



The street vendor and working conditions in São Luís (MA): contributions of ergonomics to the environment of informal commerce.

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SUMMARY: Informal commerce is a complete reality around cities, including São Luís (MS), characterized mainly by the activities of street vendors and the jobs created by them in squares, streets, avenues and main points of flow of people. Such a context may involve ergonomics, considering working conditions for the sale of various types of products (food, drinks in general, utensils, clothing, etc.). In this way, the present research intends to describe a scenario relating to the aspects that can be explored by ergonomic interventions, that is, the preliminary problematization (demand analysis) regarding the situation of the working conditions of street vendors. Systematic observations and structured interviews of the sellers' activities were carried out, in addition to the typification of artifacts used to sell various products. It was possible to recognize that the profile of salespeople, in general, is made up of men, with a low level of education and who work under inadequate conditions (exposed to bad weather, environmental factors, with jobs that do not consider the principles of ergonomics - of order biomechanical, anthropometric, informational, among others).

KEYWORDS: Informal commerce, street vendors, problematization (demand analysis), ergonomics.

1. INTRODUCTION

Informal work is understood as that activity carried out without any direct involvement or regulation by the state, thus there being no employment relationship between worker and employer (dos SANTOS, 2016). According to Krein & Proni (2010), informal workers can dedicate themselves to different activities and are also able to move between them easily, whether selling, reselling products or services or even producing other products.

In Brazil, the informal market experienced even greater growth following the economic changes that the country has undergone since the 1990s, a period marked by the opening of the economy to the flow of commerce and the reduction of industrial jobs, which increased the unemployment rate and caused many Brazilians to turn to the streets to ensure their self-support (NERI, 2000). In more recent data before the pandemic caused by Covid-19, the Continuous National Household Sample Survey (PNAD) developed by the Brazilian Institute of Geography and Statistics (IBGE), it was recorded that almost 15% of the population lived in conditions of unemployment, representing almost 14 million unemployed Brazilians.

With the pandemic, the situation has worsened even further with the reduction of jobs and the closure of commercial establishments, directly affecting the economy and the means of guaranteeing income for several families (CARVALHO, 2020). Still in the context of informal work, Cunha (2006) and Santos and Melo (2011) describe that from the 1970s onwards the term “informal” was used to describe non-stable income from economic activities that were not part of the regulation of the state. According to IBGE (2012), the highest rates of informality are found in the north and northeast regions, in 2021, for example, it was recorded that the number of self-employed workers rose to 23.5 million, measuring an increase of 4.7 % compared to data from previous years. In the same year, the state of Maranhão led with the highest informality rate among other states in Brazil in the months of January, February and March, attributing that almost 62% of the population lives from the informal economy.

The main characteristics of informality, according to the International Labor Organization (ILO), are that the individual who performs this activity is the owner of their own work instruments, their stocks and qualifications for carrying it out; the use of autonomous workforce and/or family production, so that not only can the worker employ himself, but also engage family members; the absolute control of the producer and all his work processes, among others (CACCIAMALI, 1994). Dos Santos (2016) highlights that informal

work presents deprivation of legal benefits related to social security, such as retirement, legislation and, mainly, the lack of coverage regarding health protection, since in most cases the sellers themselves produce artifacts that present functionalities regarding the commercialization activity of different types of products (such as: food, drinks in general, equipment, utensils, etc.), without paying attention to the technical criteria that take into account, for example, comfort, usability, and safety at work, and other aspects related to ergonomics and design.

In general, street vendors have characteristics in common, they generally have a basic level of education (primary or high school), often due to the lack of opportunities for decent education (ALFERS, 2009). In a survey carried out by Macedo (2020) in São Luís (MA), mainly in the most central region of the city, it was found that the average age of workers was 44 years old, varying between 20 years old and 67 years old, for the sex male and between 30 and 58 years old for females, with the majority of the sales population being made up of men. Regarding working hours, the author noted a variation between 3 and 12 hours per day, with almost 60% of those working between 7 and 9 hours. In addition to long hours spent working, there is also exposure and conflicts related to supervision by government agencies, as well as robberies, assaults, violence in the workplace and uncertainty regarding their occupation (dos SANTOS, 2016).

It is in this context that the situation of workers in informal trade gains more visibility, becoming a focus for studies and research aimed at improving working conditions, taking into account ergonomic criteria. VASCONCELOS et al (2015) identified that the informal market is configured as a large-scale sector that directly involves human beings in improvised jobs, the authors focus on the figure of the churro seller and through research, they conclude that the artifact of churro seller has several problems related to the use and ergonomics of the worker, therefore, they aim for an analysis that constitutes a conceptual project, establishing a possible design solution for this class of informal workers. Melo et al (2015) carried out research that analyzed and recommended improvements to the workstation of a traveling salesman of cases for cell phones, taking into account criteria such as principles of anthropometry, biomechanics and environmental factors, resulting in a redesign proposal ergonomic for the position.

Considering these issues, this article intends to describe artifacts collected in several commercial regions of São Luís (MA) through the classification of Use, Form and Type according to Löbach (2001), the categorization of the artifact according to Valesse (2007) and the classification of products and services from the National Institute of Industrial Property

(INPI, 2018), as well as the use of criteria from ergonomics literature to describe and detail the context relating to street vendors' jobs in the central region of the city.

2. THE WORK OF STREET SALESMEN

According to Mitullah (2003), in many countries informal work through street vendors is a source of employment and income for many people, but in common, these activities are not recognized in national economic statistics, as it is seen as an activity clandestine people who put the healthy economy of countries at risk. According to the author, to carry out street vending activities, these vendors use simple structures, technology and production, producing their own jobs.

For Singer (2000), these unofficial working conditions, seen as “underemployment, disguised unemployment, survival strategy” are maintained by the ability to construct artifacts based on the specific needs of each worker. These artifacts are products that express the cultural particularities in which they are inserted, making it possible to carry out tasks and overcome situations that prevent them from carrying out their work. Oliveira (2009) describes that the reality of street vendors shows that, even though these workers carry out their activity with a certain autonomy, they are still limited in the process of managing their activities, needing to complete long working hours to achieve monthly family income - being the largest portion without the basis of labor legislation - and in precarious conditions that could possibly generate negative conditions for the seller's health. Given the divergences related to the conceptualization of informality, some research sought to categorize informal workers based on their profile. Alves (2006), for example, classifies workers into two groups, traditional informal workers who refer to generally temporary conditions, acting on labor supply and demand, being directly linked to the number of unemployed people. The self-employed are linked to commercial activities, such as street vendors, who act on the circulation and consumption of goods and services, creating a relationship between consumers and sellers.

Costa (2007) describes that even though work in its general context can be considered as a producer of health and a means for individuals to participate in social life, it can still be a factor with negative effects on the lives of workers, causing accidents, illness and even death.

In view of the changes affected in the context of work after the productive restructuring followed by the global economic crises in the 1970s, there was an increase in unemployment that was influenced by these changes, affecting Brazil in this scenario around the 1990s, highlighting the growth the participation of workers in the informal labor market, in which they carry out their activities in risky and dangerous conditions, characterizing precarious

employment, presenting greater occurrences of accidents or other health problems. Studies, such as Costa (2007), demonstrate that the work of street vendors is often seen as exhausting and extremely discriminating, creating even more gaps so that the type of activity is not taken seriously, nor is there a special look at the health of sellers, recognizing that factors such as unemployment, low education and personal qualifications, which in turn can have consequences for health, both in terms of illnesses, exposure to bad weather or handling of chemical products, and work accidents, such as cuts, falls or burns.

Costa (2007) describes that street vendors are exposed to health problems associated with the work performed, including spinal pathologies, headaches and pain in the upper and lower limbs resulting from poor posture, carrying heavy weight and expropriation of artifacts used to help with sales activity. These notes corroborate the study by Pick et al (2002), which presents the conditions of women in the informal sales sector, describing complaints of headaches and musculoskeletal problems, in addition to discomfort resulting from the work environment.

Thus, it can be noted that, even in conditions of informality regarding labor issues, the surroundings of informal commerce and street vendors require the performance of ergonomics, as this reality is an autonomous possibility of obtaining income that collaborates with the movement of popular market and, mainly, with the generation of income that supports families and more families in poor or underdeveloped regions that lack educational and teaching opportunities and the provision of formal jobs. Therefore, given the issues related to the health of this class of workers (street vendors), ergonomic intervention is essential for improving working conditions and jobs as a whole.

3. THE CONTRIBUTION OF ERGONOMICS AND THE CONTENT OF INFORMAL WORK

It is possible to find in the literature research carried out in Brazilian cities, focusing on informal work with ergonomics as its main contribution. Such research has highlighted ergonomic constraints related to the working conditions of salespeople, such as the working day, the tasks performed and the work position in general, and also to the artifacts produced for the sale of numerous products, from food, drinks, handicrafts , electronics, among others.

Arai et al. (2003) focused on street vendors in the city of Rio de Janeiro, who sold drinks and cookies on the city's beaches. The results showed prolonged work characterized by wandering, both during the day and night shift, in addition to exposure to environmental factors

(noise, toxic materials and lighting) and bad weather. Furthermore, there were reports of discomfort/pain in muscle groups (back, shoulders and knees), load handling, physical and mental stress. In a study carried out by da Silva et al. (2021) with street vendors in Boa Vista (RR), specifically with people from Venezuela, it was possible to highlight: ocular erythema, hearing loss, sunburn, discomfort/pain in body segments. In Maceió (AL), in a survey carried out with sugar cane juice sellers, ergonomic constraints related to the workplace were found, such as: inadequate occupational postures (arising from the use of the artifact and its transportation), exposure to the elements and, also, smoke and dust (dos SANTOS et al., 2016).

Finally, the contribution of Macedo (2020) is cited, with research carried out focusing on street vendors in the main commercial areas of São Luís, investigating the processes involved in the production of artifacts produced to overcome the unemployment situation, using as The term for this type of occurrence is Popular Design (DBP), based on Andrade's (2009) intention to present issues of popular design as a discipline in academia, given the relationship of these popular designs with the material sphere. As a result, there was a categorization of 6 groups of artifacts that had the most occurrence in the capital (snack and water cart, snack bike, bench, display and fruit cart) and technical recommendations in the field of ergonomics for each group found.

In this context, in which research applies the knowledge of ergonomics to improvements and implementations in the activity of street vendors, we can see the materialization of what Guérin (2012) describes regarding the purpose of ergonomics, since the author presents the objective of understanding the work with a focus on its possible transformation, taking criteria directly linked to the health and safety of workers, in order to guarantee both the effectiveness and quality of work.

So, when it comes to the figure of the street vendor in relation to his workplace and the artifacts he produces, to optimize the process of selling products, he produces and transforms his own support for the sale of products in general in the material sphere. , naturally using tacit and empirical knowledge, their traditional knowledge, as a guide. However, in certain situations, the interference of technical knowledge as a reference to optimize the possibility of accidents and undesirable developments during the performance of sales activities (product marketing) is also notable.

4. METHODS AND TECHNIQUES

This article can be considered as applied research content, which aims to find solutions to everyday problems, with a descriptive character that, according to Lakatos and Marconi (1991), presents aspects of investigation, recording, analysis and interpretations of current phenomena. Thus, it covers the description of the work context of street vendors, specifically in the city of São Luís (MA). Also, it can be considered a qualitative approach, where Neves (1996) describes employment when one wants to better understand the social process to visualize the entire context, taking an empathetic look in order to better understand the phenomenon (informal commerce and work of street vendors considering the principles of ergonomics, envisioning a preliminary problematization as a possible demand for ergonomic interventions).

To collect data, systematic observations were carried out through photographic records, described by Moraes & Mont'Alvão (2010) as planned, structured or controlled. In this case, the target of the observations were the places in the city of São Luís where there was a presence of street vendors (streets, squares, avenues), resulting in a geographic mapping of the main ones found. The data collection period took place between January and March 2019, before the pandemic caused by the coronavirus (COVID-19). To survey the working conditions of street vendors, a semi-structured interview was carried out, which presented guidelines regarding the vendors' personal data (such as name, age, education, income and family composition, and work data, such as work location, working hours and work routine), in addition to a specific agenda on collecting technical data related to workstations (“Do you feel any discomfort or discomfort/pain during transport or sale?”; “In which body segment do you feel discomfort/pain?” and if; “are there any accidents occurring during work?”). In total, 29 salespeople were interviewed and the results were tabulated in an Excel spreadsheet, grouped by order and response frequency.

To carry out data collection, a Free and Informed Consent Form was applied, as well as the preservation of the participants' identity and all precautions regarding possible related risks, following the favorable opinion of the research ethics committee number 3,696,667.

To ensure a better understanding of the data collected, the use of an initial classification was considered based on the typification of the artifacts found (VALESE, 2007), the classification of use, shape and type of the artifact (LOBACH, 2001) and the classification of products and/or services offered by sellers (INPI, 2021), in addition to the use of ergonomics

literature (IIDA & BUARQUE, 2016; GRADJEAN, 1998; DUL & WEERDMEESTER, 2001) to evaluate the conditions of workstations and artifacts (environment, work organization, product ergonomics issues – handling, anthropometry, biomechanics, informational ergonomics).

5. RESULT AND DISCUSSION

5.1 Mapping and personal data of sellers

The results showed that, in São Luís, there is the presence of informal commerce, reflecting a large possibility of artifacts that were produced to overcome different types of sellers' needs and a possibility for implementations of technical knowledge. The mapping of artifacts made it possible to record the places with the greatest occurrences of the informal sector on the island, such as the city center, on Ruas Grande, Santana and Mercado Central, as well as other regions where a focus of informal sales was noticed, such as the region coastal area and neighborhoods such as João Paulo, Cidade Operária and Germany.

Basically, the salespeople's profile was as follows: majority male, working time between 2 years and 40 years (with working hours varying between 6 and 12 hours per day) and, in terms of education, the largest portion has completed secondary education, receiving up to a monthly minimum wage (highlighting that it is the main source of income in the family).

5.2 Typification and classification of artifacts and working conditions (demand analysis)

Beforehand, the vulnerability of workers can be seen in terms of working conditions, such as exposure to bad weather, noise and accidents, or in terms of inspection and seizure of products that are sold. According to Valese (2007), artifacts can be fixed, when the salesperson does not have the objective of moving around in search of customers, and mobile, when the artifacts have smaller dimensions to facilitate the salesperson's mobility, of the artifacts collected 62.3% of the artifacts are mobile and 37.7% represent fixed artifacts, those that, even if they have components for mobility, are not used for this purpose (figure 1).

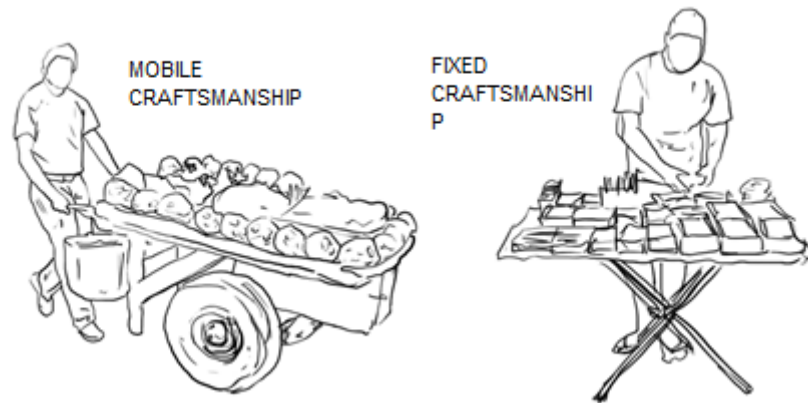


Figure 1. Types of artifacts. Source: the authors

Regarding Löbach's (2001) classification, the author considers the relationship between user and product in 4 ways: 1. Consumer products, those that cease to exist after use, 2. Products for individual use, 3. Products for use by certain groups and 3. Products for indirect use. Of the workers interviewed, 66.7% sell consumer products, 23.3% products for individual use and 10% products for indirect use. Relating the sampling based on Löbach's (2001) classification to the INPI (2021) classification of products and services, it can be seen that the percentage 66.7% refers to food consumption, showing an inclination towards classes 31, related to sale of various fruits, 32, related to the sale of drinks such as water and soft drinks and 30, focused on the sale of savory snacks in general and sweets.

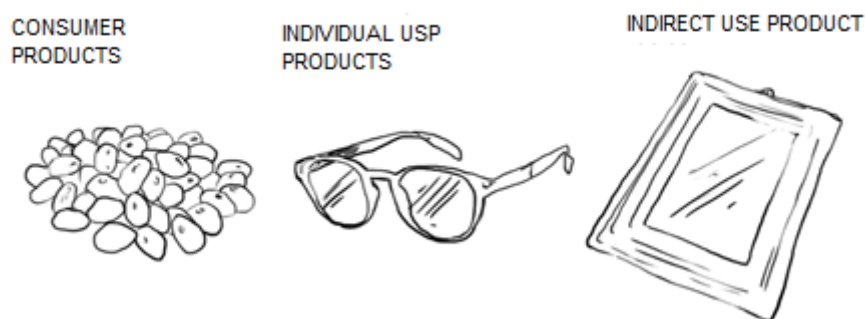


Figure 2. Types of products. Source: the authors

Figure 3 presents some examples of mobile artifacts from the fruit cart and snack cart groups. It is observed that this type of artifact causes the worker to maintain a standing posture for a prolonged period of time, there is no seat for resting or for varying occupational postures.



Figure 3. Sellers with mobile artifacts. Source: the authors

According to Iida & Buarque (2016), maintaining a standing posture for a prolonged period of time requires high energy consumption and static muscle work to maintain the position, which can cause fatigue and tiredness in the limbs, especially the lower limbs. Anthropometric inadequacy is also noted regarding the height of the carts, as they were created by tacit knowledge and were not technically adapted to the seller, having a dimension that results in exceeding the maximum reach of the worker, causing him to be in an uncomfortable position. which, together with the force exerted to pull the cart, can compromise your muscles and cause pain or injuries in the shoulder regions. According to CHAFFIN et al., (2001), it must be considered in the pulling/pushing action that the force is applied close to the waist region, the other also advises that the composition and size of the cart casters can improve mobility. Result

In fixed artifacts, where in most of the recorded incidents, in addition to the seller also spending a lot of time standing, the size of the artifact contributes to long-term problems (figure 4).



Figure 3. Sellers with fixed artifacts. Source: the authors

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Iida (2005) clarifies that many of the anthropometric measurements when applied, require a combination of the minimum and maximum measurements of the population, in the case of these artifacts, this criterion is not taken into account, thus, it becomes harmful to the health of the seller, since the author complements by describing that the ideal height for a standing workbench, such as the example of artifact P01, should be based on the height of the elbow and the type of work that this seller performs, having a recommendation that the surface of the bench is 5 cm to 10 cm below elbow level. For Couto (2002), when a bench is used for moderate or light work, without the seller needing to exert great visual effort, measurements from 1.09m to 1.18m can be used.

The first case in the figure involves an artifact that, in addition to having a smaller size than recommended, causes the seller to make a greater effort to reach the products he sells. As already mentioned, the effort on the musculoskeletal structure can lead to pain, motivated by lateral and frontal inclinations of the trunk, generating fatigue more quickly, thus Couto (2002) recommends standardizing the maximum horizontal reach to the smallest measurement based on the anthropometry, which is 0.66m. The result of the interview showed that the function, use and materials vary according to each of the artifacts used in the sellers' workstations. Fixed artifacts are positioned in a location that facilitates their assembly/disassembly, whereas Furniture artifacts are built with the structure of a cargo cart, with casters, generally with handling areas for transportation.

As for discomfort/pain, 62.1% of salespeople said they felt some type of discomfort, with the back having the highest percentage (61.9%), perhaps as a consequence of the main posture assumed during the sales process (standing, in prolonged time). Respondents also reported exposure to adverse weather conditions (sun, rain, wind, etc.) and, finally, high levels of stress as a result of the professional relationship with consumers during the marketing process.

6. FINAL CONSIDERATIONS

Informality is inserted within a global context, and there are several authors in different areas who are interested in and study this topic, which is of great relevance to the world

economy (Arai et al. 2003; Dos SANTOS et al., 2016; Macedo , 2020). Research on unemployment rates and informality confirms this growing interest in the subject, especially among poor and socioeconomically developing countries.

Informal activity is an alternative for those who cannot find formal employment. The results showed that in São Luís there is the presence of informal commerce in several urban spaces, essentially in places with high traffic of people.

Street vendors work in commercialization (selling), often because they cannot find work in the formal sector. The largest portion is male. Most have completed secondary education, and many have a low level of education, which is also attributed to the fact that they are unable to get a job. Even so, the informal sale of products can be understood as a source of income, often the main one for many families.

It was also possible to observe that the priority of these workers is to obtain income, and this causes them to work long hours, be exposed to the elements, handle objects (artifacts, products) with excessive weight and functionalities. who do not consider the principles of ergonomics, without concern for their own health. Often, using objects (artifacts, products) with mechanisms/operations, which instead of helping to better carry out the activity, cause discomfort/pain during it.

Based on the results found, it is possible to present a section of information that problematizes items that can serve as a reference for the performance of ergonomics in relation to the universe of work and the interaction of the street vendor (user) with the artifacts produced by them, which are used as support for the commercialization of products in urban regions, specifically in São Luís (MA).

Seeking a better fit between the street vendor, the workstation and the artifact used to sell products. Such as, for example, the sizing of artifacts, the height of furniture-type benches and handling dimensions (handle or handle), also related to the footrest. In short, the application of an ergonomic intervention methodology is considered relevant for a better understanding of ergonomic diagnosis, highlighting the main ergonomic constraints and the proposal for improvements.

Finally, it is considered important to relate the context of street vendors in relation to the Pandemic caused by the coronavirus. This context is another challenge for street vendors and concerns about economic self-sustenance and should also be a matter of concern regarding the application of ergonomics and design.

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