Agile methodologies and emotional intelligence: An innovative approach to team management

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Abstract

This paper integrates agile methodologies in organisations and relates them to emotional intelligence. Through a programme consisting of ten sessions, the Kanban method is used to develop emotional competencies. The programme is developed, and the competencies that make up emotional intelligence, previously defined in a dictionary of competencies, are measured. Through the programme, the methodology is applied to a total of 300 employees of a leading company in the outsourcing sector in Spain. There is a control group that has not undergone the proposed programme in order to compare the effectiveness of the training with those workers who have undergone it. A questionnaire composed of 32 variables was designed to measure eight emotional competencies that make up emotional intelligence, in order to ascertain the level of success acquired by the employee, before and after the programme. The results obtained show that, after the training, not only have most of the competencies improved, but also the need to promote an improvement in the working environment has been detected, which is one of the limitations found in this study. This opens the door to further research on the specific benefits of the application of agile methodologies and continuous improvement in the dimensions of emotional intelligence.

1 INTRODUCTION

Until recently, the market had not been forced to implement major changes in new ways of working and in the definition of business strategies. To date, the same pattern had been followed as in previous decades. Organisations did not promote changes in their products; only superficial and basic changes were made, where they only sought to increase revenues, reduce costs, create new price catalogues, and where the evolution was predictable. However, the technological disruption generated in recent decades has marked a change (Ritzer, 2015). Customers, both internal and external, have taken over the core of organisations and decision making.

Above all, this new approach has enabled small and medium-sized enterprises (SMEs) to consider competing with large organisations. This disruption has caused customers to constantly change their needs, and companies are forced to change their paradigms and ways of working (Maciaszczyk & Kocot, 2021. People are starting to be put at the centre of organisations, and new methods are being promoted to be implemented in work procedures. Managers, personnel in charge of organisations, and researchers are beginning to pay special attention to soft competences (Caruso & Rees, 2018). Technical knowledge is no longer so important, but rather the ability to react and adapt, tolerance to frustration, and interpersonal

relations, among others, stand out. In other words, emotional intelligence (EQ), a term coined by Daniel Goleman in 1995, is beginning to gain importance. Goleman focused on 5 dimensions: self-awareness, self-management and self-control, empathy, motivation and social skills. Various competencies related to leadership, accurate self-assessment, initiative, catalyst for change, positivism, cooperation, teamwork, etc (Goleman, 1995). Mayer et al. (1999) stated that, in order to develop intelligence, a number of standard criteria must be met. The first of these is that it can be measured, through the application of a questionnaire; secondly, the competencies to be measured must be correlated and meaningful; finally, the competencies that make up intelligence must be able to develop and mature over time. Therefore, the competencies that make up intelligence must be able to develop and mature over time. To address these criteria and to be able to develop some of the competencies that comprise emotional intelligence, new methodologies are adopted, such as the Kanban methodology (Chai, 2008). This leads to a first hypothesis (H1) to be tested: is it possible to develop emotional competencies through agile methodology, and if so, how?

For the agile methodology to work, it must permeate all the hierarchical levels that compose it. It must flow from within each employee. Until the beginning of the 21st century, top management had shown little interest in the personal and interpersonal skills of their employees, nor of their customers who are influenced by the environment in which they find themselves. (Mayer et al., 2008). They had focused mainly on the development of general intelligence, i.e., technical knowledge. Picard et al. (2001), were among the first researchers who began to focus on the ability to recognise emotions as a fundamental aspect of human intelligence. They argued that EQ was ahead of mathematical and verbal intelligence, as defined by Gardner (1983). Moreover, this situation is compounded by the constant advancement of technologies (Nwaiwu, 2018; Nyagadza, 2022). Nwaiwu (2018) argued that organisational transformation, referring to digital technologies and their transformative effects, still had to deepen organisational structures supported by digitalisation and new methodologies. A second question to ask, and the second hypothesis (H2) of this study, is, how can the agile methodology be implemented to develop EQ?

Digitalisation has helped generate interest in working on soft skills and measuring workers' performance, not only with data, but also by competencies (Kongrode et al., 2023; Patton, 2014). The Kanban method eliminates multitasking, as it reduces efficiency by up to 40%. It helps the worker to focus on finishing, prioritising quality and opening up communication and collaboration between all workers. Therefore, it is interesting to study the competences associated with the dimensions of self-management and self-awareness, empathy, motivation and social skills (Goleman, 1995) of workers in their workplace and their opportunity for development and promotion in organisations. Through the incorporation of the Kanban method, the aim is to help workers and work teams better manage their work and achieve a sustainable rhythm. Brackett (2019) and Yao et al. (2022) also deal with emotional intelligence, developing an emotional intelligence learning system oriented to digitalisation and implemented in prestigious companies. It is mainly based on implementing employee training on the principles of EQ and product design. In this study, something similar is pursued, where a training programme is designed and incorporated to develop competencies highlighted by the company on emotional intelligence, and an agile methodology is applied to develop it. Finally, as a third hypothesis (H3), is there a positive effect of providing training to employees?

Therefore, the purpose of this study is to evaluate the emotional competencies that integrate emotional intelligence by applying the Kanban model in a group of employees in the logistics sector, where to date the company under study is characterised by prioritising performance instead of highlighting its employees. As specific objectives, and as a consequence of the main analysis, the aim is to delve deeper into the emotional competences embedded in this

methodology. In order to measure and develop the competences that integrate the definition of emotional intelligence, a training based on the Kanban methodology is intended to be used. Therefore, this study makes three important contributions: (i) it identifies competencies to be developed in organisations based on the analysis of a case study, (ii) it recommends new practices in the agile methodology, and (iii), it identifies future lines of research in Kanban. It has been determined that there is still an existential gap in how companies intend to give importance to soft skills but still lack the tools to implement them in their organisations and achieve their purpose. This contribution might be of interest to directors who define business strategies, middle managers who manage teams, as well as business schools that intend to train future professionals in new team management methodologies that are currently in demand in the market.

The structure of this paper comprises an introduction on the context of the new dynamic and flexible environment, the agile methodology, the principles of Kanban and its definition and the need to deepen the analysis of competencies to develop Emotional Intelligence. In the second section, a review of the literature on the subject is carried out. The third section presents the methodology used, presenting the different sessions and the questionnaire developed. The fourth section discusses the main quantitative and qualitative results obtained in the study. Finally, two sections refer to the discussion and the main conclusions of the study, as well as mentioning the lines of future research.

2 LITERATURE REVIEW

The 20th century was characterised by many changes: social, political, demographic, economic, and especially the digitalisation and development of new technologies (Nwaiwu, 2018). All of them revolve around the development of a new form of behaviour (González-Padilla et al., 2023; Tagscherer & Carbon, 2023). This is why a prior analysis of the literature must first be carried out in order to identify the main characteristics, the new behaviours of individuals and the new tools to meet these challenges.

2.1. Kanban in the New Society

The 21st century has been marked by a fluctuating environment, full of change and rapid business revolution (Zhang & Sharifi, 2000). The evolutionary transformation of the market has reflected changes in all areas, be it financial, economic, environmental, cultural, behavioural, among others. Businesses have been forced to adapt to these changes and renew themselves in order to avoid stagnation. In 2001, the Agile Manifesto was developed, which defined twelve principles to be used when following an agile project management approach (Swanberg, 2018; Beck et al., 2001). But, in recent years, it is being implemented in other areas and institutions, namely organisations dedicated to services in general, without being expressly dedicated to the supply chain, based on the development of multidisciplinary teams. The concept of Kanban was coined by David J. Anderson (CEO of Lean Kanban, Inc.). This tool comes from agile methodologies, emerging in 2010 in California. Kanban is a way of managing the flow of parts in a manufacturing system, where they should be moved or produced when there is a need, but not before (Becker & Szczerbicka, 1998). This type of card-based production control was first implemented at Toyota in Japan (Liker, 2004). Kanban methodology is a method based on work organisation and management using lean management concepts (Kadarova & Demecko, 2016). In large companies, it is a good tool that can be easily adapted because they usually have solid hierarchical structures and strong standardisation, but this does not mean that it cannot be implemented in small companies.

The first trainings that began to be implemented in organisations were in 2015. In Spain, they began in 2017. Agile is a business philosophy that has become tangible in companies that have implemented its practices. In these companies, it is possible to identify several common characteristics: customer orientation, short time-to-markets and a connection with the business ecosystem. All agile companies focus on meeting the needs of their customers. These companies incorporate into their corporate culture the need to always provide value to all their customers, so that continuous improvement prevails at all times. In other words, the shorter the product development time, the more frequently new products can be launched that meet the latest customer need. Kanban is an improved variant of scrum (Schwaber & Sutherland, 2011; Kniberg, 2009). Kanban is a means of limiting work in progress and signalling when capacity is available to start new work. This is known as a "pull" system, and it enables the management and control of complex operational systems by improving system efficiency (Wakode et al., 2015). The Kanban methodology uses boards to visualise invisible work, detect business risks and define workflows. The Kanban method offers much faster, more efficient and predictable delivery to both internal and external customers. It is highly adaptive, allowing quick responses to changes in the market. This study seeks to implement this methodology to foster innovation, as mentioned by Urbancova (2013), where, in a highly competitive environment, the main focus of any organisation is to beat the competition and win new customers. In short, the methodology allows companies to be more competitive and stand out from the rest. As Martín-Navarro et al. (2023) pointed out, it is essential to promote the intention to innovate in a challenging environment.

2.2. Developing soft and agile competencies

Soft skills, that is, competencies that integrate the dimensions of emotional intelligence (Salovey & Mayer, 1990; Goleman, 1995) and that subsequently support this term Mayer et al. (1999, 2008), Picard (2001), Wong and Law (2002), among other authors, highlight the importance of these competencies in the development of people today. Following the study and questionnaire of a set of 62 items by Schutte et al. (1998), they represented the different dimensions of the model. With the creation of their factor analysis of the responses of 346 participants, they suggested the creation of a 33-item scale. Further studies showed that the 33-item measure had good internal consistency and test-retest reliability. Therefore, competencies such as teamwork, leadership, analytical skills, organisation, motivation, communication, stress management and responsibility have been identified for this study. A study conducted by Hofmann et al. (2018) offered a way in which to integrate all team members, even in the manufacturing industry, in which it is common to work with part-time staff who are not familiar with large IT (Intelligent Technology) and hardware projects. They present a model for the different maturity levels that helps to introduce the agile methodology to teams facing this challenge without overloading the rest of the team members.

Since 2015, it is really starting to be seen in organisations as a tool that strengthens the development of project teams, especially in technology and software-based companies (Salameh & Bass, 2018). In 2008, Spotify developed their own experience-based agile methodology model that has later served as a major influencer in many industries (Fleischer, 2021; Salameh et al., 2020). Within the teams, different positions were appointed: squads and agile coach (Salameh & Bass, 2019). Companies from multiple industries have used Spotify's model as a guide, including its implementation, to incorporate it into their organisations. A study by Moe et al. (2009) analysed the challenges of self-management in five projects based on the experiences of three small and medium-sized software product marketing companies that implemented scrum as an agile process. They concluded that, in the process of transforming

from traditional command and control management to self-managing collaborative teams, there was a lack of redundancy and conflict between team members and individual autonomy (Moe et al., 2009).

A first hypothesis to contrast with the literature review is whether knowledge, both theoretical and practical, of the agile methodology favours the development of soft competences that comprise the dimensions of emotional intelligence.

2.3. The importance of training in agile methodology

Piotrowska (2019) highlighted the fact that competence in self-development is the most important facet of competitiveness for employees up to the age of 40, while over 40, the facet of enjoying work predominates. Competence in terms of financial compensation was found to be the least important facet in each age group. However, in general terms, regardless of the age of the employees, they were all highly stimulated to improve their soft skills, without being extrinsically motivated.

This is why training is considered key and essential in the development of work teams. However, the agile methodology has not been integrated as a teaching and implementation model in the performance of tasks and management of work teams until the last decade (Herzog, 2010). Specifically, in Spain, it began to be integrated into organisations in 2017 (Martins & Zacarias, 2017). Manufacturing companies were the first to implement this methodology (Ismail & Sharifi, 2006). Managers and strategic directors, as a solution to a volatile environment, propose to integrate this new model to maintain their competitive advantages (Tsou & Chen, 2022; Raut & Raut, 2014; Chai, 2008). To achieve agility in manufacturing and the delivery of goods, such as customer satisfaction, they apply these best practices to provide new tailored capabilities, and the organisation responds appropriately to changes as they arise (Sharifi & Zhang, 2000, 2001).

Agile methodology is increasingly important in information systems and education, where it is taught for the management of teams of future young professionals (Wu et al., 2023; Sharp & Lang, 2018). In academia, professors have already incorporated project management within their work teams, which is key to success (Harding, 2017). This new methodology will help students better prepare for the workplace (Frame et al., 2015). Saltz and Heckman (2020) studied the usefulness of the Kanban methodology by relating it to the twelve principles of the agile methodology. In their analysis, they found that two of the agile methodology principles, self-organisation of teams and reflection at regular intervals, led to improved communication and effective coordination within the team. To implement agile methodology in the classroom, Lui, Lee and Fung (2019) designed a computer game that supported inquiry-based learning of agile development with Kanban for undergraduate students in software engineering. They observed that students were especially involved and engaged in the learning process, resulting in increased knowledge in the subject of agile development.

Riaz (2019) investigated the impact of incorporating Kanban methodology on organisations and their employees. Specifically, his study was based on a total of 67 companies and 241 employees, who had been working with agile techniques for a reasonable number of years. Although the results were generally positive, there was a lack of specialised training and experience in adapting to the organisational culture in the implementation of Kanban (Riaz, 2019).

A second hypothesis of the paper arises from here. That is, this study is based on identifying, in the sample under study, whether the application of a training programme based on agile

methodology, such as Kanban, facilitates the management of work teams, making them more competitive and with better performance.

Following the literature review, it has been found that, despite the fact that organisations are betting on this new management model, there is still little literature on studies that analyse the development of emotional competencies and that are implemented for their development. Therefore, this study offers both practical and theoretical contributions. It highlights the agile methodology for the development of high-performance teams. From a theoretical point of view, a literature of general interest is offered to society and the scientific community. Thus, this study contributes to further knowledge in the field of people management.

3 RESEARCH OBJECTIVE, METHODOLOGY AND DATA

The methodology used in the research is based on incorporating a programme centred on agile methodologies in a company dedicated to the outsourcing services sector located in Madrid, Spain. This company also has offices throughout Spain, in Bilbao, Valencia, Barcelona, Jaen, Malaga and Seville. There was a total sample of 300 participants. The programme had a duration of 10 theoretical-practical sessions of a total of four hours each session, once a week. It ran from May 2020 to December 2021. The programme was set up in the different branches of the company, taking into account their needs and times for the correct development of the production process.

As inclusion criteria, it was considered that the participants enrolled in the programme should be employees of the company without being required to have a degree or higher education, without restrictions in terms of gender, age, and other socio-demographic variables, as well as hygiene. It was also required that they remained in the company during the study period. On the other hand, as an exclusion criterion, it was established that all those members who were not part of the company during this period could not participate in the programme.

3.1. Aim of the programme
The main idea behind the programme was focusing on managing high performance teams with the objective of improving productivity and efficiency not only in the workplace but also to be able to transfer orders to higher and lower hierarchical levels. This would enable the company to 1), be more effective than competitors, and 2), be able to create an organisational identity that will help the professional future, as well as gain a competitive advantage over competitors and customers. The purpose is to get competitors and customers to listen to the company, the service provider. Other specific objectives are as follows:

- Quality: increasing the production quality level of a system means reducing the number of errors, repairs and rejections.
- Costs: The production process involves many costs, starting with manpower, equipment and raw material costs, which together are necessary to produce a finished product or service.
- Delivery: decreasing lead time is considered a goal that all companies strive to achieve. Lead time is the time that elapses between the time the company buys the raw materials and charges for the finalised services or finished products.
- Reducing the length of the production line: A production line that is too long means not only more employees, but also an increase in "work in progress." Work in progress is understood as the number of simultaneous tasks or jobs that a team is able to perform.
- Reduce inventory: over time, the team would be able to reduce inventory, which is positive because inventory takes up space and adds considerable logistical costs.

- Reduce space: as a general rule, the biggest problem that any company dedicated to the logistics sector encounters is the lack of space.
- Well-being management: at the end of the day, what we are looking for is an improvement in the working environment, which would lead to an increase in productivity.

3.2. Assessment instruments

Prior to the development of the questionnaire, a dictionary of competences to be measured pre and post-training was created. In order to analyse the application of agile methodologies in an organisation and to be able to corroborate the improvement in the different conducts and behaviours, a total of 8 competences were analysed, divided into 4 levels. The variables defined correspond to the following competences: teamwork, leadership, analytical skills, organisation, motivation, communication, stress management and responsibility. An example of a leveled competence is shown below. A questionnaire consisting of 32 variables with 4 possible answers (never=0, occasionally=0.33, regularly=0.66, always=1) was then created. A Likert scale from 1 to 4 is used to avoid intermediate answers that do not facilitate clearer conclusions. For this purpose, the choice of this scale stems from support by Carifio and Perla (2008). They in turn relied on studies by Cohen (1968), Gaito (1980) and Hunter and Schmidt (1990). Depending on the answer given to each variable, a score is assigned. If the question is directly related to the competence, ascending scores are assigned, If inversely related, descending scores are assigned. The aim is to transform the qualitative data into quantitative data in order to be able to further analyse the answers of the surveys before and after the training course, as well as to measure the effect of the training course on each of the competences.

3.3. Programme development

At the beginning of the programme, during the first two sessions, the conceptualisation of agile methodologies and what would be the line of action for the complete programme of these methodologies was studied in depth. A pre-training evaluation questionnaire was given to measure the competencies previously defined. Once they were introduced to agile methodologies, the third session focused on introducing Kanban and lean thinking was held in order to involve them in the new methodology. As mentioned, the Kanban board is the tool to be used to map and visualise the workflow (PULL) and one of the key components of the Kanban method. Originally, a whiteboard (or cork board) was used, which was divided into columns and rows. Each column visualises a phase of the process, and the rows represent different types of specific activities (design, bugs, technical debt, etc.). It is recommended to elaborate a proto-Kanban, being individual boards for a better organization and management of tasks and to start applying it in personal life. This board is corrected in the next sessions to see what they are learning, as the pace of learning is set by each individual. During the fourth and fifth session, these proto-Kanban boards start to take on a different colour, and that is why the first group boards, not individual ones, start to be applied. The way to organise is simple; you look for people who have relatively the same functions and group them. In this way, the most complicated thing is to detect which are the phases of their productive process, that is, their work routine taken to the extreme of analysis, in order to know at all times that these phases take. In the sixth and seventh sessions, the so-called work in progress (WIP) limits begin to be established. WIP limits restrict the maximum amount of work items in the different stages (columns of the Kanban board) of the workflow. Implementing WIP limits helps your team to focus only on the current tasks and thus allows you to finish individual work items faster. During the eighth and ninth sessions, we explain the cadences, the different types of meetings within the lean methodology and how they are carried out, and look for a practical application to be developed once the process is finished. The phases for carrying out these retrospectives

are also explained. In this case, the most useful one to apply is called "lean coffee." This consists of a daily meeting of the managers and participants of the board in order to quickly and, in the time of a coffee, detect what is pending, what is being done incorrectly and what has been finished, with the objective of having constant feedback at all times with the rest of the team. The last session is used to clarify any doubts that have arisen, to evaluate whether there has been an improvement in behaviour through the post-training questionnaire, and to analyse its evolution and impact. Consideration is given to those participants who have participated the most and who have made the greatest effort to ensure that everything goes well. Finally, a series of outdoor activities are prepared for the improvement and integration of the group, such as outdoor training.

4 RESULTS

For the analysis of the data, the pre and post-questionnaires that had been completed at the beginning and end of the training implemented in the organisation were analysed. First, a descriptive statistical and frequency analysis of the questionnaires before the training, after the training, and of the variations in absolute terms (deltas) after the course, is carried out. The aim of this analysis is to understand the structure of the data and to see how it changes after the training, in order to obtain information on the effect it has on each of the competences.

Tab. 1 – Pre-training descriptive statistics. Source: own research.

Variable	Teamwork	Leadership	Analysis	Organisation
Media	0.58	0.49	0.54	0.62
Standard deviation	0.20	0.15	0.23	0.17
Kurtosis	-0.88	0.08	-1.02	-0.07
Asymmetry	0.01	0.22	0.05	0.03

Variable	Motivation	Communication	Stress management	Responsibility
Media	0.65	0.55	0.53	0.58
Standard deviation	0.21	0.28	0.24	0.21
Kurtosis	-0.42	-0.74	-0.53	-0.55
Asymmetry	-0.41	-0.15	0.14	-0.07

The first competence to be analysed is teamwork, which is notable for a low negative kurtosis, meaning that it has a flatter distribution than the Gaussian bell, and the values are more widely distributed around the mean. The low kurtosis is caused by the grouping of the frequencies into two clusters with two different modes that move the values away from the mean value: a majority cluster with a mode close to 0.4 points, and a minority cluster with a high teamwork competence that exceeds the mode of 0.8 points. Secondly, the leadership competence has a relatively low mean of 0.49; the only one below half a point. The standard deviation (0.15) is the lowest, so the values are concentrated around the mean more than with the rest of the attributes. This is also reflected in the positive kurtosis, slightly above the Gaussian bell. The distribution has a positive skewness of 0.22 points, with frequencies concentrated in values smaller than the mode. This implies that most individuals have medium-low levels of leadership, and only a small part of the sample stands out with high levels of leadership. Third,

the analysis ability highlights the high level of kurtosis it has, with different groups having their own modes far from the mean values. The distribution of values in its histogram reflects the existence of at least two groups with different levels of analytical ability, one group mainly contained between 0.2 and 0.5, and another group above 0.6 up to 0.9. The next competence is organisation, taking fairly normal values with skewness and kurtosis close to 0. The only thing to note is the high value of the mean (0.62), which reflects the high level of self-perceived organisational ability of the individuals in the sample. The separation between the values arises from the existence of fewer questions for the organisation attribute, which leaves fewer possible results as mean values for each attribute. Regarding the motivation competency, it has an even higher mean than organisation (0.65), with a negative skewness that concentrates the frequencies in the highest values. This concentration leaves a negative kurtosis, sharpening the Gaussian bell. The communication competence has the highest value of standard deviation, which means that the data deviate more from the mean. It has a negative kurtosis, which distributes the data flatter than the Gaussian bell with some negative skewness, which skews the frequencies to higher values. This implies that individuals have a high self-perception of communicative ability with a mean of 0.55. The competence of stress management has similar values to communication in terms of mean, kurtosis and standard deviation, but in this case the skewness is positive. Therefore, it is also a slightly flatter distribution than the normal one, but with a higher concentration in the lower values. Finally, the competence of responsibility is characterised by a negative kurtosis with central values close to the mean, giving it a fairly flat shape. This is to say, most of the sample takes mean values between 0.4 and 0.8, and only a small part departs from this range.

In the following, the descriptive statistics and variations after the training courses will be analysed:

$$Values_{delta} = Values_{previos} - Values_{post}$$

Tab. 2 – Post-training descriptive statistics. Source: own research

Variable	Teamwork	Leadership	Analysis	Organisation
Media	0.61	0.51	0.56	0.65
Standard deviation	0.19	0.15	0.23	0.17
Kurtosis	-0.83	0.11	-1.03	-0.12
Asymmetry	-0.06	0.41	0.04	-0.42

Variable	Motivation	Communication	Stress management	Responsibility
Media	0.71	0.58	0.61	0.61
Standard deviation	0.20	0.28	0.23	0.21
Kurtosis	0.20	-0.66	-0.59	-0.52
Asymmetry	-0.62	-0.27	-0.07	-0.13

Tab. 3 – Descriptive statistics of the variation in attributes. Source: own research.

Variable	Teamwork	Leadership	Analysis	Organisation
Media	0.032	0.014	0.022	0.023
Standard deviation	0.042	0.027	0.039	0.043
Kurtosis	0.930	3.00	3.01	1.81
Asymmetry	0.01	0.22	0.05	0.03

Variable	Motivation	Communication	Stress management	Responsibility
Media	0.064	0.032	0.078	0.027
Standard deviation	0.082	0.071	0.109	0.052
Kurtosis	0.64	3.66	-0.19	2.03
Asymmetry	-1.11	-2.10	1.06	1.71

As demonstrated in Tables 4 and 5, the teamwork competence improves by 0.032 points on average, with a high kurtosis (0.93 points) but not as high as other values. There is an improvement in teamwork in about 50% of the sample, but some individuals improve significantly more than others. The kurtosis value has slightly decreased from before to after the training course. In addition, there is less left skewness. This is due to the fact that individuals with lower teamwork skills improve their values more, which results in a slight convergence of the two groups that were formed. In the competency of leadership, the competency that improves the least on average with only 0.14 points, this could be related to the fact that leadership can be considered the most innate competency of those analysed. Furthermore, there is an increase in the kurtosis and asymmetry of leadership. This means that leadership improves in those individuals who already had it more developed, as opposed to teamwork. The analytical ability presents one of the lowest values of average improvement (0.022 points).

The case is similar to that of leadership. The level of asymmetry increases. Individuals who already had good analytical skills improve, while individuals who did not have such a developed analytical skills stagnate. This can be explained by the fact that the self-perception of individuals with good analytical skills improves, as self-esteem improves, while individuals who are aware that they are less developed in this aspect do not improve it. In the competence of organisation, there is an improvement of 0.023 points, which is relatively low compared to other attributes. The asymmetry values go down, which means that there is a tendency towards a more homogeneous group, with the improvement of those individuals with a lower self-perception of organisational ability. Motivation competence is one of the parameters that improves the most, on average 0.064 points. All values tend to improve, but the greatest improvement occurs in values that were already average or high, which causes this increase in kurtosis and a more negative asymmetry. Regarding communication, it improves on average 0.032 points, as does teamwork. In general, they have a similar structure in their distribution before and after the test. There is also an unequal improvement between individuals, but with a greater improvement of individuals with lower values, so that there tends to be a less asymmetrical distribution after the training.

The similarity between communication and teamwork seems to be related to a correlation of the variables. This will be tested later to see if this is true. Stress management competence is the variable with the highest improvement of its mean, with 0.078. The asymmetry decreases, which means that individuals with a lower self-perception of stress control improve more than those who already had a more developed self-perception of stress control. Finally, the responsibility competence improves 0.027 points on average, with no major changes in kurtosis, skewness or standard deviation.

In addition, a principal component analysis (PCA) is performed in order to reduce the dimensions of the data by generating a smaller number of variables with linear combinations of the variables to be reduced. In this case the objective is to reduce the components to two, so that the variables can be analysed graphically in two dimensions.
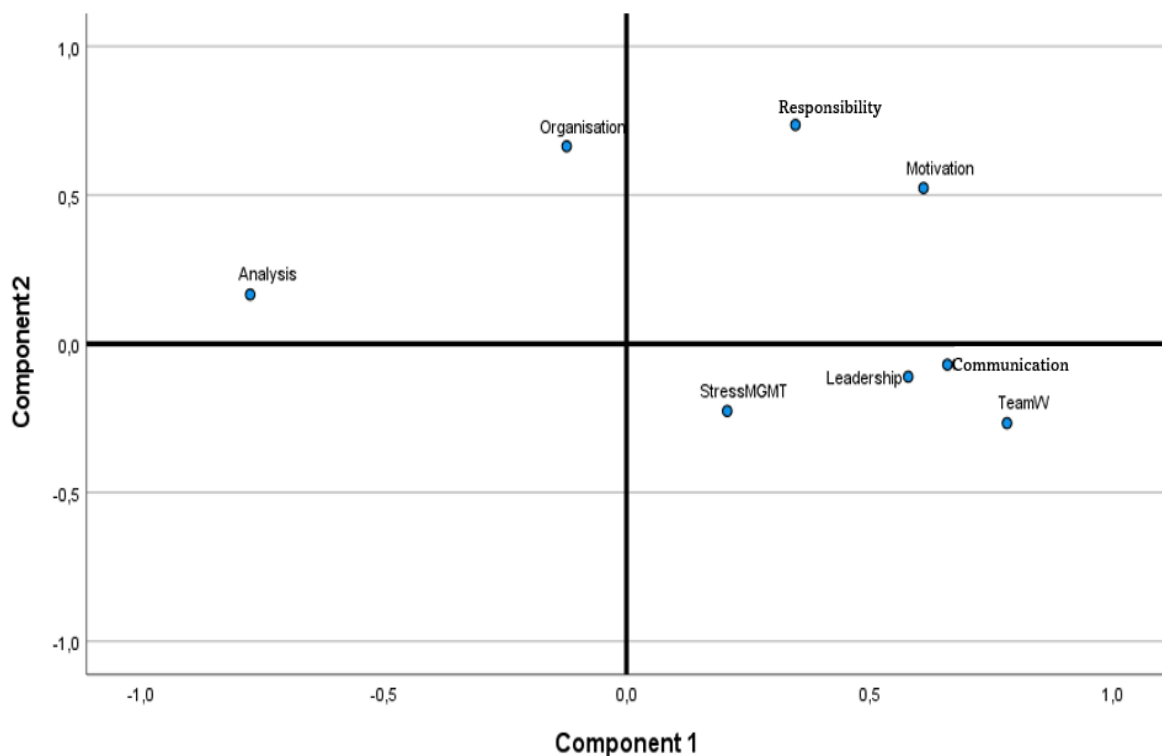

Fig. 1 – Principal Component Chart. Source: own research

Figure 1 shows component 1, based on communication, teamwork and leadership mainly, with an important weight of motivation and responsibility as well. This component is the opposite of analytical skills. This first component will henceforth be called the social component, as it is based on interpersonal skills such as communication, teamwork and leadership. Component 2 is mainly based on organisation, together with responsibility, motivation and analytical skills. We will call this component the analytical component, as it is related to the more organisational and analytical part of the attributes.

To support this classification, the component matrix is also used, which assigns the coordinates of the graph that linearly compose the components from the variables. The correlation matrix, which shows the correlation between variables and other variables, independent of the components, is also used. Furthermore, with this matrix, it is possible to deduce some of the correlations that have escaped with the PCA by limiting it to two components.

Tab.4 – Correlation matrix. Source: own research

	TeamW	Leader-ship	Analy-sis	Organi-sation	Motiva-tion	Commu-nication	Stress-MGMT	Responsibility
TeamW	1,000	,340	-,571	-,205	,310	,473	,083	,062
Leadership	,340	1,000	-,289	-,031	,224	,271	,242	,093
Analysis	-,571	-,289	1,000	,197	-,354	-,415	-,064	-,139
Organisation	-,205	-,031	,197	1,000	,107	,039	-,045	,172
Motivation	,310	,224	-,354	,107	1,000	,201	,056	,467
Communication	,473	,271	-,415	,039	,201	1,000	,060	,105
StressMGMT	,083	,242	-,064	-,045	,056	,060	1,000	-,043
Responsibility	,062	,093	-,139	,172	,467	,105	-,043	1,000

The correlation matrix shows a relationship between analysis and organisation, while analysis is inversely related to the rest of the variables. However, organisation is also directly related to responsibility and motivation. This relationship fits with the idea of two profiles, one analytical and the other more social. Teamwork is related to leadership, motivation and above all communication. Thus, these form the group of the profile with the most developed social skills. Leadership is characterised by having one of the least negative relationships with the analytical part, so it follows that profiles with leadership, in addition to social skills, must have a certain development of analytical skills, especially organisation and responsibility. Finally, the variables are classified by clusters. The aim of this classification is to group the variables according to their similarity, so that individuals can then be classified according to how they fit these characteristics, and conclusions can be drawn from the sample data. First, a hierarchical clustering method will be used, which groups variables one by one according to their similarity, joining them into groups until they form a single cluster. The similarity between the variables is measured with Euclidean distance, which allows smoothing the weights of the values furthest from the centre, in order to avoid deviations of extreme values and to obtain clusters despite having values that deviate from the mean.
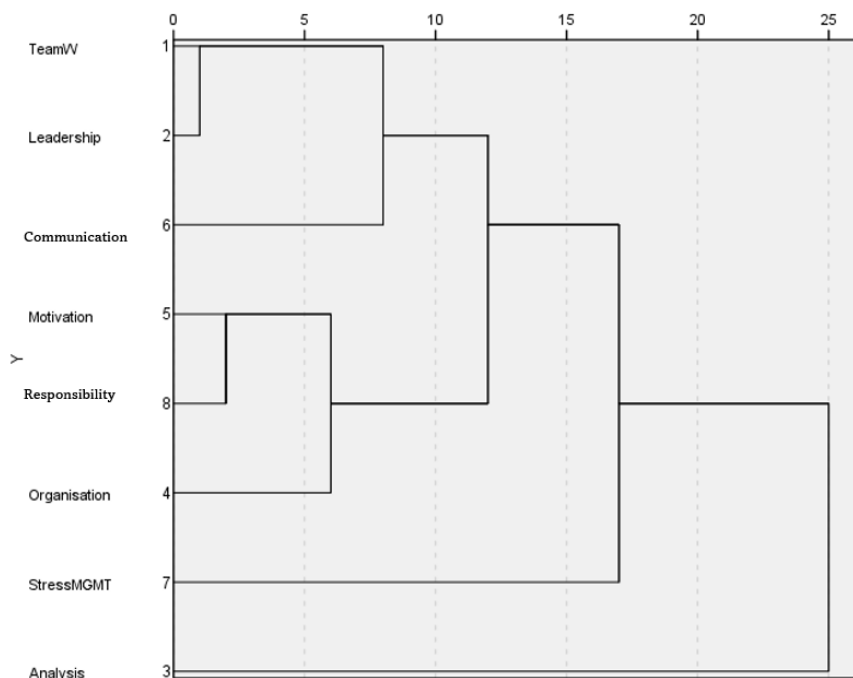

Fig. 2 – Cluster Dendogram of the variables. Source: own research

The dendogram (Figure 2) shows how the variables are grouped according to the number of groups to be formed from left to right. If we form four groups, we find a group for leadership, teamwork and communication; another for organisation, motivation and responsibility; one for stress management; and a final group for leadership.

Secondly, a classification is performed with a two-stage cluster, also using the squared Euclidean distance. This cluster is used to assign a group to each of the individuals and then plot them against each of the components to see how the individuals in each cluster are distributed according to their weight of the principal components. The quality of the cluster is not bad, and since it deals with subjective data such as self-awareness, which tend to have a less clear structure, the cluster is good enough for the analysis.
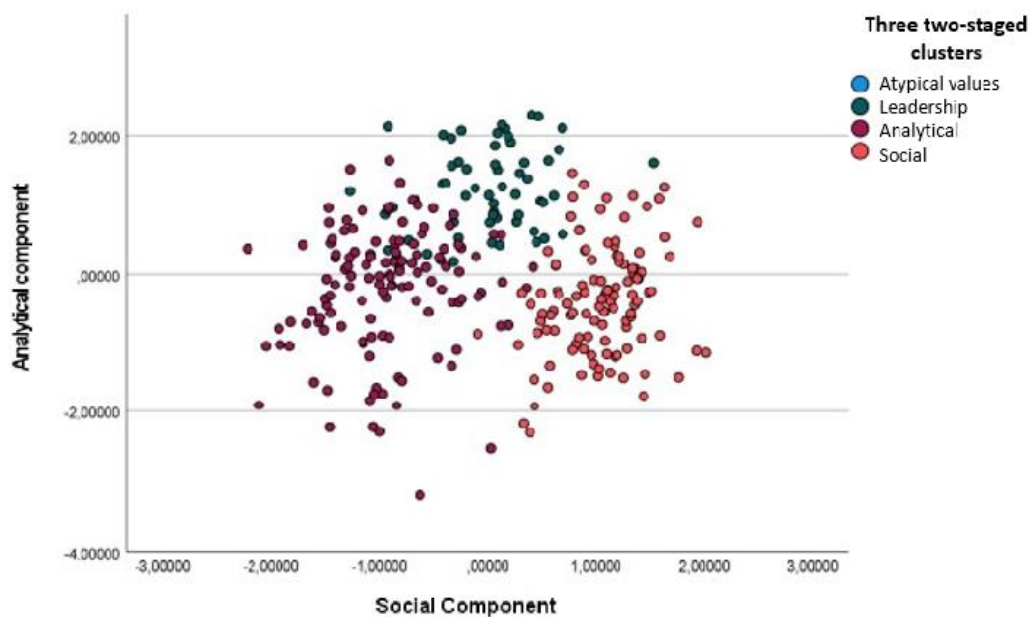

Fig. 3 –Two-stage cluster plot according to PCA analysis 1. Source: own research

In the first classification, four groups are observed: the 3 cluster groups and one outlier cluster discarded in order to make the model. The clusters are named analytic, social and leader according to the weight of each component. The analytical cluster captures profiles with more weight on the analytical component, and less weight on the social component. However, some high analytical values with low levels of the social component are classified as leaders. These profiles are probably not leaders if they do not have sufficient levels of the social component. The social cluster is concentrated in the right part of the table, with higher levels of the component formed by the social skills variables. This cluster collects individuals with high values in the social component who also have high values of the analytical component, who could probably also fit into the leader cluster according to the given definition of leadership.

To try to improve the model, the classification is now done with a fourth cluster, in order to better capture the social and analytical components, and to avoid the possibility that the analytical cluster captures the lowest values that should not correspond to either of the two clusters. Introducing a fourth cluster lowers the quality of the model somewhat, but it is still acceptable for analysis.
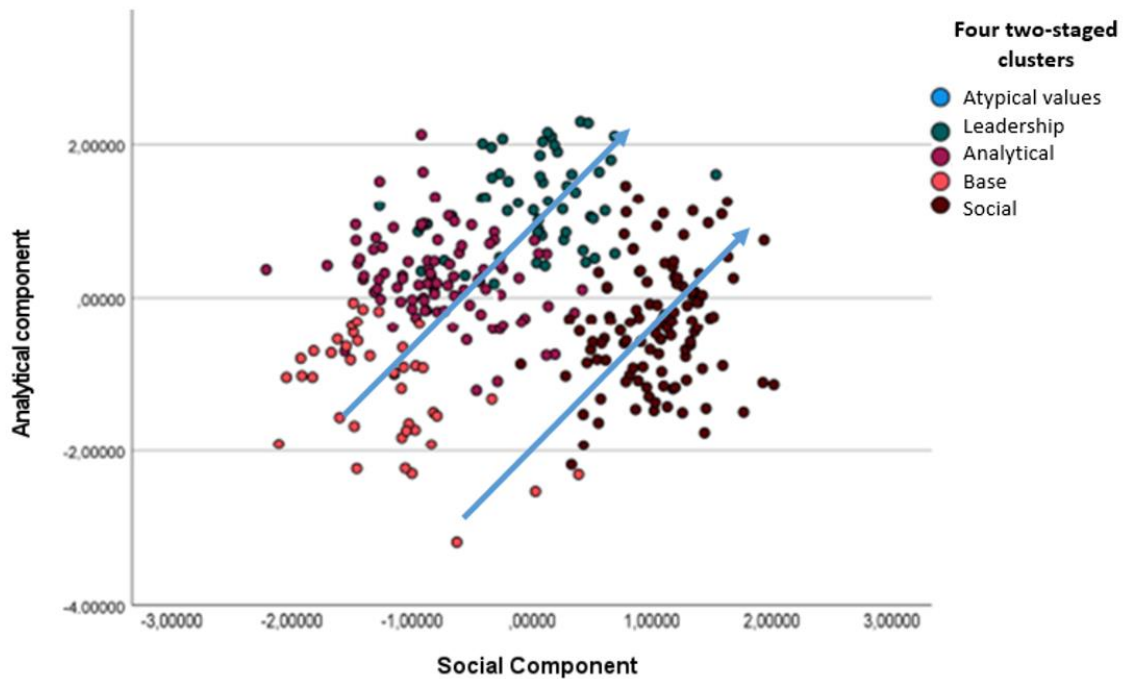
Fig. 4 – Two-stage cluster plot according to PCA analysis 2. Source: own research

With a fourth cluster, a fourth group appears, with more basic values for both the analytical component and the social component. This solves the problem of low values in the analytical component. In the graph, two different clear profiles can be observed around the two trends indicated by the blue arrows. This verifies the existence of the analytical or organisational profile and the social profile.

5 DISCUSSION AND CONCLUSIONS

5.1. Comparison of results and conclusions

This study focused on implementing agile methodologies, through a programme based on the Kanban method, to develop some emotional competencies that integrate emotional intelligence. The idea is to seek to improve the development of work teams, in order to be more productive and successfully meet the needs of customers. The design of the programme, as well as its validation, followed the research conducted by Balve et al. (2017) who demonstrated that problem-based learning, applying Kanban, favoured the development of emotional competences such as communication, teamwork, and knowledge of work progress involving better organisation and leadership.

Therefore, through this study, it has been possible to implement a training programme based on agile methodology, obtaining significant and positive results. After having carried out the analysis of the variables, it can be observed that the application of training based on agile methodologies not only serves to provide theoretical knowledge and a more effective way of working with these methodologies, but it has also been proven that they have an extension with competitive advantages far beyond those considered outside of learning, as stated by Lei et al. (2017), Rocha et al. (2018) and Amorim et al. (2021). This is in response to the study conducted by Riaz (2019), who stated that the incorporation of agile methodology in work teams was

positive and motivating for employees, but required previous training in organisational culture. This study serves as a complement and a continuation of that study.

As demonstrated by the analysis of the data, in most of the cases that have been taken into account with attention paid to training in agile methodologies, there has been an increase in all the competencies measured. It can also be seen that the dimensions of EQ can be improved by applying training courses, which do not have to be directly related to leadership or motivation, in short, to the explicit development of soft skills. It is therefore interesting to note the effectiveness of such a programme. Edbring et al. (2016) found that EQ was significantly correlated with the development of competencies such as stress management, motivation, mutual trust and communication competence.

During the training courses, it has been detected that those people who paid little attention or were not interested, are those who have not improved in the dimensions of emotional intelligence. On the other hand, those who were interested in what they were learning and were able to take advantage of the training, have improved considerably in the analysis variables. In particular, self-motivation, being a dimension noted by Goleman (1995), benefits employees who meet the aforementioned characteristics. In other words, they have had to face situations that have taken them out of their comfort zone, their way of working, and the procedures they have been following for a long time in carrying out their work. They have been able to introduce training in agile methodologies, generating an increase in their teamwork, leadership and communication skills. What began as a study to observe whether agile methodologies are related to the dimensions of emotional intelligence, has also allowed us to demonstrate that there is a direct relationship between the two, as in most cases there have been positive and significant changes. This finding verifies the conclusions of Luong et al. (2021).

5.2. Contributions and theoretical implications

The first contribution of this study is related to offering a programme based on agile methodology that can be useful for middle management or a company's management to integrate it into their training and talent retention strategy. On the other hand, it is useful for companies, helping in work restructuring and team management. It is also an opportunity for workers to adapt to this new methodology, as currently in many organisations, it is already implemented with the acquisition of basic knowledge in agile methodologies, but this study highlights that these courses help to improve individuals personally and emotionally. Finally, it offers support to the existing literature on the effects of agile methodology, and its relationship with EQ.

5.3. Limitations and future research

The limitations encountered during the research were mainly related to the motivation of the participants to continue the training on a voluntary basis, as well as their openness to change and active participation. Due to the facts that some delegations had a negative working climate, staff were frustrated, and there was a high number of job rotations, it was difficult to train the staff as initially planned. Another constraint was that some middle managers did not believe or did not see the need for training. Time was spent explaining to them that the lean manufacturing-based programme was based on Kanban boards, and that they would probably be the first to benefit from it in order to manage their employees and increase productivity ratios. After the first sessions, they detected that the programme could meet their needs, and they were more optimistic about the implementation in the following delegations and in the departments that work together.

For this reason, it was essential to have the commitment and trust of the management so that the rest of the employees would understand that the techniques used in the training made sense and were in line with the strategic direction of the organisation. The importance of continuous feedback was also emphasised, where improvements and mistakes were corrected immediately.

As future lines of research, and learning from the limitations that originated, within the implementation of agile methodology programmes, greater emphasis should be placed on teamwork, improving the working environment. The outdoor training tool could be incorporated to strengthen teams, clean up the toxic climate and achieve team commitment to make this type of programme much more effective. This opens the door to further research to be able to relate the concrete benefits of the application of agile methodologies and continuous improvement in the dimensions of emotional intelligence.

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