RIT Evolution - Career Management Platform

Versão final após defesa

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Relatório do projeto de estágio
Engenharia Informática
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Resumo

Com a constante evolução do mundo empresarial, é necessária também uma adaptação nas carreiras empresariais. Desta forma, a ReadinessIT desenvolveu um novo modelo de carreira, surgindo a necessidade de criar uma plataforma adequada à gestão deste novo método, a plataforma *Evolution*. Posto isto, o principal objetivo deste estágio é o desenvolvimento da plataforma *Evolution* e a sua disponibilização para a comunidade ReadinessIT.

O *Evolution* é desenvolvido na tecnologia Outsystems, e apresenta dois componentes principais, uma parte de *Backoffice* para dar suporte à gestão e configuração do modelo e, ainda um componente para o utilizador final, disponibilizado a todos os colaboradores. A plataforma suporta todos os fluxos que o modelo de carreira detém, desde avaliações, reconhecimentos, formações e aprovações.

Ao longo de todo o projeto, foram desenvolvidas todas as tarefas de planeamento, *design*, definição, implementação, teste e subida a produção da plataforma que estão descritas e discutidas neste documento. Atualmente, algumas funcionalidades encontram-se já em utilização por todos os colaboradores da ReadinessIT, conforme as suas prioridades, e as restantes estão inteiramente desenvolvidas.

Palavras-Chave

Modelos de Carreira;Evolução;Gestão de Carreira;Opinião 360;Outsystems;Low-Code

Resumo Alargado

O mundo empresarial está em constante evolução, bem como a forma como as carreiras empresariais são geridas. Para fazer face a esta evolução, a ReadinessIT desenvolveu um novo modelo carreira, mais dinâmico e proativo, dando a possibilidade aos colaboradores de escolher a velocidade do avanço da sua carreira. Com esta nova abordagem, surge a necessidade de criar uma plataforma adequada à gestão deste novo modelo de carreira, a plataforma *Evolution*, a qual permite a gestão e o acompanhamento do modelo em vigor na ReadinessIT. Assim, o principal objetivo deste estágio é o desenvolvimento da plataforma *Evolution* e a sua disponibilização para a comunidade ReadinessIT.

O *Evolution* é inteiramente desenvolvido na tecnologia *low-code* Outsystems, e apresenta dois componentes principais, um componente *Backoffice* para dar suporte à gestão e configuração do modelo e, ainda um componente de utilizador final, disponibilizado a todos os colaboradores. A plataforma desenvolvida acopla todos os elementos que o modelo de carreira possui (formações, reconhecimentos, avaliações, tarefas, aprovações, entre outros), e permite ao departamento de recursos humanos (*People&Culture*) consiga consultar e desempenhar as suas funções de gestão através do *Evolution*. Por outro lado, é disponibilizado várias métricas e estatísticas para que a administração consiga ter perceção do estado geral da comunidade.

Ao longo do projeto, foram desenvolvidas todas as tarefas inerentes ao desenvolvimento de uma aplicação, desde o planeamento, *design*, definição de arquitetura e modelo de dados, implementação, teste e passagem para ambiente produtivo da plataforma. Ao longo do projeto, seguiu-se uma abordagem faseada, isto é, foram realizadas várias passagens para produção, consoante as prioridades definidas pela ReadinessIT das funcionalidades implementadas.

Atualmente, o *Evolution* encontra-se em utilização pelos cerca de 250 colaboradores da ReadinessIT, permitindo que estes usufruam das funcionalidades implementadas na plataforma, permite também a gestão do modelo de carreira desenvolvido por parte de People&Culture e, por fim, oferece métricas para que se possa analisar e avaliar todo o processo inerente à evolução na carreira e interação entre colaboradores.

Abstract

Business world experiences a continuous evolution, so it is also needed an adjustment in enterprise career. This way, ReadinessIT developed a new career model, arising the need of a suitable platform to management the model, the Evolution platform. Thus, the main goal of this internship is the development of Evolution platform and its availability to ReadinessIT community.

The Evolution is developed in Outsystems technology, and displays two main components, the Backoffice to support the model management and configuration, and also, the End User component, available to all employees. The platform supports all the included flows in the model, such as appraisals, recognitions, trainings and approvals.

All the tasks related to planning, design, definition, implementation, testing and deployment of the application were carried out during this project, and are presented and discussed in this document. Currently, some functionalities are in used by all ReadinessIT collaborators according to its priorities, and the remaining are completed developed.

Keywords

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List of Abbreviations

AD	Active Directory
AI	Artificial Intelligence
API	Application Programming Interface
AWS	Amazon Web Services
AngularJS	Angular JavaScript
CPQ	Configure, price, quote
CRM	Customer Relationship Management
CSS	Cascading Style Sheets
FAQ	Frequently asked questions
HCM	Human Capital Management
IDE	Integrated Development Environment
IT	Information Technology
PDUs	Professional Development Units
P&C	People & Culture
SaaS	Software-as-a-Service
SN	System Ninja
SOA	Service-Oriented Architecture
UBI	University of Beira Interior

Chapter 1

1 Introduction

This project describes the work carried out within the scope of the Computer Engineering Dissertation/Computer Engineering Project, at the University of Beira Interior (UBI), in the academic year of 2020/2021. The work is developed in ReadinessIT company, focusing on the implementation of a platform to manage the career model, using the Outsystems technology.

In this first chapter, the covered topics are the company description and characterization of its main technical departments. The problem description and the document organization are also included in this chapter.

1.1   Company Description

Founded five years ago, ReadinessIT is an international Information Technology (IT) company focused on digital transformation and systems integration. Nowadays, with more than 400 employees, ReadinessIT is spread in three continents, with its headquarters located in Oporto and other offices in Lisbon, Fundão, Santiago do Chile, Lima, and Auckland.

Even though the company has offices in three different countries, the global organization distributes the company into eight departments, each one with its roles and activities defined (Figure 1). This organization allows the best performance in all departments and contributes to a good work environment.

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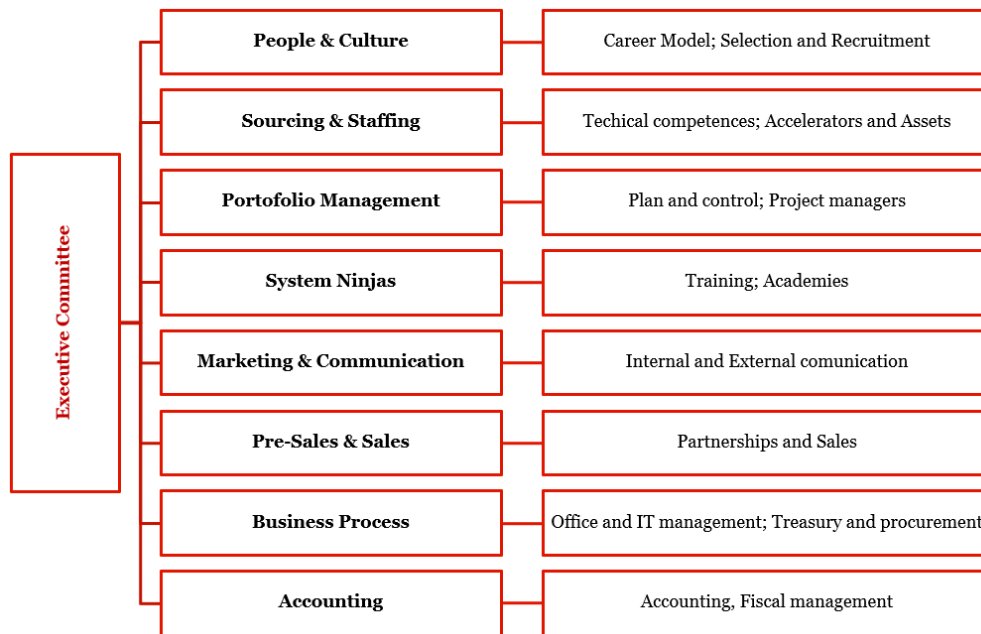
Figure 1 - Global organization of ReadinessIT with departments division and main roles and activities.

The sourcing and staffing department couples the technical competencies, where the IT services and the Accelerators and Assets of the company are developed. The services provided by ReadinessIT are highly specialized in digital transformation, among various industries, such as telecommunications, energy, retail, health, fintech, and e-commerce. The Accelerators and Assets comprise various company's platforms that are developed in a generic approach and can be used as the basis for various businesses. These platforms are a useful resource to be later customized in future projects of the company.

Therefore, the company operates in three kinds of areas, in particular the Digital Consulting, the Managed Services, and the Digital Services, which are characterized and distinguished by their technological, functional, or strategical focus.

Digital Consulting, the most technological and strategical component, provides top talents to other technological teams, which can operate in all life cycle of product development, i.e., an outsourcing approach. A development life cycle includes several phases, such as architecture, design, development, testing, deployment, maintenance, and support.

Both Digital and Managed services have their focus on the functional/operational side of the company. While Managed Services involves the maintenance and support of the product/project when it is already delivered to the customer, Digital Services focus on the

entire project development phases in any technology. In ReadinessIT, there are the Centers of Excellence to categorize the main technologies where the company can operate.

The Centers of Excellence consist of various teams focused on different competencies, all of them supported by digital transformation expert teams. Inside these centers, there are the following competencies:

- **Micro-Services and Integration**: The competence's core is based on building modules that act as simpler parts of complex processes, which can be reused. The project's architecture is settled on a micro-services approach with functionalities separation and simplification.
- **CPQ Catalog and Order Management**: This department aims to provide support on the development of order and catalog platforms, from the offer creation to the fulfillment and final accomplishment.
- **Quality Automation Assurance and Deploy**: To guarantee the quality of a project and give a superior experience, this competence uses different test frameworks, to ensure an efficient and effective deployment.
- **Low Coding**: The Low Coding center, with a focus on Outsystems technology, has its effort on all kinds of business with the development of mobile and/or web apps. It is characterized by its facility to integrate with other existing systems. Vlocity/SalesForce is another low-code-based technology utilized in ReadinessIT, with a focus on Customer Relationship Management (CRM) and another complementary set of enterprise applications.
- **User Experiences**: This competence is responsible for performing brand, design, and usability tests, in order to create the best usability and provide an appropriate experience to the users.
- **Customer Relationship Management**: This center allows the design, development, and test of various CRM solutions through a 360º portal, which contains a customer profile, and, in this way, it is possible the redefinition of customer engagement, relationship, and support.

In the IT world, a valuable partner can raise any business. Nowadays, ReadinessIT has several partners and alliances with well-established companies, such as Ericsson, Oracle, Outsystems, SalesForce Vlocity, and Amazon Web Services (AWS). These partnerships allow the use of different stacks and technologies, promote joint ventures, and can broaden horizons. In this way, ReadinessIT can better serve customers and deliver projects faster.

Despite the various stacks and the available products from the partnerships, such as Vlocity, Oracle, Outsystems, AWS, other technologies are explored and used in ReadinessIT's projects (Figure 2). These technologies can cover from backend to frontend process of web and/or mobile applications, such as AngularJS, CSS, JavaScript, .Net, among others. For example, in the quality assurance department, the main technologies used are Ruby and Cucumber. The Micro-Services technologies are applied to product development that can be added to a product suite or work separately, such as Notification Manager, Voucher Manager, among others. Other services are used in the company such as Jenkins and Git, which are useful in project management, report, and tracking. Figure 2 illustrates the several technologies and stacks used inside ReadinessIT.
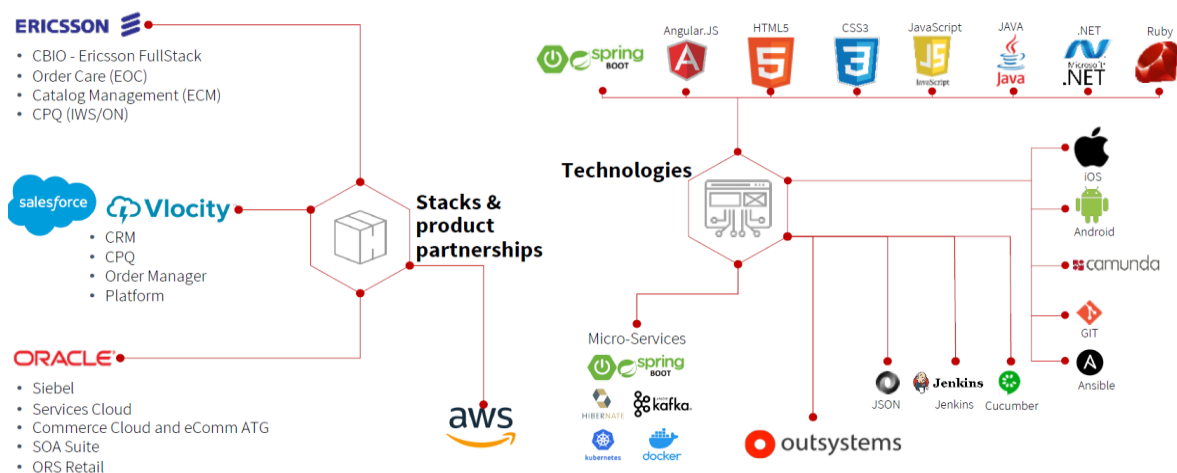
Figure 2 - Representation of the various technologies, stacks, and product partnerships available and used in ReadinessIT.

The large technological range allows the technical background of ReadinessIT to deliver the best experience to its customers and offers support from the initial to the implementation stages of the business. Finally, it is important to highlight that the spectrum of ReadinessIT clients spans the whole globe, including some prominent and very well-known companies, such as Ericsson, Entel, Spark, Oracle, Telefonica, Swisscom, Claro, Super Bock, Century Link, BMW, Frontier Communications.

1.2   Problem Description

During the year 2019, in order to assess the collaborators' satisfaction level and its clarification in several points, such as credibility, respect, impartiality, pride, camaraderie, and career evolution, ReadinessIT proposed itself an external evaluation (made by Great

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Places To Work®). From this scrutiny, several weaknesses were pointed out, including the appraisal methodology and the career model, which subsequently raised the need for the revision of the current approach and the implementation of a new career model.

Accordingly, the company devised a new career model, called *Evolution*, which is a new ecosystem where the main purpose undergoes personal encouragement and aims (each person develops their route and the goals are set by each person), transparency (adding external elements on individual assessment), proactivity through a non-hard model and also the availability of *Training Catalog* that should be used as tools to personalize the individual's evolution.

The *Evolution* has to provide two different career paths, namely the technical and management, that are divided by stages and are distinguished by the scope of the involved person. While the management path contains 4 stages and a total of 13 levels, the technical one contains 4 stages and a total of 14 levels. In both paths, admission to a higher level requires compliance with a determined rule set. In general, the rules can include:

- reaching a certain value of points (PDUs – professional development units);
- obtaining a minimum value on *Observe360*;
- obtaining a certain grade on a technical exam and/or side-project;
- have a successful amount of projects;
- positive evaluation by an external committee.

The model defines the applied rules of each level and the progress degree adjusted to the individual performance. The *Observe360* mentioned above is an assessment component that allows other involved people to participate (by filling a form) on the appraisal of a determined employee. The involved people usually undergo from 7 to 10 different people, and all of them are working in the environment of the evaluated employee, such as leader, project co-workers, mentor, mentee, and space co-workers, contributing with a different percentage to the final *Observe360* average.

Moreover, there is another component, called *PowerUps*, that are present in this model. The *PowerUps* are a value from 1 to 4 and can be assigned by any employee to a desired one. All the *PowerUps* of an employee are combined and converted to a bonification percentage that will influence the final average.

The management of monthly monitoring sessions (called *PowerUps meeting*) of each employee and the management of 360 feedback sessions (called *Observe360*) is essential.

Before these sessions, an appropriate form should be available and filled by the group in the work environment of the employee under assessment, and then associate with the appraised employee.

The appraisal process contains various components; thus, the *Evolution* model will generate high data volume, therefore, a platform to handle the numerous information of each stage and all information related to appraisals is required. This platform, the *RIT Evolution,* should be in line with other internal management applications, and in order to maintain uniformization inside ReadinessIT's platforms, the technology selected for development is Outsystems.

In short, the project goal is to build the *RIT Evolution* platform to provide support for personal development and career evolution. In more detail, it is expected the development of a back-office platform to customize the adopted career model and all the variables that are included. Additionally, the end-user application intends to use the previously configured model and variables and also works as the application for each employee to follow its evolution and perform the tasks related to self-appraisal and pairs-appraisals. In parallel, it is expected the skills development in Outsystems technology to accomplish this implementation.

1.3   Document Organization

This project is structured in several chapters, such as:

- Chapter 1 – *Introduction* - describes the company and the problem that motivated this project.
- Chapter 2 – *State-of-Art* – reviews and discusses the research of theoretical topics that will be covered in the project, such as the top 5 career model approaches, the importance of career management, and also some activities that are involved in this management. This chapter also reviews platforms to manage career performance.
- Chapter 3 – *Proposed Method* – describes the work plan, as well as the several activities of the overall project.
- Chapter 4 – *Implementation and Results* – describes the technologies and tools that were used in this project, the obtained results and a brief discussion of the results.
- Chapter 5 – *Conclusion* – presents the main conclusions of the entire work and future work that can be included in the platform.

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Chapter 2

2 State-of-Art

This chapter is focused on the career model management topic, where it is explored the career model theories, career management, and also some activities that can be involved in this management and planning. Moreover, examples of platforms to manage this thematic are also included.

2.1 Career Model Management

2.1.1 Career Model Theories

A career can be defined as the work-plan experiences and activities of an employee, where the objectives for the individual development are defined [1]. Over the last years, the concept of career has been changed and adopted several models and theories. Currently, the literature offers numerous theories and models, however, there is a top-five that resumes the most important aspects in career models topic [2].

First, the *Theory of Work Adjustment* shows a relation between the person and the work environment. On one hand, the person will try to fit the environment requirements and needs, and on the other hand, the environment will look for the person who possesses skills to meet the requirements of the company. The career development of a person depends on person-environment correspondence [3].

Additionally, the *Theory of Vocational Personalities in Work Environment* explains that a person prefers a job, where the job is like them in personality perspective. The personality can be expressed by the individual vocational interest, and this vocation can be categorized into six forms, such as Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. In turn, the work environment can also be divided into similar categories. Thus, one person chooses their development career in a work environment that matches with their vocational interest [4].

Another career theory is called *Self-concept Theory*, developed by Super [5]. According to Super, the person's self-concept is a developing and changing process that will influence career planning and their perception and desire of a career. In their point of view, life and work fulfillment are both important and involved in self-concept and have an impact on

career [5]. Leung *et al* describe that this theory has received high international attention and it is one of the most explored by the research community due to the importance of balance between work and life and how this can contribute to self-concept development [2].

Moreover, there is a most recent contribution by Gottfredson [6], where career selection and development are defined as a process that requires cognitive capacity [7]. According to Gottfredson, circumscription, and compromise influence career development [7]. The individual circumscriptions can be personal interests, social class, and gender. Another influence is the compromise, i.e., a person attempts to adapt their choices to achieve real-world demands. Changes in the labor market, economy, familiar obligations lead to an adaptation of job preferences and influence the career [6].

Finally, the fifth theory is called *Social Cognitive Career Theory*. Lent *et al.* [8] explains three career development aspects, which are interrelated, such as (i) how basic education and career aspects are developed; (ii) in what manner academic and career choices are performed and (iii) in what way academic and career success is obtained [8]. Here, there are three central variables (self-efficacy, outcome expectations, and personal goals) and the result of its interaction can define the development of career goals [8].

All these theories contribute to the development of career models adjusted to personal and professional needs and expectations.

2.1.2   Career Management

Career management is the strategy developed for the problem-solving process related to employee evolution, which can occur the information gathering, perception of oneself, and career goals analysis [1, 9].

Career management becomes a huge concern to companies' administration mostly due to labor marker evolution and its consequently emerging competition [10]. A successful career management program can lead to a *win-win* situation, i.e., contributes to skill and knowledge development of the employee, which in turn promotes company growth and continuous technological development [10]. Additionally, it is important that the career model couples with the employees' expectations and assists the employee switch from the traditional model to one more personalized and provides skill acquisition and constant professional growth [9].

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The initial vision of career evolution suggests that individual skills and own investments in training result in the individual development of an employee. Thus, each person can determine their career depended on their own investment [11]. However, another approach is supported by Rosenbaum, which indicates that individual investment, when compared with investments performed by companies, is much lower [12]. Therefore, companies have been developing mechanisms for human resource needs, such as recruiting, training, developing, appraising, promoting, and rewarding their employees. In general, these mechanisms are the responsibility of the human resource department which should be in line with executive ideas and future approaches. All these mechanisms and practices are a gradual process where individual goals and company achievements are matching and identical, contributing to the development of both [9, 11].

In literature, several common practices combine the company and individual career management scopes. These practices are included in four main strategies, such as (i) workforce planning; (ii) learning and development, (iii) performance management, and (iv) employee relations, which aggregates several activities, listed below [9, 11]:

(i)   career counseling and guiding, where is discussed with an employee their activities, performance, personal skills, and career objectives;

(ii)   succession planning, to identify and cultivate an employee for superior positions;

(iii)   open internal positions, to allow applying to fill positions in the company;

(iv)   assessment centers, to employee evaluation of their competencies and skills;

(v)   dual-career ladder, to provide upwards mobility without the obligation of management positions;

(vi)   mentoring programs, to support the personal and professional growth of each employee;

(vii)   benefits programs, to reward an employee towards increase the well-being of collaborators;

(viii)   Work-life programs, to promote a balance between private life and work.

Each activity has its own role, however, the set of all aims to support the implementation of an effective career management program.

2.1.3   Mentoring in the Work Environment

The mentoring concept in a work environment was first explored by Kram *et al* and nowadays this approach has gained emphasis on career models context [13]. In the mentoring approach exists two important intervenients, the mentor and the mentee. In a classical definition, a mentor is an experienced person (senior), who should support and help a less experienced person (junior, i.e., the mentee).

However, this definition has been changing and mentoring can include more than one mentor and one mentee or even not corresponding to a typical hierarchy. Thus, the mentor does not require to be a senior person or group mentoring can be examples of this more recent approach where it is described that group dynamics can improve mentee development (social and career fields) [14]. Another methodology adopted in mentoring is *E-Mentoring* provided by the internet and technology progress, which can be beneficial both quantitatively and qualitatively to mentor-mentee interactions [15].

Additionally, mentoring can be classified into two forms: formal and informal [16]. In the company environment when the mentoring follows the company guidelines such as meeting schedules, expectations, and the start/end of these relations is considered a formal type [13]. In the case of occurring spontaneously, such as for mutual person identification and without company role, mentoring is considered as an informal way [14, 16].

The research around mentoring shows that exists benefit for both mentor and mentee and also the company itself [14]. Several studies summarized by Jeong and Park [14] reveal that mentoring can enhance work and career satisfaction and commitment to the company. Moreover, the performance and proficiency of an employee are improved (communication, initiative, and work ethic, for example). On the other hand, the mentor can reach leadership and improve career development [14]. Nevertheless, in order to be effective for all involved parts, the mentor and mentee should have a good relationship, where occurs satisfaction and commitment to mentoring, professionalism, empathy, and great communication [14].

2.1.4   360-Feedback in the Work Environment

In the 90's decade, Edwards and Ewen described the term "360-Feedback" in the work atmosphere [17]. Initially, the 360-Feedback aim was to promote leadership development, individual development coaching, and organizational changes [18]. Nowadays, this approach is defined as a process that involves several people, such as the worker, superior, subordinates, co-workers, and where is collected feedback from all parts. It is applied

mainly to performance management, career planning, talent management processes, and also for decision-making purposes [18, 19]. 360-Feedback is a well-established practice and not only a trend in the human resources field [18].

This practice has been showing value among companies because it has been demonstrated a positive impact for both parts (employee and company). From an employee perspective, it can be used to identify employee's strengths and weaknesses, to set and define goals, and promote personal development. In this way, the 360-Feedback process can be the basis of two company' activities, the employee' appraisal and development practices [19, 20].

From a company point of view, 360-Feedback can be used as a strategy to facilitate alterations on company culture or values, for instance, introduce changes in the traditional approach of assessment and development. Moreover, the 360 feedback should be useful in decision communications and collecting opinions about these decisions [18]. When it is clear the purpose of all this process, 360-Feedback can be a successful practice inside a company [20].

2.1.5   Platforms Examples

In the business world, there are several platforms to help companies to provide suitable management of employees' career development. The *G2 - Business and Software and Services Reviews* is a tool that provides examples of software and services, organized by categories. In this way, this tool can offer different platforms to career management, which are mostly used by IT industries, namely Computer Software and Information Technology categories. Additionally, the criteria to select these two categories areas was the ReadinessIT business focus. In this way, Workday HCM, Lattice, Fuel50, and 15Five were the selected products, which are presented below. Based on the user experience score on G2, the main features highlighted on these platforms are easy to use, the quality of support, and the ease of setup [21, 22, 23, 24].

<u>Workday HCM</u> [25]

Workday HCM (Human Capital Management) is a cloud-based software that allows companies to meet the changes in business objectives. Workday HCM is a global system, which contains several features, such as reporting time, expenses registry, benefits plan, learning, and career information. Moreover, this platform provides many functionalities, such as (i) it allows an employee to provide feedback to a colleague, to a mentor or coach,

(ii) it may offer suggestions and recommendations for internal job opportunities, or even (iii) it allows to participate an interview process.

In more detail, Workday HCM allows both perspectives, the employee one, and the administrator. From an employee point of view, the platform contemplates several starting points, each of them with more details in each tab. On the *Profile* tab, the employee information is presented with personal data, work experience, professional skills, received feedbacks, and assigned projects. A timeline with information about managers, positions, performance comments, and ratings is also available. Another important screen is the *Career* tab, which can display the different career/job interests, namely what the employee intends to do, and the development goals. The individual development plan is demonstrated in this tab, which can be adjusted depending on individual interests. Using machine learning technology, Workday HCM recommends to employees what the next move should be, using people with similar roles and interests. On the *Learning* tab, several courses are presented about company-wide global initiatives and personalized suggestions based on employee interests (which can be edited to obtain different suggestions). Here, the employee can see the courses currently enrolled with the corresponding status (for example pending approval, completed, or in progress) and can select courses to see the details and choose to apply.

From another point of view, on an administration view, Workday HCM provides the management of the teams and a dashboard with metrics/statistics and its details. While the administration person is navigating by platform, a notebook widget is available to add a note to review later during a planning meeting, for example. One feature also offered is the support of ongoing changes, such as reorganize departments and change the company hierarchy chart, which allows the preview of everything that will be impacted, assign new superiors and edit subordinates.

Lattice [26]

Lattice is a software-as-a-service (SaaS) that combines a product suite with a focus on the performance, engagement, and analytics of the employees. To manage the performance of an employee, Lattice offers various activities to smooth this management, such as performance reviews, setting goals, continuous meetings, and continuous feedback, i.e., not only at one isolated moment. The main emphasis of Lattice is to promote an engagement strategy and a culture of feedback. To accomplish this objective, this software delivers

engagement surveys 1-2 times per year to establish the engagement plan and measure the employee progress every 6-12 months.

Moreover, Lattice provides tools that allow the administrators to drive the engagement, such as a faster schedule of meeting between the employee and manager, sending notification weekly to maintain the team focus, priorities, and roadblocks, and also provides a tool where employees can give and request feedback from managers and peers to help each other to improve and share positive feedback in the company. On the other hand, Lattice contains a *pulse survey*, an analytics tool to track the health of the organization, to give real-time results to managers and administrators. These data can help them to make informed business decisions and to prevent problems due to these decisions.

From the user point of view, Lattice shows an employee profile with last updates, personal goals, feedbacks information, and a task list to perform. A *checkins* page with meetings and employee updates is also offered, where the employee can consult and complete the information about these matters. For every review, the user can do their self-review and their peer reviews, filling a survey.

Fuel50 [27]

Fuel50 is an artificial intelligence-driven (AI-driven) platform that contains several features oriented for employees, leaders, and companies. On employee vision, the main features available are the *Career Pathing*, *Career Journeys*, *Gigs*, *Mentors,* and *360 Feedback*.

Based on individual skills, job experiences, and aspirations, the AI algorithms of Fuel50 combine the internal mobility of the company to employee individual expectations in order to provide career path suggestions. *FuelPathing™* functionality can detect skills gaps in career development and show the skills that are needed to work on (on the *Explore Paths* screen). Moreover, the *FuelGigs™* feature allows career growth, development, and experience with the suggestion of *Gigs* and opportunities according to the skill or competence that the employee intends to develop. *Gigs* can be created/managed by leaders on their dashboard to help them to find the talents that they are looking for. Another component of *Fuel50* is the *FuelFeedback™*, which can help the employee to find key strengths to maximize the career progress. This platform allows the employee to request feedback (from peers or leaders) to monitor the development planning, and it is also possible to give feedback to another employee. From the employee's point of view exists another feature, the *FuelMentor™*. The *FuelMentor™* suggests several mentors for an

employee, based on the skills and needs of this employee, using an AI-based engine. Here, the mentee can apply to this mentoring, through a custom questionary, and later the mentor can track this mentoring process (i.e., after the beginning of the mentor-mentee relationship).

Another available feature directed to leaders is *FuelLeaders™*, which constructs a dashboard to view powerful insights on their teams in real-time, such as top engagers, a summary of profiles, factors of risk, and coaching notes. This tool enables the generation of reports or to contact an employee through the platform, for example, to send reminders to the desired task.

15Five [28]

15Five is a product with several features, that can work together or not, depending on the company's needs. Among the various features, *15Five Check-ins* have the intuit to improve employee performance in 15 minutes weekly and aim to replace the long reports. The employee has access to the *Pulse* widget (1 to 5 score about the current feelings), their objectives, their priorities, and questions. The platform displays an expert question bank or gives the possibility to create custom questions. Once the data are collected, the 15Five metrics can be consulted, responded to, or passed up the ladder. *15Five Check-ins* allow the managers to realign employee goals, performance, and culture in a quick way. During an employee's *15Five Check-in* review, the manager can add the desire response to the *1-on-1s* agenda. The *1-on-1s* feature is a meeting agenda software that allows the manager easily to create an action list based on employee answers and what the manager intends to discuss. In this way, the action points to discuss during the meeting are rapidly available and planned.

Another important element in career planning is the possibility to establish objectives and set key results. This is available in *15Five Objectives*, which separates the objectives by departments, company-wide, or employee, each of them with the corresponding status and percentage of accomplishment. Additionally, 15Five product contains a recognition software, the *High Fives*, which allows the mention of a person by a colleague and share this mention by the community and promotes boosting morale.

On the analytics and metrics field, there are available tools that enable the capture of the full picture of employee performance. The *Pulse Check* and *Best-self Review®* features are examples of these tools. The first one shows the interactions statistics among the

community, allowing the administration to get the global perception of the company. Moreover, the *Best-self Review*® provides a relevant 360º and upward feedback based on employee performance, where the manager can select co-workers to peer review or even get their feedback.

Global considerations

Nowadays, in companies with a high number of collaborators or with several offices, the global well-being of the company and its collaborators is a colossal concern to the human resource department and administration. The review of the above platforms shows that this management approach can offer in only one place the company's global health, i.e., not only the individual (by an employee) but also the overall perception. According to Bersin, a prediction analyst by Deloitte, a company should be built with highly empowered employees and teams, and this mindset can be achieved by enabling and supporting career growth [29]. Moreover, employee satisfaction and commitment to the company are influenced by the career landscape. Thus, the possibility to collect and understand the career development status data and to act according to this information is crucial to organizations.

Chapter 3

3 Proposed Method

This chapter defines the proposed method that will be used in the development of the entire project. Regarding the method overview, this section is divided into several activities with a description of the main work related to each activity. Additionally, this chapter also presents the work planning, which is organized and illustrated in a Gantt chart.

3.1 Method Overview

The method overview is divided into activities to better identify the several procedures that the project will have and the main tasks that should be performed and its goals.

3.1.1 Activity 1 – Project Overview and Contextualization

This activity is mainly devoted to the gathering of all project requirements, their analysis, and specification. This is an important step since all the use cases and main features of the platform should be analyzed, and consequently, the global idea of *RIT Evolution* assembled. The main features include the separation of *Backoffice* and *End User* flows. Additionally, the essential data model should be defined.

Here, the architecture design of the project should be defined to fit all the needs and in agreement with the best practices of Outsystems technology, namely following the Architecture Canvas approach. This approach is an Outsystems methodology to facilitate the Service-Oriented Architecture (SOA), which provides an abstraction layer of reusable services and functionalities isolation (for example, to develop more than one application that reuses these functionalities). Moreover, between both Outsystems possibilities to develop a web application, such as Traditional Web or Reactive Web, it is required to decide what technology will be used.

3.1.2 Activity 2 – *Evolution Backoffice* Development

Following the selected requirements and defined architecture, the development of a back-office application is expected. The *Evolution Backoffice* proposes to offer the possibility to

configure tables and steps/rules that will be applied and used by the *Evolution End User*. The *Backoffice* includes several functionalities, such as the creation and configuration of projects, employees, levels, rules, and *a Training Catalog*. Regarding project and employee configuration, it is necessary since the appraisal of each employee requires the intervenients of the work environment of an employee (mentors, mentees, and leaders) and also its project co-works. Furthermore, the possibility to customize the levels and rules of the career model creates a dynamic application for the future addition of news rules or levels.

Also, the *Evolution Backoffice* provides the creation of a *Training Catalog* list, which consists of a technical training collection, where the employee should perform to develop skills and collects points for its assessment (the points amount is configured here). Moreover, knowledge recognition is a feature that allows a particular employee to assign points to another work colleague. The point quantity and the minimal hierarchy level of an employee that can perform this assignment are configurable in the *Backoffice*.

Along this process, there are some tasks, such as filling out surveys, performing appraisals to pairs, periodic meetings to gather opinions, which are essential to this career model. In this way, the task assignment and event configuration are activities that should be supported by the *Evolution Backoffice*, firstly in a manual way but the final goal is its automation depending on scheduled rules.

 Lastly, the employee performance measurement is the final task where the collection of all data should allow the assessment of each employee, following the level rules of the model.

3.1.3   Activity 3 – *Evolution End User* Development

The *Evolution End User*, the main application, regards the graphical interface that all employees should use to check the details of their career development. The *User Dashboard* is the main page and should contain information about the current status of the employee, such as view the pending tasks related to self, co-works and superiors' appraisals, projects, mentee and mentor, current level and PDUs, and other relevant information.

The development of *Observe360* and *PowerUps* flows are both tasks that are included in this part of the platform. These flows are components that have high importance on an employee assessment because influence the total score of the final appraisal.

The *Observe360* is a complete form that all the persons directly related to an employee (mentee, mentor, leader, and co-workers) and self should fill out assign a score from 1 to 5.

Each of these *Observes360* forms has a different weight (i.e., by the leader- 35%; by the mentor 15%; by the mentees – 10%; by the project co-worker – 20%; and self – 20%) and are collected to assign the final *Observe360* score. Regarding these percentage divisions, where the leader, mentor, and self are mandatories, if any employee does not have mentees or project co-workers, the percentage of these parts is distributed by the mandatory parts. This form will appear as a task on *User Dashboard* to be completed. Also, the *Observe360* final score can have a bonification of -5% to +5% depending on another component, the *PowerUps*. In more detail, the *PowerUp* is a smaller form to attribute points (-2 to 2) to any employee of the company, in a non-mandatory way. This form should be always available on *User Dashboard* to allow the employee to assign this score whenever he desires (for example, if a colleague had an attitude that he intends to recognize or alert). All the *PowerUps* received should be later analyzed and presented by the mentor to the mentee (employee that received it), in a monthly session called *PowerUp Meeting*. On the annual appraisal, all the monthly *PowerUps* should be collected to calculate the bonification value on the *Observe360* component.

The individual *Training Catalog* is a feature that provides employees the possibility to enroll in a training program to improve their skills in a specific topic of computer programming or even in the soft skills area. The training catalog feature should be also capable of communicating with the performance profile of the employees, to assign PDUs for each enrolled course. In the *Training Catalog* screen, the user has access to the attended and available training. As mentioned before, the possibility to perform a knowledge recognition to a colleague is another feature that this model allows. Here, an employee can select a colleague to assign PDUs, thus, is needed a screen to provide this and consult the received and sent points.

As the literature refers, the data about the global status of a company is advantageous to the administration and human resources departments. So, a dashboard with company metrics and statistics should be developed to help the administrators to take informed company decisions and only be available to *admin* users.

3.1.4   Activity 4 – Application Testing

During product development time-life phases, the testing phase is crucial to deliver a product with quality, i.e., in conformance to requirements, without failures, and meeting customer satisfaction. Thus, testing is an activity that should keep up with the development phases in order to ensure error-free software.

3.1.5 Activity 5 – Application Deployment

The deployment is the activity that sets the application available in the production environment, i.e., available to end-users. In Outsystems technology, the deployment of an application is a process performed in the *LifeTime* platform, provided by Outsystems. In general, it is necessary to select the application to deploy, add a deploy plan, validate the plan, approve the plan, and finally perform the deployment.

3.2   Work Planning

Commonly, work planning is introduced by a Gantt chart because it provides a global vision of entire project activities. The work has been divided into activities, which in turn comprise several tasks. One activity starts when their first task also starts (represent by an 'S') and finishes when the last task stops.

Activity description by week number	January		February				March				April				May				June		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
A1. Project overview/contextualization	S																				
T1.1. Requirements gathering	X																				
T1.2. Architecture definition and design	X																				
A2. *BackOffice* Development		S																			
T2.1. Projects configuration		X	X																		
T2.2. Employee configuration		X	X																		
T2.3. Employee and project association			X	X																	
T2.4. Employees association			X	X																	
T2.5. Levels and rules configuration			X	X	X																
T2.6. Manual tasks configuration								X	X	X											
T2.7. Training catalog configuration											X	X	X								
T2.8. Knowledge recognition configuration											X	X	X								
T2.9. Automatic tasks generation															X	X					
T2.10. Employees perfomance measurement																X	X				
A3. *EndUser* Development					S																
T3.1. User Dashboard development					X	X	X	X	X	X		X	X	X	X	X	X	X			
T3.2. *PowerUps* flow development							X	X													
T3.3. *Observes360* flow development								X	X	X											
T3.4. Training catalog management												X	X								
T3.5. Knowledge recognition												X	X								
T3.6. Admin Dashboard development																	X	X			
A4. Application testing						S															
T4.1. *BackOffice* testing						X				X			X				X				
T4.2. *End-User* testing													X				X				
A5. Application Deployment																				S	
A6. Project Writing			S																		

Figure 3 - Gantt chart of the proposed work plan.

Chapter 4

4 Implementation and Results

The implementation and results chapter is divided into two sections. First, it presents the technologies and tools used during the project development. In the last part, the results section reports the results obtained from the Evolution project.

4.1 Used Technologies and Tools

This section describes the main used technologies and tools. It is explained the Outsystems technology and the designed architecture to accomplish the entire project. This part also includes the user stories and the data model of the Evolution project to better understand the platform business.

4.1.1 Outsystems Technology

Outsystems is a low-code solution that allows the entire lifecycle development of an application, including the front-end, back-end, database, and integration with other systems. This technology provides the development, integration, deployment, and maintenance needs of an application [30]. Outsystems platform contains several tools and components such as *Service Studio*, *Integration Studio*, *Lifetime*, and *Service Center* to support the development and maintenance, all connected to a central point, as is illustrated in Figure 4 [31].
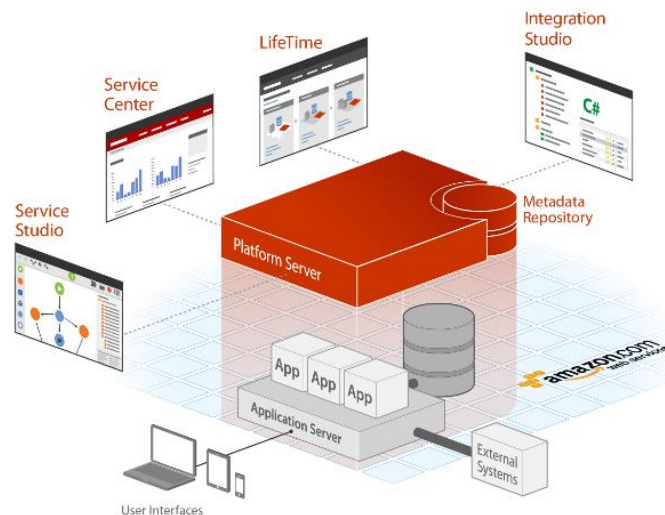

Figure 4 – Representation of the various components supported by the Outsystems platform [31].

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The development is performed in *Service Studio*, which is the Integrated Development Environment (IDE). *Service Studio* allows the creation of all parts of the application, such as the logic, user interfaces, business processes, and database, each of these parts developed in the corresponded tab, i.e., *Logic*, *Interface*, *Processes*, and *Data* tab and follows a drag-and-drop approach. In *Service Studio*, different application modules can be created and defined, such as an end-user, library, service, or a blank module. Components and elements of the modules can be shared, leading to a dependency between the producer and consumer modules being created [32].

Further, another development environment, called *Integration Studio*, is an optional tool used to create or use external components, such as some pieces of code or connect to external databases and libraries, that cannot be covered in *Service Studio* [31].

Once the development is completed on *Service* and/or *Integration Studio*, a central part of the entire tool, called *Platform Server*, is responsible for generating, optimizing, building, packaging, and deploying the application. The *Log Service* is also a service of this server to help to manage the application at runtime [33].

Moreover, the other component, the *Service Center,* is a portal to consult the system logs of each server application and provides the configuration of security, web-services end-points, timers scheduling, and *Site Properties* (i.e., global variables, that can be used by the application). Along the development time, several versions of the application modules are created every time that the developer *publish*es a module. In the *Service Center,* it is possible to manage these versions and update dependencies between the modules if needed [34].

Finally, the *Lifetime* component is a visual console, with centralized management for development, such as the development users, quality assurance, and production environments of all infrastructure. This component allows the deployment of an application and manages all the included phases, such as tag creation, deployment plan, approval of the deployment plan, and perform the deployment itself [35, 34].

4.1.2   Used Architecture

An Outsystems application should follow a standard architecture, which is designed to ease fast development and be customizable in future changes. The application architecture comprises the modules and components, internal and external systems, and the

communication between these parts. The main objective of a well-defined architecture is to promote the capacity to scale according to business needs and ensuring the correct isolation of concepts and accurate dependencies between components. This way, Outsystems offers a framework to support architecture design, called Architecture Canvas [36].

The Architecture Canvas is a tool to enable the abstraction of reusable services and its isolation based on functionality, useful when different applications are sharing common modules. With correct and minimal dependencies among modules, it is possible to preserve and maintain the application lifecycle and decrease the overall change impact [37]. To achieve a well-designed architecture, there are three main rules to accomplish, such as (i) no upward references, (ii) no cyclic references, and (iii) no side references between end-user modules. If any of this rule is violated, it indicates that the business concepts are not correctly abstracted and/or services are not isolated [36, 38].

By analyzing this architecture, we find layers and sub-layers according to the functionality of the module, illustrated in Figure 5. The layers can be divided into reusable services and non-services, i.e., the End User layer is a non-service, whereas the Core and Foundation layers are reusable services. It should be noted that this approach applies only to Outsystems 11 version [36, 37].

Layers	Sub-Layers	
End User Modules Functionality to end users	**End User**	Frontend User Interface modules
Core Modules Business services Services around business concepts	**Core**	Reusable services around business concepts, exporting entities, business rules and web-blocks
	API	Provides APIs to expose your Core Services
	Core Widgets	Core widgets
	Composite logic	Reusable business logic composition or logic to synchronize data
	Core Service	Reusable core services
Foundation Modules Non-functional requirements Services to connect to external systems or to extend framework	**Foundation**	Non-functional requirements or integrations modules, reusable in any business context
	Style Guide	Reusable UI patterns, themes and theme templates
	Foundation Service	Integration services to wrap-up external services and services to support non-functional requirements (e.g. Audit trailing)
	Library	Reusable libraries and plug-ins

Figure 5 – Representation of layers and sub-layers of Architecture Canvas approach (adapted from [37]).

Following the Architecture Canvas approach and the actual ReadinessIT infrastructure on Outsystems services, the Evolution architecture is presented in Figure 6.

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Figure 6 – Representation of Evolution application architecture implemented on ReadinessIT Outsystems *Cloud* infrastructure.

This architecture was implemented on ReadinessIT Outsystems *Cloud* infrastructure. This infrastructure is included on an Outsystems partner license, which has a capacity of 8Gb for application metadata and data and contains two distinct environments, i.e., development and production. This infrastructure also has a capacity for 500 different end-users.

Since *Cloud* infrastructure is used by all ReadinessIT applications, database space to serve all the applications has become a limitation. The solution for this limitation was to migrate several core and foundation modules to ReadinessIT Outsystems *On Premises* infrastructure in order to save database space. With that in mind, an application was created to encapsulate Evolution backend services on *On Premises* infrastructure. The mentioned architecture application is represented in Figure 7.

Figure 7 - Representation of Evolution application architecture implemented on ReadinessIT Outsystems *On Premises* infrastructure.

With this kind of infrastructure, we were able to obtain some database space on *Cloud* and have all database-related entities, business logic, and services on the *On Premises* platform. Since ReadinessIT Outsystems *On Premises* infrastructure license only has one environment, we had to use Outsystems multi-tenant to distinct production from non-production data.

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After all infrastructure limitations were discussed and all the resolutions implemented, the final Evolution architecture is represented in Figure 8. This architecture follows the layers and sub-layers division, suggested by *Outsystems Architecture Canvas*.
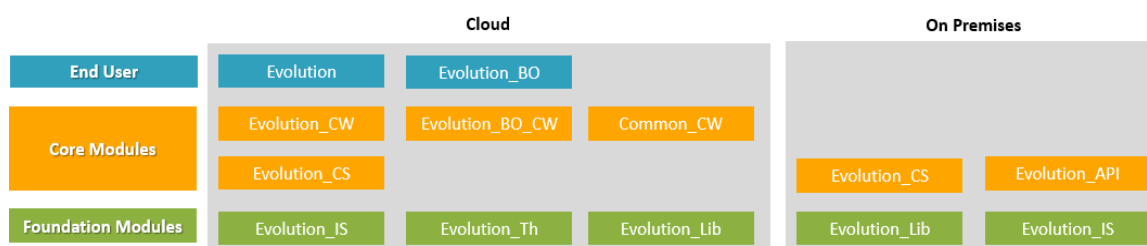

Figure 8 - Representation of final architecture of Evolution application implemented on ReadinessIT Outsystems *Cloud* and *On Premises* infrastructure.

4.1.3   Epics, Features and User Stories

In software development, a *User Story* is a description of a feature from the perspective of an end-user and simplifies the requirement description. Several *User Stories* can be grouped in a *Feature*, i.e., a *Feature* contains several related *User Stories* to compile a software feature. Related *Features* represent an *Epic*. According to this, the Evolution platform contains 61 *User Stories*, grouped into 18 *Features*, which are included in 6 *Epics*, all of them represented in Table 1.

Table 1- Description of Epics, Features, and User Stories of Evolution (US – *User Story;* P&C – *People&Culture*; SN – *System Ninja*).

EPIC	FEATURE	US	AS A…	I WANT TO …	SO THAT I CAN…
Backoffice	Projects	1	Admin	view the project list	search by project name or country and filter by active projects.
		2	Admin	add a new project or edit an existing one	manage project details and associate profiles.
		3	Admin	add multiple projects	download a template and import it.
	Profiles	4	Admin	view the profile list	filter by employee name or active profiles.
		5	Admin	add a new profile or edit an existing one	manage profile details associate projects and mentees.
	Levels and Rules	6	Admin	view the technical level list	search by number level and filter by active levels.
		7	Admin	add a new technical level or edit an existing one	manage technical level details and associate with existing rules.

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		8	Admin	view the management level list	search by number level and filter by active levels.
		9	Admin	add a new management level or edit an existing one	manage management level details and associate with existing rules.
		10	Admin	view the rules list	search by name and filter by active rules.
		11	Admin	add a new rule or edit an existing one	manage rule validations.
	Knowledge Recognition	12	Admin	view the management recognition list	filter by recognizer level.
		13	Admin	add a new management recognition or edit an existing one	manage management recognition details.
		14	Admin	view the technical recognition list	filter by recognizer level.
		15	Admin	add a new technical recognition or edit an existing one	manage technical recognition details.
	Training Catalog	16	Admin	view the *training catalog* list	search by name and filter by active trainings.
		17	Admin	add a new raining or edit an existing one	manage training details and associate to levels.
	Help	18	Admin	view the suggestion list	search by reported name and date range.
		19	Admin	view the reported bug list	search by reported name and date range.
		20	Admin	add new FAQs or edit an existing one	manage the details or download a template and import it.
PowerUp	*PowerUp* form	21	User	submit a *PowerUp*	fill the *PowerUp* form.
	PowerUp Meeting	22	Mentor	submit a meeting or save a draft	view the list of *PowerUps* received by the mentee and choose an action for each one or revised by People&Culture and view the meeting bonification.
		23	Mentor	consult the meeting history	view the details of a meeting in history.
	PowerUp Review	24	P&C Approval	view the list of *PowerUp* under revision	search by mentor name and filter by close/open revisions.
		25	P&C Approval	approve or reject a *PowerUp*	view the *PowerUp* details under revision.
Observe360	*Observe360* form	26	User	submit an *Observe360* or save a draft	fill the *Observe360* form.
	Observe360 meeting	27	Mentor	submit the *Observe360* meeting or save a draft	consult each received form by the mentee, view the average score of each one, and the final grade based on form type percentage with *PowerUp* bonification.

		28	Mentor	consult the *Observe360* meeting history	view the details of a meeting in history.
Backoffice	**Task Management**	29	Admin	view the list of tasks	search by type, priority, or assign to and filter by open or close status.
		30	Admin	add a new task or edit an existing one	manage the task details, close or delete the task.
Dashboard	**Dashboard Widgets**	31	User	view the profile details	consult the current information and update the profile photo.
		32	User	view the *PowerUp* form	submit a *PowerUp*.
		33	User	view my open tasks	consult the details, navigate to the corresponding destination or close it.
		34	User	view my *PowerUps*	consult the received *PowerUps* and view the sent *PowerUps*, which can be deleted if it is not associated with the PowerUp meeting.
		35	Mentor	view my mentees	navigate to PowerUp or *Observe360* meeting for each mentee.
		36	User	view my *Observe360*	consult the received *Observe360s* and view the sent *Observe360s*.
		37	User	view my projects	consult the ongoing ones or project history.
		38	User	view the help card	give suggestions, report a bug, and consult FAQs.
	Dashboard Details	39	User	view my all tasks list	filter by open or close task, type, and priority.
		40	User	view my all *PowerUps*	filter by received or sent, score, or employee to/from.
Training Catalog	**View and request a training**	41	User	view the available technical and management *training catalog*	search by name and filter by level.
		42	User	request a training	view the details of training and submit the request.
		43	User	view my requested trainings	view the request status details, filter by open and close requests, and search by name.
	Review a training request	44	Mentor	view my mentees trainings	consult the open/closed requests.
		45	Mentor	approve or reject a training, with justification	view the training details under revision, after mentee request.
		46	SN Approval	view the list of trainings under revision	filter by the employee who requested the training.
		47	SN Approval	approve or reject a training	view the training details under revision, after mentor approval.
		48	P&C Approval	view the list of trainings under revision	filter by employee name who requested the training.

		49	P&C Approval	approve or reject a training	view the training details under revision, after Systems Ninja approval.
Knowledge recognition	**View and request a knowledge recognition**	50	User	view the available technical and management recognition table	consult the details and rules.
		51	User	perform a recognition	selected the details of recognition and submit.
		52	User	view my received and send recognition	filter by open or close request and search by the employee to/from.
	Review a knowledge recognition request	53	Mentor	view my mentees recognitions	filter by open or close request
		54	Mentor	approve or reject a recognition	view the recognition details under revision, after mentee submission.
		55	P&C Approval	view the list of recognition under revision	filter by the employee who requested the recognition.
		56	P&C Approval	approve or reject a recognition	view the recognition details under revision, after mentor approval.
Backoffice	**Admin Dashboard**	57	Admin	view the mentor/mentee relation	have a global vision of mentor/mentees.
		58	Admin	view the *PowerUps* given	consult the news, approved, rejected, and under revision ones.
		59	Admin	view the *PowerUps* meeting status	consult the submitted and draft ones, and filter by month and year.
		60	Admin	view the *PowerUps* metrics	consult the mentee mood on *PowerUp* meeting, *PowerUp* score, and status and filter by date range.
		61	Admin	view the total of *Observe360s* given	consult the average score per question and the global mentee mood.

4.1.4   Used Data Model

The data model works as a visual representation of the tables and the relationships between them. The conceptual data model contains the project entities and how they are related. The Evolution conceptual data model is represented in Figure 9.
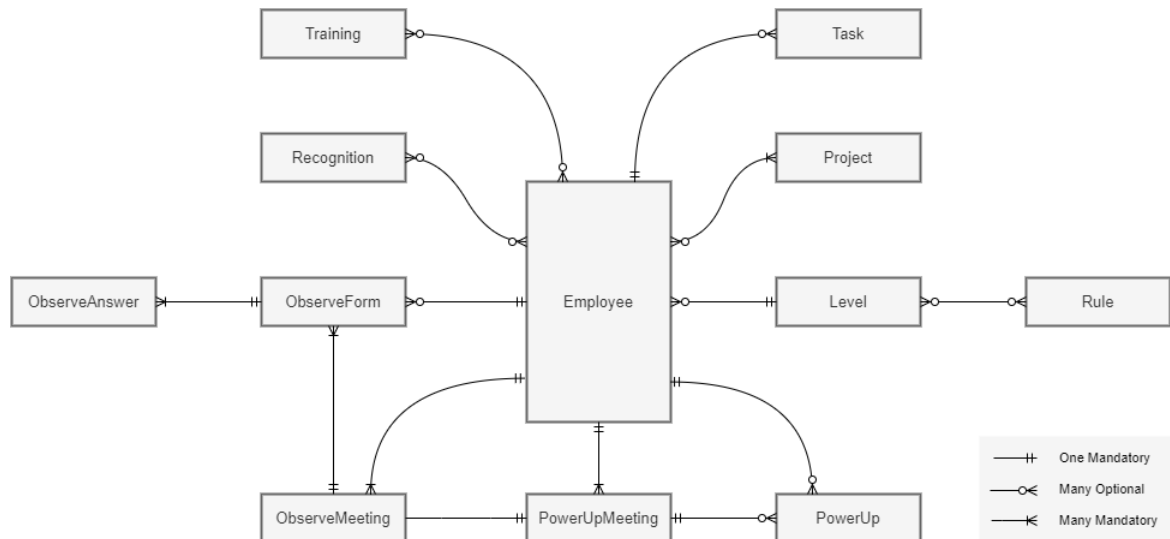
Figure 9 – Representation of conceptual model diagram of Evolution.

This conceptual model follows the Evolution business rules and can be further explained with the following premises/statements:

- One employee has one or many projects and one project can belong to any or many employees; i.e., a project can be configured but not associated with an employee.
- One employee has only one level, and one level can belong to any or many employees, i.e., a level can be configured but not associate with an employee.
- One level can have any or many rules, and one rule can belong to any or many levels, i.e., a level can exist without rules, and a rule can be configured but not associated with a level.
- One employee can have any or many tasks, and one task belongs to only one employee; i.e., when a task is created, it is always assigned to an employee.
- One employee can have any or many trainings, and one training belongs to any or many employees; i.e., a configured training in the catalog can be or not associated with an employee.

- One employee can have any or many recognitions, and one recognition belongs only to an employee; i.e., a configurated knowledge recognition can be or not associated with an employee.
- One employee can have any or many *PowerUps*, and one *PowerUp* belongs only to an employee.
- One P*owerUp* Meeting can have any or many *PowerUps*, and one P*owerUp* belongs only to a *PowerUp* Meeting; i.e., one *PowerUp* is always associated with a *PowerUp* meeting.
- One employee has many *PowerUp* meetings, and one *PowerUp* meeting belongs only to an employee; i.e., one *PowerUp* meeting is always associated with an employee.
- One employee can have any or many O*bserve360* forms, and one *Observe360* form belongs only to an employee; i.e., an *Observe360* form is always associated with an employee, which can contain more than one form.
- One *Observe360* form has many *Observe360* answers, and one *Observe360* answer belongs only to an *Observe360* form; i.e., an *Observe360* form contains several answers, which are not shared with other forms.
- One employee has many *Observe360* meetings, and one *Observe360* meeting belongs only to an employee; i.e., one *Observe360* meeting is always associated with an employee.
- One *Observe360* meeting has many *Observe* forms, and one *Observe360* form belongs only to an *Observe360* meeting; i.e., one *Observe360* form is always associated with an *Observe360* meeting, which contains several forms.
- One *Observe360* meeting has only one *PowerUp* meeting; i.e., one *Observe360* meeting contains one *PowerUp* meeting, which can be or not be referred to in an *Observe360* meeting.

4.2 Results

The results section covers the outcomes from the Evolution platform, which is split by *Epics* and/or *Features* to better categorize the huge quantity of developed screens and main results.

From a functional point of view, the Evolution display several functionalities, that can be represented using a functional architecture diagram (Figure 10). The diagram illustrates the frontend (in an *Outsystems Cloud* server) and backend (in an Outsystems *On Premises* server) distribution, both containing smaller components. The Dashboard is a transversal component due to be a starting point for all other functionalities (*PowerUps*, Trainings, Tasks, etc.).

The communication between the two main servers is established using Rest API, i.e., the *Integration Manager* consumes the exposed APIs of the *API Manager*. In turn, the *On Premises* infrastructure makes some integrations with external systems, using the *Integration Manager* component of the backend that consumes services from these systems (namely Replicon, Azure Active Directory, and RIT Portal).
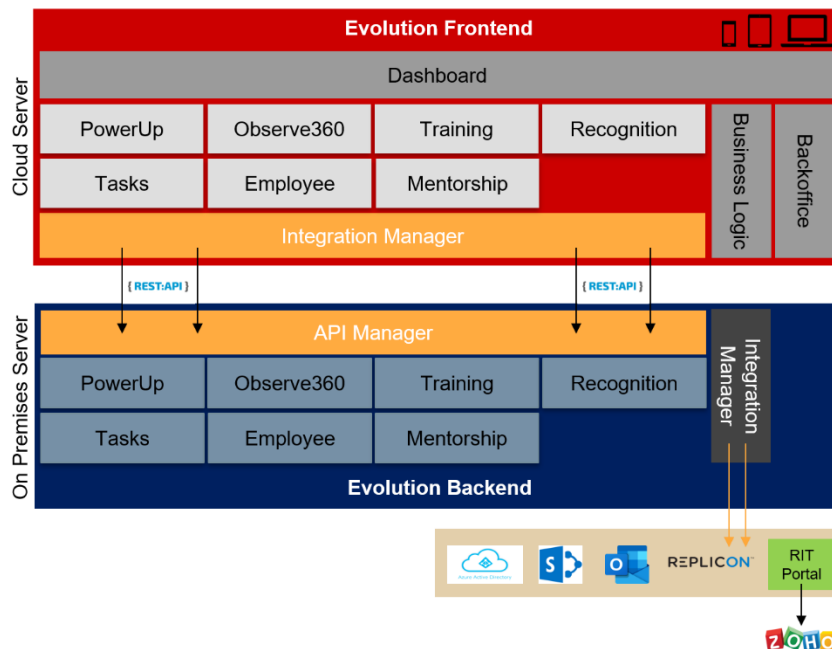
Figure 10 – Functional architecture diagram of Evolution platform, organized in frontend and backend components.

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4.2.1 Login

Evolution platform supports user login in two ways: Outsystems platform user authentication or external authentication providers. Outsystems has a native user management module that allows *EndUser* creation and management as well as their assignment to roles or groups. On other hand, it also supports external user providers like Azure Active Directory (AD) (used by ReadinessIT).

ReadinessIT has an Office 365 account for each one of its employees. Since Evolution supports login through the Azure AD user provider, after a successful configuration on the Outsystems platform and correct user role associated with each user, the login can be done by each user without the need for user account creation as Outsystems takes care of the needed mappings.

In the future, if the need for new user access (without ReadinessIT Office 365 account) arises, End Users can be created through Outsystems User Provider, without depending on any code changes to the Evolution platform.

After a successful login, the main page displayed is the Dashboard. In the top menu, it is possible to navigate to other features, such as *Training Catalog*, *Knowledge Recognition*, and *Backoffice*, that will appear according to the user role.

Entire platform comprises five distinct roles, such as:

- User – All ReadinessIT employees to access the Evolution *End User*.
- People&Culture – Department of *People&Culture* (human resources) to access to *Evolution Backoffice* to manage the configurations and perform revision tasks to *People&Culture*.
- System Ninja – Department of *System Ninja* (training and academies) to access to *Evolution Backoffice* to perform revision tasks to *System Ninja*.
- Admin – Evolution Administrator to access the entire functionalities in the *Evolution Backoffice*.

4.2.2 Evolution Backoffice

The *Evolution Backoffice* has restricted access, only to users with *People&Culture*, Admin, or *System Ninja* roles. The main page contains all the available features in this part of the

Evolution platform (Figure 11), divided into "Approvals and Tasks", "Analytics", "Configurations", and "Synchronization" section. Each of them displays a starting point to a more specific feature, which is presented and discussed in detail along the results section.
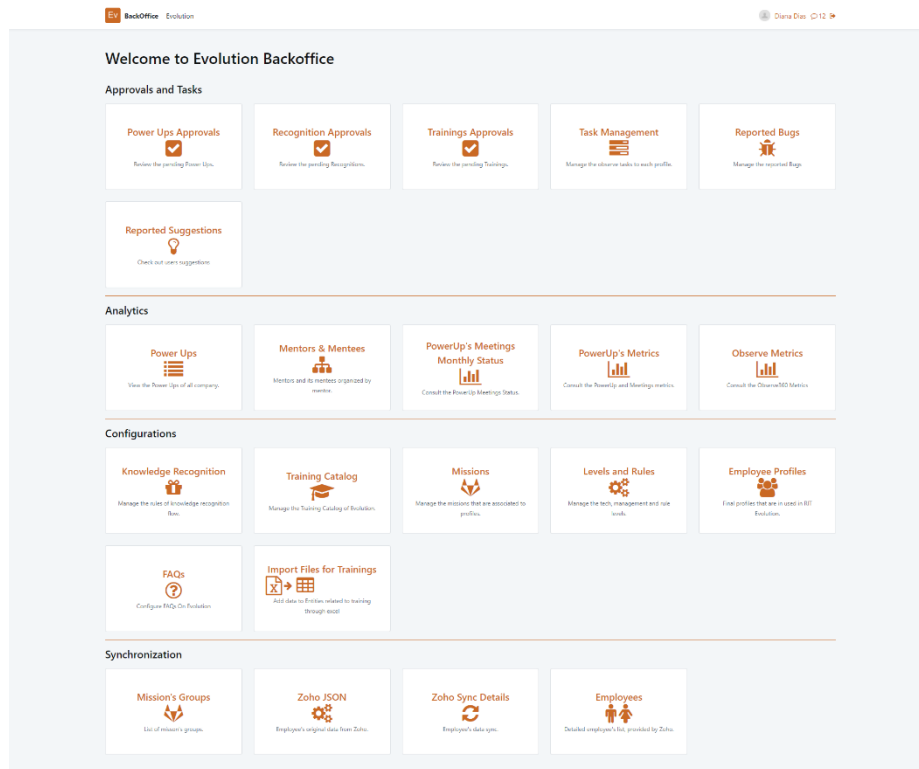
Figure 11 - Main page of Evolution Backoffice.

4.2.3 Backoffice - Projects Configuration
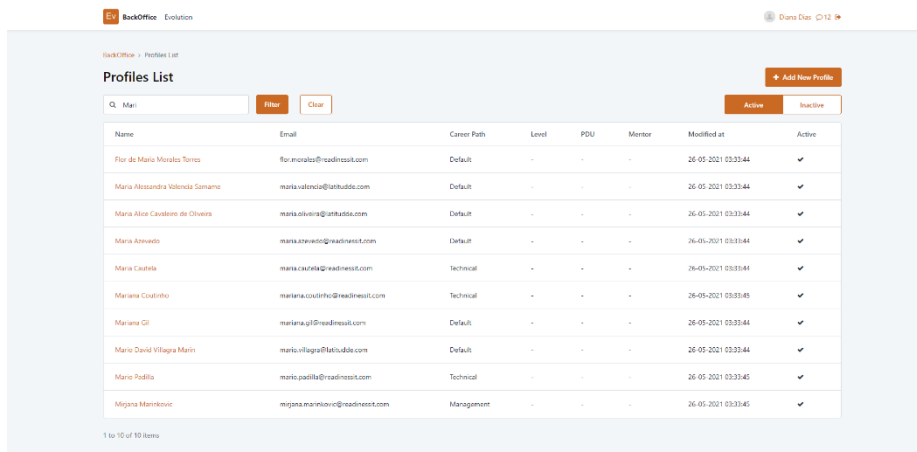
From the *Backoffice* main page, it is possible to navigate to project configuration, labeled as "Missions". The *Project List* page contains all ReadinessIT projects available in Evolution, displayed in a table with pagination (Figure 12). The table can be filtered using a search bar and active or inactive ones. When a project is already stored and configured, it is possible to navigate to its details and edit its previous configuration.

ReadinessIT has several current and past projects that should be available in Evolution. At this moment, ReadinessIT uses the Replicon software for time tracking supervision according to the project allocation of an employee [39]. In order to get all project information, an integration with an external system was performed, consuming REST APIs provided by Replicon APIs [40]. Moreover, in the platform is also possible to add new projects, using the displayed 'Actions' button, to add a single project or multiple projects

simultaneously. The multiple project configuration is performed by downloading a template file, that is filled in with the required information and then upload to the platform.

Figure 12 - Example of the Project list screen in Evolution *Backoffice*.

To add a new project, a *Details* page is displayed with a form to configure the project details and the team, who is part of the project (Figure 13). When an employee is added to the project team, a relation between the employee and project is created, with employee role, start and end dates of the project, and the project's allocation.

Figure 13 - Example of a project configuration on Project Details screen, with all project details filled and the allocated team.

4.2.4 Backoffice - Employee Configuration

From the *Backoffice* main page, it is possible to navigate to employee configuration, labeled as "Employee Profiles". The *Profile List* page contains all ReadinessIT employees available in Evolution, displayed in a table with pagination (Figure 14). The table can be filtered using a search bar and by active or inactive ones. When an employee is in the table, it is possible to navigate to its details and edit its previous configuration.

Figure 14 - Example of the Employee List filtered by "Mari" in the search bar, on Profiles List screen in Evolution *Backoffice*.

Currently, ReadinessIT uses a software to manage all employee-related information, the Zoho People platform [41]. Due to the many employees that ReadinessIT actually have, the first setup of all profiles could be highly time consuming, thus it was performed an integration with Zoho People to retrieve all employee data, which is already set up in this software. ReadinessIT developed a middleware to communicate with Zoho, the RIT Portal. This way, an external communication is made between Evolution and RIT Portal. Exposing a REST API, the RIT Portal system consumes this service and the employee table can be populated with Zoho information, via RIT Portal.

To avoid dependencies between other services, the Evolution platform allows adding a new employee, to the *Employee Profiles List* page. Here, a new employee can be added using the *Details* page, which shows a form to configure the employee details. When the mentor of the employee exists, the mentor's name is displayed. The mentee list of an employee and the associated project can be also configured (Figure 15), using a side-by-side list widget. Every time that a mentee is associated with the current employee, a relation between these

employees is created. Similar to a project-employee association in the *Project Details* page, the page of employee details also allows this association.

Figure 15 - Example of an employee profile configuration on Profile Details screen, with all employee details filled, the corresponded mentor, mentees, and the assigned projects.

4.2.5   Backoffice - Levels and Rules Configuration

The levels of the Evolution platform are an important component to manage the progression across the career model. From the *Backoffice* main page, it is possible to navigate to level and rules configuration, labeled as "Level and Rules". The *Level and Rules List* page contains three distinct tabs (Figure 16). The *Technical* tab contains all technical levels configured in the platform, organized in a table with filters by name or active or inactive ones. Additionally, the *Management* tab contains all management levels of the platform and follows a similar structure to the *Technical* tab. For both situations, when a level is stored and displayed in the table, it is possible to navigate to its details to edit its previous configuration or delete this level from the platform (Figure 17).

RIT Evolution – Career Management Platform
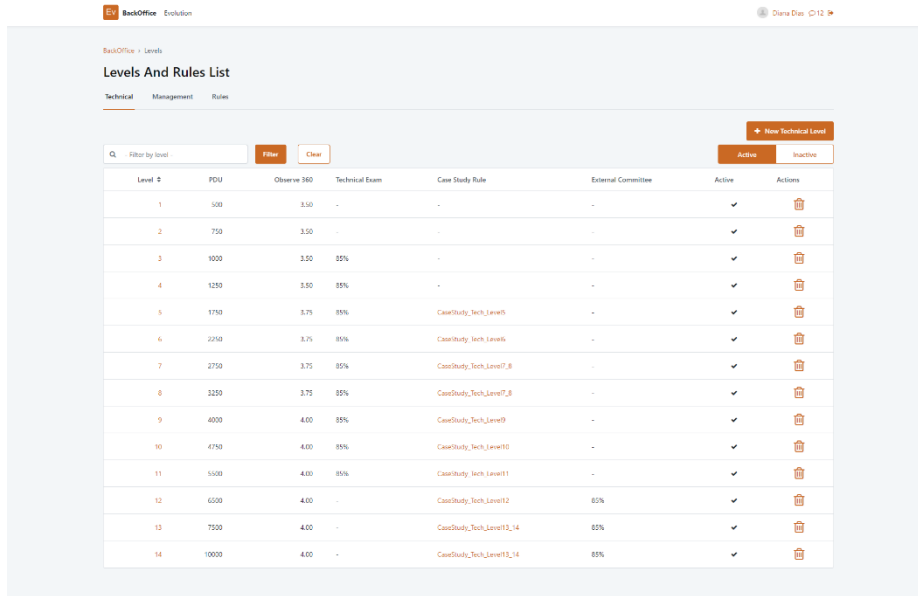
Figure 16 - Example of the Level and Rules List screen in *Backoffice*, with the technical level tab open.

Moreover, the level list page allows adding a new level, technical or management depending on the currently open tab. The level configuration requires some rules, according to the definition of career model. In order to have the available rules to associate a level, previously these rules should be created and configured.
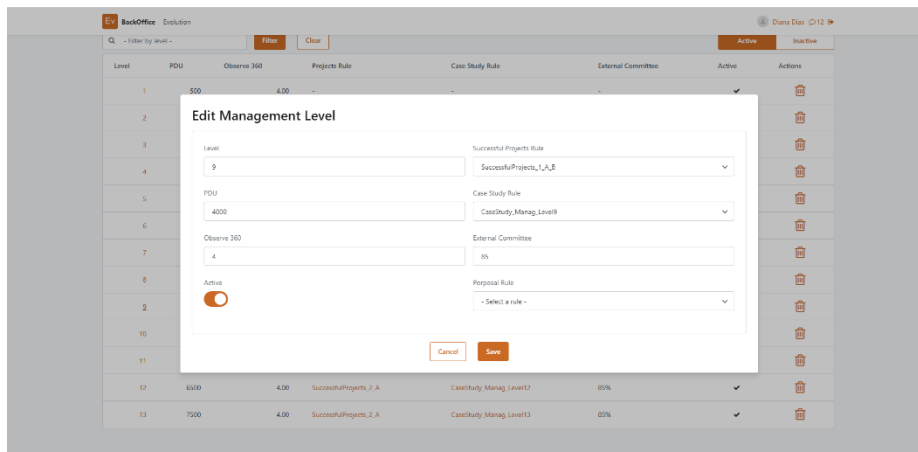
Figure 17 - Example of a Management Level configuration, on Management Level List tab.

The *Rules* tab shows all the existing rules organized in a table with pagination and filter by name, where each rule can be edited or deleted, and a new rule can be added in the *Rules*

tab (Figure 18). Since a rule is created, it can be associated with a level, whether technical or management.
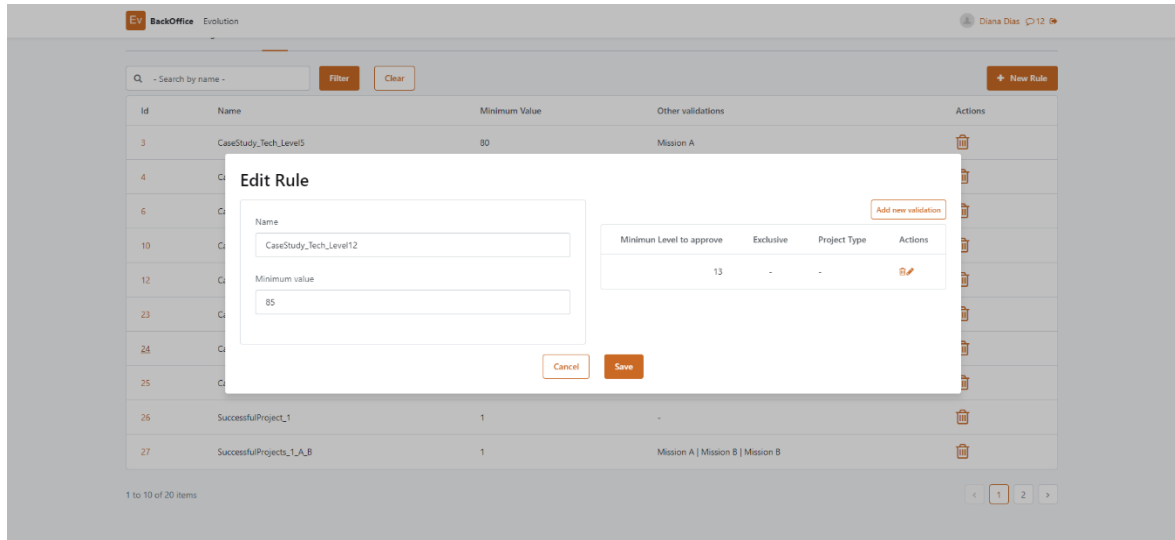
Figure 18 - Example of a Rule configuration, in Rule List tab.

4.2.6 User Dashboard

After a registered user login, the displayed page is the *Dashboard*. This is the Evolution main page, which contains a gallery with several cards to organize the crucial information of the Evolution (Figure 19). The following points clarify the details of each card:

- First, the *Details* card shows the employee's current information, about the project, mentor, career type, level, and PDUs. Here, it is also possible to upload or change the profile photo;

- The *PowerUp* card allows the employee to give a *PowerUp* to another employee, in an anonymous way or not. In this small form to submit the request, the employee should choose the score and justify its option.

- The *Open Tasks* card is organized into three tabs. According to a task type, it is displayed in a specified tab. Each task shows who requested the task, the due date, and the details. In the details popup, it is possible to consult more information, close it, or be redirected to another screen to complete it. There is also, an *All Tasks* link, which redirects the user to a *User Tasks* screen, displaying all user tasks, with the possibility to filter by closed or open, task type, and priority.

- Another card, the *PowerUps Lists*, allows the user to access the last five received and sent *PowerUps*. Each item contains information about who gives/receives it, the

score, and the given justification. Similar to the *Open Tasks* card, an *All PowerUps* link is also available to view the entire list and filter by score or from who gave/to who gave a *PowerUp*. In the *Received* tab, the current bonification value of all PowerUps is also presented.

- In the Evolution career model, there is a mentorship component. The *Mentee* card helps to identify the mentees of an employee. This card also works as a starting point to meetings that a mentor should have with a mentee, like *PowerUp* and *Observe* meetings.

- The *Observ360* card is similar to the *PowerUps Lists*, since it contains a summary of the received and sent *Observe360* forms. Both tabs show the score and form type of each item, but the received tab shows who performed the form, whereas the sent tab shows who received the form.

- The user projects are an important aspect of the career model. In this way, the *Projects* card displays the project name, the employee role (leader or member), and the start/end dates. Each of them is separated by ongoing or past projects.

- The last card on the *Dashboard* page is the *Help* card. This card emerged from the demand to gather feedback from the current users and clarify some doubts about human resources issues. The *Help* card is organized into three sections, i.e., the *Suggestions* tab to collect suggestions among users, the *Bug Report* tab to report defects due to daily utilization of the platform, and the *FAQ* (frequently asked questions) tab to present the recurrent and common issues that *People&Culture* department received.
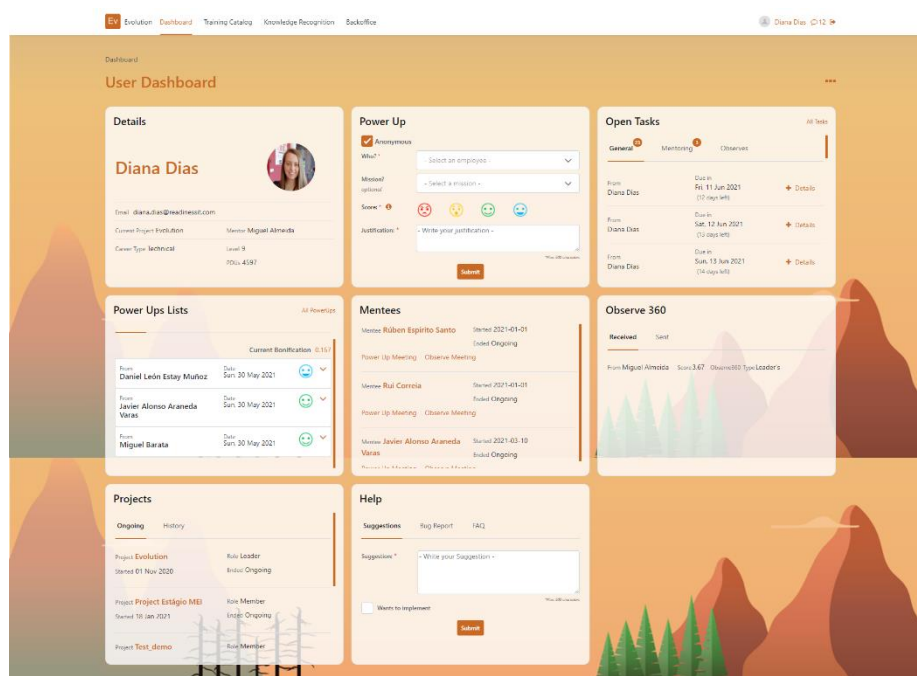
Figure 19 – Dashboard example screen of a user, with all available cards, after performed the login.

4.2.7 *PowerUps* Flow

As described in Method Overview (3.1 section) the *PowerUp* flow is an important component of the Evolution career model. The *PowerUp* flow starts in Dashboard, where an employee awards a *PowerUp* to another one, using the *PowerUp* card and submitting it (Figure 19 – Second card of Dashboard, labeled as "Power Up"). Monthly, there is a meeting (*PowerUp meeting*) between the mentor and mentee to present all *PowerUps* received by the mentee.

A *PowerUp Meeting* page was created to support the mentor during the meeting and to register the meeting notes and details in the platform. The screen contains the list of *PowerUps* received by the mentee, that have not yet been presented in a previous meeting.

Each item from the *PowerUp* list should have an action performed by the mentor, such as approve, reject, send to *People&Culture,* or delay for the next meeting (Figure 20). When a *PowerUp* is fully approved, then the mentee will receive it in the *Received* tab of the *PowerUp Lists* card. If a *PowerUp* is rejected by the mentor, then it is not counted to bonification and does not appear in the received list. The send to *People&Culture* action can be chosen, and the final action (approve or reject) is decided by the human resources department. While the decision is under revision, the *PowerUp* remains blocked, and the

mentor cannot perform any action. Additionally, a *PowerUp* can be delayed to the next meeting, and, in this way, it will appear in the next meeting, but it cannot be delayed again, i.e., it will have only available the approve, reject, or send to *People&Culture* actions.
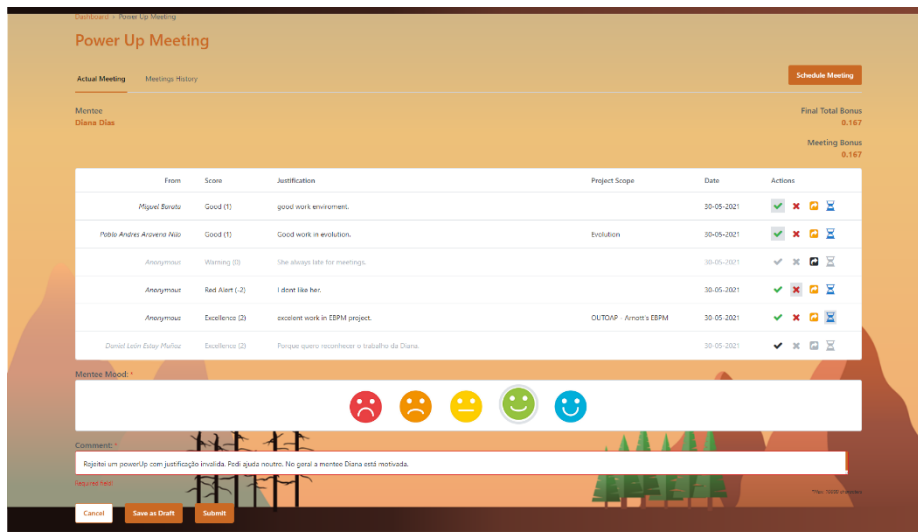
Figure 20 - Example of *PowerUp* Meeting screen, presented to mentor, with a list of *PowerUps* with distinct actions selected, namely, *approved*, *sent to People&Culture*, *rejected*, *delayed*, *approved by People&Culture*.

The action to *People&Culture* will create a revision task in Backoffice. All *PowerUps* sent to *People&Culture* are presented in a paged table on the *PowerUps To Review* page (Figure 21). Clicking in a *PowerUp* under revision (open filter), the authorized user (with *People&Culture* role) is redirected to a detail page.
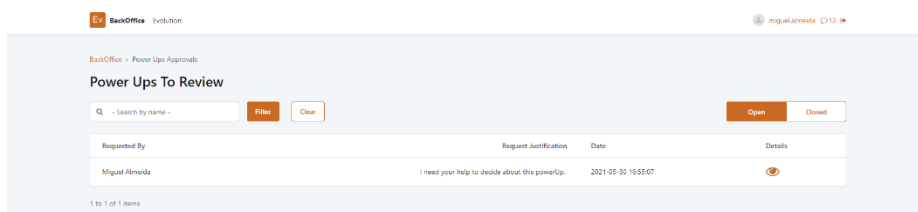
Figure 21 - Example of *PowerUp* Revision screen, available to a user *People&Culture,* in Evolution *Backoffice.*

This detail screen includes all information about the *PowerUp* (score, who performed it, and justification) and the mentor's justification to request this revision (Figure 22). So, the *People&Culture* user can approve or reject, and after this, in the *PowerUp* meeting screen, the mentor sees the item with a taken action.
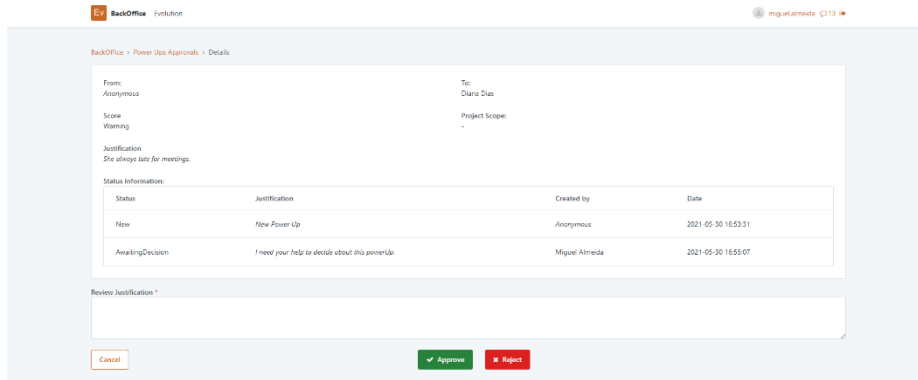
Figure 22 - Example of *PowerUp* Revision details screen, where the *People&Culture* user should perform an action and justify it.

A *PowerUp Meeting* can be saved as a draft or submitted. After submission, the meeting remains in history with all related information (Figure 23). At this moment, the mentee can consult the received and approved *PowerUps* in its card.
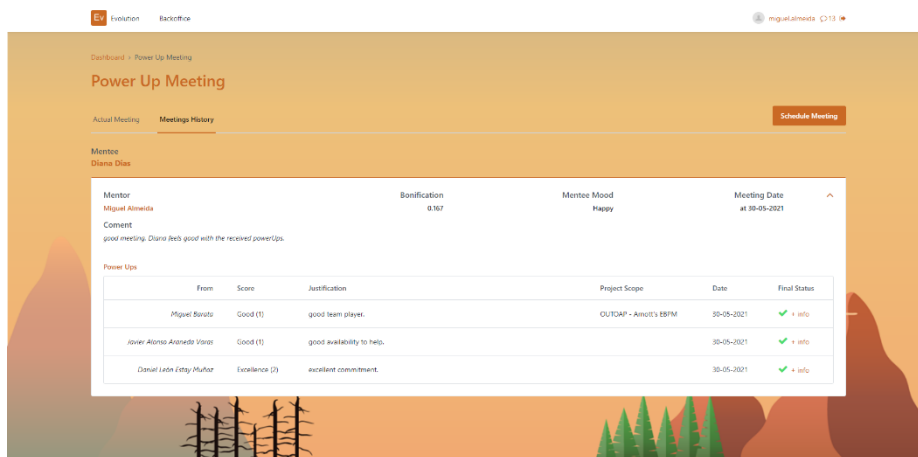
Figure 23 - Example of *PowerUp Meeting* already saved and displayed in *History* tab of *PowerUp Meeting* screen.

4.2.8 *Observe360* Flow

In general, the *Observe360* is a form to evaluate the progression of an employee. The evaluation occurs one time per year (employee's date of joining ReadinessIT) and it contains the evaluation of all persons directly related to the collaborator under evaluation.

The *Observe360* flow of an employee (who is under evaluation) initiates four weeks before the date of joining. In the first phase, for three weeks, all forms should be created (through

"Task Management" in Backoffice) and assigned to the correct collaborator, i.e., a form to the Leader, a form to the Mentor, a form to each Mentee, a form to self, and a form to each project co-worker. Here, it is necessary to scrutinize the past months, since the last *Observe360* moment. Firstly, to consider all possible project leaders and the percentage of time across this period. Second, to consider all projects that the employee was involved in order to analyze the possible co-workers and their time percentage. Moreover, if the employee is a mentor, it is needed to capture the corresponding mentee's information. When some of these parts do not exist, the respective percentage should be shared with the other parts, excluding the *Self* part since it is mandatory.

For an employee with mentorship responsibilities (i.e., is mentor), the common distribution of form weights is 35% by the leader, 15% by the mentor, 10% by the mentees, 20% by the project co-workers, and 20% of self. On other hand, for an employee without mentorship responsibilities (i.e., is not a mentor), the form weights change to 37,5% by the leader, 17,5% by the mentor, 22,5% by project co-workers, and 22.5% of self (Figure 24).
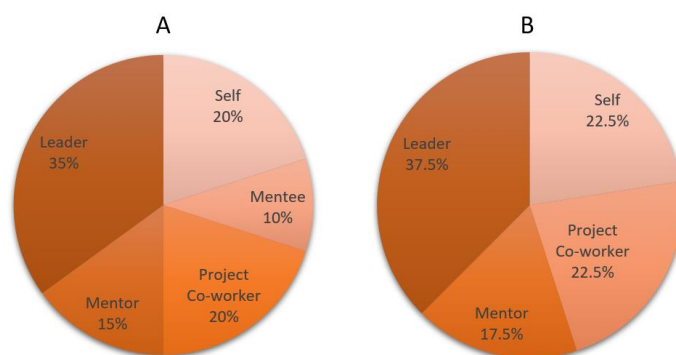
Figure 24 – Distribution of percentages by *Observe* type. (A) employee as a mentor; (B) employee without mentorship responsibilities.

The content and questions of each form change depending on the dimensions under evaluation (e.g., *Responsibility*, *Availability*, *Communication*, *Share*, *Trust*, *Impartiality*, *Commitment*, *Team-Work*, *Self-Sufficiency*, *Rigor*, among others). So, it is needed to have in mind the form type and the corresponding dimensions to correctly compile the form. To accomplish the form filling, each collaborator will have an open task on the *Open Task* card (*Observes* tab) in Dashboard, that redirects to the form page (Figure 25).

Figure 25 – Example of a section of *Observe360* form screen of co-Worker type. The entire form is too long to display in a figure, so it is available in Appendix – A.

Once this phase is finished, a second important one starts, called the *Observe360 Meeting*, which should be registered in the platform (similarly to the *PowerUp* meeting). This meeting should aggregate in a table all the received forms, organized by type, with the respective average score in all dimensions (i.e., questions). This information is analyzed and shows an indicator of "self-perception", i.e., pinning the question score of self-survey, all the other dimensions contain an arrow symbol, indicating if the self-assessment is higher or lower than the average score of the other dimensions' assessment.

In this way, the *Observe360* meeting screen displays a summary of average scores and percentage by type and the final grade (Figure 26). The final grade has in consideration the obtained bonification of *PowerUps* during the current year. Once submitted, the information of the meeting remains in history and can be queried. After that, the employee will receive in their Dashboard the summary of their *Observe360* scores, in the *Observe360* card.
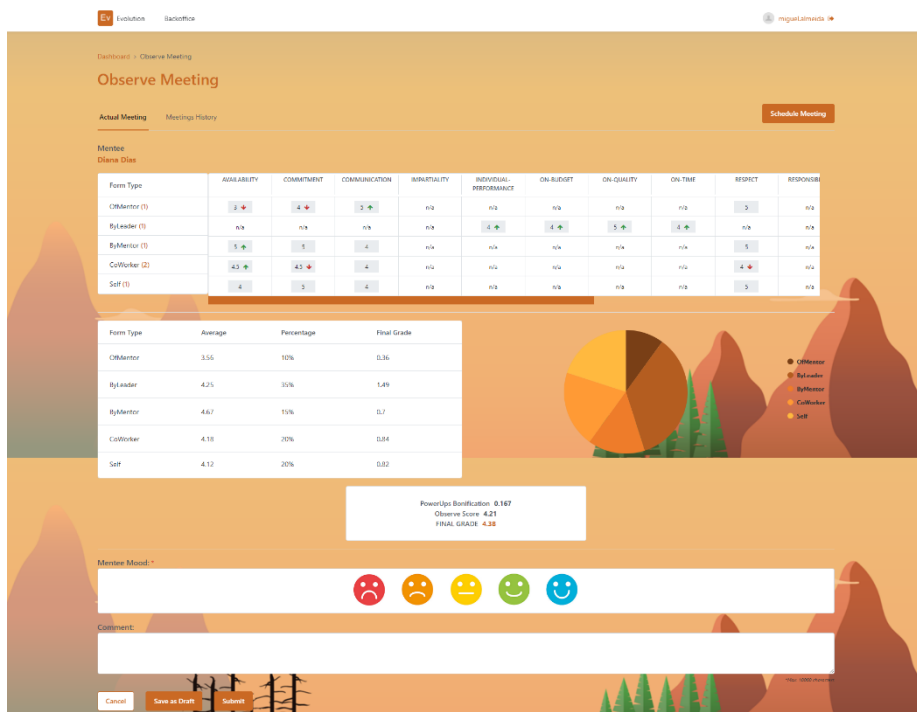
Figure 26 – Example of *Observe360* Meeting screen that is presented to Mentor and contains all relevant information about mentee scores.

4.2.9 *Training Catalog*

The Evolution career model has a catalog of trainings, which should be updated regularly by the *People&Culture* department. In order to update this, it was created in the *Backoffice* a screen to configure and maintain the training list.

From the *Backoffice* main page, it is possible to navigate to training catalog configuration, labeled as "Training Catalog". The *Training Catalog List* page contains all available trainings in Evolution, that are displayed in a table with pagination and can be filtered using a search bar and by active or inactive trainings. When a training is already configured, it is possible to navigate to its details and edit its previous configuration (Figure 27). Each training has a PDU quantity to assign to each employee who applied to it, can be associated with one or more technical and/or management levels, can have other training as precedence, among other details.

RIT Evolution – Career Management Platform
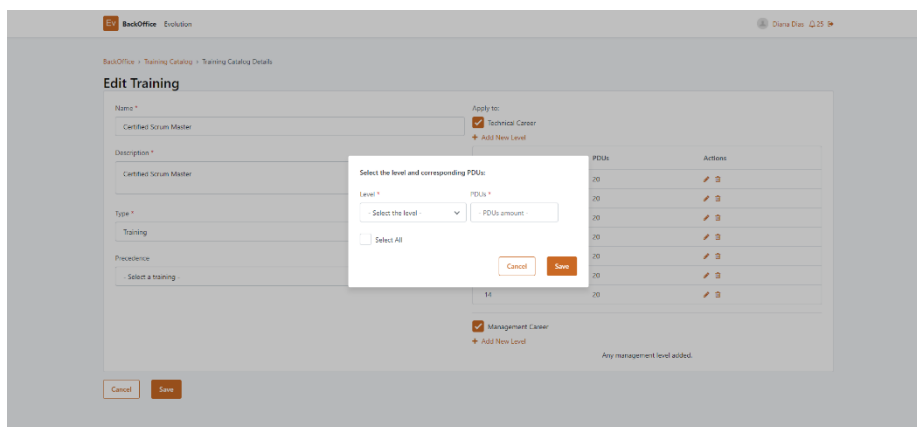
Figure 27 -Example of *Training Catalog* Details screen to configure a training, namely the popup to assign the level and the PDUs.

Once configured, the training becomes available in the Evolution *End User* platform, in the top menu of the Evolution main page. The catalog list is displayed according to the user career type (technical or management), and it highlights the level column of logged employee (Figure 28).
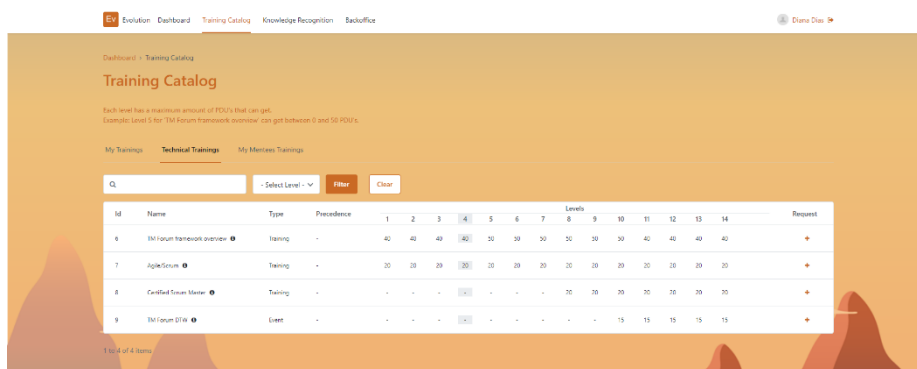
Figure 28 - Example of how the *Training Catalog* list is presented to an Evolution User, where it is highlighted the current user level and the possibility to request the desire training.

For each training, an employee can apply for it, using the "Request" column of the table. This submission will generate an approval flow with three distinct hierarchical levels – Mentor, *System Ninja* department, and *People&Culture* department. At any moment, the employee has access to request status, in the "My trainings" tab. This screen also shows the finished or open trainings.

When the employee submits the training request, the mentor receives a task from the mentee to approve or reject. This task will appear in "Open Task" card in Dashboard.

Moreover, the mentor can access to all requests (open or closed request) in the "My Mentees Trainings" tab (Figure 29). For each one, the details can be consulted, and an action should be performed to proceed with approval flow (in case of approval, because if it is rejected the request is closed).
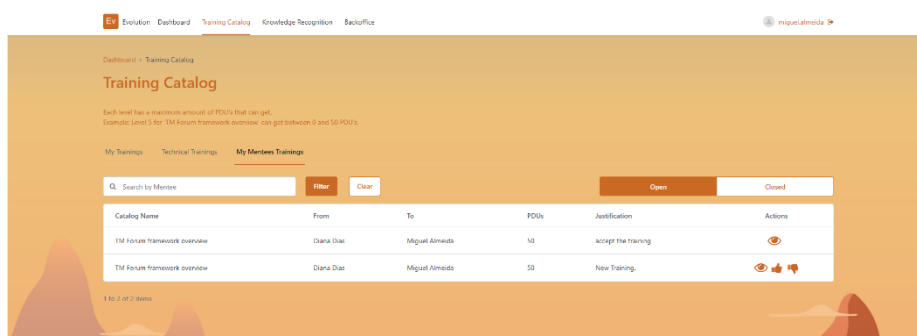
Figure 29 – Example of "My Mentees Training" tab in *Training Catalog* screen presented to a mentor after a training request by a mentee.

Since the remaining approvals are available only to specific roles (*System Ninja* and *Peolple&Culture* roles), it was required the development of a page to manage the training approval in the *Backoffice*. From the *Backoffice* main page, it is possible to navigate to the pending trainings approval, labeled as "Training Approvals" (Figure 30). After mentor, the *System Ninja* department is the next approval stage, which should be done in the "System Ninja" tab. Subsequently, the last approval step (by the *People&Culture* department) can be done in the other tab (labeled as "People&Culture") to finish and close the request.
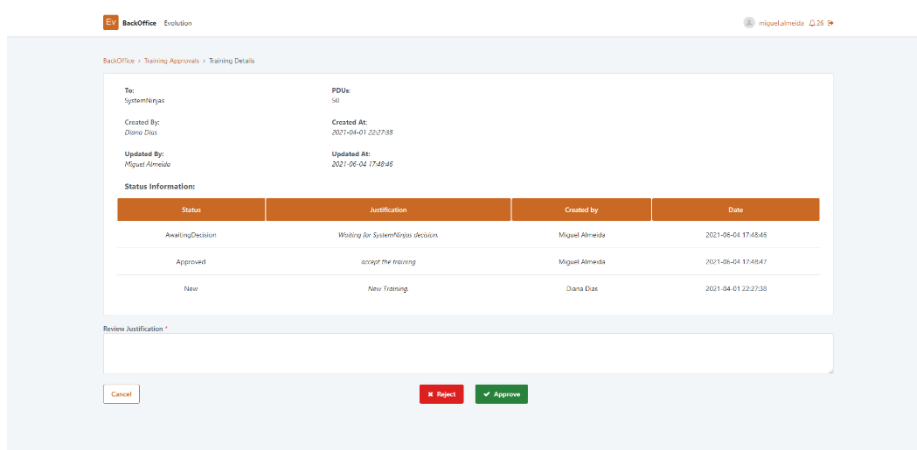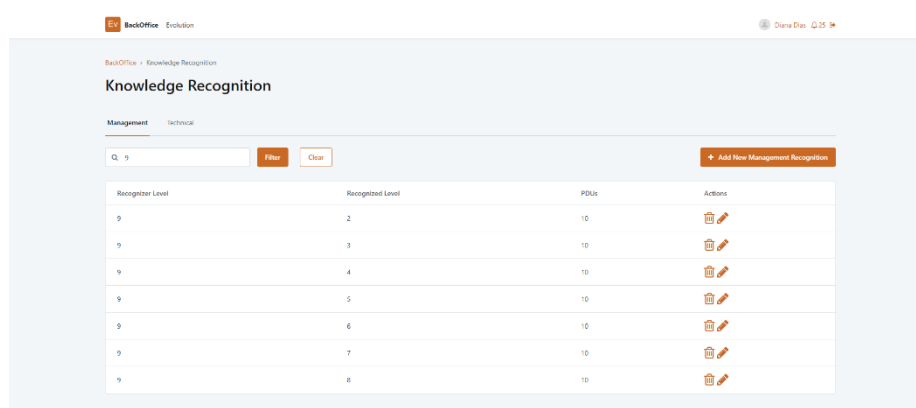
Figure 30 – Example of *Training* Approvals screen, available to a *System Ninja* or *People&Culture,* in Evolution *Backoffice*.

4.2.10 Knowledge Recognition

Knowledge Recognition is a feature available in this career model, that contains some rules, determined by the *People&Culture* department. To configure and support the recognition rules, it was developed a screen in the *Backoffice* area.

From the *Backoffice* main page, it is possible to navigate to recognition configuration, labeled as "Knowledge **Recognition**". The *Knowledge Recognition* page contains all configured recognitions in Evolution, for both career paths (technical and management, separated into two tabs). In both tabs, they are displayed in a table (Figure 31) and can be filtered using a search bar. When a *Knowledge Recognition* is already configured, it is possible to navigate to its details and edit its previous configuration. Each configuration requires the setup of the recognizer and recognized level and the maximum of PDUs that can be given (from recognizer to recognized employee).

Figure 31 – Example of *Knowledge Recognition* List of Management career, filtered by level '9'.

Once configured, the *Knowledge Recognition* information is available in the Evolution *End User* platform, in the top menu of the Evolution main page. The configuration is displayed through a table, crossing the recognizer and recognized levels with the maximum PDUs allowed, and it highlights the level column of logged employee (recognizer perspective) (Figure 32).

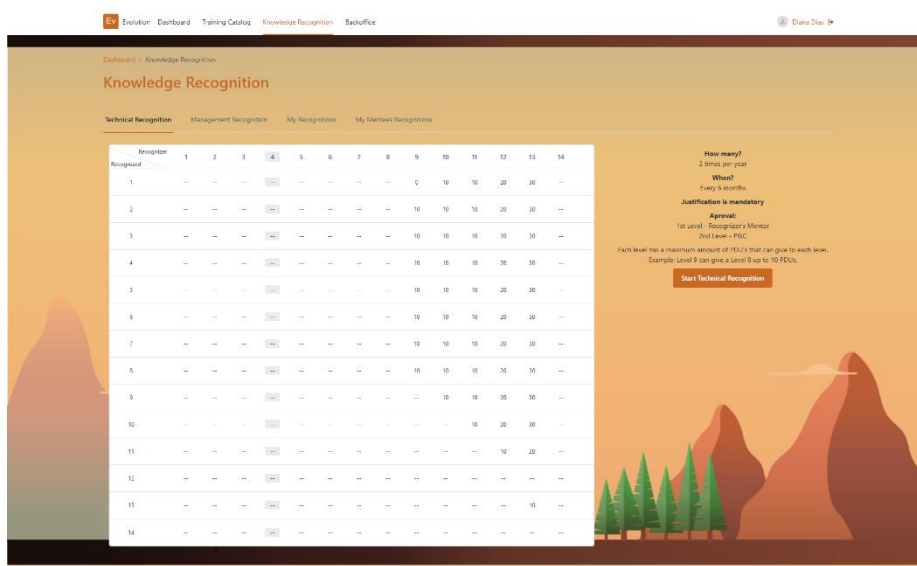**RIT Evolution – Career Management Platform**

Figure 32 – Example of *Knowledge Recognition* page available for all employees, containing information of some rules and the possibility to start a recognition for another employee.

Any employee can start a request to recognition flow, choosing the recognized employee, the PDUs to award, and submitting it. This request requires an approval flow, with two hierarchical levels. From now on, the employee can consult the recognition details, in the "My Recognitions" tab. Here, the recognitions are divided into "Received" and "Sent". In particular, the sent recognitions can be filtered by employee receiver and open/closed request status.

As mentioned before, the employee can start a recognition request and, after that, the corresponding mentor receives a task to approve this request, which appears in the "Open Tasks" card. An action should be performed to proceed with approval flow (in case of approval, because if it is rejected the request is closed). Moreover, the mentor can access to all requests (open or closed request) in the "My Mentees Recognitions" tab (Figure 33). For each one, the details can be consulted.
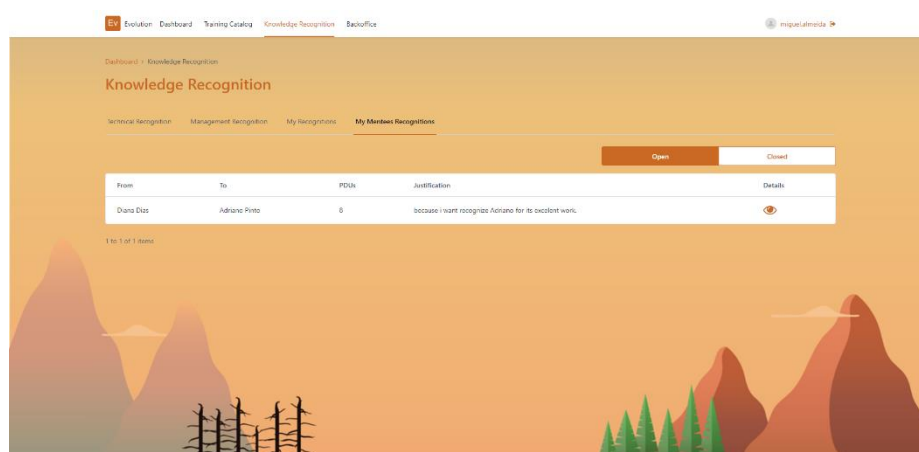
Figure 33 – Example of "My Mentees Recognition" tab in of *Knowledge Recognition* screen presented to a mentor after a recognition request by a mentee.

The second phase of approval is performed by the *People&Culture* department, on the page "Recognition Approvals" in the *Backoffice*. This page displays all the open and closed recognitions, and for each of them, the details can be consulted. On the *Details* page, the recognition history information is presented to the user to take an action (approve or reject) to close the request.

4.2.11 Admin Dashboard

The *Admin Dashboard* is an exclusive feature of Evolution *Backoffice*. The main goal is to provide a full picture of Evolution metrics, like the number of meetings, employee *mood* during the meetings, *PowerUps* average score, and *Observe360* statistics.

Thus, from the *Backoffice* main page, it is possible to navigate to several screens in the *Analytics* separator. The first one is the "Mentor & Mentees" screen, which organizes all ReadinessIT mentors to capture the global distribution of mentees (Figure 34).
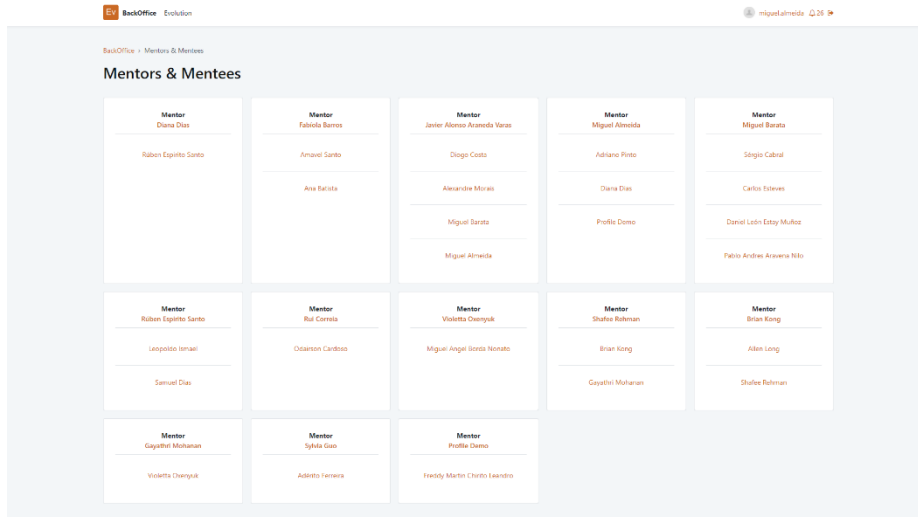
Figure 34 – Example of Mentor & Mentees screen, available in Evolution *Backoffice*.

Regarding *PowerUps* analytics, there is the entire list of *PowerUps* in the company, with several filters and also the metrics derived from this *PowerUps*, like "Meetings Mood", "Score", "Status", illustrated by charts and the total number of meetings, *PowerUps* and its bonification (Figure 35). These data can be filtered in a date range. The *PowerUps Meetings* also contains a screen to verify the monthly status. In this way, the *Admin* can perceive by month the meetings already submitted or in draft status.
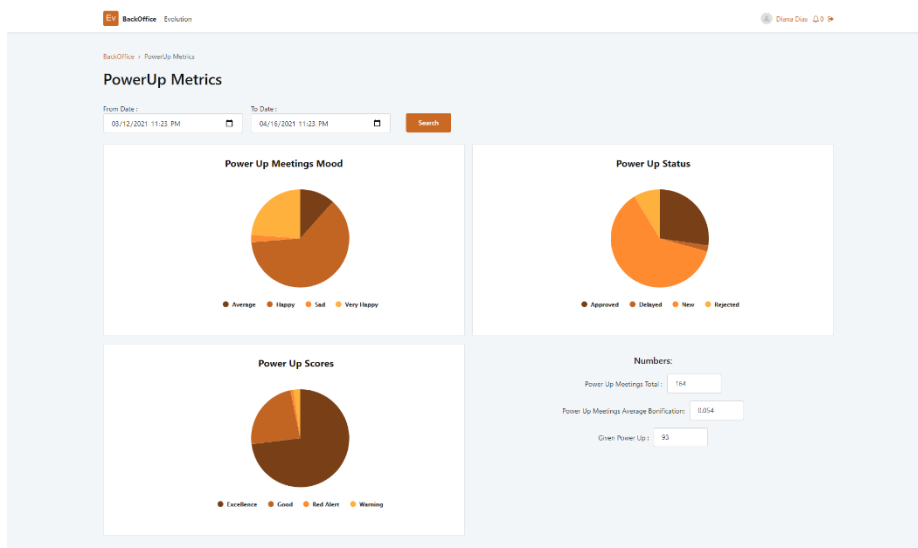

Figure 35 – Example of *PowerUp* Metrics screen, available in Evolution *Backoffice*, displaying data from 15th March to 16th April.

The *Observe360* component has extreme importance since this aggregates several questions, which match with the mission and values of the ReadinessIT company. The possibility to view the average scores by question can be a powerful insight in order to clarify the global status of the company. This screen shows a bar chart and allows some filters (date range and employee) to facilitate the analysis (Figure 36).
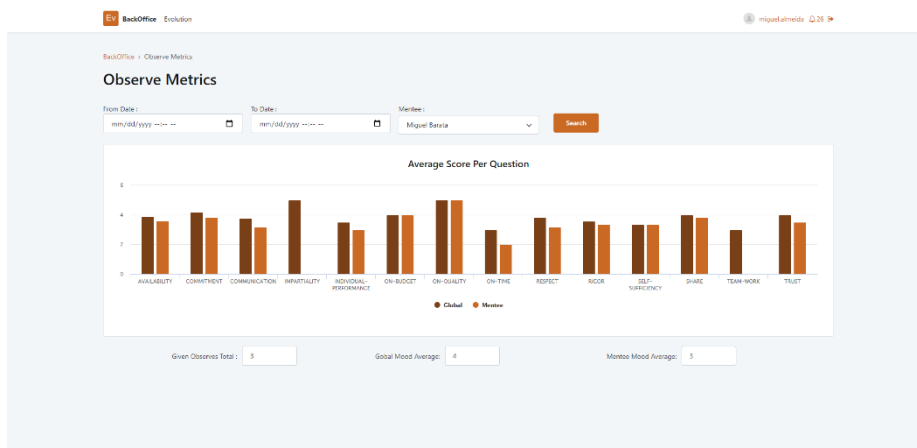

Figure 36 – Example of *Observe360* Metrics screen, available in Evolution *Backoffice*, comprising the average score by question and comparing the global average with the mentee average.

4.2.12 Task Management

Over some flows, like *PowerUps* or *Observe360* for example, it is implicit the accomplishment of a task. This way, the platform includes scheduled actions to create and assign the desired task. For example, the *PowerUp Meeting* should be monthly performed by all mentors and has a monthly associated task that is automatically generated on the 3rd Friday for each month using this approach. Thus, all mentors receive a task in the *Open Task* card to notice the meeting.

However, the Evolution allows the management of several types of tasks, such as a *General* task, *Observe360*, *PowerUp Meeting*, *Survey*, among others. This management can be done on the "Task Management" page of Evolution *Backoffice*. Each task can be configured individually by defining a priority, employee from, employee to, close date, description, and external URL if necessary. Moreover, there is a screen to list all Open/Closed tasks to facilitate the *People&Culture* management and for each item of the list is possible to view the details, close it or edit some configuration. All created tasks will appear in the Dashboard of the addressee employee.

4.2.13 Suggestions, Report Bug and FAQ flow

As mentioned before (4.2.6 section) on the Dashboard page there is a *Help* Card. The original plan did not contain these features, however, the idea to absorb feedback from current final users is important to perform some platform improvements. In this way, new User Stories were added to accomplish that. On Dashboard, every user can submit a *Suggestion*, report a *Bug* and consult the FAQs.

In Evolution *Backoffice* there are news screens to handle these features. Regarding *Suggestions*, it is possible to view the list of suggestions, in a table with pagination and using the filters to search with more detail. Each suggestion has a status to identify the current stage and know if it was implemented or not. Here, it is also possible to export the list to an Excel file.

Additionally, the related bugs (using *Help* card on Dashboard) appear in a paginated table on the *Reported Bug* page, and as usual, can be filtered. Each item in the table can be edited to assign the desired priority and the current status (*new*, *checking*, *solved,* or *rejected*). The information on the table can be exported to an Excel file.

Another component of this card is the FAQs. A new screen in *Backoffice* was created (*FAQs Configuration*) to facilitate the setup of question-answer pairs. The creation can be done in bulk, with the download of a template file, that is filled in with the required information and then upload to the platform.

4.2.14 Deployment

Once a feature is fully developed and tested, it is submitted to the client and latter made available in a production environment.

ReadinessIT Outsystems infrastructure has two distinct environments: development and production. The development environment is used for code development and bug fixing, and user acceptance tests. Once acceptance tests are passed by the client, the Evolution stable code is deployed to a production environment, hence made available to ReadinessIT's employees.

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The deployment process is performed in the *Lifetime* and has various phases that can only be performed by people with specific permissions, normally IT Management people. These phases include:

- Deployment plan creation, where a developer or team leader creates a build for a certain group of applications, in this case, the Evolution platform code;
- Application dependency validation, where the chosen applications are checked regarding other application dependencies or simple version check against what's already in the Production environment is performed;
- Validation result actions, i.e., after validation, the user can proceed with the deploy process if no problems are reported, but if validation error is thrown, it may need to perform manual operations or even code changes to resolve these errors;
- Deploy notes and summary, i.e., it shows to deployer a summary page with the plan information, and allows the responsible person to add some notes that may identify what was deployed or fixed and then proceed to the actual deploy.

Following this process, on 12th of March, the first Evolution deployment was made. The features made available to ReadinessIT employees consisted in:

- The Evolution *Backoffice*, available only the people with the correct privileges where they can access Project and Employee configurations, Project/Employee associations, Level and Rules configuration, and Tasks management;
- Evolution Dashboard, where all employees have access to their user details, can award *PowerUps* to other employees, can view each *PowerUp* they received and sent, have a list of their current and past tasks, and if they are mentors, a list of their current mentees.

The second feature to be available to all employees was the *PowerUp Meetings*. A new deployment on 26th of March was performed. *PowerUp Meetings* were available to be scheduled and managed by the respective ReadinessIT mentors. In *Backoffice*, there were other features available, such as *PowerUp* Reviews, and added some filters in table that were previous delivered. Here, some bugs were identified, including page redirects, and invalid permissions screen.

Due to client change of priorities, the third feature to be implemented, tested, and accepted, to be deployed in production was the Admin Dashboard. The deployment occurred on 15th April and made available to employees with the respective permissions the ability to consult and analyze some career model metrics. Alongside the Admin Dashboard, some bug fixing,

and improvements were also deployed to enhance platform performance and stability (performance in Dashboard loading, for example).

The next delivered feature, after successful testing and client acceptance, was the *Observe360* flow. This feature was deployed on the 1st of June and allows the execution of the annual performance assessment of each ReadinessIT employee.

Training Catalog and *Knowledge Recognition* features are already developed, however per ReadinessIT decided to delay their deployment.

4.2.15 Analytics after Deployment

Currently, the Evolution is used by ReadinessIT since the first delivery in March. The platform contains more than 250 profiles/users and 500 projects configured in the production environment.

As mentioned in section 4.2.14, the platform was deployed to production in March, and after that was possible to analyse some data to understand the impact of Evolution in the ReadinessIT community. In order to collect reliable information, Adérito Ferreira (ReadinessIT CEO) answered some questions (Appendix Part B) about the acceptance and expectation of the Evolution platform. According to him, in the first month, around 90% of *PowerUps Meetings* were accomplished, and about 90 *PowerUps* were given. This means that all mentor-mentee meetings were performed and recorded on the platform, all mentees are accompanied, and the new career model is in use by the community. In the following months, these statistics were maintained, namely, in June, the Evolution has more than 270 *PowerUps* and 285 *PowerUps Meetings*.

The *Observe360* flow for all employees under appraisal will initiate in the middle of June, which is expected to generate a total of 2850 *Observe360* related tasks, indicating the huge number of tasks and forms that Evolution is planned to handle. Moreover, a support team will be allocated to Evolution, to assist and help in the next phases of Evolution.

4.3   Discussion

In general, an industrial project follows an Agile methodology. The Agile methodology is based on incremental deliveries, according to the requirements, and contains a set of phases, i.e., planning, analysis, design, development, and acceptance testing. At the end of each iteration, the work is demonstrated to the stakeholders, to provide continuous feedback. Here, new inputs and insights are welcome to reach the final result.

This way, the Evolution followed the Agile methodology and some delivery phases occurred, in alignment with ReadinessIT priorities. As described in section 4.2.14 - Deployment, several features were frequently delivered. Comparing the results with the initial planning, the deployment task was the one to have some deviations, because the deployment occurred in a phased approach, instead of one full deployment as planned initially. The work distributed along the calendar permits better control of closed features since allows gathering feedback and fix some bugs that appear over time.

In Evolution, there are some flows, like *Training Catalog* and *Knowledge Recognition*, which reveal a higher complexity than initially planned, once, it was required an approval flow was done, with different hierarchical levels. Moreover, the *Observe360* flow also revealed a high development effort due to its numerous business logic. This flow accommodates several combinations to perform the annual employee performance measurement. The combinations should work as the employee annual record in ReadinessIT in the year under evaluation. For example, for an employee, there is the need to collect all the enrolled projects, with the corresponding leaders (and contemplate if they did not change) and co-workers, to transform this into mensurable percentages for each leader and each co-worker, which generates a lot of specific cases making it hard to create generic rules.

Even with these deviations and complexities, other functionalities were added, such as the *Help* card that, in particular, emerged to gather feedback to continuous improvements and support employees to common doubts. As final outcome, 57 User Stories were initial planned, although, 61 were developed and implemented.

Overall, the development, both in *End User* and *Backoffice* sections, the screens were made from scratch, however, there was an effort to keep design consistency to promotes an enhanced *User Experience*.

Chapter 5

5 Conclusion

5.1 Main Conclusions

The current document describes the work developed in the scope of "Project of Dissertation or Internship in Computer Engineering" and "Dissertation or Internship in Computer Engineering", curricular units of Computer Engineering Master, in collaboration with ReadinessIT company.

The work was divided into two main phases. In the first phase, the main objective was to complete the work planning and define goals (chapters 1 to 3). In the second phase, the global aim was to implement and develop the work proposed, which is presented in chapter 4.

The entire project was developed using Agile methodology. The Agile methodology that is part of the spirit of the company, and that best adapts to the circumstances of today's business, anticipates these changes in context according to priorities.

The Evolution emerged from ReadinessIT career model reformulation. In general, it supports the human resource department (labeled as *People&Culture*) to manage the performance of all ReadinessIT employees, covering different career paths (Technical and Management careers). Furthermore, all ReadinessIT employees can use the platform to award a colleague, consult tasks, and check performance evaluation data, among other functionalities. From the administrator view, the analytics and metrics section helps the administration to get the global perception of the company and capture the full picture of assessment processes, in real time. This can provide powerful insights of their teams, which helps to detect problems early or recognize a positive impact.

The *Observe360* flow together with architecture and data model definition were the major challenges, since this should be planned to keep in mind that Evolution generates a huge amount of data. However, after technical discussions and exploration, the architecture and data model were defined and maintained updated.

Since the functional design and development of the Evolution were mostly dependent on this practical work in alignment with project manager, this work had the responsibility to organize new implementations and developments, following project priorities. Having the

full picture of Evolution requirements, it could combine the best technical solutions to create the best design and performance, always having into account the user's experience. Thus, this development autonomy allowed the growth both technically and personally (soft skills).

5.2   Future Work

The Evolution is an open project, i.e., new functionalities will be added to meet the continuous improvements that can be suggested.

Firstly, in *Backoffice*, the possibility to allow the creation of dynamic forms and, after that launch, the correspondent task to collect the employee replies, can be helpful to *People&Culture* staff, since they can gather in one platform all the survey data along the year and understand the missing answers.

Further, an in-app notification system will be advantageous, since after login the user quickly realizes the new tasks or new updates of their requests.

Lastly, the use of the Case Management Framework can be beneficial to manage the various approval flows. This tool is a native Outsystems framework that accelerates the creation of business processes, through Business Process Technology (BPT). With this, the approval flows should be rapidly adapted to new rules or even accepted delegations for these activities.

Even with all the planned features developed, others can be included to improve and add more value to the Evolution platform.

6 Bibliography

[1]   J. H. Greenhaus, G. A. Callanan and V. M. Godshalk, Career management, Sage, 2010.

[2]   A. S. Leung, "The big five career theories," in *International handbook of career guidance*, Dordrecht, Springer, 2008, pp. 115-132.

[3]   R. V. Dawis, "Person-environment-correspondence theory," in *Career choice and development*, San Francisco, Jossey-Bass, 2002, pp. 4, 427-464..

[4]   J. L. Holland, Making vocational choices: A theory of vocational personalities and work environments, Psychological Assessment Resources, 1997.

[5]   D. E. Super, "A life-span, life-space approach to career development," *Journal of vocational behavior,* vol. 16, no. 3, pp. 282-298, 1980.

[6]   L. S. Gottfredson, "Gottfredson's theory of circumscription, compromise, and self-creation," *Career choice and development,* vol. 4, pp. 85-148, 2002.

[7]   L. S. Gottfredson, "Circumscription and compromise: A developmental theory of occupational aspirations," *Journal of Counseling psychology,* vol. 26, no. 6, p. 545, 1981.

[8]   R. W. Lent, G. Hackett and D. S. Brown, "Social cognitive career theory," *Career choice and development,* vol. 4, pp. 255-311, 2002.

[9]   J. H. Greenhaus, G. A. Callanan and V. M. Godshalk, "Career Management in Work Organizations," in *Career Management for Life*, New York, Routledge, 2018, pp. 401-434.

[10]   A. F. Martin, F. P. Romero, C. R. Valle and S. L. Dolan, "Corporate business strategy, career management and recruitment: Do Spanish firms adhere to a contingency model?," *Career Development International,* 2001.

[11]   S. Bagdadli and M. Gianecchini, "Organizational career management practices and objective career success: A systematic review and framework," *Human Resource Management Review,* vol. 29, no. 3, pp. 353-370, 2019.

[12]   J. E. Rosenbaum, "Career mobility in a corporate hierarchy," Academic Press, New York, 1984.

[13]   E. K. Kram and A. I. Lynn, "Mentoring alternatives: The role of peer relationships in career development," *Academy of management Journal,* vol. 28, no. 1, pp. 110-132, 1985.

[14]   S. Jeong and S. Park, "Mentoring in the Human Resource Development Context," *The Wiley International Handbook of Mentoring,* pp. 45-63, 2020.

[15]   E. A. Ensher and S. E. Murphy, "E-mentoring: Next Generation Research Strategies and Suggestions," in *The handbook of mentoring at work: Theory, research, and practice*, Los Angeles, Sage Publications, 2007, pp. 299-322.

[16]   L. M. Finkelstein and M. L. Poteet, "Best Practices in Workplace Formal Mentoring Programs," in *The Blackwell Handbook of Mentoring: A Multiple Perspectives Approach*, Blackwell Publishing Ltd, 2007, pp. 345-367.

[17]   M. R. Edwards and A. J.Ewen, 360° Feedback: The Powerful New Model for Employee Assessment & Performance Improvement, Amaocn, 1996.

[18]   A. H. Church, D. W. Bracken, J. W. Fleenor and D. S. Rose, Handbook of Strategic 360 Feedback, Oxford: Oxford Universsity Press, 2019.

[19] D. W. Bracken, D. S. Rose and A. H. Church, "The Evolution and Devolution of 360° Feedback," *Industrial and Organizational Psychology,* vol. 9, no. 4, pp. 761-794, 2016.

[20] M. Mohapatra, "Mohapatra, M. (2015). 360 degree feedback: A review of literature," *Research Scholar of Management KIIT University Bhubaneswar Orissa,* vol. 2, no. 1, pp. 112-116, 2015.

[21] G2.com, "Workday HCM Review 2021," G2.com, 2021. [Online]. Available: https://www.g2.com/products/workday-hcm/reviews. [Accessed 02 January 2021].

[22] G2.com, "Lattice Performance Management Review 2021," G2.com, 2021. [Online]. Available: https://www.g2.com/products/lattice-performance-management/reviews. [Accessed 02 January 2021].

[23] G2.com, "Fuel50 Reviews 2021," G2.com, 2021. [Online]. Available: https://www.g2.com/products/fuel50/reviews. [Accessed 03 January 2021].

[24] G2.com, "15Five Continuous Performance Management Reviews 2021," G2.com, 2021. [Online]. Available: https://www.g2.com/products/15five-continuous-performance-management/reviews. [Accessed 03 January 2021].

[25] Workday, Inc, "HCM and Human Capital Management Software | Workday," Workday, Inc., 2020. [Online]. Available: https://www.workday.com/en-us/products/human-capital-management/overview.html. [Accessed 27 December 2020].

[26] Lattice, "Lattice Overview | People Management Platform," Lattice, 2020. [Online]. Available: https://lattice.com/platform. [Accessed 28 December 2020].

[27] Fuel50, "Fuel50 - Discover the Award winning Talent Experience Plataform," Fuel50, 2020. [Online]. Available: https://www.fuel50.com/platform/. [Accessed 29 December 2020].

[28] 15Five, "15Five's Evidence-based Performance Management Software," 15Five, 2021. [Online]. Available: https://www.15five.com/product/. [Accessed 30 December 2020].

[29] Deloitte Touche Tohmatsu Limited, "Global Human Capital Trends 2016 - The new organization: Different by design," Deloitte University Press, 2016.

[30] Outsystems, "Developing with Outsystems | Evaluation Guide," Outsystems, [Online]. Available: https://www.outsystems.com/evaluation-guide/developing-with-outsystems/. [Accessed 3 March 2021].

[31] Outsystems, "Setting Up OutSystems," Outsystems, 24 February 2021. [Online]. Available: https://success.outsystems.com/Documentation/11/Setting_Up_OutSystems. [Accessed 21 March 2021].

[32] Outsystems, "Service Studio Overview," Outsystems, 04 December 2020. [Online]. Available: https://success.outsystems.com/Documentation/11/Getting_started/Service_Studio_Overview. [Accessed 21 March 2021].

[33] Outsystems, "Outsystems platform Services," Outsystems, [Online]. Available: https://www.outsystems.com/evaluation-guide/platform-services/. [Accessed 20 March 2021].

[34] Outsystems, "OutSystems development and management tools," Outsystems, [Online]. Available: https://www.outsystems.com/evaluation-guide/development-and-management-tools/. [Accessed 21 March 2021].

[35] Outsystems, "Managing the Applications Lifecycle," Outsystems, 20 Octuber 2020. [Online]. Available: https://success.outsystems.com/Documentation/11/Managing_the_Applications_Lif ecycle. [Accessed 21 March 2021].

[36] Outsystems, "Application Architecture: Best Practices for Future-Proofing Your Apps," 21 August 2020. [Online]. Available: https://www.outsystems.com/blog/posts/application-architecture/. [Accessed 28 March 2021].

[37] Outsystems, "The Architecture Canvas," 18 March 2021. [Online]. Available: https://success.outsystems.com/Support/Enterprise_Customers/Maintenance_and_O perations/Designing_the_Architecture_of_Your_OutSystems_Applications/The_Ar chitecture_Canvas. [Accessed 28 March 2021].

[38] Outsystems, "Validating your application architecture," 18 March 2021. [Online]. Available: https://success.outsystems.com/Support/Enterprise_Customers/Maintenance_and_O perations/Designing_the_Architecture_of_Your_OutSystems_Applications/Validati ng_your_application_architecture. [Accessed 28 March 2021].

[39] Replicon, "Time Tracking Software Suite | Replicon," Replicon, [Online]. Available: https://www.replicon.com/. [Accessed 1 March 2021].

[40] Replicon, "Viewing the available API operations | Replicon," Replicon, [Online]. Available: https://www.replicon.com/help/viewing-the-available-api-operations/. [Accessed 1 March 2021].

[41] Zoho , "HR Software Solution | Zoho People," Zoho, [Online]. Available: https://www.zoho.com/people/. [Accessed 2021 20 March].

[42] Outsystems, "Platform Runtime," Outsystems, [Online]. Available: https://www.outsystems.com/evaluation-guide/platform-runtime/. [Accessed 20 March 2021].

7 Appendix

<u>Part A</u>

Example of Co-worker form of an *Observe360*

Part B

Interview with Adérito Ferreira | ReadinessIT CEO | 2nd June 2021

Como surgiu o projeto Evolution? Quais as necessidades que veio dar resposta?

"O *Evolution* surgiu, tal como o próprio nome indica, da necessidade de evolução do anterior modelo de carreia da ReadinessIT. Tínhamos um modelo de carreira muito estático e conservador. Assim sentimos necessidade de criar um modelo onde as pessoas tivessem a carreia na sua mão e onde o próprio modelo fosse uma ferramenta de evolução. Tudo baseado na sua essência, isto é, a progressão e os caminhos que as pessoas pretendem para a sua vida profissional, tudo com base nessa premissa e responder às várias velocidades que as pessoas querem imprimir, estabelecendo o melhor equilíbrio pessoal e profissional. Isto porque nem sempre aquilo que as empresas querem é aquilo que pessoa pode dar naquele momento e naquele contexto. Por isso o modelo tinha que ser flexível, e que fosse um modelo transparente. Daí criamos então o modelo *Evolution*, com as PDUs (*professional development units*), o sistema de *mentoring*, os *PowerUps*, entre outros componentes. Este modelo que criámos é simples, mas bastante sofisticado ao mesmo tempo. Validámos o modelo com a *Great Places To Work* que nos tem assessorado ao longo destes 3 anos e nos elogiou pelo modelo que criámos. Posto isto, temos o modelo e as regras, no entanto, há que agilizar todos os processos, com transparência para todos os envolvidos (mentor, mentee, líder, *co-workers*, *project co-workers*). E assim, precisávamos de uma plataforma que suportasse todo este mecanismo de evolução, para o registo das *PowerUps*, das *meetings*, e de todas estas funcionalidades que criámos na plataforma. Portanto a necessidade surgiu daí, primeiramente desenvolver este modelo para responder à tal evolução daquilo que existia, e também para promover a evolução profissional dos colaboradores da ReadinessIT. "

Quais os benefícios que a plataforma veio trazer para os colaboradores ReadinessIT? E para a o departamento People&Culture?

"Os benefícios são fundamentalmente a transparência do modelo de carreira, permitir aos colaboradores terem claro os caminhos que podem traçar, o que lhes falta e o que podem conseguir para evoluir ao ritmo que desejam. Mas, por outro lado, trouxe também uma ligação com as pessoas, através dos *PowerUps*, uma transparência e equidade entre a comunidade. Para o departamento de *People&Culture*, isto vem ajudar muito a organização

a atuar mais rapidamente sobre um tema ou que é preciso correção ou sobre um tema que merece reconhecimento. Tem presente vários aspetos que auxilia o departamento. Por outro lado, associado ao *Evolution* temos o processo de avaliação *Observe360*, onde automaticamente todos os envolvidos no processo de avaliação de alguém irão receber as tarefas e o formulário personalizado dependendo do contexto da pessoa. No entanto, também conseguimos saber o *Mood* da empresa, e para isso basta analisarmos os *PowerUps* que estão a ser dados, ou se quisermos avaliar e saber se as reuniões mentor-mentee estão a acontecer. De facto, isto são benefícios excelentes para *People&Culture*, porque tem tudo centralizado e digitalizado."

Até ao momento como vê a aceitação da plataforma Evolution na comunidade ReadinessIT?

"Como qualquer novidade, tem sempre um processo de aceitação. Mas surpreendentemente nós tivemos uma excelente aceitação logo de início. Quando nós temos no primeiro mês 90% de *PowerUps meetings* realizadas, significa que todas as pessoas falaram com o seu mentor, todo o *mentee* teve uma conversa de acompanhamento, e isso está refletido e registado na plataforma. Acho que os resultados são excelentes, nós nunca tivemos esta sistematização e uma ferramenta que suportasse isto. Antes eram avaliações clássicas, suportado em ferramentas igualmente clássicas, e desta forma a plataforma veio agilizar em muito este processo de registo, criação de memória de acompanhamento contínuo das pessoas."

No geral, desde a ideia inicial ao estado atual do projeto, é um projeto que está a ir ao encontro das expectativas?

"A plataforma respondeu e superou as expectativas. Nunca pensámos que em tão pouco tempo e os recursos disponíveis construíssemos o que temos agora. Veio abrir um conjunto de ideias, e induziu outras ideias para continuar a evoluir a plataforma. Isto porque ter a informação centralizada, ter a capacidade de *analytics*, e a capacidade de comunicar com as pessoas através de uma plataforma destas, fez-nos sonhar com o que podemos incluir ainda mais aqui. E de facto queremos pegar nisto e torná-lo na plataforma de comunicação e de iteração com o colaborador. Vamos passar a ter os nossos processos de recursos humanos típicos a partir daqui, porque aqui tudo gira a volta da pessoa. No fundo a plataforma superou as expectativas e abriu nos horizontes para implementar muito mais funcionalidades na plataforma."