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Technological Article

Development of a process innovation in an informal enterprise of floral arrangements field

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Rafael de Almeida Martarello[a]* e Débora Ferro[b]

[a] *Virtual University of the State of Sao Paulo (UNIVESP), São Paulo, SP, Brazil*
[b] *Federal Institute of Education, Science and Technology of São Paulo (IFSP), São Carlos, SP, Brazil*

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***Corresponding author:**
Rafael de Almeida Martarello
martarellorafael@gmail.com

Abstract

Purpose: reporting a process innovation in an informal productive enterprise, inserted in the field of parties, ceremonies and events décor, involving floral arrangements**. Methodology**: qualitative-descriptive study, with information being obtained through documentary research and case study**. Originality/Relevance**: this study analyzes an informal productive business, whose practice improvement was conducted based on technological resources. It is relevant because there are only few studies dedicated to technological development, and that thematize the most frequent type of productive enterprise in Brazil. **Findings**: the process innovation that was conducted has enabled a greater productive efficiency, as well as health, safety and hygiene in the workplace, since it has reduced costs and manufacturing time; and it has eliminated unnecessary procedures that result from the manual method**. Theoretical/Methodological Implications**: the innovation, developed and described heading from the theories and methodological approach used, in addition to promoting improvement in the ability of adapting to different customer demands, has added an element to the process innovation effects foreseen by Oslo Manual. **Social Implications:** in parallel to the operational results pointed out, the academic activity has enabled the improvement of economic enterprise that belong to settings and groups in social disadvantage.

Keywords: Female entrepreneurship. Technological development. Informal economy. Floral arrangement.

Resumo

Objetivo: relatar a inovação de processo em um empreendimento produtivo informal, no ramo de montagem e decoração de festas, cerimônias e eventos, envolvendo arranjos florais**. Método**: estudo qualitativo-descritivo, com informações obtidas por meio de pesquisa documental e de estudo de caso**. Originalidade/Relevância**: este estudo analisa um negócio produtivo informal, cujo aperfeiçoamento da prática foi realizado com base em recursos tecnológicos. Ele é relevante porque há escassos estudos que "abrem a caixa-preta" do desenvolvimento tecnológico, e que tematizam o tipo mais frequente de empreendimento produtivo no Brasil. **Resultados**: a inovação de processo realizada permitiu maior eficiência produtiva, bem como saúde, segurança e higiene ao ambiente laboral, pois reduziu custos e tempo de produção; e eliminou procedimentos desnecessários, resultantes do método manual**. Contribuições teóricas/metodológicas**: a inovação, desenvolvida e descrita a partir das teorias e da abordagem metodológica utilizada, além de promover a melhoria da capacidade de adaptação às diferentes demandas dos clientes, adicionou um elemento aos efeitos da inovação de processo preconizados pelo Manual de Oslo. **Contribuições sociais:** em paralelo aos resultados operacionais apontados, a atuação acadêmica possibilitou a melhoria de empreendimentos econômicos pertencentes a contextos e grupos em desvantagem social.

Palavras-chave: Empreendedorismo feminino. Desenvolvimento tecnológico. Economia informal. Arranjo floral.

INTRODUCTION

The history of management science is marked by the exposure of reports and theories regarding the great cases of business success, in addition to inventions that have brought deep changes in the business world and, as a consequence, monetary gain obtainment. This is not, however, the average or most frequent reality in productive enterprises, mainly when it comes to the Brazilian territory, in which it is even tinier.

As an example, the extensive literature regarding entrepreneurship field depicts the situation of enterprises and entrepreneurs that do not know how measure productivity; the indebtedness degree; the business return rate; the value of its liabilities and assets; the customer's decision making factors; and/or that do not make certain plannings, such as cash, strategic, tax or inventory ones (Galvan, 2014).

When it comes to the size, although micro and small businessses absorb a great contingente of workers, being responsible for a considerable share of the country's Gross Domestic Product (GDP), and in spite of the historic improvements that have been verified during the last years, as certified by the Brazilian Institute of Geography and Statistics (IBGE) (Gomes, 2017) and the Brazilian Micro and Small Business Support Service (Sebrae, 2016), a concerning survival rate in the early years of the businesses remains floating over them.

It is also worth mentioning the high informality panorama that characterizes the Brazilian urban economy, in evidence due to the huge amount of informal workers and productive enterprises. Until the last decade, informality reached a share of one-fifth to one-third in the GDP (Nogueira & Zucoloto, 2017); and, in 2019, according to the Underground Economy Index (Chiara, 2019), informal economic activities represented 17,3% of the Brazilian GDP.

In terms of effective performance in the job market, there is a record number of 15,34 million unregistered workers, including domestic workers; as well as of 23,8 million self-employed people (out of which 80% do not have a CNPJ registration). On the other hand, 33 million occupy formal vacancies, being registered workers; and 11,3 million are public workers (IBGE, 2019). Thus, it is possible to say that four out of 10 Brazilians are working in informality – the main factor responsible for reducing the rate of manpower underutilization.

In Brazil, the panorama of the national productive organizations, for the past few years, is built as it follows: 2003 – more than 10 million informal companies (IBGE & Sebrae, 2005); 2006 – 98% out of the 5,1 million formal companies were micro and small companies (IBGE, 2007); 2018 – 5 million formal businesses (IBGE, 2020); 2019 – nearly 4,5 million formal employers (IBGE, 2019); and 2020 – about 19 million informal businesses (Sebrae, 2020).

Business informality is delimited by international criteria, namely: being a productive unit; producing in small scale; having low level of organization; no separation between production factors in capital and labor; being non-agricultural and focused in producing goods and services for income and employment (in opposition to self-consumption). It is worth noting the absence of a legal registration which, although it is a useful analytical criterion, is not included in the conceptual basis of informality, constituted solely by the operational status.

As a result, informal enterprises largely: (a) do not have a business license; (b) do not use tax incentives; (c) can not take part in bids and, as a consequence, to take advantage of them; (d) have difficulty accessing credit and leasing in general; (e) are at risk of receiving fines for acting in an irregular manner; and (f) can not count on the right to social security coverage (which extends to employees who employ).

Given the growth in the number of employers without a CNPJ registration in Brazil, and that innovation is a secure source of income and competitive advantage in liberal economy, this study reports the elaboration and implementation (by its authors) of a process innovation at a floral arrangements company (informal enterprise) in the city of São Carlos/SP, which has resulted in the improvement of its productivity.

ENTREPRENEURSHIP AND TECHNOLOGICAL DEVELOPMENT

According to data of Global Entrepreneurship Monitor (GEM), released in 2016, it was estimated that 48.239.058 Brazilians were involved in entrepreneurship activities, which corresponded to nearly 20% of the population.

In summary, these early Brazilian entrepreneurs attend to the following profile: they are, mostly, women (51,5%), with brown skin (54,4%), married (41,7%), with ages between 25 and 34 years old (30,3%); with regards to family income, the reality is of two minimum wages (28,8%), and most either have completed high school or are attending college (46,4%) (GEM, 2016).

When it comes to entrepreneurship practice, women have, recently, increased their participation, both in qualitative and quantitative way, and this may be a female autonomy exercise. On the other hand, this space continues to reproduce social inequalities that affect women throughout their social paths. This is due to the potential effects of gender modulation over the choice of certain sectors of activity and business, which are linked to the social role assigned to women; and to the attempt of reconciliating female professional and personal home life in a patriarchal society (Brandão et al., 2019; Jonathan & Silva, 2007; Silva et al., 2019; Teixeira & Bonfim, 2016).

An entrepreneur is the agent responsible for offering alternative solutions to social problems by promoting and transforming opportunities into goods and future services, adding value to the business and changing economy.

It is stated by Schumpeter (1988) that the innovation process has a leading role in enhancing the cycles of economic progress, as it maintains a close connection with the purposes that correspond to the figure of the entrepreneurial agent of creative destruction, since the different manners of arranging elements and productive forces are conditioned to the desired economic adequacy.

An innovation, according to Oslo Manual, written by the Organisation for Economic Co-operation and Development (OECD), refers to the "implementation of a new or significantly improved product, process, marketing method or organizational method" (OECD, 1997, p. 55). The fundamental and minimum feature proposed by the theoretical approach of this Manual is, therefore, the organization's novelty degree, established by a planned procedure that aims to enhance organizational performance, and not the innovation's diffusion degree in the market.

Among the existing innovation types, the process one is responsible by the intentional creation of technologies, working methods, automation and equipments that are used in the production process (Araújo & Araújo, 2013; Artuzo et al., 2017). According to the OECD (1997, p. 58), "a process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software".

Oslo Manual (OECD, 1997) argues that, in order for a company to be considered innovative, it must implement at least one innovation, which may come from the engagement in scientific, technological, organizational, financial and/or

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commercial activities. When it comes to small and medium companies, due to the components of its organizational structure and the difficulty in having resources for innovation activities, their needs are more specialized than the ones of big companies.

Moreover, with innovation, it is also possible to achieve success in sales; access to markets; higher profit margins; cost reduction; increased productivity; to improve products quality and commercial performance, as well as to enhance distribution.

METHODOLOGY

The assignment that has preceded this study was characterized as an exploratory descriptive and of applied nature one, and it has used the participatory action research for developing a prototype – steps performed throughout 2019. For this paper, the object approach, proposed by Oslo Manual, was used. It refers to "collect some descriptive, quantitative and qualitative data about the particular innovation at the same time as data is sought about the firm" (OECD, 1997, p. 28).

Thus, we opted for the qualitative-descriptive approach, using document research and case study (interview and observation) as technical procedures, in order to obtain information regarding the enterprise, chosen by convenience (floral arrangements business).

Heading from this point, a direct observation and an in depth unstructured interview were, then, conducted with an entrepreneur of floral arrangements field, aiming to understand facts and experiences related to the business practice and her path towards becoming and remaining an entrepreneur.

In order to understand the last aspect mentioned, the Oral Life History method was applied, which analyzes the narrative of reports about paths and the subjective construction of the world – when it comes to this study, about the life learning that culminated in entrepreneurship. For that, the researcher should apply, as his strategy, the examination over the sociocultural context in which the interviewee is inserted, as well as over her psychic and historical dimensions (Vogt & Bulgacov, 2019).

In the next phase of the study, the antecedents and outcomes of a process innovation are described.

Next (Table 1), we present a comparison between the goals and the effects of the innovation process produced by Oslo Manual and the ones that have been found during this case study.

Table 1

Factors related to the goals and effects of the innovation

Relevance	Innovations of			
	Product	Process	Organizational	Marketing
Competition, demand and markets	■			
Obsolete products replacement	■			
Increased goods and services variety	■			
Development of eco-friendly products	■			
Increase/maintenance of market share	■			■
Entry into new markets	■			■
Increased products visibility/exposure				■
Reduced response time to consumer needs		■	■	
Increased goods and services quality	■	■	■	
Increased production/service provision flexibility		■	■	
Increased production/service provision capacity		■	■	
Reduced unit production costs		■	■	
Reduced materials and energy consumption	■	■	■	
Reduced product design costs		■	■	
Reduced production time		■	■	
Industrial technical standards achievement	■	■	■	
Reduced operational costs for service provision		■	■	
Increased efficiency/speed of provision and/or distribution of goods/services		■	■	
Improved IT capabilities		■	■	
Improved communication and interaction among the different business activities			■	
Improved knowledge sharing and transferring with other organizations			■	
Improved adaptability to different customer demands			■	■
Development of strong relationships with consumers			■	■
Improved working conditions		■	■	
Others:				
Reduced environmental impacts	■	■	■	
Improved health and safety	■	■	■	
Regulatory requirements execution	■	■	■	

Note: OECD (1997).

Elaborated by authors.

CONTEXT AND INVESTIGATED REALITY

From entrepreneur to enterprise

The entrepreneur, who sees herself as a florist, has started her professional life working, sporadically, by the age of 14 years old, as a helper at some relatives' flower shop, looking for financial independence and monetary support for her own leisure.

Aiming to improve herself in that work environment and to prove her value to herself and others, the interviewee began, during the time she had to rest, training the process of setting floral arrangements up, conceiving her own productive strategies. After a while, due to the skill acquired, she was able to reach her first professional achievement – she became the florist responsible for certain events.

Even so, there was still an issue involving her position as a worker: the work seasonality, in contrast to the constant need for remuneration in order to support her living. Besides, internally, the young lady started to criticize her job position and economic stability, as well as the lack of appreciation and recognition from her employers. Due to that, the interviewee left the floral arrangements segment and started to work on other occupation.

After a stable period working in another area, which was higher-paid, she was missing the unique feeling of fullness she used to have when seeing the result of her work, people's happiness and the beauty of the floral arrangements. This encouraged her to go back, in parallel, to the floral décor field. This time, however, as an entrepreneur.

The enterprise was founded in 2001, with her own financial resources, which came from savings accumulated during previous work experiences. The floral arrangements used to be produced after her work journey, and advertised/offered, literally, in a door-to-door format.

Therefore, the entrepreneurial motivation had its roots in a personal nature, since the young lady sought for fulfillment with the position, given her previous dissatisfaction with her job; and in necessity, as she had to earn money and wanted to change her life. At some point, the enterprise was the entrepreneur's main source of income; currently, however, it is an economic activity that aims income supplementation.

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Organization

The floral arrangements segment is composed of: (a) informal service providers, with low training and extensive experience, such as interior decorators, floral artists and party ornamentors, working under low demand and with local coverage; and (b) occasional and institutional clientele.

Being part of the floral segment for events, the "Diferencial Festas, Eventos e Decorações" has regional coverage and has the proposal of serving customers that want to celebrate an event, through the production of floral arrangements.

Predominantly hired by intermediary companies that, in general, act as commercial representatives of the final consumers by negotiating several services that, when put together, compose an event, the Diferencial can be hired fully or partially. In full mode, the customer accepts the conditions and use of materials from the company's partners; and in partial mode, the hirer previously establishes its suppliers (the product types for each event category are described next, in Table 2).

Table 2

Product types

Event	Raw material	Product purpose
Graduation	Roses, field flowers, noble flowers, exotic flowers	• set a solemn tone to the event; • photos panel; • arrangements to: table, entrance, sideboards and restroom.
Graduation		• photos panel; • cake and gifts table; • arrangements to: footbridge, chantry, table, entrance, sideboards and restroom; • bridal bouquet, bridesmaid and lapel.
15 years old party		• photos panel; • cake and gifts table; • arrangements to: table, entrance, sideboards and restroom.
Events in general, with natural flowers		• photos panel; • cake and gifts table; • arrangements to: table, entrance, sideboards and restroom.

Note: Elaborated by authors.

For the small orders, Diferencial has a storage space for finished products, which are shipped using a private vehicle; large orders are made at the place in which the event will be held.

As for the human resources, the entrepreneur kept a portfolio of potential employees, recruited sporadically, in a contract format, when large events came up. The selection was based on a vulnerability profile created by her: unemployed people, single mothers and people looking for a first work experience (following this priority order).

The training for performing the operations is conducted after the employee's admission to the team. It is carried out by the entrepreneur herself, based on the On the Job Training method, which provides practical experiences. That being said, some disadvantages could be mentioned when it comes to this training, specifically talking about this enterprise: lack of a well-structured environment for its execution; the entrepreneur's limited skills in acting as an instructor; and the inexistence of other criteria for performance analysis, besides this stage.

The existing positions in the researched company, the assignments, the necessary requirements for performing them, as well as the respective "financial rewards" offered to the employees, are listed below (Table 3).

During the contact with the entrepreneur, it was possible to notice that the changes regarding equipments, such as the acquisition of a manual thorns extractor, as well as of special scissors and knives, had, as their main goal, to enhance productive efficiency, since better instruments enable the operations to have higher quality, which directly affects the product. Moreover, such changes also aimed to offer safety and quality of life to the operator, since there used to occur a lot of hand injuries and fatigue, due to the obsolete state of some equipments. Currently, there are benches and tables for the working process; vegetable knives (with no saw); pruning shears; a meat knife (in order to cut the flowers with precision); and a manual rose cleaner.

Table 3

Rewards

Position	Assignments	Requirements	Payments
Helper	• clean the handle and petals of the flowers; • offer assistance to the florist.	Being attentive; having flexibility to learn; proactivity; and agility with the hands.	Fixed per day.
Florist's assistant	• finishing	Having the basics on assembling floral arrangements; proactivity; agility with the hands; and being detail-oriented.	Fixed per day or by demand.
Florist	• compose floral arrangements; • assemble floral arrangements; • outline work strategies.	Having agility with the hands; creativity; flexibility to learn; responsibility; ability to guide people; and knowledge about the different types and events' profile.	Variable

Note: Elaborated by authors.

The business relies on the entrepreneur and one more collaborator. Together, they also hold a matrimonial family bond. Currently, the enterprise only fullfills small orders, and its greatest issue refers to low profitability, based on its entire history.

Problem situation diagnosis

SWOT analysis is one of the most famous and applied tool in Business field. Besides verifying the strategic position, it performs a "general assessment of the company's strengths, weaknesses, opportunities and threats" (Kotler, 2016, p. 59) regarding the enterprise. Based on the information collected, we present, next, a SWOT analysis of the studied company (Table 4).

Table 4

SWOT analysis

Strengths	Weaknesses
• quality raw material; • on-time delivery; • assembly agility; • customer loyalty; • product differentiation by customization; and • image linked to quality service.	• working only with natural arrangements assembly; • not having productive availability for large events; • little capital to be invested; • low profit margin; • outsourced service provision; • demand seasonality; and • standardized cost, with no differentiation among the customers.
Oportunities	**Threats**
• high number of graduates in the city; • growth of the events sector; • opening of new spaces for parties; • artificial floral arrangements; and • supply chain partnerships.	• excessive competition; • loyal customers to other event companies; • increase in the number of competitors; • increase in manpower cost; and • growth of new trends in the market.

Note: Elaborated by authors.

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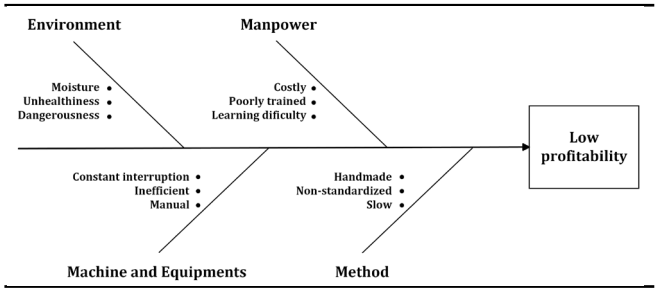
SWOT analysis reveals that, on the company's horizon, there were threats related to manpower cost and to an increase in the number of competitors; on the other hand, there were opportunities arising from an increased demand in the area; and, as for the weaknesses, it is possible to mention the little capital available to be invested, and the lack of work with large events. According to the other data collected and observed in this research, there is also a difficulty in training new professionals; a high cost involving raw material and manpower; low profitability; and a dangerous and unhealthy activity.

Heading from these findings, at first, the Iceberg Principle, which breaks down the factors/symptoms of a certain problem, was used; followed by the Cause-Effect Diagram, also known as Ishikawa Diagram, that logically sorts the possible causes of the main negative factor, according to the perspective of the entrepreneur-florist.

It is worth outstanding that, for this process, only four categories (4M) were taken into consideration, due to the features of the two causes types, that could not be changed (Figure 1).

Figure 1

Cause-effect diagram

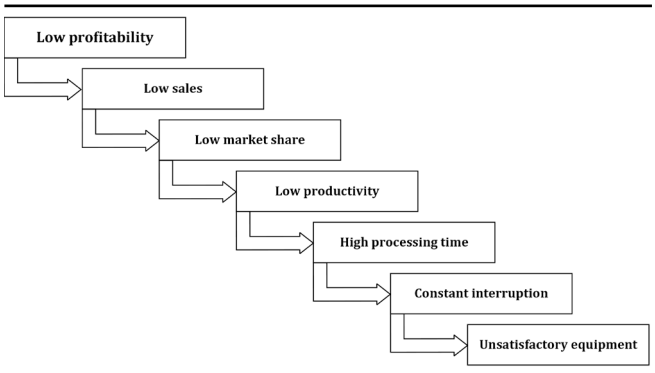


Note: Elaborated by authors.

After that, in a second moment (Figure 2), the interrogative technique of the Five Whys was used, in order to explore the root cause of the superficially diagnosed problem and, later, to act over it in a resolute manner.

Figure 2

Five whys



Note: Elaborated by authors.

The low profitability is primarily attributed to the small number of sales, since the final product offers low profit margin per unit. This factor, inserted in a macro-environmental context, makes the enterprise holder of an insignificant portion of market share, situation that is aggravated by the existing fierce competition. Nevertheless, a low market share is attributed to low productivity.

Thinking, now, about productivity, it is worth mentioning that the total processing time was long, which points out to interruptions due to misfortunes, to production bottlenecks, and to a time lapse during handlings, specially when it comes to the operation to remove thorns and leaves.

Finally, by questioning the cause once more, it was possible to conclude that there was not enough technological capacity to effectively and satisfactorily support the process, which revealed the need to act over this operation.

The operation to remove thorns and leaves out of the flowers used to be performed manually, a flower each time, which, in general, hurt the helpers' hands. Even though the entrepreneur made safety goggles and gloves available, the use of this last safety equipment generated less productivity, as it used to get stuck in the flowers and was, as a consequence, discarded. This operation was, therefore, considered to be exhausting and unhealthy.

With this manual extraction method, the production process of 150 floral arrangements used to require 11 people, those being: four helpers to clean the roses (thorns and leaves) and two to clean the petals; two assistants to add the green part; a florist to model; and two people to carry and position the arrangement. The time for removing thorns and leaves was estimated at seven seconds per person and rosebud.

Currently, the existing technologies fulfilling this operation, given by the patents PI96b0191 (thorns extracting device for roses) and ES1012938 (manual device to remove the thorns from roses), use the manual process and the method of transforming one item at a time, which results in: larger amount of time to produce the order; excessive manpower in the process; and quality losses in customer service. As a result, they no longer meet the business needs of Diferencial Festas, Eventos e Decorações.

Due to that, an innovation opportunity in the area of equipments and machinery was identified, aiming to achieve a better development of floral arrangements and more agility in their assembly process by the florist. From an economic point of view, developing a prototype of a new product – in this case, a mechanized rose extractor – will be a differential in the floral décor field.

Solution analysis

The device created has an engine; a drive shaft; a protective acrylic box; a hollow wooden plank; an acrylic waste box and a pedal. Another factor, taken into consideration when stipulating and implementing the improvement, is the place in which the arrangements assembly takes place, in order to provide the operator with compatibility, experimentation and simplicity. Depending on the type of demand, the florist makes the arrangements at the event's venue and, for that, the proposed solution is portable and lightweight (it weighs about 14 kilograms).

Following the installation of the device to extract thorns and leaves out of the roses, the number of operators has decreased to five; as a result, the process relies, now, on 45% of the manpower previously employed. Moreover, the machine cleans the 150 roses in 30 seconds (it removes thorns from five roses per second), which represents a 97% time savings.

This provides greater speed to the operation developed by the florist, and makes operators available to other activities, being now distributed as it follows: a helper to clean the roses (thorns and leaves) and the petals; two assistants that add the green part and provide support to the florist; a florist to model; and a person to carry and position the floral arrangement.

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Compared to previous models existing in the state of the art, this invention: reduces the physical effort required of the operator; increases the efficiency/speed of provision and/or distribution of goods and services; decreases operational costs for the provision of services, the time, and the unit production costs; increases the capacity and flexibility of production/service provision; eliminates the waste/by-product collection step of the operation; and operates with less risk of damaging the health of the operator.

Next (Table 5), the effects observed after the process innovation was implemented by Diferencial Festas e Eventos are described. Among them, the list recommended by the Oslo Manual (1997) draws attention because the process innovation in question has caused an effect attributed to another type of innovation: an improvement in the ability of adapting to the different demands of customers, who need certain decorations at the event venue.

Table 5

Factors related to the goals and effects of the innovation

Relevance	Process innovations	Diferencial
Increased goods and services quality.	■	■
Increased production/service provision flexibility.	■	■
Increased production/service provision capacity.	■	■
Reduced unit production costs.	■	■
Reduced materials and energy consumption.	■	■
Reduced product design costs.	■	■
Reduced production time.	■	■
Industrial technical standards achievement.	■	
Reduced operational costs for service provision.	■	■
Increased efficiency/speed of provision and/or distribution of goods/services.	■	■
Improved IT capabilities.	■	
Improved adaptability to different customer demands.		■
Improved working conditions.	■	■
Others:		
Reduced environmental impacts/Improved health and safety.	■	■
Regulatory requirements execution.	■	

Note: Elaborated by authors.

CONCLUSIONS

The entrepreneurship practice, combined with the technological development process, makes it possible to increase revenue; optimize production efficiency; and meet customer needs; by enhancing the service level. Thus, innovation is an important competitive factor for micro and small businesses in the market and, in general, for economic and social development.

The informal productive enterprise analyzed arose out of a personal need for income, as well as of a search for professional fulfillment in an activity envisioned by the entrepreneur. After conducting an in-depth study and applying the usual tools of Business science, the low profitability issue was diagnosed and its root cause was found, for which a resolving alternative was developed – a prototype that would improve the arragements assembly process, in order to avoid causing injuries to operators, reduce the amount of human resources applied in this operation, and provide increased productivity. Previously, the rose cleaning operation was performed manually, one flower at a time.

The process innovation consists of a mechanized thorn extractor device, applied in the assembly area, at events and during the decorations of floral arrangements. As a result, there was a 45% reduction in the manpower previously required for carrying production out; and 97% time savings in transforming an equal number of items when compared to the previous work method.

Due to its weight and size characteristics, the machine is portable, which makes it possible for it to be used at the events' venues or at the florist's physical establishment; it does not cause any damage to the plant; and its cost is also a relevant factor, as the investiment can be recovered in ten days.

It is expected that the technological development in question will make a competitive advantage feasible, given the lack of similar technology, which enables the enterprise to choose low-cost strategies. Furthermore, in a context of growing demand for floral arrangements, the business can now increase its offer and respond more quickly to customer needs.

This research was focused on a single case; therefore, the multi-case approach, in enterprises belonging to the same sector, as well as for the regulatory situation and/or size, is suggested for further studies.

As for the innovation, due to biotechnological advances, there is a threat arising from the production, in the future, of thornless roses.

Conflit of interest statement

The authors have no conflicts of interest to declare.

Authors' statement of individual contributions

Roles	Contributions by authors	
	Martarello RA	Ferro D
Conceptualization	■	■
Methodology	■	■
Software	N.A.	
Validation	N.A.	
Formal analysis	■	■
Investigation	■	■
Resources	■	■
Data Curation	■	■
Writing - Original Draf	■	■
Writing - Review & Editing	■	
Visualization	■	■
Supervision	■	
Project administration	■	
Funding acquisition	N.A.	

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AUTHOR BIOGRAPHIES

Rafael de Almeida Martarello *is pedagogical supervisor at the Virtual University of the State of São Paulo (UNIVESP). He has a Master's degree in Applied Human and Social Sciences, an MBA in Digital Marketing and Analytics, a Specialization in Municipal Public Management, a degree in Public Policy Management and another in Administration. His areas of concentration are: Science and Technology; Planned obsolescence; and Marketing in Public Administration.*

E-mail: martarellorafael@gmail.com.

Débora Ferro *holds Bachelor of Technology in Management Processes from Federal Institute of Education, Science and Technology of São Paulo.*

E-mail: dedeferro@hotmail.com.