Improvement intervention proposal for a small clothing company: airtable software

Proposta de intervenção de melhoria para uma pequena empresa de vestuário: software airtable

Felipe Facco Mendes Ferreira¹
Evandro Bezerra Soares²
Priscila Pasti Barbosa³

Abstract

The basis for any industry to achieve high growth potential and, consequently, profitability, comes from organization, efficiency, standardization, quality, among other factors. Entrepreneurs are often unable to pinpoint how damaging the disorganization of a production process is, poor programming and development can suck up all the company's profits, and due to the lack of planning and production control this situation can be imperceptible in the final process. All of these points can be resolved with good company organization aligned with good production planning and control. However, every optimization process requires everyone's involvement and commitment, that is, everyone needs to be willing to donate to achieve process improvement that brings positive impacts to both the worker and the company. In this work we observed the importance of developing and implementing Production Planning, Programming and Control (PPCP) software on an online platform called Airtable. With the software it was possible to access the company's entire data history, making

¹ PhD in Production Engineering from Universidade Federal de São Carlos (UFSCar), Rod. Washington Luís, s/n, Monjolinho, São Carlos - SP, CEP: 13565-905. E-mail: felipefaccomf@gmail.com
Orcid: https://orcid.org/0000-0002-4870-3800

² PhD in Production Engineering from Universidade Federal de São Carlos (UFSCar), Rod. Washington Luís, s/n, Monjolinho, São Carlos - SP, CEP: 13565-905. E-mail: evandrobezerrasoares77@gmail.com
Orcid: https://orcid.org/0000-0003-2090-5950

³ PhD in Production Engineering from Universidade Federal de São Carlos (UFSCar), Rod. Washington Luís, s/n, Monjolinho, São Carlos - SP, CEP: 13565-905. E-mail: ppbarbosa2@uem.br
Orcid: https://orcid.org/0000-0003-2872-2753
the information easily accessible for everyone in the company. As a result, it was possible to see a significant improvement in the company's organization, a reduction in lead time and consequently a significant growth.

**Keywords:** Airtable; Database; PPC; Professional Uniforms.

**Resumo**
A base para que qualquer indústria atinja alto potencial de crescimento e, consequentemente, rentabilidade, vem da organização, eficiência, padronização, qualidade, entre outros fatores. Os empresários muitas vezes são incapazes de identificar o quão prejudicial é a desorganização de um processo de produção, programação e desenvolvimento ruim pode sugar todos os lucros da empresa, e devido à falta de planejamento e controle de produção, esta situação pode ser imperceptível no processo final. Todos esses pontos podem ser resolvidos com uma boa organização da empresa alinhada a um bom planejamento e controle da produção. No entanto, todo processo de otimização requer o envolvimento e o compromisso de todos, ou seja, todos precisam estar dispostos a doar para alcançar uma melhoria de processo que traga impactos positivos tanto para o trabalhador quanto para a empresa. Neste trabalho observamos a importância de desenvolver e implementar o software de Planejamento, Programação e Controle de Produção (PPCP) em uma plataforma on-line chamada Airtable. Com o software foi possível acessar todo o histórico de dados da empresa, tornando as informações facilmente acessíveis a todos na empresa. Com isso, foi possível observar uma melhora significativa na organização da empresa, redução do prazo de entrega e, consequentemente, um crescimento significativo.

**Keywords:** Airtable; Banco de dados; PPC; Uniformes Profissionais.

**Introduction**

Among the needs of companies and industries, Production Planning, Programming and Control (PPCP) is characterized as an excellent tool to bring optimization to the production process. Through the cycle, it is possible to point out which points may be deficient for the company's productivity. Any attempt at improvement within an Individual Microenterprise (MEI) must be very well developed and highlighted with great attention, due to the impact that development without due efficiency may be carried out within the company (Blanch, Pellicer, Romeu, & Ciurana, 2011). Entrepreneurs are often unable to understand how harmful
the disorganization of a production process is, poor programming and development can suck up all the company's profits, and due to the lack of control over planning and production control, this situation can be makeup (Alting & Zhang, 1989).

The clothing sector has very significant production variability, causing difficulty in applying certain improvement points. However, this should not become a demotivation but an even greater challenge, the amount of rework due to lack of disorganization is very significant in the sector, where with the help of the application of a PPCP problems can be found and corrected, causing an improvement of work and profitability of the production process (BARRETO, 1997). By controlling the activities of the entire production process, the lack of information is eliminated from the process, meaning that the amount of rework is also excluded as a result (Pereira & Faia). But all these points can only be achieved when the industry proposes to cooperate for improvement, all these optimization processes involve the entire production process, so everyone involved must be willing to change their way of working if necessary, causing thus an improvement for both the worker and the company itself (Pereira & Faia).

The textile sector in Brazil is classified as the sixth largest in the world, with annual revenue of R$167 billion, of which more than 1.5 million people are employed. This data is presented by ABIT – Brazilian Association of the Textile and Clothing Industry in 2022 (SEBRAE, 2023). The Textile and Clothing sector in Brazil is considered one of the largest and most modern in the world, this is due to the commitment of companies in this segment to achieve greater expansion within the market (BARRETO, 1997).

Production Systems have the purpose of making some type of product or service available to consumers who need added value. Therefore, production systems are not only focused on the production process, but they also encompass the entire cluster of activities and relationships that involve the company, such as: finance, marketing, inputs and outputs, maintenance, human resources and other functions (Blanch, Pellicer, Romeu, & Ciurana, 2011). The PPCP aims to coordinate and apply production mechanisms, so that it best meets all the metrics required at the strategic, tactical, and operational levels. The flow of productive time can be divided into three levels: long, medium, and short term. Just like every industry, PPCP also evolved, in the 80s, with the high use of information technology in industries, resources such as CAD/CAE achieved great automation. Its purposes were to provide data for programming and control, dealing with production planning (Alting & Zhang, 1989).

In this context, the importance of personalized management software for small businesses cannot be underestimated. While large corporations have the resources for complex
and expensive management systems, small businesses often face unique challenges that demand specific solutions (Blanch, Pellicer, Romeu, & Ciurana, 2011). Customized software allows these companies to tailor their operations to their precise needs, automate repetitive tasks, improve process efficiency and accuracy, and make more informed decisions based on real-time data. Additionally, these systems can scale as your business grows, ensuring they continue to meet changing demands (Pereira & Faia). Ultimately, custom management software empowers small businesses to compete more effectively in the marketplace and achieve a greater level of success and long-term sustainability. A good option, with a free initial cost, is the Airtable platform.

Airtable is an online cloud data storage platform. It presents the features of a database applied to a spreadsheet. Within an Airtable space it is possible to create database bases, this way each database has several tabs with template spreadsheets (Caruso, Karligkoti, Selempa, & Nikita, 2023). Within each tab it is possible to configure which type of task to perform, such as: short text, long text, attach files, checkbox, multiple selections, simple selection, collaborator, date, phone number, email, URL, number, currency, percentage, formula, among other functions (Prokopets, 2023). The Airtable workspace has six basic components: Bases, tables, views, fields, records, and the time (Airtable, 2023). An Airtable database contains all the information needed for a particular project or collection. Each of the square icons on your home page is a different base. It's like a workbook in a traditional spreadsheet and can contain multiple tables of contents (Porter, 2016).

Therefore, this article aims to reduce lead time and minimize rework in a clothing and screen-printing industry through PPCP software developed on an online platform exclusively for the company in question.

**Methodology**

The company under study comprises the sales, cutting and screen-printing sectors. Sewing and embroidery activities are outsourced. As a methodology, brainstorming was first carried out to identify the problems, then analyzes of the problem of the company's production process were carried out, in order to discover the vital causes of the problem. After discovering the causes and analyzing the company's entire production process, the action plan was drawn up. Next, the execution stage dealt with the development of a system, that is, PPCP software through the Airtable platform and its implementation and training in the company. Finally, the effectiveness of the implemented software was analyzed using data collected before and
after implementation, so that the results could be compared.

**Results and Discussion**

The company covered in the study is a manufacturing and screen-printing industry. It is located in the northwest region of Paraná, in the city of Goioerê. Foco Uniformes has been on the market since 2010, its main activity is the production of personalized clothing, such as: simple t-shirts, polo t-shirts, sports sets (t-shirts, shorts), shorts, vests, pants, aprons, sweatshirts, sweaters, jackets, and lab coats. Through observation carried out from August to October 2020, some problems were identified that were occurring in the company. Among them: Errors in orders; high Lead-Time; high rework rate; lack of planning, programming, and production control in the company. Most of the time, each order had a procedure and order that was carried out in the production process unevenly, making it difficult to map each particular procedure. Mapping the production process (Figure 1) helped to better visualize it, and it became clear that the company did not have a standard in its operations.

![Figure 1 - General mapping of the production process](source: Own authorship)

With the data collected, it can be seen that in the month of August, 101 pieces were remade, representing a total of 22% of rework of the month's production. In September, 50 pieces were remade, representing 27% and in October, 61 pieces were remade, representing
35% of the month's production. The errors that generate rework come from various sectors (sales, cutting and stamping), however when analyzing them more deeply it was realized that the relevant sectors failed due to information received in an erroneous manner from the sales sector. Some of the reasons identified for errors in the sales sector were:

a) Lack of a well-designed production order (OP), as they were done manually, hindering understanding;
b) Lack of an information system;
c) Communication failure between sectors;
d) Storage of data (quantity, colors, details, deadlines) carried out manually and mentally;
e) Lack of attention from employees;
f) Failure to communicate with the customer; and
g) Lack of organization and standard procedures.

Another crucial point identified was the delivery time. The company in question operates with pull production, and with zero stock, its purchase of raw materials occurs after the order is closed, which ends up resulting in a longer wait to start production of the order, considering the time taken to order and fabric delivery, resulting in a longer lead time and longer wait times for the customer.

3.1 Process Analysis

Analyzing the company's production process, it was noticed that when the order arrived for the other production sectors of the factory, it did not have any writing standard. A draft was often made on any paper, in which the quantity and sizes were described. Therefore, a lot of data was scattered, such as the date the order was placed, delivery date, material that would be used, color of the fabric, among various details. Due to the fact that there was no good communication between the company's sectors and outsourced companies, some orders were made with errors, due to a simple lack of communication between them, resulting in rework later. The lack of organization often resulted in failure to meet the deadline for delivering the product to the customer, which was determined on the date the order was placed. This caused a lot of inconvenience, both for the customer and for the employees. To analyze the process, the Ishikawa method was used to develop the cause and effect of the company's main problems, namely: the lack of organization and the lack of standardization of orders.
3.2 Creation of PPCP Software

The platform chosen for the development of the software was Airtable, which has no costs, the user only purchases space in the clouds to allocate the database. Airtable has online access, so it can be viewed from any device, as long as it allows the use of the Internet. This way, the employee can have access from anywhere via their smartphone, logging into the app. The beginning of the preparation was based on gathering information that should be included in the database and what the platform's functionality was in light of the company's needs. From the collection of information necessary to improve the company's production factors, the main information was listed:

a) Customer Registration;
b) Orders;
c) Order Payments;
d) Production Order;
e) Production Control;
f) Cash Movement;
g) Sellers; and
h) Type of Products.

The first tab created is the customer registration tab. This tab contains all the fields necessary to fill in and store the company's customer data. In Figure 2, you can see how the factors that will be used for the factory's PPCP were established.

![Figure 2 - Software header](source)

In Figure 3, the customer needs to identify their name or company name, the date of registration, their CPF or CNPJ, telephone number, address, and city. Thus, when the order is produced, the employee contacts the customer to collect it. If the customer does not withdraw the order within a certain period, using the data extracted from it, it is possible to protest on their behalf, to force payment and mitigate the company's losses. Registration aligns all tabs, so customer registration is necessary to place an order and proceed. In each tab there is a field...
that performs the alignment function. The second tab created was the order tab. In this part, all the specifications that the order needs to be produced were filled out.

In this way, the details that the customer has must be included in the order within each field, such as: descriptions, seller, type of product, sizes of the pieces, total number of pieces, which fabric will be used, the color, which art and the unit value of each product. A different order is placed for each type of product, so that conflicts do not occur within the production process (Figure 4).

![Figure 3 - Customer registration](image1)
Source: Own authorship

![Figure 4 - Requests](image2)
Source: Own authorship

A field of great importance is the order date. This field is necessary for production time control to be applied, and it must be completed exactly on the day the order is being placed. In the orders tab, other tabs are also aligned. Thus, making filling out all the data more...
functional, the order aligns the payment data and the production order. In the order payments tab in Figure 5, all order payment notes are made, such as payment method, payment type, payment notes and entry value. Payments are grouped by payment status in Figure 6, which classifies payments that are paid and those that are still awaiting payment.

**Figure 5 - Payment for orders**
Source: Own authorship

**Figure 6 - Order payment status**
Source: Own authorship

Every order must have a payment specification upon collection by the customer, to avoid delays in receiving payment. Making the factory have a greater financial turnover. The production order tab, in which all order data is automatically copied to the fields, in this way, the user must only fill in the art image field, where it will be attached, that is, where the design of the manufactured product will be inserted. When the product design is grouped into the production order, the form is ready to be printed and allocated to production. The production control tab (Figure 7) aims to demonstrate which stage the order is at and calculate the
production time for each order. CP calculates not only the total production time, but also how long the order waits to be produced in each sector of the company.

Figure 7 - Production control
Source: Own authorship

Production control needs daily monitoring, in which it is necessary to record the stages in which each order is and the date on which it passes from one sector to the other. This process ensures that orders meet their completion deadlines, carrying out greater supervision, thus ensuring that the order reaches higher quality. Figure 8 shows the box movement tab. This tab must contain all financial transaction data. Each payment data has a connection with cash flow, in which the amounts that are entering the company's cash flow are noted.

Figure 8 - Financial movement
Source: Own authorship

Any other sale made of products sold in the store must be included in the cash flow.
All expenses that the store and factory have are also described. This way, it is possible to analyze the movement of inputs and outputs that the company is carrying out. Aiming for greater financial control. The salespeople tab shows all the company's salespeople and their personal data. Therefore, each order is registered with the seller who places it. This tab is for including or excluding sellers. Another functional tab of the software deals with the type of product. The type of product must appear on all orders, showing which item will be produced. It has the function of adding types of products in production and calculating the total of each type of product being produced in the factory. Figure 9 exemplifies.

![Figure 9 - Product type](Source: Own authorship)

Another feature of the tab defines the cost of each type of product and what the net profit added to the product is. It also shows which materials, and their respective added values are used in each manufactured product. When the fields on each tab are expanded, the platform shows which changes are being made when filling out each production factor and which user is making that change. In this way, the person responsible for production can carry out more effective control of the production process.

**Conclusions and Implications**

Based on all of the above, he concluded that to solve the problem of the lack of standardization of orders caused by the lack of information, it would be necessary to implement PPCP software in the company. Due to the high cost of software on the market and the size of the company, which could not afford the costs, it was decided to develop exclusive software for the company on an online platform, Airtable, due to the fact that it is free, requiring only online spreadsheet programming knowledge, which a member of the company
had. The Airtable platform proved to be effective for software development, allowing it to be created exclusively for the company in question and with no initial costs.

Regarding its application, its acceptance by all employees and owners of the company can be concluded. The software also proved to be effective for circulating company information, solving problems such as the lack of OPs in the company, doubts regarding orders, among others. In relation to rework, through this study, it was possible to reduce its rate from 28%, collected in the months of August to October/2021, to just 3%, with data collected after the implementation of the system until April/2021. A significant improvement for the company since each rework represents more time and more money spent on production. Thus, its reduction represents a significant reduction in production costs for the company.

In this way, not only a reduction in the company’s financial expenses was achieved, but also a reduction in emotional and mental exhaustion. Another important point in this study was lead time. The production time, which in 2020 was an average of 27 days, was reduced to an average of 15 days in 2021, after the implementation and adaptation of the software. With its restructuring, the company also managed to achieve growth of 74%, in which its production went from an estimated 382 pieces produced in the month of August/2020 to 883 pieces produced in the month of February/2017 and 1500 pieces produced in the month of April/2021.

This result resulted from the introduction of the company's services in other regions of the city since the company currently has the structure and organization to meet such demand. Also with the new structure, it was possible to expand the number of employees, so the company currently has two partners, an employee and an assistant in screen printing, an attendant in the store, an employee, and an assistant in cutting and an intern. In this way, the company doubled its staff during this period.

References


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