Implementation of Intelligent Automation of Production Processes in the Company Espumados del Litoral in the City of Barranquilla

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Abstract. The objective of the project is to know, identify the importance and applications of the implementation of intelligent automation processes in a company, obtain a good analysis on it, to manage and integrate these digital processes in the production area of the company Espumados Del Litoral, in order to obtain a more flexible production and optimization of time.

Keywords: Automation processes · Digital processes · Production · Optimization

1 Introduction

The objective of this project is to demonstrate the importance of intelligent process automation systems and their different applications in different work areas. As we know, the main objective of process automation is to reduce costs through the integration of applications that manual processes, speeding up the execution time of tasks and eliminating the possible human errors that can be made when working manually. When optimizing a process, the following aspects must be taken into account when optimizing a process:

i) We must know the process from end to end.
ii) We must measure the time we are using in each task.
iii) Analyze which aspects of the process we can eliminate or simplify.
iv) Use software and/or applications that make our work easier. make our work easier.
v) Integration of different platforms and software that communicate with each other.

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2 Development

2.1 Problem Statement

The problem posed for the development of the project aims to answer the following question: What computer-simulated solution alternatives based on and based on industrial automation tools can be automation tools can be implemented in Espumados del Litoral S.A.? In order to improve the efficiency of the improve the efficiency of production processes the industrial engineering career offers different analysis tools and seeks to propose and implement improvement plans and provide solutions to specific situations, both in the specific situations, both in the operational and administrative areas, as well as administrative. This means that every process can be improved, but it is be improved, but it is important to give priority to those with long execution times, high costs or those that show high costs or that show a competitive difference through the use of technology competitive difference through the use of advanced technology. One of the basic technological tools for process for process improvement is automation and our focus in this case is the automation and our focus in this case is the operative area of the company operational area of the company Espumados del Litoral S.A. Which, as a production plant, is looking for alternative solutions to implement improvements in the efficiency of the production processes based on industrial automation tools.

Today, the country's purchasing power has improved has improved, helping to import and create new import and creation of new products that products that make people's lives more comfortable people's lives, evolving the companies to satisfy the needs of the consumer. In the course of time, the company of Espumados del Litoral, has been recognized has been recognized and has undergone great changes. In fact, by means of capital flows and machinery necessary to manufacture flexible foams, with the passage of time, the national market has been expanding and so did its consumption by the mattress, upholstery and the mattresses, footwear, etc., resulting in a satisfied demand. resulting in a satisfied demand. In Latin Latin America, the uses and applications of flexible polyurethane foams are represented polyurethane foams are represented in a 57% for the upholstery and the upholstery and mattress sector, 10% in the automotive area, 16% in the automotive, 16% for rigid - sprayed foams and 17% for various uses, such as thermal insulation, adhesives insulation, adhesives, sealants and elastomers, giving an idea of the number of an idea of the number of applications and uses in our daily life [1]. However, there are currently several ways of manufacturing flexible polyurethane foams in small and large scale, taking into account the volume of sales, thus trying to of sales, thus trying to cover the foaming market in the city of Bariloche the foaming market in the city of Barranquilla and generate employment, since the volume of consumption is increasing in Latin America and the world, for this reason it is proposed the realization the realization and implementation of intelligent automation to obtain a good analysis on this, to manage and integrate these digital processes digital in the production area of the company Espumados del Litoral.

3 A Look at Automatic Control

3.1 Introduction to Automatic Control

Intelligent automation and control processes have been gaining momentum in recent years, thanks to the progress and development of technology. Although since the industrial revolution, process optimization and operating cost optimization and savings in operating costs, the current dynamics have driven the current dynamics have driven the generation of different mechanisms to increase productivity and competitiveness, incorporating mechanical, electronic and mechanical, electronic and computerized systems that are replacing manual labor.

In the third and last stage, the analysis of the information is performed information in order to design a report that will allow students to students to identify which are the managerial competencies and skills that should be managerial competencies and skills that should be applied in a managerial role. Automatic control has played a vital role in the advancement of engineering and science. In addition its extreme importance in spacecraft, missile guidance, robotic space vehicles, and similar systems, automatic control has robotics and the like, an important integral part of modern industrial and manufacturing processes. For example, automatic control is control is essential in the numerical control of machine tools in manufacturing industries, in the design of manufacturing industries, autopilot systems in the aerospace industry, and in the design of cars and trucks design in the automotive industry. It is also essential in industrial operations such as pressure, temperature, humidity, viscosity and flow control in the humidity, viscosity and flow in the process industries process industries.

Process control and automation are appearing in the world and have been advancing since the beginning of the industrial revolution; although the term as such has been the term, it refers to the ability of technology to carry out technology's capacity out work or daily life processes with work with a high degree of ease and effectiveness, saving and effectiveness, saving resources, physical effort and time. It is essential for the economic progress of and explore new methods in production and logistical in production, especially those based on new technologies, in order to reach the levels of competitiveness required in an increasingly globalized market. It is estimated, according to the McKinsey Global Institute, that automation levels can range from 41% to 55%, with between 41% and 55%, with the developed and emerging countries that have implemented automation methods and tools in their industries that can automation tools that can replace, according to the same study, some 1.2 billion jobs worldwide, which is undoubtedly a challenge for the undoubtedly a challenge for states, companies and educational institutions [2]. Regarding the ranking of robot implementation, for example, to industrial processes, leading the list are South Korea, Singapore and Japan lead the list; Mexico, Argentina and Brazil are the first in Latin America [3]. Understanding, therefore, the phenomena related to control and intelligent automation allow the public and private sectors to make decisions on the implementation of such processes, taking into account the social, political and social economic impacts that may be generated impacts that may be generated.

3.2 Definition of Control and Intelligent Automation

Intelligent control and automation is understood as the system that collects data, processes it and generates autonomous orders that allow the inspection, control and intervention of environments and communication with users. Throughout the history of humankind, man has sought to adapt the world to its conditions, while other species have simply adapted to it [4]. This particular characteristic of the human being has been an engine of innovation and entrepreneurship that continually modifies society's way of continuously modifies the way of life of society and even of other species. The use of animals for transportation, the invention of the wheel, writing, mathematics, agriculture, electricity, communications and the computer, among others, have been inventions that have led mankind to humanity to transmute physical energy into time to continue creating and innovating into time to continue creating and innovating; time that is in today's society as a high-value resource.

3.3 The Power of Automation in Organizations

Advances in technical developments in computer hardware and software have made it possible to introduce automation into virtually all aspects of human-machine systems [5]. This science not only replaces physical matter, but also brings about changes in the activities carried out by human beings [6] refers to the total or partial substitution of a function, previously performed by human beings, with the possibility of varying the level of application, i.e. whether the process is slightly or highly automated. To better understand the concept of automation, the Royal Academy of Exact, Physical and Natural Sciences (RA-CEFyN) of Spain starts from the definition of automation, understood as the set of methods and procedures for the replacement of the operator in physical and mental tasks and previously programmed, therefore, automation is understood as the application of automation to the control of industrial processes and has evolved to many fields of science. The Dictionary of the Royal Spanish Academy [15], derives it to the verb to automation the same that has two meanings: on the one hand, "to convert certain movements into automatic or in deliberate movements", and, on the other hand, "to apply the automatic to a process or a device". It also rescues the definition of the Oxford English Dictionary [16], when it refers that automation is the action or process of introducing automatic equipment or devices in a factory or other process or facility, or also as the fact of doing something through a system, device, etc. automatically. Furthermore, since the 1950s it was related to mechanical or electronic devices and allowed the substitution of people's work, which has remained to the present day. For Parasuraman et al. [7] automation refers to the total or partial substitution of a function, previously performed by human beings, and the level of application may vary, i.e. whether the process is slightly or highly automated. In another research Parasuraman and Riley [14] define automation as a concept that can change over time, under the conception that automation comes from a machine (usually a computer) and where the assignments of functions from human to machine will be transferred and will change over time. There are several criteria regarding the roots of automation, for Sergio Parra [8] they go back to very ancient times before Christ: In the eighth century BC, Homer, in his famous Iliad, already

describes mechanical servants endowed with intelligence built by Hephaestus, the god of metallurgy.

Between 400–350 B.C., Archytas of Tarentum built an automatic bird. Between 262–190 B.C., Apollonius of Perga invented a series of water-powered musical automata Ctesibius also built musical automata, whose sound was created by the passage of air through various tubes. According to Macau [9], one of the first milestones that marked the history of automation is that "from 1960 onwards, information technology was introduced into organizations with the aim of automating repetitive administrative tasks (mainly accounting, invoicing and payroll)", transforming the organizational processes of companies from that time to the present day. The next big step, which occurred at the end of the 1970s, according to Rafael Macau [10] was the emergence of the concept of "Management Information System (MIS), an integrated information system that, based on a global design, comprises both bureaucratic work automation systems and management information systems for the different management levels" within an organization. For Gerardo Tunal [11] automation has two origins dating back to the 1980s. The first was when the statistician of the U.S. Census Bureau [18], Herman Hollerith [19], created a computer capable of classifying punched cards, duplicating and comparing them and being able to code population data to generate census statistics, and the second milestone, when in 1994 Howard H. Aiken [20], of the University of California, Berkeley, USA, created a computer that could be used to generate census statistics [12]. Aiken, from Harvard University, created the first fully automatic and electronic calculator, the Automatic Sequence Controlled Calculator (ASCC), with which it was possible to perform continuous operations previously programmed [17]. These inventions had a high value for the time due to the conditions in which they were developed and the technological advances, the first one has even been considered as a preordained one.

4 Methodology

The development of the present research was elaborated under a systemic literature review methodology. The systemic literature review provides the facility to identify, contrast, evaluate and interpret the relevant research available and on that to answer certain research questions that have been posed, which can be one or more than one [13]. The purpose of using this methodology is to identify current research with respect to intelligent process automation and to find new areas or lines of research for future research. A protocol was used that includes the following elements: Problem statement, State of the art and Objectives.

5 Conclusions and Discussions of Information Analysis

We can conclude that because automation systems most of the time are very complex and diverse. The proposed methodology provides a useful tool to carry out automation projects. But in order to successfully carry out an automation project it is necessary to obtain in the greatest detail the information of the system description, since this is the one that opens all the gaps to acquire the (existing) technology, in addition to helping to have a broad vision of what can and wants to do. The solutions found for the present investigation are framed in the themes of Cost reduction:

i) Improvement in equipment load, decreasing resources.
ii) Reduction in the number of errors: Human or communication errors.
iii) Significant increase in execution speed: Significant time reduction.
iv) Obtaining reports: Quickly and on the spot.

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