapt to the demands of the environment to gain efficiency and effectiveness in its processes, with this reason it is necessary for management control in organizations reach the place that really belongs and become a means for deploying the strategy throughout the organization and evaluate their performance. This paper aims to propose a method for designing a Management Control System that allows linking the three levels of organizational management and integrate tools for better decision making in organizations. The methods used were group work, the percentage analysis and analysis of reports, documents and regulations. The main results were obtained from the study of fifteen works related to the subject, of which a procedure consisting of six steps was obtained and its theoretical basis are the proposed by the authors Nogueira (2002), Comas (2013) and Vilar (2014).

KEY WORDS: Management Control; Management Control System; Procedure; Strategy; Decision Making.

INTRODUCTION

In its objective of increasing competitiveness, organizations have learned to lead, anticipating with transformative decisions that allow their survival and development in the environment towards a conceptual direction (García, 2009).

The concept of management has undergone modifications and is currently defined as the process of planning, organizing, leading and controlling the work of the members of the organization and using all available resources to achieve established organizational objectives.

Control, in its global approach as a function of the Director, is one of the tasks that has been most neglected. However, it represents a key element in the administration process, as it contributes decisively to improving the actions of the organization. Consequently, to achieve efficient and effective (competitive) management, the control function has to be considered within the whole system and take its rightful place, if it aspires to be a world-class organization. (Nogueira et al., 2004).

Internationally, Management Control has developed in its strategic essence and with a business nature, focusing its attention on conducting financial studies, cost accounting, audits, budgetary control, accounting and operational controls. Since the last decades, the modern approach to Management Control has overcome these frontiers, opening the way for Process Management, in such a way that the organization achieves its strategic objectives, for which it is also necessary to have an information system that allows to the managers to make the decisions in a timely and effective way, a question not yet overcome in Cuban organizations (Nogueira, 2002).

The experience is showing that even within the most varied styles of administration, the direction of an organization cannot be exercised effectively if it is not through a Management Control System that promotes the best use of resources to achieve or exceed the results expected and that makes it possible, in a timely manner, to take the necessary measures for the corrective actions that are required to be carried out.

The present research is carried out in an Entity of Science, Technology and Innovation (ESTI). Currently in the Centre, Research-Development projects are carried out with the aim of inserting new products in the international market. At the same time, and as a result of the development of these investigations, the organization offers highly specialized technical services, which, together with the national and international postgraduate activity, complete in practice the intellect developed by the organization.

The previous thing mentioned would be possible with an adequate approach of development of the science, the technologies and the innovation, that they lead to an improvement of the society. Currently the Centre does not have a tool that allows it to achieve greater control in the monitoring and implementation of the institutional strategy designed to anticipate future consequences and act to avoid or minimize risks and correct deviations that affect the strategic management of the organization and, in general, the relevance of the results of the processes that are developed.

Taking into account these antecedents, the need arises to design a procedure that establishes the activities to be followed and the tools that allow the organization to design its Management Control System, in order to facilitate the management of the process of taking decisions for the continuous improvement of the organization.

DEVELOPMENT

Then, Figure N°1 shows an analysis of 15 works, among them are procedures, resolutions, decrees and models for the design of Management Control Systems, where they try to systematize their achievements and limitations regarding the presence or not of different elements of the Management Control. Among the authors are (Hernández, 1998; Kaplan & Norton, 1999; Royero, 2002; Nogueira, 2002; Pérez, 2005; Palacio, 2006; Villa, 2006; Tapia & Valdez, 2008; Resolución 60/ 2011; Espino et al., 2013; Comas, 2013; Decreto Ley 320, 2014; Vilar, 2014; Da Fonseca, 2015; Lineamientos del PCC, 2016). In some cases, the element has been considered as Included (I), Partially Included (PI) and Not Included (NI) because it is not explicit in the model. This research was carried out by selecting 22 elements of interest for the study: diagnosis, environment, leadership, teamwork, process focus, integration of levels, customer orientation, continuous improvement, information system, quality management, innovation and creativity, proactive approach, human resources, dynamism and flexibility, system of indicators, strategy, economic, financial, environment, risk analysis, feedback, decision making, effective communication.

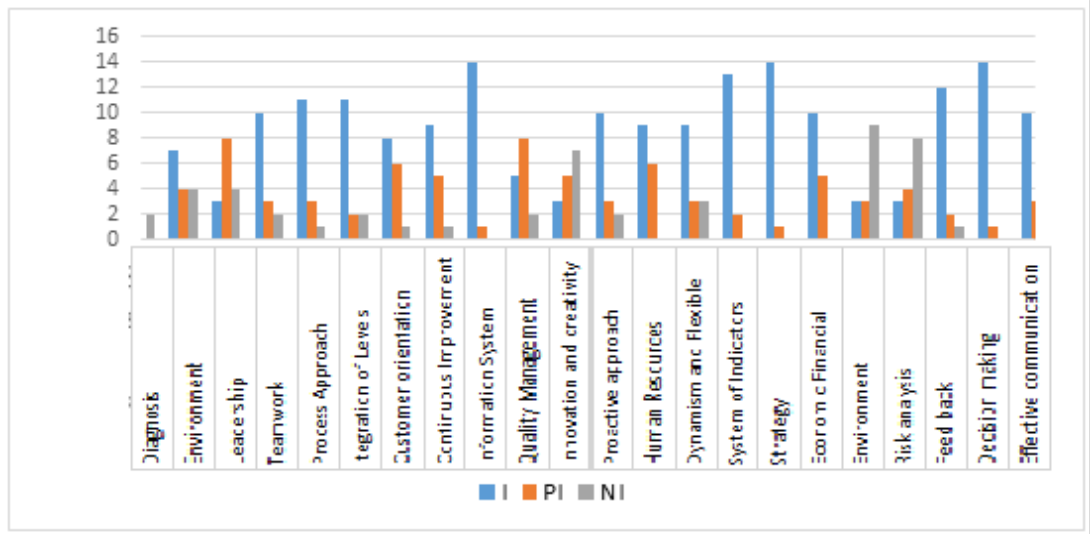

Figure Nº 1. Analysis of the elements present in the works studied
Source: Self Made

The authors of this research adhere to the criterion of Vilar (2014), who points out that the existence of differences between the models obeys to their degree of application or the historical stage in which they were proposed, so that the level of representation of an element in the models it does not constitute a sufficient fact for its exclusion in a later one.

From the analysis carried out, most of the authors consider the variables strategy, information system and decision making as a fundamental pillar in the design of a management control system, since these are included in 14 of the studies studied; highlights the need for a permanent diagnosis that allows to formulate or reformulate the strategies in an organization with their corrective actions, their follow-up and the presence of a system of indicators that provide management with concrete information on the current progress of the organization; the latter is found in 13 of the works.

There is also a trend towards the integration of levels and the use of the process approach, where human resources play an important role as a key factor of success; this is demonstrated in the works that were taken in study, where it is included, or partially included and emphasizes teamwork, effective communication and leadership.

In most cases, the presence of a proactive approach to control is emphasized, with emphasis on the economic-financial aspect and with projections of continuous improvement, innovation and creativity, an element that should be present as a relevant aspect in any management system. Being treated only in three of the studies studied, although other authors include it partially in their investigations.

New approaches to business management and today's competitive priorities are focused on customer satisfaction as a top priority; this is shown by most of the authors studied, who consider the need to study environmental variables with an emphasis on clients.

An important factor of change in the business culture has been the pressure and influence exerted by different interest groups so that the organizations assume a responsible environmental behaviour. Pressures exerted by different interest groups and the development of strict legislation (especially in developed societies) have forced many organizations to introduce the environmental variable in their management; However, it is not present in nine of the models analysed, which shows that they are more focused when looking for results in the social and economic dimensions.

Quality management, as a variable of analysis within a management control system, is partially included in nine of the cases; However, it is necessary to have a strict control of the quality management in the organizations, because it manages to have an impact on the performance of the processes, the quality of the services or products that the organization offers, pretends to know which concerns are related to the quality of the work done, which areas require in-depth research, what changes can be measured over time and if they are

relevant to exert greater control; This implies continuous improvement in the efficiency and effectiveness of the organization and its activities.

With regard to risk analysis, its little inclusion in the models is given with the chronology in which these were made, since they are not present until Resolution 60/2011 of the Comptroller General of the Republic, where the management component is established and risk prevention, and its rules are based on: identifying and analysing the risks faced by the organization that may affect the fulfilment of the objectives, determine the control objectives and define a prevention plan. The definition of risks by processes is in correspondence with the process approach and what is proposed in ISO 9001: 2015, where the aim is to align the internal control system with the quality management systems.

From the works studied previously, those of Kaplan & Norton, (1999), Nogueira, (2002), Pérez, (2005), Villa, (2006), Tapia & Valdez, (2008), Espino et al., (2013), Comas, (2013) and Vilar, (2014), who present a greater inclusion of the elements previously addressed in the analysis. Based on these authors, an analysis was carried out to determine the points of contact regarding the presence or absence of the steps or activities to be followed and the order that can be taken in the procedure for the design of the Management Control System. Throwing that there are certain aspects that cannot be absent from the procedure, Figure Nº2 shows the percentage of inclusion of the activities in the studied procedures.

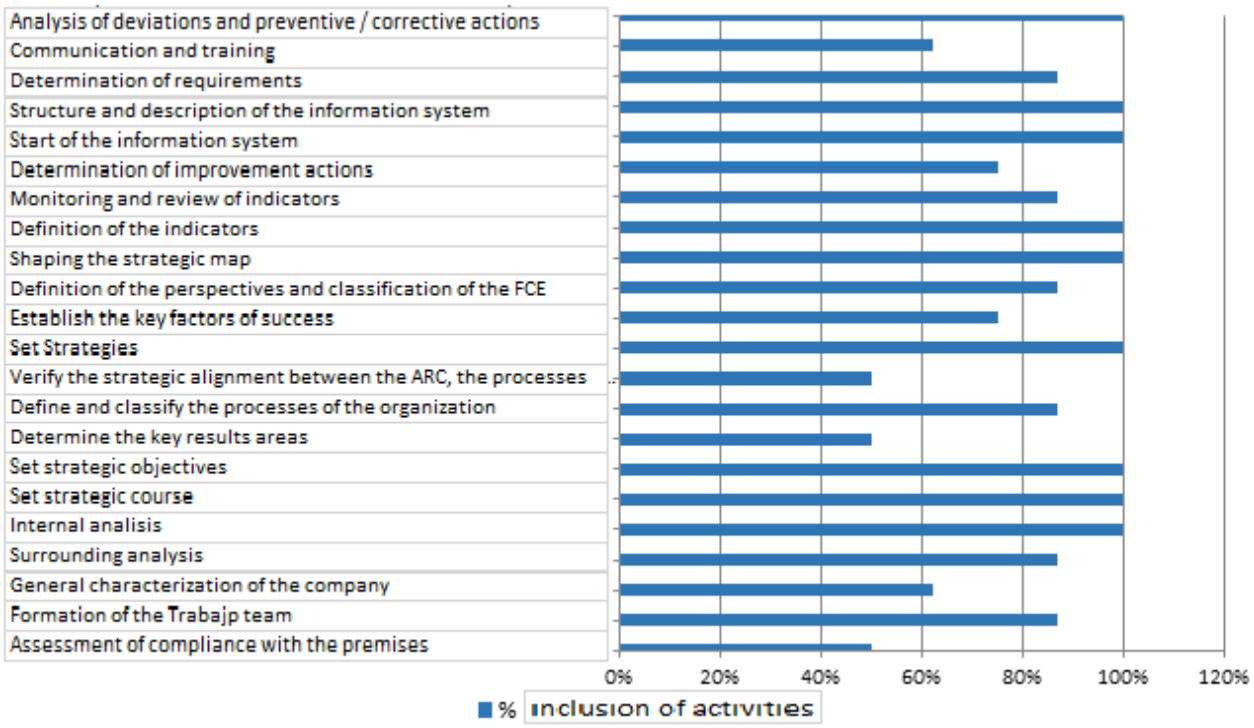

Figure Nº 2. Percentage of inclusion of activities in the procedures studied
Source: Self Made

For the design of the procedure, the aspects of greater convergence, equal or above 50%, were selected, taking into account a logical order, which are significant because these aspects are essential to achieve the work and fulfil the general objective of Research as an essential element for the design of the Management Control System of the organization.

Figure N° 3 shows the percentage of inclusion by author; the authors Nogueira (2002), Comas (2013) and Vilar (2014) stand out, which constitute the theoretical methodological bases of the present investigation with the greater percentage of inclusion of the steps to follow in the design of the procedure.

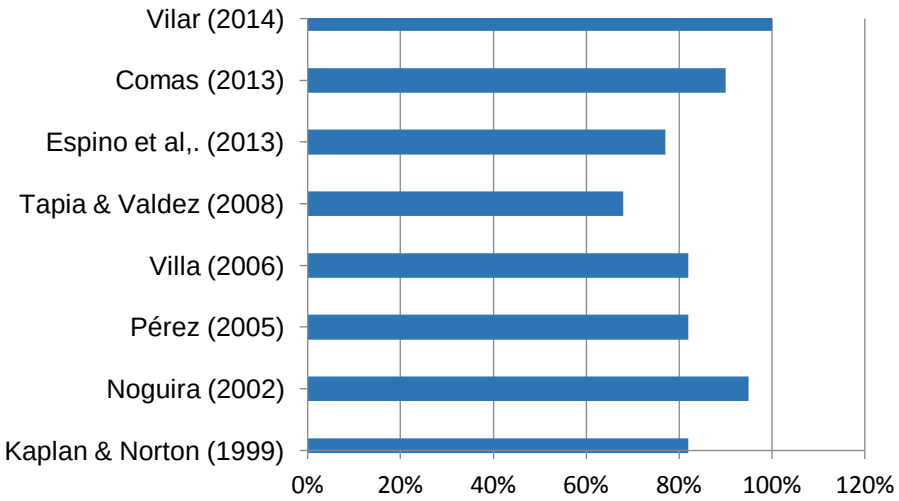

Figure Nº 3. Percentage of inclusion by author
Source: Self Made

Methodological design of the procedure

It can be said that the authors Nogueira (2002), Comas (2013) and Vilar (2014) approach these steps in different stages, according to the development of their procedures and the characteristics of the organizations under study; Comas (2013) and Vilar (2014) include in their design a stage related to the preparation of the study, not so for Nogueira (2002).

The three authors refer to a stage of Diagnosis and Strategic Design of the organization in their respective investigations; Stage IV is approached in a similar way by Nogueira (2002) and, in the cases of Comas (2013) and Vilar (2014), it is dealt with in Stages II and IV, using the same tool proposed by Nogueira (2002); in the case of Stage V and Stage VI, they are addressed by Vilar (2014) in the same way, and the authors Nogueira (2002) and Comas (2013) analyse them in Stages V and IV of their respective studies in a similar way.

The author of the present investigation considers that all the activities exposed and analysed previously can be grouped in six stages, independently of the procedure that is applied; in this way the following six stages are defined:

Stage 1: Preparation of the conditions for the study.

Stage 2: Diagnosis of the organization

Stage 3: Strategic design

Stage 4: Deployment of the Balanced Scorecard

Stage 5: Design or Redesign of the Information System

Stage 6: Implementation of the Management Control System

Procedure description

Stage 1: Preparation of the conditions for the study.

The stage of preparation of the conditions for the study is of vital importance for the satisfactory reach of the objectives of the diagnosis, as a result we will have: the assessment of compliance with the premises of the procedure, the conformation of the work team and the characterization of the organization. This stage is formed by three activities, which are explained below:

Activity 1: Assessment of compliance with the premises

In order to satisfactorily apply the proposed procedure, firstly, compliance with the following premises must be verified:

- Commitment to change
- The training of the personnel involved
- The strategic management processes
- The organizational climate and teamwork
- Recognition of the need for Process Management

In order to comply with these premises, it is proposed to apply a checklist consisting of five elements referring to each premise, adapted from Vilar (2014); which will be applied to members of the board of directors of the organization, heads of processes, personalities with wide prestige and recognition within the organization that impact on decision making. The checklist is evaluated in: good, sufficient, acceptable, insufficient or unacceptable. If there are insufficient or unacceptable evaluations, the entity must take corrective actions in order to improve them to continue the development of the procedure; If the evaluations are good, sufficient or acceptable, proceed to Activity 2.

Activity 2: Conformation of the work team. Once it is determined that the entity complies with the premises for the application of the procedure, it must proceed immediately to form an interdisciplinary team, motivated, experienced and with full knowledge of the entity. The

selected employees must be aware that the project will be successful as long as it is developed as a team work, ensuring compliance with the stages described in the present procedure.

Activity 3: General characterization of the organization. At this point is where the organization is particularized, the fundamental aspects that characterize the entity and the service it provides are collected, therefore, they should be defined: name, date of creation, location, subordination, social purpose, mission, vision, structure organizational, composition of the template, products and / or services offered; likewise, the processes of the organization will be identified and classified.

In this activity, the observation, the unstructured interview and the review of documents related to the organization are used; The Organizational Chart and Process Map of the center are displayed and graphical representations, such as bar and pie charts, are used to facilitate the analysis of the elements of interest for the investigation.

Stage II: Diagnosis of the organization. This stage has as a fundamental objective to diagnose the current situation of the organization from three dimensions: Strategic, Operational and Economic, as well as the information system.

Activity 1: Analysis of the organization. It is necessary and important for any organization to know its starting point to chart the path to where it wants to go. In this regard, a permanent diagnosis is proposed that encompasses the three dimensions of Management Control presented by Nogueira et al. (2002): strategic, economic and operational and modified in this research, taking into account the elements of management control.

a) Strategic dimension

1. Strategic direction: The strategic heading analysis allows a complete and comprehensive study, since it offers, in addition to the analysis of the general and specific environment of the organization, an internal analysis that includes the knowledge and evaluation of the reality that is present within the organization, the interiority of all its areas, its management system and its results. The execution of this task will have a greater or lesser degree of industriousness depending on the level of detail and scope that has been achieved in the Strategic Planning of the Organization; However, due to the importance it has for the correct design of the SCG, it is recommended to review and refine it taking into account the insufficiencies detected in the analysis of the strategic management carried out.

The analysis of the environment, will allow to study the competitors, the policies, image of the organization in society and other factors, in the attempt to find the opportunities and threats of the organization that is why it is proposed for this external diagnosis to apply the analysis PESTE (Political, Economic, Social, Technological and Ecological) from a group work.

The internal analysis is a premise for the development of Management Control, therefore, it must be specified if the organization has carried out the strategic exercise

adequately, if all the gaps and weaknesses that allow the determination of all of them have been taken into account. the output variables: vision, mission, values, strategies, objectives and policies, with the possibility of applying the following tools: SWOT analysis, and / or the calculation of the Integration Level of the Management System (Internal and External) since, According to (Alfonso, 2007), the integration of the management system of the company is the coordination of all processes through relationships that reinforce the fulfillment of the mission to meet the present and future needs of society and customers.

2. Leadership: It is essential for the success of the changes in the organization, since it requires the involvement of the management team and above all, of its maximum leader, to attract and engage all workers in the process of change and implementation of the proposed tools to improve decision making and organizational control. Management must promote a culture of teamwork, training of all in modern management practices and a culture of service that meets customer expectations (both internal and external), for which it must be the most committed in this process. Thus, to achieve success, it requires strong leadership by managers. For the analysis of this aspect, it is proposed to apply a survey carried out by Suárez (Suárez et al., 2001) on leadership to members of the Board of Directors and personalities that impact on decision-making.

3. Innovation and creativity. The analysis of this element will be carried out through the measurement of the innovative culture, for this purpose it is proposed to apply a survey proposed by Nogueira (2002) to the members of the board of directors and some specialists, chosen at random, from the different areas and center processes; Subsequently, the Level of Management of Technology and Innovation in the organization will be evaluated through the calculation of the MINGTI indicator (Integral Meter of the Level of Management of Technology and Innovation), it is proposed to apply a Check List prepared by Suarez (Suarez et al., 2001).

The calculation of the synthetic indicator MINGTI that represents a probability function, given by the real occurrence reason of the events between the sample space or optimal state of the events, is obtained using a mathematical expression, with the objective of obtaining the final quantitative evaluation.

The value obtained is expressed as a percentage from the discrete score in the interval 1≤ x ≤5 (Likert scale), given by the evaluating group.

Mathematical expression for the calculation of the synthetic indicator:

$$MINGTI = \frac{\sum_{i=1}^{n}(vi * pi)}{N} - 1$$

Where:

MINGTI: Integral Meter of the level Management of Technology and Innovation

Vi: assessment of the group evaluating the variables

Pi: weight of each variable

N: sample size (number of evaluators)

4. Scope product / market: Understands the essence of where the organization competes (consumers, geography and product segments), as well as where, by exclusion, it does not compete (Hamel, 2000). The definition of a company in the product / market area can be a source of innovation when it is very different from that of traditional competitors (Nogueira et al., 2002).

5. Identification of the key success factors: It is necessary to know if the organization has identified its FCE, which represent a small number of key indicators (linked to the mission of the organization) such that, if they show a satisfactory progress towards the objectives, it will normally be perceived that the entity is functioning positively on its path of improvement. They are important for success, as it allows you to achieve a sustainable competitive advantage to the organization.

6. Basis for differentiation: Represents the essence of how the company competes and in particular, how it competes differently from its competitors, that is, the offer of competitive advantages to customers.

b) Operational dimension

1. Human resources: It includes the basis of the resources available to the organization to sustain its competitive advantage. These resources include the assets that the organization owns, what the organization 'abe' (key competences), the skills and abilities of human capital as the main source of value creation in the organization. For its realization, it is proposed to use the Diagnostic Technology for Integrated Human Capital Management System (SGICH) by (Melo, 2009).

2. Process management: For the diagnosis of this element, the Checklist for measuring the Level of Integration of Focus on Delgado Processes (2011) is proposed and must be applied to heads or specialists of the processes of the organization; once the level of approach to processes presented by the entity under study is determined, it is necessary to take into account whether it is managed by process; for this analysis, it is proposed to use the relationship matrix between all the processes present in the institution, adapted from Alfonso (2007) and perform the calculation of the NISDE indicator (internal).

From the scores obtained, according to the assessment of the experts, the data will be tabulated and the agreement between the specialists will be determined by the Kendall coefficient. The following considerations can be assumed, as shown in Table 1.

Table No1. Relationship between the results of the checklist and the degree of application of the process approach

Level of process approach (LPA)	Degree of application of the process approach
NEP 90%	Suitable
50% NEP 89%	Medium
NEP 49%	Very low

Source: (Mola, 2015)

In general, when the degree of application of the approach to processes is very low, it corresponds to an organization that works in a functional way.

To make the matrix and calculate the Level of Integration among all the processes of the organization, a series of considerations are established, which are explained below, taking into account the proposal of Mola (2015).

• Define all the processes that are carried out (take into account the current process map).

• Draw up an interrelation matrix, placing the processes in the same order, both in the rows and in the columns.

• Carry out interviews or surveys to the specialists of each process to know that you give your process to others, taking into account the logistical flows, that is, if they provide information, money or materials.

• Ask these specialists how important their process is for the rest and how they believe their performance is.

• Look for critical relationships. The relationships they have (Criticality ≥3 and Performance ≤3) will be classified as critical.

• The internal NISDE is calculated among all the processes according to Alfonso (2007).

3. Environment: Based on the requirements of the International Standard (ISO 14001: 2015) on environmental management, it is proposed to apply a survey to both members of the board of directors and workers of the organization, in order to know the current situation regarding the Environmental Management System, regarding its production and service processes and its relations with the environment. Success depends on the commitment of all levels and functions of the organization and especially of senior management and the personnel designated to perform this function.

4. Quality management: This requires, on the part of every organization, results with high quality standards, managed efficiently and effectively, that pay tribute to its differentiation and distinction in the market in which it operates. To do this, it is proposed to use the checklist designed by Alonso (2016) based on the requirements set forth in ISO 9001: 2015, in order to determine possible gaps. The list is made up of 114 questions that respond to 313

requirements of the standard, with spaces to answer Yes or No to each of the requirements, as well as a column to record any important observation during its application.

c) Economic dimension

It includes the periodic calculation of financial ratios based on the information provided by the financial statements and other indicators, in order to allow the organization to project itself into the future, by analyzing its behavior over time (trend) as a necessary requirement to a process of continuous improvement.

Activity 2: Analysis of the information system. The proposed procedure needs to be implemented on the basis of an information system that is efficient, flexible, timely and relevant. That is, to offer at all times the information that is really needed to make effective and timely decisions, assimilating changes quickly and at low costs.

Based on the above, a questionnaire was designed to be applied to members of the board of directors and specialists related to these activities to achieve a diagnosis of the Information and Communication System of the organization, which is based on the aspects proposed by the Component. of Information and Communication of Internal Control in Resolution 60 of 2011 and the checklist proposed by González, (2015).

Stage III: Strategic design: To carry out this stage efficiently, it is necessary to take into account all the gaps and weaknesses identified in the previous phase of the procedure, both from the internal and external points of view, as they will provide the elements that will be they should consider in the new strategic design, in search of excellence and integration in the management that is pursued in the organization.

For the elaboration of this stage the proposal of Rojas (2016) is taken into account, who developed a procedure for the strategic design of the organization object of study, which, after being analyzed, was incorporated activities that were not well defined and They are of the utmost importance. Below, the activities that make up this strategic design stage are shown.

Activity 1: Define Mission, Vision and Values. The vision must be shared with the entire organization to achieve the commitment and enthusiasm of the workers. The mission, for its part, must transmit the essential values of the organization as a whole, translated into ways of acting to be able to concretize the vision.

In this activity, group work should prevail; It is recommended to conduct brainstorming sessions, dividing the participants into three groups, with a maximum of 10 members in each working group. The ideas proposed by each group will be communicated to the rest of the teams conformed with the objective of finding the coinciding points and, by consensus, formulating a new mission, vision and values of the entity.

Activity 2: Determine the Key Results Areas (ARC). The Key Results Areas (ARC) are the areas or decisive aspects that will allow reaching the strategic objectives based on the satisfaction of the needs of the clients and in search of fulfilling the social object of the organization. The ARCs must be determined from a group work with the members of the team, each one must be associated with a key process of the organization. For each ARC, strategic objectives are defined, which are statements of aspirations to be reached in a given period. The strategic objectives establish the path to reach the vision and must be coherent with the basic categories of the defined strategy (mission, vision and values).

Activity 3: Set strategic objectives. In this activity, the work team should formulate the strategic objectives depending on the result that shows the analysis of the main weaknesses, strengths, opportunities and threats found in the diagnosis made in Stage II. They should be focused on obtaining specific results in economic and financial terms, satisfaction of needs, processes and human development.

Activity 4: Establish the processes of the organization. For this activity a specific procedure is constructed from the proposal of Comas (2013) and Rojas (2016), which has eight steps where all the processes must be defined and designed and represented in the process map taking into account risks, competences, strategic objectives and interrelations. The following are the activities of the procedure to establish the processes:

- Identify the processes of the organization
- Determine key processes
- Select those responsible for the processes
- Define the preliminary limits of each process
- General representation of the processes
- Identification of risks
- Representation of the results in the Process Record
- Form and train process improvement teams (EMP)

Activity 5: Verify the strategic alignment between the ARCs and the strategy. Defined the basic categories of the strategy, and identified the ARC of the organization, are contrasted to evaluate the strategic alignment between these and the strategic objectives.

The strategy defined is effective if the strategic objectives have their specificity in the key areas and these areas respond to the strategy.

To verify this alignment, an impact matrix must be created between the ARCs and the strategic objectives. To this end, the Impact Matrix between the ARCs and the strategic objectives is proposed, a tool developed by Vilar (2014).

Activity 6: Set strategies. The strategies will explain how, that is, the way or path traced for the achievement of the objectives. In consideration of these, is that they are designed or designed the most appropriate strategies to achieve them, given that a certain strategy may be common for various purposes. It is interesting to note that Strategic Planning requires constant feedback about how strategies are working.

Activity 7: Establish the Key Success Factors. The Critical Factors of Success (FCE) are variables or essential conditions for the success of an organization (Vilar, 2014).

The FCE will be determined through the use of the brainstorming technique and work in groups, proposing ideas based on experience and based on the requirements imposed on the Organization by all persons, groups or institutions affected, both positively and negatively.

Stage IV: Deployment of the Balanced Scorecard (CMI). This stage is focused on achieving a line between the perspectives with the FCE, the preparation of the strategic map of the organization and the identification and establishment of the indicators that make up the CMI.

Activity 1: Definition of the perspectives and classification of the FCE. Once the previous steps have been completed, it is necessary to analyze the different perspectives on which the CMI is going to be created and to group the FCEs in each of the perspectives, as appropriate. To develop this stage, a session will be held with the working group to obtain consensus. Kaplan & Norton (1999) propose in their CMI four perspectives that collectively encompass the organization: financial, customers, internal processes and learning and growth. Depending on the strategy outlined, one or more additional perspectives may be needed.

The definition of the perspectives and the strategic map are the final steps of designing a strategy where the CMI is the control system to be used.

Activity 2: Conformation of the strategic map. The strategic map allows to visualize the strategy of the organization, it provides the foundation on which the CMI is built, since in it the relations between the objectives defined for each one of the perspectives will be represented.

For its construction, it must proceed, jointly with all those involved, to its categorization or location within each perspective of the WCC. These WCC relationships portray the way in which strategic issues drive better outcomes with clients.

Activity 3: Definition of Indicators (Strategic and Operational). Once the vision and mission of the organization is determined and understood, the objectives that must be met to achieve the strategy are analyzed, taking them to indicators. The indicators should reflect the very specific results of the objectives and should report on the progress to achieve them. The first rule of identification of the indicators is that they must be characterized as stable and understandable, that they are configured as an interrelated and coherent set that covers as

many attributes or characteristics of the entity as possible, which necessarily implies the way to manage them.

Activity 4: Monitoring and review of indicators. The measurement of the indicators, as a fundamental tool to evaluate the operation of the SCG, will be carried out according to the frequency established in the design phase; However, in all cases it is recommended to make partial evaluations to observe the trend and adopt, whenever necessary proactively, the measures to achieve the proposed objectives.

Activity 5: Determination of improvement actions. Based on the results of the measurement of the indicators, it will be possible to determine actions (corrective and preventive) that will ensure the effectiveness, stability of the processes and the possibility of continuous improvement.

Stage V: Design or redesign of the Information System (SI). For the development of this stage it is proposed to identify the most adequate sources and procedures for the collection and processing of information. In this aspect, the following questions should be elaborated: What type of information is needed? Is it available? How will it be collected and processed? Who will be responsible for processing and analyzing it? This stage is essential, both for the case of design or redesign of the IS.

Activity 1: Start of the Information System. In this phase, those responsible for the design of the system will be determined. This team is made up of: users of the Information System, people with knowledge about the information system and computer specialists with experience in software development (Vilar, 2014).

Activity 2: Structure and description of the Information System. For the development of this point the objectives of the SI must be expressed clearly; they must be precise, achievable, feasible and audacious. In addition, the analysis of the needs of the IS, the identification of the scope of action, the scope of the IS (Comas, 2013) will be carried out and the source documents will be identified, the end users that make use of the IS and the areas in which they affect dependence on the indicators to be measured in the CMI. (Vilar, 2014).

Activity 3: Determination of Requirements. This activity corresponds to the definition of equipment and technology that the organization has or should have for the control of their information. The initial requirements are obtained from the defined objectives and from the research carried out on the Comas study object (2013). In case the organization does not have the technology to support the IS, it must decide whether it is more feasible to purchase a software or its preparation, taking into account the information of the previous activities. (Vilar, 2014).

Stage VI: Implementation of the Management Control System

Activity 1: Communication and training. The control system, although addressed to the management, must be shared by the entire organization. In the control system a part of the workers works directly and their results are of interest to all, because they show the direction the organization is going through. Consequently, the elaboration of the control system implies an effort of explicit and implicit communication in addition to the normal one, since all stages represent a valuable educational process (Nogueira, 2002).

Activity 2: Analysis of deviations and preventive / corrective actions. As the organization moves towards achieving its objectives, it should check its progress, based on the expected results and make the necessary adjustments.

For the analysis of deviations, the FICAR matrix (FCE, indicator, causes, actions, responsible) proposed by Comas (2013) is used.

In the FICAR matrix, the FCEs are displayed with the indicators that show deficiencies in their performance, the causes of the deviations are defined and the corrective actions for their performance are proposed.

Once the planning has been carried out and the corrective actions have been implemented, the verification must begin, which consists of measuring the results and comparing them with the defined and expected standards. If necessary, other actions must be defined to prevent possible deviations and impregnate the proactive nature of management control. This sequence is applied continuously (Comas, 2013).

CONCLUSION

Based on the models and procedures studied and based on the current requirements of the Management Control, the need to take into account different elements that must be present in the design of a management control system that allows connecting the strategic direction is evident with the management of its processes, supported by strong leadership, innovation and creativity, considering the human factor as a key to business success and supported by an information system that ensures effective decision-making.

A procedure is proposed for the design of the Management Control System that takes as theoretical-methodological bases the methodologies proposed by Comas (2013), Nogueira (2002) and Vilar (2014), conceived with a cyclical character and composed of six stages: Preparation of the conditions for the study, Diagnosis of the organization, Strategic design, Deployment of the CMI, Design or redesign of the Information System and Implementation of the Management Control System.

The proposed procedure is contextualized to the Cuban regulatory framework and integrates different management control tools where the Integral Scorecard is highlighted, as a fundamental tool for decision-making control, which allows guiding the strategy in a balanced set of indicators from four perspectives.

REFERENCES

Please refer to articles in Spanish Bibliography.

BIBLIOGRAPHCIAL ABSTRACT

Please refer to articles Spanish Biographical abstract.