

BPM-SCRUM Integrated Model with Digital Marketing to Increase Patient Recruitment Rate in Mental Health Services

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Abstract—In a pre-pandemic scenario, 350 million people in the world suffer from depression, 60% of whom do not receive treatment. In Peru, every 22 minutes someone tries to take his or her own life. In the world, 800 000 people do so, mainly due to depression. Of the people who suffer from this disease, 75% do not do anything about it. This is due to the barrier of misinformation about mental health, its importance and the services available. In spite of this, in the case of the people who do get treatment, many of them end up abandoning it because it does not meet the special expectations of each patient. Therefore, a redesign of the patient attraction process has been proposed using BPM and Scrum Methodology. This proposal will also apply Digital Marketing to launch a web platform that automates the entire patient recruitment process. The current patient acquisition rate is 50% of the industry standard and the rate of digital tools usage is 60%. After the implementation of the proposed model, these rates increased to 76% and 100%, respectively.

Index Terms—BPM, digital marketing, mental health service, SCRUM

I. INTRODUCTION

In Peru, 50% of its residents say that their mental health has deteriorated since the start of the pandemic, placing the country in 9th place out of 30 countries surveyed on changes in their mental health [1]. This research highlights the importance of redesigning, through BPM and Scrum Methodology, the process of attracting patients in need of professional psychotherapeutic care. This affects the attention and investment needed in the mental health sector, within the health sector, since Peru has the lowest share of health spending on GDP compared to other Latin American countries, despite having increased the budget allocated to the health sector by 63.4% in the last 5 years [2]. The increase in the demand for mental health care due to the Covid-19 health crisis has expanded to the corporate level, as 76% of companies currently indicate that they need help in managing the mental health of their employees.

Only 65% of the companies that have already initiated mental health measures for their workers have resorted to the implementation of virtual chats on anxiety and stress management [3]. However, in reality all of the above-mentioned is the result of the limited access of people and/or companies to a mental health service according to their expectations, in addition to the barrier of lack of knowledge and poor information on the supply of mental

health services [4]. Adding the deficient process of psychotherapeutic attention on the part of the psychologists and/or psychiatrists at the time of attracting, attending and conserving their patients, has made this investigation to be carried out, because the redesign of the process of attraction and conservation of patients will not only benefit the professionals of mental health, but also the population affected with diseases of this category.

In practice, this problem has been evidenced in Brazil, where due to the political, economic, social and uncertainty circumstances, which are the main determinants to generate internal problems in individuals [5], has placed this country as the highest rate of anxiety and depression in Latin America, ranking number four of one of the most depressive countries in the world [6]. A similar case is identified in Mexico, which is the country with the highest occupational stress in the world according to the WHO [7]. A study conducted by the IMSS indicated that 75% of Mexican workers have stress due to workload. Despite the latent need for therapies, there is no improvement so far, because there has not been an effective market analysis, nor has it been possible to develop a digital tool to automate the process of scheduling a psychological session according to the patient's requirements.

Due to the aforementioned circumstances, Peruvian psychologists must be more effective at the time of entering the market in order to practice their profession in an optimal way. To achieve this, 12 psychologists specialized in different currents have been chosen to reflect the sector's problems regarding the poor management of patient attraction. Some of the main and most recurrent problems that cause this situation were identified; the most used method at the moment to obtain patients is by recommendation (mouth to mouth), the lack of connection between patient and therapist, due to the little previous information known of the person who offers this service and the service itself. All of the above-mentioned results in not having a more standardized flow of patients and that the patients that have already been attracted don't stay; this has caused losses that represent 23% of the net profit. Therefore, the proposal of this research is to apply an integrated model of BPM-Scrum and Digital Marketing to increase the rate of patients in the mental health sector. This model integrated by the three mentioned tools and methodologies has not been developed so far in the sector of study; for this reason, the need to conduct the research is created; however, digital transformation tools have been used, in previous studies, to automate the process of scheduling a psychological session in a faster and more convenient way by the patient. It should be noticed that, with the suggested models and working them in synergy, we want to achieve the optimization of the process mentioned, a systematic, structured, iterative and incremental

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approach to analyze, improve, control risks, anticipate uncertainty [8] and manage the processes in order to improve the quality of service to a given customer [9]. Also, in a recent study it is mentioned that the Scrum methodology allowed the authors to carry out their project in a more orderly and efficient way [10], for this reason they recommend the implementation of this model which helped them to increase sales and improve their business management.

II. STATE OF THE ART

A. Business Process Management

This methodology allows designing, modeling and managing process flows with the objective of easily identifying and analyzing the existing problems in it and propose improvements and a redesign that fits the particular operation of each company [11, 12]. In a case study, BPM was used to map the patient care process and identify weaknesses in it, with the goal of improving inefficiencies and automating the process. The most common inefficiencies in the healthcare sector, shared by these studies, are patient waiting time, workload, and clutter in the workflow of professionals [13], [14]. The implementation of BPM can achieve formalizing the steps of providing their services [14], monitoring patient information properly, improving the quality of patient care and increasing employee performance [13].

B. SCRUM Methodology

The use of the SCRUM methodology as a framework aims to increase the probability of success of the projects carried out, since doing it without using an agile methodology in its development involves a higher risk of failure [15, 16]. In this sense, as it has been proven in a case study, this methodology is characterized by allowing the organization and optimal performance of work teams by performing smaller tasks that facilitate and accelerate the execution of the project in general [17]. It is for these reasons that a case study decided to implement the SCRUM methodology during the development of its project to create a web system for the management and control of anemia patients' information. The development of this project was organized in 4 stages: 1. Sprint Planning, which consists of 4 sprints where the selection and migration of the necessary data to the system will be performed; 2. Development, where digital tools and modules will be used for the creation of the web system; 3. Sprint Review, where the efficiency and operation of the web system will be evaluated through user testing; finally, 4. Sprint Retrospective, where the problems encountered are prioritized and the development of the respective solutions are planned [18]. Likewise, several case studies prove that the application of this methodology allows the control and monitoring of all phases of a project; in addition, it facilitates planning with the work teams and optimizes the use of resources. It is also mentioned that it guarantees compliance with the agreed delivery deadline and quality conditions.

C. Digital Marketing

The personalization of a product or service for a specific audience is necessary for the organization to become more recognized and create a strong and sustainable connection between the customer and the brand. On the other hand, research on mental health services states that digital marketing of this type of online service is making its greatest effort to boost its development; however, the application of these services still lags far behind the availability of existing new technologies for virtual health treatments [19]. A research examined the service utilization of two Digital Mental Health Services and the current indices provide an estimate of engagement, but website visits and registrations cannot represent the complexity of users' experiences with DMHS [20]. It is mentioned that further studies need to explore the quality and effectiveness of user engagement with DMHS, collect detailed information regarding registrants' personal circumstances (e.g., health, unemployment, gender.) and ethnicity and socio-economic status which precludes conclusions about specific populations [20]. Such information where not taken into account in the mentioned case study. Therefore, the relationship between those factors and consumers' uptake and access to digital tools could not be estimated [20]. In that sense, digital transformation constitutes an evolutionary process, changing our lifestyles and ways of doing business through digital technologies; mainly by implementing new technological solutions based on Internet services and modern information technologies [21].

III. CONTRIBUTION

A. Model Basis

Nowadays, due to the "contactless" era, businesses have found the need to digitally transform themselves. Therefore, developing an application and/or web that automates some needs, reduces unnecessary time (leaving home, time in line, search time, etc.), projects effectiveness and it's less expensive for the customer, which generates a great differential value in relation to national and international competition. In this sense, the search for various models, tools and methodologies has been carried out in order to replace the conventional manner, taking into account the most relevant customer needs. In this way, we found in the literature the Scrum methodology which is the most successful to solve the identified problem, and with the integration of BPM and Digital Marketing will achieve a faster and more effective strategy to the customer's need.

B. Proposed Model

The proposed model is developed based on the following tools: Agile Scrum Methodology, BPM and Digital Marketing. All the previously mentioned techniques will work in synergy, but with a majority focus from the perspective of the Scrum methodology, in order to meet customer expectations, through a high effectiveness in the development and quality of service. The design of the Proposed Model can be seen in Fig. 1.

C. Model Components

1) Component 1: Diagnosis of the current situation

The purpose of this phase is to analyze the existing technical gap and its causes. Here we compare the average number of patients per month in the selected sample with the average number of patients in the standard sector, in order to define the target outreach rate for this case study and the methodology to be used in the proposal. Once the technical gap is determined, the Process Management, BPM, is carried out. The purpose of this is to analyze, in detail, the current process flow. In this, errors are detected and redundant activities that do not add value to the process are eliminated and improvements are proposed.

2) Component 2: Proposal planning

The first activity to be carried out is the design of the new model using the BPMN.

Then continues with the application of the SCRUM methodology, specifically with the first stage of this, the Sprint Planning, which defines the number of Sprints to be performed, the activities to be carried out in each one of them, the time that each Sprint should last and the objectives to be achieved at the end of each one. This organization of the work process is carried out with the objective of achieving the development of the project efficiently in terms of time, activities and quality.

3) Component 3: Proposal development

In this stage, the proposed model is put into practice, which implies the execution of the new processes designed in the flowchart, up to the application of the second tool selected, Digital Marketing. The objective of this tool is to generate positive impressions in the client regarding to the service to be provided, using resources that are adapted to the characteristics and interests of the market in question. Taking this into account, the commercial strategy is designed to capture the customer's attention.

4) Component 4: Proposal implementation

In this last component, the new patient recruitment process is applied, starting with the launching of the advertising designed for the public. Subsequently, we continue with the next steps of the process, which involves providing the psychotherapy service. Table I shows the relation between the State of the Art and the proposed Components.

TABLE I: COMPARISON MATRIX OF THE PROPOSAL COMPONENTS VS THE STATE OF THE ART

Authors	Components			
	Diagnostic	Planning	Development	Implementation
Alexi Delgado & Jes ús Torrej án Burgos (2020)		Scrum	Scrum	
Ferreira, G. S. A., Silva, U. R., Costa, A. L., & P ádua, S. I. D. de D. (2020)	BPM	BPM		
Firth J, Torous J, Carney R, Newby J, Cosco T, Christensen H, Sarris J (2020)				Digital Marketing
Proposal	BPM	BPM & Scrum	Scrum	Digital Marketing

5) Indicators

For this research, the following indicators will be used to evaluate progress and verify the improvements obtained.

- NPS: Allows to calculate the effectiveness of the service in relation to customer satisfaction.

$$NPS = \frac{(Qp * Promoters - Qd * Detractors)}{100}$$

The traffic light scorecard shows that a percentage under 60% is a critical value. A value between 61%-89% is an acceptable level. An efficient value is those over 90%.

- Customer recruitment: Allows to calculate the effectiveness of the service in relation to new patient intake.

$$CR = \frac{\#Actual appointments per week}{\#Target appointments per week}$$

The traffic light scorecard shows that a percentage under 50% is a critical value. A value between 51%-89% is an acceptable level. An efficient value is those over 90%.

- Digital tools usage (% Improvement): Allows to calculate the increase in the use of digital tools by psychologists for the patient recruitment process.

$$I = \frac{\#Psychol. using DT now - \# Psychol. using DT before}{\#Total Psychol.}$$

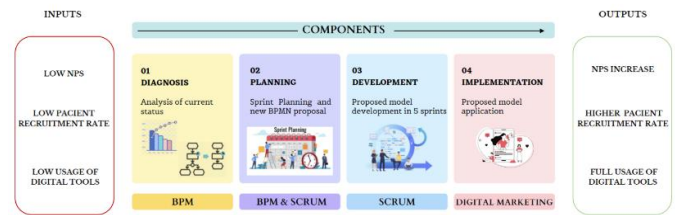


Fig. 1. Proposed model design.

The traffic light scorecard shows that a percentage under 60% is a critical value. A value between 61%-89% is an acceptable value. An efficient value is those over 90%.

IV. VALIDATION

The pilot study was developed applying the SCRUM, BPM and Digital Marketing methodologies, in order to define a structure that goes according to the solution of the problems and reprocesses found thanks to the data collected from two surveys conducted on a sample of 18 psychologists, where the client recruitment rate represented 50% and is expected to reach 94%. Therefore, a web page was developed, which contains information about psychological approaches, profiles of each psychologist, a step-by-step process to achieve the match between patient-psychologist applying an initial survey to learn about the patient's condition and preferences.

A. Initial Diagnosis

The initial results collected from the 2 surveys showed that the rate of client recruitment was 50% of the standard sector rate and had a negative impact on the economy of each psychologist, with an annual loss of S/. 72,000. All this was

due to the following facts: (1) patients were always in the dilemma of not knowing where to look for a specialist and if they found one they could not determine that this specialist was going to connect with them and/or fit with the approach the patient needed, evidenced by the NPS initially obtained of 39%; (2) the conventional method of recruiting clients nor find psychologists was not effective and (3) that the specialists did not carry out an adequate marketing strategy nor did they make good use of social networks, reaching 40% of non-use and little knowledge of digital tools.

B. Validation Design and Comparison with the Initial Diagnosis

In order to validate the objective of this case study, a pilot plan was developed over a period of 03 months and tested. The SCRUM methodology was applied to achieve each sprint, always considering customer satisfaction and the problem to be solved. The BPM methodology was implemented to identify and analyze the root causes. In this way, it was possible to redesign, model and manage the flow of the entire service. Also, to implement all of the above, it was decided to develop a web page, that satisfies everything the client needs and that were not fast and effective to found with the traditional method.

Therefore, the website contains the following points: psychological approaches, profiles of the specialists which also include a video presentation to offer greater proximity, conditions of use and the survey which is linked to a server with the database to then make use of the macros in Excel. The macro has 08 indispensable questions of the form which are based on the knowledge and experience of each psychologist and also on the preferences and needs of each patient (gender of the specialist, schedule, psychological school, etc.) so that each answer can be transformed into a binary number and the effectiveness of the match can be measured. The digital tool developed has generated a positive impact for both patients and psychologists, since during the first month and a half of implementation, a flow of 100 paid sessions was reached, and so far in the second month, 176 sessions and 57 clients have been reached. On the other hand, according to advertising statistics, potential customers have generated more interaction through advertising on Instagram. This is due to the fact that a large percentage of our customers (69.23%) are young adults and it is precisely them who use the social network most. Likewise, we plan to use other types of videos and images for advertising on Facebook to reach a more adult audience. According to the analysis of the tool, it has been found that in order to provide a more meaningful match, personality questions should be added. Table II shows the results of the general indicators.

TABLE II: GENERAL INDICATORS RESULT

Indicator	Current	Expectation
Patient-psychologist connection (NPS)	39%	94%
Customer recruitment rate	50%	94%
Index of digital tools usage	60%	100%

C. Improvement-Proposal Pilot

In order to measure the retention of each client, the first

step is to find the average length of stay for each patient during their entire treatment. Secondly, by means of a satisfaction survey it will be possible to calculate the NPS and also the effectiveness of the service. Thirdly, thanks to the tool that connects you with an ideal psychologist, the time to find a specialist for the client was reduced to 13 minutes. Finally, by including the profiles and presentation videos of each psychologist, it can be determined that the use of digital tools is 100%. The final results are shown in the following Table III.

TABLE III: CURRENT SITUATION VS PILOT IMPROVED SITUATION

Indicator	Initial	Improvement
Patient-psychologist connection (NPS)	39%	82%
Customer recruitment rate	50%	76%
Index of digital tools usage	60%	100%

By looking to the indicators found to date, it can be determined that the effectiveness, which goes hand in hand with customer satisfaction, increased by 43%, the customer recruitment rate has increased by 26%, and the use of digital tools reached the expected 100%.

However, as in any new implementation, defects were found in the flow. The first one was identified when the client goes to receive their next sessions, since in order to make the payment and schedule their next session they must go through the "Calendly" link again and send the proof of payment to our "WhatsApp" chat; therefore, this generates mistrust, since the client could schedule directly with the psychologist and pay them directly. On the other hand, the last root cause found was the total client retention. To achieve this, it is necessary that the client does not get bored of the same cycle of service and finds in us an innovative, but necessary, model. So, what is proposed to solve all the above mentioned is to include to the website a frequent payment and offer more benefits to customers such as unlimited messaging in cases of crisis, mindfulness workshops, meditation audios, free monthly workshops on emotion control and yoga sessions, so that in this way, the customer sees that we are necessary and does not look for an alternative to our service.

Lastly, in order to give more added value to the specialist, it is proposed to implement a Log in on the web for the psychologist, where they will be able to find their scores, the number of patients they have, their clinical histories, step by step of what things are missing in their profile, etc. Likewise, in order to keep them in constant learning, it is proposed to include free courses based on what each psychologist is looking to specialize in. These benefits will be added by the end of 2022.

V. CONCLUSIONS

The SCRUM methodology allowed implement the proposed model in 3 months.

The application of BPM made it possible to redesign the process flow in order to automate it and reduced the time to find a psychologist from a long investigation period to 13 minutes and increase the customer acquisition indicator by 43%.

Thanks to the Digital Marketing tools, 100% of the psychologists are in networks generating greater exposure of their experience and professional knowledge.

It is recommended to continue using this model for a longer period in order to obtain more representative indicators.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Quiroz-Flores, Collao-Diaz and Flores-Perez provided the conceptual and theoretical parameters for the research and writing. Yuijan-Flores proposed the subject of study and the new model. Fhon-Palacios and Yuijan-Flores conducted the research and analyzed the data. Fhon-Palacios did the proposed model design, BPMNs and wrote the article. Yuijan-Flores calculated the indicators and launch the pilot. All authors had approved the final version.

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