Developing a Methodology for Analysis of Workload Oriented Towards Knowledge Management

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Abstract

Since many of the small and medium enterprises (SMEs) are unaware of the level of workload that their staff has, they do not know how to balance it; nor do they include among their responsibilities activities aimed at managing their knowledge, which ultimately affects the company and its competitiveness. The objective of this paper is to propose a methodology focused on SMEs for the analysis of workload oriented towards knowledge management. For this, a methodology consisting of three phases is developed: identification of activities carried out in each job, analysis of workload by task, and evaluation of the workload. To validate the methodology, it was implemented in a company located in the northwestern Mexico, dedicated to the production and distribution of natural beverages and the workload of the staff was analyzed through a series of values, which made it possible to determine the level of workload, better distribute the workload, and include activities related to knowledge management.

Keywords: Knowledge management, Workload, Task analysis, Small business

1. INTRODUCTION

Knowledge has been recognized as the fundamental asset in all types of organizations, which needs to be used and managed properly so that the organization is more competitive and better satisfies the needs of its customers. In the literature, the appropriation of knowledge assets is recognized as one of the best ways for an organization to promote and achieve competitive growth. Knowledge and human intellect are key assets that contribute to competitiveness and wealth creation in an organization (Marulanda et al., 2016; and Ramadan et al., 2017). This applies to large, medium, or small companies. However, small and medium enterprises (SMEs) are organizational environments that are in the development process and continue their way to obtain better benefits from this intangible asset.

SMEs always had difficulty in competing within the globalized environment with their limited resources, whether human, economic and/or technological. Due to these limitations, and with few staff at their disposal, they sometimes carry out innumerable activities, which in many cases cause their staff to become exhausted. High levels of work stress and burnout

affect the productivity of the organization. On the other hand, the personnel that work in such an organization have a lot of experience and knowledge in decision-making and problem solving. However, since it is not documented, although they come across situations that were resolved in the past they do not remember exactly how they were solved. In other words, many of the SMEs are unaware of the level of workload that their staff has, do not know how to balance it, and do not include among their responsibilities activities aimed at managing their knowledge, which ultimately affects the company and its competitiveness. Against this background, this paper proposes a methodology that analyzes the workload of the personnel and allows to include the activities oriented to the management of organizational knowledge, so that the experience of its personnel is used for the benefit of the organization. The paper is structured as follows. First, a review of the literature is presented, where the main concepts and experiences related to the present study are reviewed. Next, a methodology for the analysis of workload oriented towards knowledge management is proposed; it is divided into three phases, and with the application of evaluation of tasks, it is intended to be used as a tool for the analysis of the proportion of resources necessary to fulfill a task. Subsequently, it is explained how the methodology was carried out with an example of a job in an SME located in the northwest of Mexico. Next, a discussion on the findings is presented, and finally, the conclusions derived from the study are offered.

2. CONCEPTUAL FRAMEWORK

This section describes the conceptual principles of human resource management in the organization, which are the main source of valuable knowledge for the organization. There is also a description of the workload balancing process. Finally, some methods are shown that help to correctly measure, classify and evaluate the workload of workers.

2.1. Workload

In the Mexican context, the term work is defined by NOM-035-STPS-2018 as any human, intellectual or material activity, regardless of the degree of technical preparation required by each profession or trade. In addition, it defines workload as the set of psychophysical requirements to which the worker is subjected throughout a working day. This workload must be carried out equitably and considering the number of workers, activities to be carried out, scope of the activity and their training (DOF, 2018).

The National Institute for Occupational Safety and Hygiene (NIOSH) mentions that the concept of workload has a negative connotation and refers to the individual's inability or difficulty in responding at a given time, that is, when the demands of the task exceed the range of normal use of the physical and mental capacities of the worker, and the consequent damage to their health (Juárez-García and Camacho-Ávila, 2011). Mental workload is one of the main causes of work stress, human errors and accidents (Barajas-Bustillos et al., 2023). If the employees' workload is high, it decreases their performance (Herdiana and Sary, 2023). According to Mansilla (2012), workload is determined by the interaction between the level of demand of the task (required effort, rhythm, environmental conditions) and the degree of mobilization of the subject's capacities to carry out the task (age, training, experience, fatigue, group support, etc.). The load involved in carrying out a task, i.e., the set of motor

and cognitive functions, focuses on the amount and information used in a job. It differs quantitatively: referring to the number of tasks to be carried out in a given time; and qualitatively: concerning the complexity of the content of the task and the resources for carrying it out (Calderón-De La Cruz et al., 2018).

Workload comprises the number of tasks and commitments that the company requires of its workers. It refers to the physical and mental wear and tear when doing their job and putting their skills into action to achieve goals. In addition, although physical and mental exhaustion tend to coexist, it is necessary to know how to differentiate them: (1) Physical workload: group tasks in which the demand for physical resources is greater than mental resources; for example, cleaning staff. (2) Mental workload: it is the workload in which mental resources like knowledge and abilities have more weight than the physical resources. Teaching, analysis, writing, design, management and interpretation of data and software administration are some examples of these tasks (Juárez-García and Camacho-Ávila, 2011).

According to Mansilla (2012), mental load is grouped into the following types: (1) Quantitative overload—when a worker performs many operations in a narrow timeframe, involving standardized process, sustained attention and a high work rate; (2) Qualitative overload—it is related to the difficulty of a task and the limited resources to solve it; e.g., interacting with an excessive number of users in a limited timeframe; (3) Quantitative underload—occurs when the volume of work activity is less than what is necessary to activate or interest the worker; (4) Qualitative underload: occurs when the task does not imply any mental commitment, resulting in monotony, rejection and demotivation for the worker.

2.2. Workload Balancing

Employee performance is vital to the progress of a company. When there is a decrease in employee performance, it indicates a high workload, which results in poor performance of the human resource (Anwar and Raharja, 2023).

Millán (2021) mentions that it is important to establish equality in working time as per International Labor Organization (ILO) standards. This implies a healthy, productive working time, convenient for the worker's family. This generates effective results in terms of provision of services and is capable of overcoming difficulties to face the challenges of the institution.

According to Morris et al. (2017), the balancing of lines is a critical factor for the productivity of a company. Its objective is to find adequate capacity distribution, to ensure a continuous and uniform flow of the products, through different processes within the plant, finding ways to equalize labor time at all stations, maximizing possible utilization of labor and equipment, and thereby reducing or eliminating idle time. Certain conditions must exist for the production line to be practical: (i) Quantity: the volume or quantity of production must be sufficient to cover the cost of preparing the line—this depends on the rate of production and the duration that the task will have; (ii) Balance: the time needed for each operation should be approximately equal; (iii) Continuity: precautions must be taken to ensure a continuous supply of material, parts and subassemblies and prevention of equipment failure.

The authors generally refer to the measurement of work in the context of manufacturing companies, which is why they question how administrative tasks can be measured, and through which methodologies a service company can access to the benefits of measuring work and defining standards. Some authors refer to techniques that, although they are

designed for manufacturing companies, can be adapted to the measurement of administrative tasks (Cabrera and González, 2019).

2.3. Methods of Workload Analysis

Work measurement is a valuable instrument to ensure that all the activities that influence production are carried out rationally in the company (Caso Neira, 2006). Various authors have presented the definitions, objectives, and applications of work measurement in organizations. Caso Neira (2006) defined the measurement of work as the application of techniques to determine the time that a qualified worker invests in carrying out a defined task; it pursues the establishment of a standard assigned for carrying out a specific job. Fernández Quesada et al. (1996) defined it as the specification of the work activities of everyone within the organization, with the aim that they develop the assigned work in such a way that there is a balance. A few specific methods are described below.

Subjective Workload Assessment Technique (SWAT): Developed by Reid and Nygren (1988), it uses data analysis procedures based on joint measurement techniques. It assumes that the mental load of a task or activity is determined by three factors or dimensions: time, mental effort, and stress. Each dimension is evaluated on a three-point scale with verbal descriptions. The dimension of time has scores from 1-3, evaluating the frequency (usually, occasionally, never or almost never) with respect to spare time, related to interruptions or overlaps between activities ranging from infrequent, frequent, very frequent. The mental effort dimension has scores ranging from 1-3, describing the level of mental effort (little, moderate and high) related to the complexity of the activity and the level of attention (low complexity requiring little attention, moderately high complexity requiring considerable attention, and high complexity requiring full attention). Finally, there is the dimension of stress with scores from 1-3, which evaluates the levels of confusion and the control that is required (low levels of stress, easily tolerates frustration or anxiety; moderate levels from confusion, frustration or anxiety and requiring significant effort; and lastly very intense levels of stress from confusion, frustration or anxiety and requiring extreme self-control) (Rubio Valdehita et al., 2001). This method has been applied in different areas such as traffic control operations (Fallahi et al., 2016) and maritime operations (Yan et al., 2019), to mention a few.

Task Load Index (NASA-TLX): It distinguishes the six dimensions of mental load: mental demand (amount of mental and perceptual activity like thinking, deciding, calculating, etc.), physical demand (amount of physical activity like pressing, pushing, turning, etc.), time demand (level of time pressure felt), performance (satisfaction with their performance), effort (degree of mental and physical effort to obtain a given level of performance) and level of frustration (confidence, stress, irritated, discontent, etc., while carrying out the task) (Rubio Valdehita et al., 2001). Subjective ratings, measured by NASA-TLX, can be used for the overall assessment of mental workload and for the collective judgment of job demands. Because of the multidimensional nature of mental demands, mental workload measures should be integrated into a combined measure using different weight coefficients (Jafari et al., 2020). This method has been implemented in different areas such as traffic control operations (Fallahi et al., 2016), maritime operations (Yan et al., 2019), rail industry (Jafari et al., 2020), evaluating instructional designs in university classrooms (Longo and Orrú, 2022), evaluating the impact of the experience that an individual has in executing the same task (BarajasBustillos et al., 2023), etc.

Workload Profile (WP): It assumes that mental load can be defined by the dimensions described in the theory of multiple resources. It consists of four dimensions: processing state (cognitive/response), sensory modality or inputs (auditory/visual), processing codes (visual/spatial), and response (manual/verbal). The application of this theory allows obtaining a prediction of the execution of an operator in multitasking situations as well as designing, choosing, and positioning information presentation devices and controls. Prior to the application, the participants must be instructed regarding the mentioned dimensions. Subsequently, once the task is carried out, the participants make an evaluation of the resources used during the execution of the task, in which a range of 0 to 1 is used, where 0 means that there is no demand for resources and 1 consumes all available resources. The efficiency in the execution when carrying out concurrent tasks depends on these tasks not being able to compete for the same attentional resources and not exceeding the limits of each resource. Unlike SWAT and NASA-TLX, it is done in a single run after completing the task, which is why it is recommended for quick assessments (Rubio Valdehita et al., 2001).

2.4. Knowledge Management

Dalkir (2023) defines knowledge as a more subjective form of experiences, typically based on values, perceptions, and individual experiences.

Knowledge management represents a deliberate and systematic approach to ensuring full utilization of the organization's knowledge base, with the potential of individual skills, competencies, thoughts, innovations, and individual ideas to create a more efficient and effective organization. However, there are different perspectives on knowledge management, and each leads to a different extrapolation and definition (Girard and Girard, 2015). Miković et al. (2020) and Matveeva et al. (2021) considered that effective knowledge management would lead to collaboration and cooperation among individuals, projects, and organizations. A differentiating characteristic of knowledge management, compared to other fields of information management, is that knowledge management deals with both knowledge and information, that is, it addresses its two main forms: tacit knowledge and explicit knowledge. Tacit knowledge is knowledge embedded in human mind; it is difficult to formalize or communicate; while explicit knowledge is easier to express, communicate and document (Dalkir, 2023). Nonaka and Takeuchi (1995) point out four modes of knowledge conversion: socialization, externalization, combination and internalization. Socialization makes it possible to share tacit knowledge through interaction between individuals, i.e., through shared experience. Externalization allows converting tacit knowledge into explicit knowledge. It is achieved through writing, recording, drawings, etc. This includes the combination (explicit-to-explicit), in which discrete pieces of explicit knowledge are recombined into a new form, for example, a summary of long reports, analysis of data trends, a new database to organize content, etc. Internalization is carried out with the practice of new knowledge, through action, and that knowledge is then internalized by the individual.

In the context of a company, knowledge management is defined as a process. The process approach could be integrated through the generation, codification, transfer, and use of knowledge (Wiig, 1997). According to Bueno (2002), knowledge generation studies the processes of acquiring external knowledge and those created by the organization; the codification and knowledge storage makes all organizational knowledge available in explicit form or by identifying the person who possesses it; knowledge transfer analyzes spaces for

knowledge exchange, as well as the technical processes or platforms that make it possible; finally, in knowledge use, the acquired knowledge is applied to carry out the routine activities of the company.

2.5. Individual Knowledge Management in Workloads

Knowledge can be defined as the understanding, awareness, or familiarity acquired through study, investigation, observation, or experience over time; that is to say, it is the individual interpretation of information based on personal experiences, abilities, and competences (Skovira, 2012). Knowledge resides in people and is mainly made up of two parts: one, formal education backed by academic/technical certificates, and the other, the skills, abilities, and experiences that are specific to it (Artiles and Artiles, 2016).

The basic set of activities of the organization is carried out by the people who are part of the company. Human capital has a characteristic—the impossibility of separating intangible files of this type from the people who develop it. When human capital enters the organization for the first time, it formalizes its link with it through employment contracts. The intangible elements that are included in human capital refer to the knowledge acquired by a person, in addition to individual qualities such as loyalty, versatility and flexibility, that condition productivity and the value of the contribution that the individual gives to the company (Fernández Quesada et al., 1996; and Subramaniam and Youndt, 2005).

The human resource that lacks adequate education, with weak skills and competencies, represents an obstacle to achieve institutional results (Asaju et al., 2013). There is a relationship between work and learning that is amplified within the knowledge economy. Wiig (2003) suggested that the performance of an organization depends on the effectiveness of the separate actions carried out by the individual and that problem solving is favored by the quality and availability of knowledge, pertinent in action points that are used to manage situations, that is, to make sense of information, decide what to do, innovate, act and evaluate the implications of approaches and action.

Knowledge management represents a deliberate and systematic approach to ensure full utilization of the organization's knowledge base, together with the potential of individual skills, competencies, thoughts, innovations, and ideas to create a more efficient and effective organization (Girard and Girard, 2015).

Human capital is a term adopted by Delgado et al. (2018) as an integration of the intellectual competences and skills that people possess, generating value for organizations through the capacity for innovation to create new products and services. The future of knowledge management will blur the boundaries between the individual, group or community and organization. Knowledge management will become a pervasive part of how daily business life is conducted.

It has been shown that the availability of resources can be altered due to exposure to work overloads in stressful contexts (Hobfoll et al., 2018). Considering the importance of behavior and knowledge to bring success to the performance of activities within a company (Shin et al., 2017), organizations improve their effectiveness by determining how they can facilitate access to resources to manage both organizational knowledge as an individual and thereby boost the capacity for innovation in workers who have heavier workloads.

Individual knowledge management will become increasingly important due to the increasing momentum with the information overload we are facing day to day. That is, some of the key

principles, best practices, and business processes of knowledge management, which to date have been focused on the organizational level, will leak out for use by people who manage their own personal capital (Dalkir, 2023).

Individual knowledge management contributes many of the key knowledge management principles that influence personal productivity and the specific job requirements of a given knowledge worker. This individual knowledge management is carried out in conjunction with the administration and support of knowledge, as well as personal information so that they are accessible, meaningful, and valuable to the individual; maintaining networks, contacts, and communities; making life easier and more enjoyable; and the exploitation of personal capital (Higgison, 2004). At the information management level, it involves filtering and making sense of information, organizing paper and digital files, e-mails, and collections of bookmarks.

3. METHODOLOGICAL PROPOSAL

The measurement of work has historically been a necessity for companies, since it is an instrument that significantly supports the management of the most valuable resource for organizations, their human resources. People are the key to greater or lesser work performance in achieving efficiency and productivity, but it is only with objective evaluations that it can be evidenced if it agrees with the interests of the organization, which includes management and execution.

Next, a methodology is proposed to carry out an analysis of workloads oriented towards knowledge management, following a detailed guide of phases to evaluate and solve the problems that gave rise to this work. This will allow an organization easy access, control, and balance workloads of the staff through the support of technological tools and systems. The representation of the methodology is shown in Figure 1.
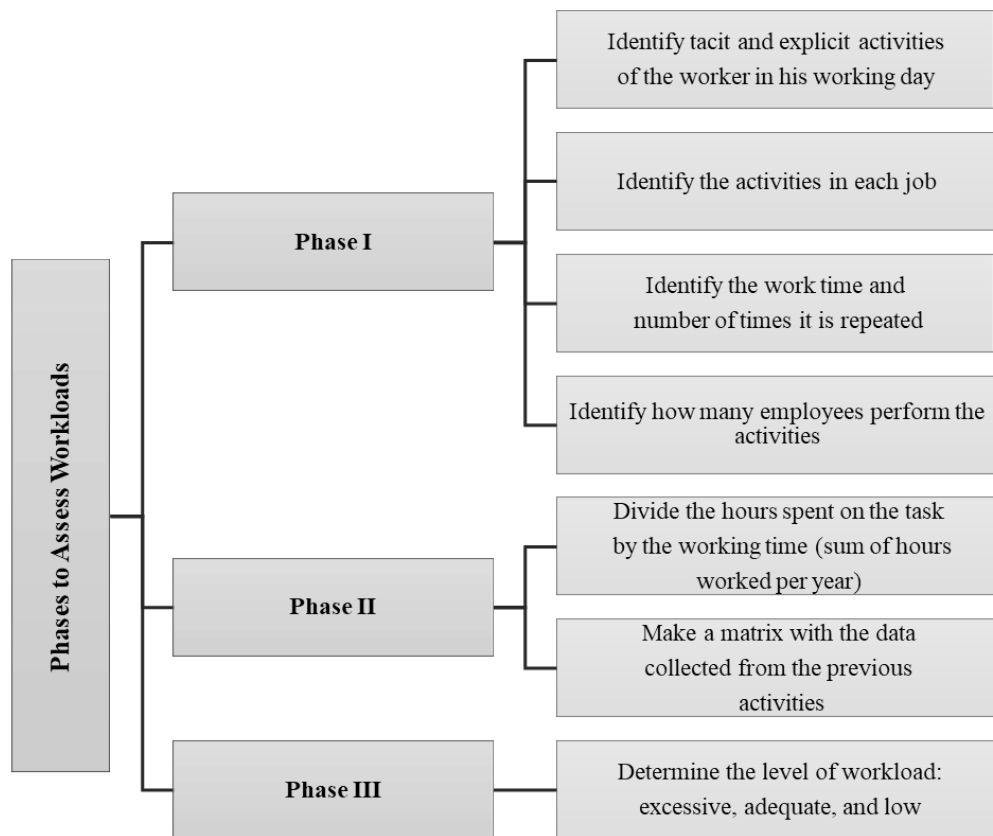
Figure 1: Methodology for Evaluating Workloads

3.1. Phases to Assess Workloads

This methodological proposal is intended to help to have better control of the work that human capital is doing. It arises from the previous bibliographical review, to give it an orientation towards knowledge management, based on processes that allow identifying, storing, sharing, using, learning, improving, and creating new information within the organization. In the application of the evaluation of their work, it is intended to be used as a tool to analyze the proportion of resources necessary to fulfill a task and the physical and mental demand. Next, each of the phases of the methodology is explained.

3.1.1. Phase I: Identification of Activities Carried Out in Each Job Position

Identify Tacit and Explicit Activities of the Worker on His Working Day: List all the activities that are carried out daily, weekly, and monthly in the position and put them in a coherent flow. These activities are necessary to have the workflow and eventually to time each of the identified activities. This procedure is the heart of the study and is what will allow the identification of the percentage of effective time spent by each person in their department and in the company. Determine the activities that involve tacit knowledge (knowledge that is known, but difficult to express); they may be models or mental maps, technical skills, own

experiences, observation and imitation, among others. The activities that involve explicit knowledge (formal, systematic, and easy to share knowledge) are expressed in operational knowledge, specifications, organizational databases, simulations and designs, among others.

Identify the Activities in Each Job: In order to facilitate the analysis of workloads in the following phases, Table 1 has 4 columns, which begins with the procedure that is carried out (for example, planning, counting, distribution, among others). In the subsequent columns, the activities, whether tacit or explicit, of the worker in his daily work (Task), job position (Job), and the resources necessary to carry out a task according to the job position being analyzed (Necessary Resources) are included.

Procedure	Task (Tacit and Explicit)	Job	Necessary Resources

Table 1: Job Position

Identify the Work Time and the Number of Times It Is Repeated: The work time in hours required for the execution of each task must be measured. The measurement of work is obtained through the application of techniques to determine the time that a qualified worker invests in carrying out a defined task; it pursues the establishment of a standard that will be assigned for carrying out a specific job. There are more specific methods from which you must select the one that best suits the situation and what you want to analyze. Among them are: Subjective Workload Assessment Technique (SWAT), Task Load Index (NASA-TLX) and Workload Profile (WP).

Identify How Many Employees Perform the Activities: The human capital that integrates the key processes must be known from their personal data to their work experience inside and outside the company. First, an identification of the existing positions and the number of people belonging to the areas of interest will be made, as well as the people necessary to carry out a task, using the database and records that the company has.

3.1.2. Phase II: Workload Analysis by Task

Divide the Hours Spent on the Task by the Working Time (Sum of Hours Worked per Year): The number will be the workload for that task. That is, if a load of 0.5 is obtained, it means that 50% of the work time is dedicated to that task or that it takes half the time of a worker to complete it.

Make a Matrix with the Data Collected from the Previous Activities: It will be necessary to generate a data matrix to facilitate the analysis of workloads, in which they are represented in columns. Table 2 shows and describes an information gathering matrix for workload analysis. Columns are presented that must be filled with the information collected in the previous phase. In the following columns are: average working time for each task (it can be measured in days and hours); number of times the task is repeated per year; total average of hour/person per task; hours per year of each worker; load per task (people needed); and load per procedure (people needed). At the end of the table, there is a sum of the load per

procedure. The summation can be used to determine the load per procedure and establish the people necessary to carry out a task.

Procedure	Task (Tacit and Explicit)	Job	Average Working Time for Each Task	Times the Task is Repeated per Year	Total Average of Hour/Person per Task	Hours per Year of Each Worker	Load per Task (People Needed)	Load per Procedure (People Needed)
							Sum	0	0

Table 2: Information Collection Matrix

3.1.3. Phase III: Workload Evaluation

Determine the Level of Workload: Excessive, Adequate, and Low: Rely on the results of the summation carried out in the evaluation of loads to determine how many people are needed to carry out a procedure, that is, obtain the sums of the scores of the evaluations, order them and group them on a scale that goes from 0 to 1; when the sum is closer to 0, it means that it is a slight load, and as the sum increases and approaches 1, it will be called excessive load, indicating that more than one person is needed per procedure. In this last phase, the level of workload of the employees must be identified according to the analysis carried out in the previous phases in order to be able to better distribute the workloads and to be able to include activities related to knowledge management.

4. CASE OF APPLICATION OF THE METHODOLOGY

The application of the methodology was carried out in a company in northwestern Mexico dedicated to the production and distribution of natural beverages. The company started operations more than 5 years ago and currently has 8 departments. The staff comprised two multidisciplinary managers who performed different tasks in various departments. In addition, there were two production/quality leaders responsible for directing and managing their respective production areas, and 13 employees distributed mostly in the production and

logistics departments, these being the activities with the highest added value for the organization. In this case, the study of workloads was applied in the sales department for the position of salesperson/delivery person.

The way in which the proposed methodology was implemented is described below.

4.1. Phases to Assess Workloads

This part shows the implementation of the methodology composed of three phases to analyze workloads, all oriented towards knowledge management and having better control of the work carried out by human capital and not falling into waste within the company. Firstly, one of the knowledge management processes consists of identifying the existing knowledge, in this case, information was collected from the jobs, tasks, working hours and employees of the organization, in order to create a series of tables to share information and facilitate analysis; the said information was stored in the company using Google Drive platform. Subsequently, the storage knowledge management process was accomplished by saving the tables to a separate folder within Google Drive, which was also shared within the organization. Once shared, the information was used to solve problems, make decisions, improve products and service. On the other hand, the knowledge management processes of creating and/or learning served to document the new data that was obtained to analyze the workloads, to correct existing knowledge and expand the information. In the job evaluation application, the analysis of the proportion of resources necessary to fulfill a task and the analysis of the physical and mental demand were used as a tool.

4.1.1. Identification of Activities Carried Out in Each Job Position

In this step, the company's database was accessed on the Google Drive platform, in which the human resources folder was located. Subsequently, the subfolder with the name "Employee Profile" was selected, in which the tacit and explicit tasks carried out in the workplace were found. We proceeded to carry out the concentration of the data found, and they are listed in a table which complements the information, incorporating the necessary resources to fulfill the said tasks as well as the procedures that determine the services or products that the activity encompasses. Table 3 shows an example for the identification of the activities of the salesperson/delivery person.

Procedure	Task (Tacit and Explicit)	Job	Necessary Resources
Planning	Check Control Panel	Delivery person / salesperson	Cellphone/Tablet
	Place orders to customers	Delivery person / salesperson	Mobile/Tablet, WhatsApp
	Record orders	Delivery person / salesman	Google Sheets, Mobile/Tablet
	Organize the corresponding routes depending on the orders	Delivery person / salesman	Delivery route template in Google Sheets, Mobile/Tablet
	Load beverages to the car where it will be distributed	Delivery person / salesman	Muscular strength
Count	Count the drinks and send the information to the production manager	Delivery person / salesman	Google Sheets, Mobile/Tablet
	Count the money and deliver it to whomever it corresponds.	Delivery person / salesman	Google Sheets, Mobile/Tablet
Distribution	Distribute orders with their respective customers	Delivery person / salesman	Car
Cleaning	Sort and clean delivery material	Delivery person / salesman	Cleaning Supplies

Table 3: Job Position

4.1.2. Phase II: Workload Analysis by Task

The working time for each task is the time that an experienced employee must obtain when carrying out a specific job at a normal rate under determined conditions and according to defined methods. To the measured time of the tasks, a supplementary time is added due to fatigue, noise, or temperature and physical or environmental conditions of the workplace. Table 4 shows and describes a matrix for collecting information for the analysis of workloads, and an example of a study of workloads carried out for the position of salesperson/ delivery person.

Procedure	Task (Tacit and Explicit)	Job	Average Working Time for Each Task	Times the Task Is Repeated per Year	Total Average of Hours/ Person per Task	Hours per Year of Each Worker	Load per Task (People Needed)	Load per Procedure (People Needed)	
Planning	Check Control Panel	Delivery person/ salesman	10 min per day	312 days	52 hours	2,490	0.02	0.309	
	Place orders to customers	Delivery person/ salesman	1 hour per day	312 days	312 hours	2,490	0.125		
	Record orders	Delivery person/ salesman	20 min per day	312 days	104 hours	2,490	0.04		
	Organize the corresponding routes depending on the orders	Delivery person/ salesman	15 min per day	312 days	78 hours	2,490	0.031		
	Load beverages to the car where it will be distributed	Delivery person/ salesman	45 min per day	312 days	234 hours	2,490	0.093		
Count	Count the drinks and send the information to the production manager	Delivery person/ salesman	15 min per day	312 days	78 hours	2,490	0.031	0.071	
	Count the money and deliver it to whomever it corresponds to	Delivery person/ salesman	20 min per day	312 days	104 hours	2,490	0.04		
Distribution	Distribute orders with their respective customers	Delivery person/ salesman	10 min per day	27-35 clients per day	1404-1820 hours	2,490	0.563-0.73	0.563	0.73
Cleaning	Sort and clean delivery material	Delivery person/ salesman	30 min per day	312 days	156 hours	2,490	0.062	0.062	
							Sum	1.005	1.172

Table 4: Information Collection Matrix

4.1.3. Phase III: Workload Evaluation

Valuable information for managers was obtained from the results obtained in the workload study. This activity was generated in all positions within the company to determine where there is a bottleneck and where support is required for the activities to be carried out, to establish support for employees and be able to release load. In this case, taking as an example

the position of salesperson, once the result of the sum is obtained to know the load per procedure, the number of people necessary to carry out a procedure is obtained. The load level was determined by an ordered scale from 0 to 1, which was divided into three parts, the first scale goes from 0 to 0.4 (light load), the second scale from 0.5 to 0.7 (moderate load) and the third scale from 0.8 to 1 or more (excessive load). From the results obtained, it is possible to observe that most of the tasks carried out in the position of delivery salesman/delivery person are light, since they require less than half of the normal annual workload of the worker, with the exception of the delivery that presented a level moderate load, which indicates that he spends more than 50% of his time doing the task, indicating that it is half the normal annual workload. The workloads for each procedure are not greater than 1, which indicates that more than one person is not needed to carry it out. In this case, all the procedures were included in the same job position (delivery person/salesman) and the total sum of all the loads per procedure was made, which resulted in a charge greater than 1 (more than 1 person per year for all procedures).

5. DISCUSSION

In relation to the analysis of personnel workloads, ideas raised by some of the methods such as SWAT, NASA-TLX and WP are taken up to propose the aforementioned methodology, which agrees with what was mentioned by Young et al. (2015) on the need to use a combination of physiological, subjective and performance measures to assess users' mental effort.

During the analysis of the workloads, it was observed that for more intellectual and reasoning activities of the staff, such as designing and organizing delivery routes depending on customer orders, it is like what was proposed by Jafari et al. (2020) that there is an increase in mental demand during non-routine operations.

Regarding the inclusion of activities to manage knowledge, the present study coincides with the ideas of Wiig (2003) that the performance of an organization will depend on the effectiveness of the separate actions carried out by the individual and that problem resolution is favored by the quality and availability of knowledge; in this aspect, the methodology allowed the organization, in addition to the control and balance of staff workloads, thanks to the support of technological tools and systems; it allowed staff to have easy access to the knowledge they required to carry out their activities, as stated by Shin et al. (2017).

Thanks to the fact that the organization included knowledge management activities for the delivery drivers/sellers, a congruence is observed in what was stated by Dalkir (2023) in that the best practices and processes of knowledge management, which to date focus on the organizational level, are also channeled so that people can manage their own personal capital. Finally, thanks to the fact that a balance was maintained in the workloads, even with the new knowledge management activities, it was possible to avoid what was proposed by Herdiana and Sary (2023), of causing a decrease in the work performance of employees if the workload is high.

6. CONCLUSION

The study found that many of the SMEs are unaware of the level of workload that their staff have, hence they do not know how to balance it; in addition, they do not include among their

responsibilities activities aimed at managing their knowledge, which ultimately affects the company and its competitiveness.

The proposed methodology for the analysis of workloads oriented towards knowledge management consisted of three phases. In the first phase, the activities carried out in each job are identified, in which both tacit and explicit activities, the working time and the number of times the activity is repeated, and how many employees carry out the tasks must be identified. The second phase analyzes the workloads by task; first, the hours spent on the task are divided by work time and a matrix is made to collect the data from the previous phase and do analysis. The third phase applies the evaluation of the workloads, in which the level of workload is determined.

The development and implementation of the proposed methodology was validated in an SME in northwestern Mexico, analyzing the position of delivery person/salesman. When obtaining the sums made in the second phase, the levels of workloads in the third phase were determined, in which a scale from 0 to 1 was used that measures the level of load in order from minor to major (low, moderate and excessive). From the results obtained, it was found that most of the tasks in the workplace are of light load, since they require less than half of the annual workload, while in the distribution (delivery), it occupies 50% of the time, indicating which is half the normal annual workload. The workloads per procedure are not greater than 1, which indicated that no more than one employee is needed to carry out any procedure evaluated. In this last phase, it was found that the total sum of all the charges per procedure results in a charge greater than 1 (more than 1 person per year for all procedures), which indicates that it is necessary to have another delivery person/salesman. The foregoing favored the analysis and identification of workloads oriented to activities related to knowledge management, since with this system, processes could be created that help measure certain indicators within the company, integrating them into the daily activities of the worker and assigning them tasks without having to impose a greater burden.

Future works would be the creation of a system in which folders with workload information are included, in the same way that a load balancing can be generated automatically, notifying managers through the technological devices in the company, removing excessive loads. Also, this methodology could be replicated in other companies in the beverage manufacturing and commercialization sector to adjust if necessary and then implement it in organizations of other economic sectors.

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