

# A longitudinal case study on HR Analytics capability development: The role of individuals, processes, and structures

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**Abstract:** Despite the increasing academic and managerial interest in HR Analytics (HRA), current research provided limited contributions on HRA development and its microfoundations. To fill gap, this paper aims at analysing how HRA capabilities are created and developed over time, deepening individual actions and interactions with other individuals, processes, and technological and hierarchical structures. This research is based on a longitudinal case approach on the evolutionary path of a global organisation facing a 3-year project for HRA development. The in-depth analysis is based on the collection and triangulation of unique data (i.e. 24 transcribed interviews, participant observations, secondary data), obtained through continuous interaction with relevant managerial and operational figures. Our findings provides contributions on how HRA capabilities are created and developed over time through microfoundational actions and interactions. First, we identified six phases for capability development, each characterised by different microfoundational dynamics: (i) Informal development; (ii) Persuasion; (ii) Legitimation; (iv) Formal development; (v) Integration; and (vi) Maturity. Second, we revealed how microfoundational actions and interactions change over time, moving from a focus on individuals to the involvement of processes and hierarchical structures. Third, we provide insights into the fundamental factors for completing the transition from individual-level to firm-level HRA capabilities, including the definition of specific roles, responsibilities, rules, and best practices. Finally, we discuss HRA governance and the HR transformation due to integration of analytics into the firm. Research findings are synthesised into theoretical and practical contributions, enriching prior discussion on how HRA capabilities emerge and develop over time through its microfoundations. Future research directions are proposed to fill research limitations and deepen emerging themes.

**Keywords:** HR Analytics; Workforce analytics; People analytics; Human capital analytics; Microfoundations; Organisational capability.

## 1. Introduction

The diffusion of digital technologies increase the opportunities for organizations to collect, store, and analyse data about their employees (Fernandez and Gallardo-Gallardo, 2020; Wang et al., 2022). Human Resource (HR) departments, thus, are progressively employing HR Analytics (HRA) practices to enhance people management (Davenport, 2018; Shet et al., 2021), including sentiment analysis (Gelbard et al., 2018), predictive models for turnover (Rombaut and Guerry, 2019), and automated screening processes (Yoon, 2021). Practitioners consider HRA as one of their business priorities for the coming years (Deloitte, 2018) and one of the main objectives for their HR departments (Andersen, 2017; Tursunbayeva et al., 2021). Interest and adoption, however, do not go hand in hand (Thakral et al., 2023), with most firms struggling in HRA development (Fernandez and Gallardo-Gallardo, 2021; Giermindl et al., 2021; Conte and Siano, 2023). Researchers and practitioners agree that these difficulties are mainly related to a “capability gap” (Deloitte, 2018; Minbaeva, 2018), which refers to the difference between current analytics capabilities and those required for the systematic implementation and use of HRA practices (Deloitte, 2018).

Academics discussed HRA using different labels, definitions, and conceptualisations (Marler and Boudreau, 2017; Qamar and Samad, 2021), generally defining it as an evidence-based approach that supports people management through the application of analytics and statistical techniques (Edwards, 2022), ranging from descriptive analysis to prescriptive models (Margherita, 2021). In recent years, scholars defined HRA as an organisational capability (Teece et al., 2000; Winter, 2000), stressing its complex and compositive nature (Levenson and Fink, 2017; Minbaeva, 2017; Levenson, 2018) and its link with organisational competitive advantage (Samson and Bhanugopan, 2022; McCartney et al., 2020). Building and developing HRA as an organisational capability, indeed, ensure the generation of organisational value and strategic advantage through the systematic use of data and analytics to support people-related decisions (Levenson, 2018; Samson and Bhanugopan, 2022). Falletta and Combs (2022) defined HRA capability as a proactive and systematic process for collecting, analysing, communicating, and using data and analytics in HR management to support organisations in achieving their goals and objectives. Minbaeva (2018), then, explained that HRA capability is rooted in three microfoundational pillars – i.e. individuals, processes, and organisational structures (Felin and Pedersen, 2014; Felin et al., 2015) – and different dimensions – i.e. data quality, analytics, and strategic ability to act. Managerial research, indeed, explained that how organisational capabilities are built, developed, maintained, and leveraged depends on their constituent microfoundations and their interactions (Foss, 2005; Felin and Pedersen, 2014).

Despite a surge in interest, academic research on how firms could successfully develop HRA is still scarce (McIver et al., 2018; Greasley and Thomas, 2020; Falletta and Combs, 2021; Larsson and Edwards, 2021; Qamar and Samad, 2021; Ramachandran et al., 2023). Most of existing studies are purely conceptual (e.g. Andersen, 2017; Boudreau and Cascio, 2017) or literature reviews (e.g. Coron, 2021; Margherita, 2021; Arora et al., 2022) that provide minimal contributions on HRA development (Marler and Boudreau, 2017; Minbaeva, 2018; Qamar and Samad, 2021). Additionally, several papers on HRA provides contributions on specific analytics techniques (e.g. Rombaut and Guerry, 2019; Kiran et al., 2023) or practices (e.g. Pessach et al, 2020; Vardarlier and Zafer, 2020), that, albeit being useful for understanding how solving specific problems (e.g., employee turnover), do not explain how to develop HRA capabilities and integrate these solutions in existing organisational structures (McCarney and Fu, 2023; Thakral et al., 2023). Eventually, recent research emphasised the “pressing need for empirical studies” analysing the interactions among organizational members, processes, technologies, and organisational structures during HRA development (Minbaeva, 2018; Greasley and Thomas, 2020; Gal et al., 2020; Fernandez and Gallardo-Gallardo, 2020; Wirges and Neyer, 2022; Ramachandran et al., 2023).

To fill these gaps, this research aims at analysing how HRA capabilities are created and developed over time through its microfoundations (Foss, 2005; Abell, Felin and Foss, 2008; Felin et al., 2012; Foss and Pedersen, 2014; Felin et al., 2015). The microfoundation approach focuses on how micro-level factors (i.e. specifically individuals, processes, and structures) determines the emergence and development of organisational phenomena (Felin et al., 2012; Foss and Pedersen, 2014). This research, thus, investigates how microfoundational actions and interactions determines HRA capability emergence and evolution, deepening the transition from individual-level to firm-level capabilities (Bingham et al., 2019; Bağış et al., 2022). This approach enhances our understanding on how HRA capabilities are built, developed, managed, leveraged, and maintained over time (Foss, 2005; Felin et al., 2012; Foss and Pedersen, 2014), providing relevant theoretical and managerial contributions (Coleman, 1990; Felin et al., 2012; Felin et al., 2015). More specifically, this research will be framed across 2 research questions (RQs):

- How do individuals act and interact with other individuals, processes, and structures during the emergence and development of HRA capabilities?
- How do individual actions and interactions among individuals, processes, and structures affect the emergence and development of HRA capabilities?

In order to address the outlined RQs, this research adopts a longitudinal case study (Corbin and Strauss, 1990; Eisenhardt and Graebner, 2007; Eisenhardt et al., 2016) on the evolutionary path of a firm – i.e. *Tyche* - facing a 3-year project for HRA development, responding to the call of Larsson and Edwards (2021) and McCarney and Fu (2023) for more empirical and longitudinal research on HRA. The in-depth analysis is based on the collection and triangulation of unique data (e.g., interviews, notes, internal documents, analytics reports, etc.), obtained from the continuous interaction with managers and other figures within the organization. This paper provides important contributions to the literature by integrating theories on HRA (e.g. Minbaeva, 2018), organizational capabilities (e.g. Teece et al., 2000), and microfoundations (e.g. Felin et al., 2015). First, our findings demonstrate that HRA capability development goes through six phases, each characterised by different microfoundational dynamics: (i) Informal development; (ii) Persuasion; (iii) Legitimation; (iv) Formal development; (v) Integration; (vi) Maturity. Second, we reveal that microfoundational actions and interactions change over time, according to the shifting importance of each microfoundational pillar (i.e. individuals, processes, structures). Third, this research provides theoretical and practical contributions on HRA development explaining how the transition from individual-level capabilities to firm-level capabilities. More specifically, our findings reveal that this transition occurs based on a gradual existence and three main stages. Eventually, we discuss the emergence and definition of HRA structures and processes and their effect on the HR department and its professionals.

The rest of the paper is structured as follows. The next section resumes academic contributions on HRA development (e.g. Minbaeva, 2018), organizational capabilities theories (e.g. Teece et al., 2000), and the microfoundational approach (e.g. Felin et al., 2015). The third section describes the methodology used in this study. The fourth and fifth sections reports and discuss research findings. Eventually, the last section presents practical and theoretical contributions, highlighting research limitations and providing directions for future research.

## **2. Theoretical background**

### **2.1. HR Analytics as an organizational capability**

An increasing number of scholars approach HRA as an organisational capability (e.g. Minbaeva, 2018; Levenson, 2018; Shet et al., 2021; Belizon and Kieran, 2022; Samson and Bhanugopan, 2022), analysing its emergence, development, and promised outcomes (McCarney and Fu, 2023; Thakral et al., 2023). An organisational capability refers to the ability of a firm to reach an intended outcome using specific organizational resources and performing a coordinated and repeated set of activities (Winter, 2000; Helfat and Peteraf, 2003; Teece, 2019). Through the repeated and reliable execution of analytics activities on different people-related issues, HRA can generate values and competitive advantage for the whole organisation (Minbaeva, 2018; Levenson, 2018). In this regard, the capability theory explains how capabilities are created, built, employed, and how the relative value is captured (Teece, 2017).

Previous research explained that organizational capabilities arise from an effective integration of different resources, processes, and organisational structures (Teece, 2019). Their improvement path depends on a complex set of factors, including learning-by-doing and resource investments over time (Helfat and Peteraf, 2003). In this regard, HRA has been described as a complex and articulated system (Vargas et al., 2018; Levenson, 2018; Shet et al., 2021; Conte and Siano, 2023) grounded in different organisational, technological, and social dimensions (Wirges and Neyer, 2022). Researchers argued that successful analytics development requires great integration among resources, social and technological systems, and even across organizational boundaries (Van de Heuvel and Boundarouk, 2017; Minbaeva, 2018; Wirges and Neyer, 2022; Conte and Siano, 2023). Nevertheless, current research has not deepened how organisational resources (e.g. human, financial, technological, etc.) should be used, integrated, and reconfigured in an organisational setting to reach the desired analytics outcomes (Van de Heuvel and Boundarouk, 2017; Minbaeva, 2018; Wirges and Neyer, 2022), leaving a relevant gap for future research (Ramachandran et al., 2023).

The resource-based view (Warnerfelt, 1984; Peteraf, 1993; Teece et al., 1997) further explains the evolution of routines and capabilities over time (Helfat and Peteraf, 2003). More specifically, the evolution of an organizational capability can be described by three main stages (i.e., founding, development, and maturity), which are followed by other additional stages that describe its course of decay (Helfat and Peteraf, 2003). In the founding stage the capability is created, usually by a team or a group of coordinated individuals. In the development stage the capability is developed through viable alternatives (i.e., development paths), depending on available resources, organizational routines, development choices, and external forces. In the maturity stage the organization focuses on capability maintenance (Helfat and Peteraf, 2003). Scholars described in depth enablers and barriers for HRA practices (e.g. Fernandez and Gallardo-Gallardo, 2020) but contributions on the developmental stages of HRA are still absent in scientific research (Angrave et al., 2016), which recommended longitudinal analysis of HRA evolution over time (Larsson and Edwards, 2021; McCarney and Fu, 2023).

Eventually, the pressing need for further research on HRA development is also emphasised by the current state of analytics adoption in organisations. Despite mounting interests, indeed, most organisations are still struggling to move from HR reporting and controlling activities to actual HRA practices (Fernandez and Gallardo-Gallardo, 2021; Giermindl et al., 2021; Wirges and Neyer, 2022; Conte and Siano, 2023). In this regard, Wirges and Neyer (2022) reported that just the 32% and 5% of their respondents have implemented descriptive and predictive analytics techniques because of difficulties in developing HRA capabilities. Thus, we need actionable knowledge to guide practitioners in the development of these capabilities (Conte and Siano, 2023).

### ***Microfoundations of organizational capabilities***

The microfoundations approach is a research program that focuses on collective constructs investigating how micro-level factors, actions, and interactions affect macro-level phenomena (Foss, 2005; Abell, Felin and Foss, 2008; Felin et al., 2012; Foss and Pedersen, 2014; Felin et al., 2015). In this regard, macro-level explanations – i.e. defined as the explanation of macro-phenomena in terms of other macro phenomena – often suffer from the problem of “unobserved mechanism” residing at the micro-level (Coleman, 1990). The explanations of specific events stand indeed “at the end of a long and complicated history” that often depends on micro-level explanations (Lewis, 1986; Felin et al., 2015). Researchers interested in capabilities and other organizational phenomena, thus, needs to investigate micro-level mechanisms and dynamics (Foss, 2010), which are considered more stable, fundamental, and suitable for the generation of actionable managerial contributions (Coleman, 1990; Felin et al., 2012; Felin et al., 2015).

In the last decades, the discussion regarding capability microfoundations has increased both among practitioners and academics (Foss and Pedersen, 2016). In managerial research, scholars (e.g. Barney and Felin, 2013) suggest that individual actions and interactions within organisations shape their routines and capabilities. More specifically, Felin et al., (2012) state that individual actions and interactions are fundamental for the emergence, development, and function of organisational capabilities. Different individual factors have been discussed and literature shows that individual behaviours (Lenka et al., 2018), actions (Bagis et al., 2022), roles (Dedehayr et al., 2022), knowledge (Felin and Hestely 2007), competencies (Sousa-Zomer et al., 2020), motivation (Lindeberg and Foss, 2011), and social motives for social interactions (Bridoux et al., 2016) shape the emergence and development of organisational capabilities. In this regard, managerial figures have a relevant role because their strategic decisions drive organisational search and accumulation of capabilities (Scharz et al., 2019). Managerial dynamic capabilities (Adner and Helfat, 2003), cognitive capabilities (Helfat and Peteraf, 2015), self-evaluation (Bendig et al., 2018) and emotions (Elfenbein, 2007; George and Zhu, 2002; Huy, 2012; Unluoglu and Kevill, 2021), thus, determine the reconfiguration of organisational resources, and thus, routines and capabilities.

Microfoundation research is not only about individuals per se but also refers to interactions among individuals and other microfoundational elements (Roscoe et al., 2019) through formal or informal mechanisms of coordination (Cousins et al., 2007). Microfoundational interactions shape individual actions and behaviours, influence processes, and create structures, affecting organisational capabilities over time (Bapuji et al., 2012; Roscoe et al., 2019). Scholars provided different studies focused on the interactions among individuals, processes, and organisational structures. Routines and processes indeed emerge from the development of sequential rules and practices determined by individuals, enabling interaction and knowledge exchange without the need of communication (Grant, 1996). In this regard, Lin and Li (2018) stated that organisational routines and processes, emerge from individual shared schemata, facilitated from horizontal interactions among employees. Then, processes are developed and refined over time through individual knowledge accumulation, observation, and experimental learning (Felin et al., 2012). On the other side, Roscoe et al. (2019) argue that the characteristics of processes and organisational structures influence individuals' actions and interactions for the development of organisational capabilities. Organisational processes act as integrating mechanism that facilitates the coordination and integration of individuals, teams, and other hierarchical structures (Hoopes and Postrel, 1999).

Eventually, Felin et al. (2012) state that the characteristics of decisional structures, the design of hierarchical structures, and the complexity of organisational structures influence individual actions and interactions, shaping the emergence of routines, processes, and thus, capabilities. In this regard, Bingham et al. (2019) suggest that the continuous and extensive communication within and across hierarchical structures shape the development process of organisational capabilities. These continuous interactions among microfoundational pillars, thus, determines the transition from micro- to macro-level capabilities (Bingham et al., 2019; Bağış et al., 2022), further explaining how capabilities are created and developed over time (Felin et al., 2012).

Despite this increasing interest in microfoundations, empirical research on how organisational capabilities develop through individual actions and interactions is still rare (Felin and Foss, 2008; Roscoe et al., 2019; Bojesson and Funding, 2020). In this sense, previous research (Bingha, et al., 2019; Bağış et al., 2022) encouraged the generation of theoretical and practical contributions on microfoundational dynamics and the transition from individual to organisational capabilities, suggesting the use of practical cases and applications (Foss and Pedersen, 2016).

## ***2.2. Microfoundations of HR Analytics capabilities***

Minbaeva (2018) stated that building and developing HRA capability requires to operate on three dimensions – i.e. data quality, analytics, and strategic ability to act – simultaneously considering its three microfoundational pillars – i.e. individual, processes, and structures. For instance, the development of HRA capabilities at the individual level requires the recruitment of HR analysts with adequate analytics competencies; committed individuals for data management; and coordination activities across organisational boundaries (Minbaeva, 2018). After Minbaeva (2018), literature did not propose further papers deepening HRA capability development from a microfoundational perspective. Most studies focus on the development of generic HRA practices (e.g. Rasmussen and Ulrich, 2015; Levenson, 2018), on the main barriers for HRA diffusion (e.g. Hamilton and Sodeman, 2018; Fernandez and Gallardo-Gallardo, 2020; Shet et al., 2021), and on specific microfoundational pillars, such as the role of HR professionals for analytics development (e.g. Vargas et al., 2018; Krzycynski et al., 2018; McCartney et al., 2020).

At the individual level, scholars discussed in detail the set of knowledge, skills, and abilities required by HR professionals to develop HRA initiatives. Several studies (e.g. Andersen, 2017; Schiemann et al., 2018; Jörden et al., 2022; McCarney and Fu, 2023) recommend developing data-related competencies, analytics skills, business and HR understanding, behavioural and psychological comprehension, communication, and ethical and privacy expertise. The competencies of HR professionals have often been cited as one the main barriers

to HRA diffusion (Marler and Boudreau, 2017; Boudreau and Cascio, 2017), due to the difficulties for an organization in acquiring and integrating such a large set of competencies and expertise (Hamilton and Sodeman, 2019; Fernandez and Gallardo-Gallardo, 2020). Literature (e.g. Vargas et al., 2018; Dhankhar et al., 2022; Dhiman et al., 2023) also discussed the determinants of HR professionals' decision to adopt HRA solutions, including self-efficacy, perceived relevance, analytics understanding, and social influence. Moreover, recent research suggest that analytics development also depends on the interactions of individuals with other socio-technical dimensions of organisations (Minbaeva, 2017; Wirges and Neyer, 2022). These interactions occur at multiple levels (e.g. hierarchical, decisional) and along several dimensions (e.g. operative, strategic, political). For instance, Jörden et al., (2022) demonstrated that individual competencies often had to compromise with organizational constraints and managerial interests, influencing their perceptions of analytics practices. Eventually, scholars discussed the effect that HRA may have on employees, investigating individuals perceptions (Newman et al., 2020), attributions (Khan and Tang, 2017), and ethical (Gal et al., 2020) and privacy implications (Giermindl et al., 2021). For instance, Tursunbayeva et al. (2021) identified the main risks, opportunities, and regulatory issues for HRA, supporting practitioners and academics in integrating ethical strategies and policies.

At the process level, the research on HRA provided several tips and rules for setting up generic HRA initiatives: starting from organizational and managerial issues (e.g. Leveson, 2018), involving top-management in analytics practices (e.g. Schiemann et al., 2018), collecting useful data to develop a deep understanding of a limited number of variables (e.g. Huselid, 2018), integrating HRA practices with other organizational analytics initiatives (e.g. Rasmussen and Ulrich, 2015), and translating workforce insights into compelling stories (e.g. McCartney et al., 2020). Despite their relevance, most suggestions have been conceptual, promotional, and generic in nature (Marler and Boudreau, 2017; Margherita, 2021). Additionally, previous studies often refer to HRA as a practice or a single initiative, neglecting the interactions and integration with existing organizational processes and structures (Greasley and Thomas, 2020; Wirges and Neyer, 2022; Ramachandran et al., 2023). The processes characterising the emergence and development of HRA capabilities have been investigated just by a limited number of authors (Qamar and Samad, 2021). Greasley and Thomas (2020) analysed the social, political, and onto-epistemological processes of HRA initiatives, evaluating the influence of these processes on traditional HR professional practice. Then, Fu et al. (2022) and Belizón and Kieran (2022) respectively explored the process of communicating analytics results, considering storytelling activities performed by HR analysts, and the legitimacy process in HRA development, analysing the cognitive, socio-political, and technological perspectives. Eventually, Falletta and Combs (2021) proposed a comprehensive model for HR research and analytics development, identifying seven processes: (i) determine stakeholders requirements; (ii) define HR research and analytics agenda; (iii) identify data sources; (iv) gather data; (v) transform data; (vi) communicate intelligence results; and (vii) enable strategy and decision-making. We have, however, scan empirical knowledge on how these processes are developed and integrated within organisations (Greasley and Thomas, 2020; Fernandez and Gallardo-Gallardo).

Finally, at the structural level, scholars provided relevant contributions on the technological and organizational structures involved in HRA. Information technologies have been considered as the main driver for HRA development (Van de Heuvel and Boundarouk, 2017). An adequate technological infrastructure is needed to enable data collection, storing, and management processes, especially in case of multi-source and multi-discipline data (Van de Heuvel and Boundarouk, 2017; Shet et al., 2021). More specifically, technologies need to facilitate data processing, visualization, and reporting (Marler and Boudreau, 2017), sharing the results with relevant decision-makers (Peeters et al., 2020). In addition to information technologies, previous research also discussed organisational and decisional structures (e.g. Greasley and Thomas, 2020; Samson and Bhanugopan, 2022). Data and business interests in input to analytics practices often come from different organizational units or levels (Samson and Bhanugopan, 2022), complicating its internal management. Organizational and hierarchical structures also legitimize data collection and analysis (Belizon and Kieran, 2020), define the application fields for analytics practices (McIver et al., 2018), support HRA development

providing resources for analytics initiatives (Rasmussen & Ulrich, 2015; Hamilton & Sodeman, 2020). However, there is still practical and theoretical disagreement over the HRA governance model, ranging from an organisational analytics function (Marler and Boudreau, 2017; McIver et al., 2018) to an analytics team emerging inside the HR department (Falletta and Combs, 2021). Eventually, the development of HRA capabilities also involve decisional, social, and cultural structures (Minbaeva, 2018; Samson and Bhanugopan, 2022; Wirges and Neyer, 2022). Nevertheless, analyses of these dimensions are still very rare into the literature.

### **3. Method**

This research focuses on understanding how individuals, processes, structures, and their interactions influence HRA capability evolution over time. To investigate this phenomenon, we employed an inductive method based on grounded theory-building process (Corbin and Strauss, 1990). More specifically, we selected a single case study approach (Eisenhardt and Graebner, 2007; Eisenhardt et al., 2016) for different reasons. First, inductive methods excel at explaining development processes and related “how” research questions (Langley, 1999; Eisenhardt et al., 2016). Second, previous research indicated this approach as the most suitable for investigating organisational capabilities development (e.g. Ellonen et al., 2011; Narayanan et al., 2009; Roscoe et al., 2019), which is often path- and context-dependent (Helfat and Peteraf, 2003; Laamanen and Wallin, 2009). Third, a single case study enables a specific focus on understanding the “how” and “why” of organisational phenomena and an in-depth analysis of the firm (Bağış et al., 2022; Kryeziu et al., 2022). Fourth, selecting a single firm it is possible to isolate our research from factors related to the industry or geographical area (Latilla et al., 2021). Eventually, we selected a longitudinal approach according to the evolutionary and complex nature of HRA development (Minbaeva, 2018; Wirges and Neyer, 2022), the interpretative nature of our research and prior research on organisational capabilities development (e.g. Gavetti and Rivkin, 2007; Laamanen and Wallin, 2009). Additionally, previous research (e.g., Davies et al., 2016; Easterby-Smit et al., 2009; Chen et al., 2008) suggests that longitudinal qualitative studies provide an in-depth and accurate investigation of the emergence, formation, and development of firm capabilities. This enables an effective focus on micro-level actions, interactions, and dynamics, and on the transition from individual to organisational capabilities.

#### **3.1. Sample**

This study analyses a global organisation – i.e. *Tyche* - and the evolution of its HRA capabilities from their establishment in February 2021 to the end of June 2023. *Tyche*'s head office is located in Italy but the firm operates in the tourism sector all over the world and has more than 15,000 employees located in Italy, Spain, Germany, France, and UK. In December 2020, the HR department of the company decided to undertake a project for HRA development, officially started in February 2021.

We selected *Tyche* since it represents a typical and interesting case of HRA development. First, before the HRA project, people-related decisions in *Tyche* were based on individual experience, intuition, or information obtained from basic HR controlling practices. These information were often performance indicators or administrative data collected from different information systems. Wirges and Neyer (2022) reported that this is the most common initial condition of the firms interested in the HRA (i.e. 96% of their sample of respondents). Second, *Tyche*'s project started from the HR department and their HR managers in response to HRIS update and the availability of larger employee's data, with the objective of improving HR processes, decisions, and strategic impact. In this regard, recent research (Ratnam et al., 2023; Ramachandran et al., 2023) argued that most of the times top-management has to be convinced of HRA outcomes before providing organisational support and resources. Therefore, HRA project often originate and develop in the HR department or from innovative individuals (Minbaeva, 2018; Vargas et al., 2018; Wirges and Newer, 2022) although this brings with it different organisational challenges related to the transition from micro-level to macro-level capabilities. Third, *Tyche* is a successful case of HRA organisational development having improved

its analytics maturity through a 3-year project. The evolution of HRA capability maturity has been assessed and evaluated in three moments (i.e. February 2021; February 2022; February 2023) through the application of an HRA Maturity Model (Rigamonti et al., 2022), ensuring on its actual improvement. The method and the results related to the model are reported in *Annex 1* and *Annex 2*. Fourth, the firm developed its capabilities by addressing and overcoming some of the main barriers for HRA development reported by previous research (e.g. Fernandez and Gallardo-Gallardo). More specifically, in February 2021 *Tyche's* HR professionals had limited analytical or engineering capabilities but willingness to develop them through the project. Additionally, the firm had different non-integrated information systems – i.e. HR information systems, performance management systems, recruitment systems – containing data and information on personnel. Fifth, the first two authors have been directly involved in *Tyche's* activities and meetings for HRA development. The direct involvement of engaged scholars (Van de Ven, 2007) is a form of data triangulation that enhances data richness (Goffin et al., 2019) and enables an in-depth and accurate investigation of the development of organisational capabilities (Bağış et al., 2022). Eventually, firm size and digitalisation level are common to most organizations interested in analytics, increasing the likelihood of generalize our findings.

### **3.2. Data collection**

Inductive approaches involve a deep immersion over time with openness to different types of data, such as interviews, notes, videos, or surveys (Corbin and Strauss, 1990). This research uses a triangulation research approach (Jick, 1979), consistently to the complex nature of HRA capability development (Minbaeva, 2018; Wirges and Neyer, 2022). Triangulation is an integrative approach that use both qualitative and quantitative data in the study of the same phenomenon (Denzin, 1978). The combination of complementary methods captures a more holistic picture of the unit of analysis, leads to more valid results, and enables the development of new theories (Jick, 1979).

In order to collect the primary evidence, we performed four rounds of interviews, summarised in Table 1. The first round was organized in February 2021 with the main promoters of HRA and the HR professionals who could have been included in HRA development. In these meetings, their individual expectations and the overall objectives of the analytics project have been discussed. In this round, we also interviewed the IT HR System Director to understand the technological infrastructure of the organisation. The second round was performed in March 2021, interviewing 8 directors and 4 line-managers to define possible application areas for HRA initiatives and their expected results. The third round includes other 32 interviews of at least 20 minutes duration, conducted between April 2021 and August 2022 with different actors who participated in HRA development. During these meetings, we had the opportunity to ask questions and take notes about HRA with the main goals of understanding the evolutionary dynamics of HRA capability and deepening the roles of different individuals, analytics processes, and organizational structures in its development. In the first three rounds, as done by Laamanen and Wallin (2009), the interviews were not transcribed but we made notes that we used to structure and analyse the final round of interviews. The fourth and final round, consisting of 24 semi-structured interviews of at least 45 minutes duration, was conducted between September 2022 and June 2023. During these interviews, we asked the interviewees to think about their HRA journey, focusing on their actions, interaction with other individuals or collective of individuals (i.e. group, team, unit), organisational processes, technological structures, or hierarchical structures, and their influence over analytics development. The interview protocol used in the fourth round is presented in *Annex 3*.

The interviews had been complemented with participant observations and secondary data. Observations are based on over 96 meetings between 2021 and 2023 attended by the first two authors. These meetings allowed to interact with the different individuals involved in the project and observe the development of analytics practices. Secondary data was gathered from three main sources.



Table 1. Meetings and recorded interviews.

Persons interviewed		1st Round	2nd Round	3rd Round	4th Round	Total
ID	Role	February 2021	March 2021	April 2021, September 2022	October 2022, June 2023	
DR1	Global Marketing Director		1			1
LM1	Consumer Marketing Manager		1			1
DR2	Direct Marketing Director		1			1
DR3	Commercial Director (Italy)		1			1
LM2	Country Manager (Spain, Port.)		1			1
DR4	Sales Director		1			1
LM3	Sales Manager		1			1
DR5	Guest Experience Director		1			1
DR6	Data Analysis Director		1			1
DR7	Revenue Management Director		1			1
DR7	Commercial Planning Director		1			1
DR8	Contact Center Director		1	1		2
LM4	Contact Center Manager			1		1
HRIT	IT HR Systems Director*	2		-	-	2
HRP1	HR Business Partner 1*	1		2	-	3
HRP2	HR Business Partner 2	1		1	1	3
HRP3	HR Business Partner 3	1		1	1	3
HRP4	HR Business Partner 4	1		1	1	3
TADM	HR Talent Acquisition and Development Manager*	1				1
TADS	HR Talent Acquisition and Development Specialist	1		8	4	13
TADH	Head of HR Talent Acquisition and Development			4	4	8
HRSI	HR Information System Analyst			2	4	6
HRAN	HR Analyst	1		8	4	13
HRD	HR Director	1		1	2	4
HRVP	HR Vice-President	1		1	2	4
	<b>Total</b>	<b>11</b>	<b>12</b>	<b>32</b>	<b>24</b>	<b>89</b>

\*The IT HR Systems Director, the HR Talent Acquisition and Development Manager and the first HR Business Partner voluntarily left the organisation in March 2021, April 2021, and August 2022.

First, we had access to the different information systems used for the development of HRA practices, including the HR information system, the performance management system, the recruitment system, and a platform for internal communication implemented by *Tyche*. This gave us insights into the quantity, type, and quality of people-related data available to the firm. Second, the organisation provided us the outputs of HRA initiatives, including: (i) employees' information collected through two global surveys, conducted in December 2021 and May 2023; (ii) econometric and analytics results performed on people-related data; (iii) documents used for the presentation and visualisation of analytics results. Eventually, we had access to further internal documents such as: (i) internal e-mails; (ii) internal communication messages for the implementation of HRA practices; (iii) internal communication messages related to the future people-management programs.

### 3.3. Case Analysis

The data analysis process is constituted by 4 main stages, summarized in Table 2.

In the first stage, we integrated available data to write *Tyche* case history (Brown and Eisenhardt, 1997; Rindova and Kotha, 2001) and describe the evolution of HRA capabilities. Thus, we firstly analysed in chronological order the notes taken from February 2021 to September 2023, in order to get an initial understanding of the general HRA development path. Then, secondary data and semi-structured interviews have been used to complement and enrich the case history and to progressively check its reliability.

In the second stage, the 24 transcribed semi-structured interviews have been analysed and coded to investigate how microfoundational actions and interactions changed over time and influenced HRA evolution. The coding process is based on Corbin and Strauss (1990) grounded theory building approach and carried out in 5 steps.

Table 2. Methodological stages used in theory development.

ID	Stage	Objective	Data used	Procedure and outcomes
1	Case history	Describing the HRA development path through a case history	<ul style="list-style-type: none"> <li>• Interviews</li> <li>• Participant observations and notes</li> <li>• Secondary data</li> </ul>	<ul style="list-style-type: none"> <li>• Thematic analysis of our data</li> <li>• Generation of a clear timeline</li> <li>• Description of Tyche's HRA capability evolution</li> </ul>
2	Coding process	Coding microfoundational actions and interactions Analysing how microfoundational dynamics changed over time and affected HRA development	<ul style="list-style-type: none"> <li>• Case history</li> <li>• Transcribed interviews</li> <li>• Participant observations and notes</li> <li>• Secondary data</li> </ul>	<ul style="list-style-type: none"> <li>• Definition of microfoundational action/interaction</li> <li>• Identification, codification and recording of 249 actions/interactions (i.e. quotations)</li> <li>• Definition of 40 first-level concepts; 16 second-level concepts; 5 categories</li> </ul>
3	Data triangulation	Increasing results validity and reliability triangulating the data from different sources	<ul style="list-style-type: none"> <li>• Case history</li> <li>• Transcribed interviews</li> <li>• Participant observations and notes</li> <li>• Secondary data</li> <li>• HRA Maturity Model</li> </ul>	<ul style="list-style-type: none"> <li>• Triangulation of data from different sources</li> <li>• Consensus-based decision-making sessions</li> <li>• Iterative revision</li> </ul>
4	Results validation	Validating practical and theoretical results	<ul style="list-style-type: none"> <li>• Case history</li> <li>• Coding results</li> <li>• Research draft</li> </ul>	<ul style="list-style-type: none"> <li>• Follow up interviews in June 2023</li> <li>• Research draft sent to the HRD and HRVP</li> <li>• Revision and validation of our results and theoretical arguments</li> </ul>

First, similar to previous research (e.g. Roscoe et al., 2019; Dedehayir et al., 2022), a microfoundational action has been defined as a specific action of an individual or a collective of individuals (i.e. a group, a team, a unit) intended to influence the organizational development of HRA at a given point in time. Microfoundational actions lead individuals or collective of individuals to interact with other microfoundational factors, generating micro-level interactions. In this regard, prior research (Felin et al., 2012) identified individuals, collective of individuals, organisational processes, technological structures, and hierarchical structures as the main microfoundational factors of organisational capabilities. Second, each author coded the data separately, ensuring coding consistency, credibility, validity, and reliability (Corbin and Strauss, 1990). Through the comparison of the various codes, 249 microfoundational actions and/or interactions (i.e. quotations) have been identified, extracted, categorised, and recorded into a spreadsheet. Considering the difficulties of ordering actions and interactions in chronological order, 6 points in time have been defined (i.e. February 2021; July 2021; February 2022; July 2022; February 2023; June 2023) and used to allocate events. For each action and/or interaction, we also recorded the individual or collective of individuals involved, the reason behind it, its content, process, and consequences. This enabled the definition of the properties, dimensions, conditions to rise, action/interaction by which it is expressed, and consequences of the final categories (Corbin and Strauss, 1990). In the third step, first-level concepts have been created using the quotations obtained from the data. Given the limited studies on HRA capabilities and its microfoundations (e.g. Minbaeva, 2018; Falletta and Combs, 2020), these initial concepts were relatively loose, in order to let the final categories emerge from the data. Fourth, first-level concepts have been reduced in second-level themes, such as the *Development of individual capabilities* or the *Operational persuasion*. Fifth, second-level concepts have been combined and associated in 5 final aggregated categories. Findings revealed that these final categories have a defined time distribution. Each final theme, thus, represents and describes a phase in the development of HRA capabilities. Tabel 3 details the coding process for the *Integration* final-category. The entire coding process and its results are reported in *Annex 4*.

Throughout the data analysis process, the data from various sources have been triangulated increasing research reliability and validity (Chen et al., 2009; Dzwigol, 2020). The process has been iterative in nature, moving back and forth between our findings, secondary data, direct observation, notes, and previous theories. The triangulation of different information provides a more comprehensive description of the phenomena and enable the generation of robust theories (Jick, 1979). Eventually, the authors reviewed the final quotations, concepts, and categories through different sessions of consensus-based decision making (Sen et al., 2012), consolidating and agreeing on the final results through theoretical saturation (Glasser and Strauss, 1999).

Table 3. Coding process. Details for the Integration category.

Quotations	First-level concepts	Second-order concepts
<p>"The diffusion of analytics processes in the HR department started to change the traditional way of working of our colleagues [...], now everyone is thinking a bit more about recording what happens during HR processes, in order to collect data and information" – TADH</p> <p>"We have transitioned from being a department that relied on employee feedback to one that listens, analyses the data and information we collect, and acts accordingly, with a more systematic and statistical understanding" – TADS</p> <p>"[...] People's way of working has changed compared to traditional HR processes, and this has allowed us to better utilize some of the technologies we had" – HRAN</p> <p>"HRA has provided an imprint that will allow us to transform the HR department [...], our way of working has already changed, becoming more analytical [...]" – TADS</p> <p>"Analytics have allowed us to start changing something because people now work while also considering data" – TADH</p> <p>"Now I know that there are data that I can use for my activities" – HRP2</p> <p>"My role as an HR professional has changed, and I see the same happening for my colleagues in their day-to-day work" – HRP3</p> <p>"We had to change, and we will need to change further, both in terms of those structuring analytics activities and those using the outputs" – TADH</p> <p>"I would like to consider the HR department as a department of scientists, working in an analytical way [...], we are not there yet, but we are moving in the right direction" – HRVP</p> <p>"HR professionals now consider data, focusing on their decisions" - HRIS</p>	<p>Transforming traditional way of working of HR professionals</p>	<p>Individuals integration</p>
<p>"Our colleagues started to think about what data and information they need to improve their decisions [...], in short, an analytics culture is spreading" – TADH</p> <p>"An analytics culture is spreading within the HR department [...], our colleagues now think with and for data" – TADH</p> <p>"The path we have embarked upon is positive because we are gradually creating an analytics culture within our department" – HRIS</p> <p>"We have done good work on processes and individuals, spreading an analytics culture both among those conducting analytics activities and the end-users." – HRIS</p> <p>"People are developing this mindset [...], I'm beginning to understand what it means to work with data and have more data" – HRBP4</p> <p>"I see an overall improvement, not only among those involved in analytics [...], I see a moderate level of awareness and a growing analytics culture" – HRD</p> <p>"The mindset of HR professionals, top management, and organizational culture are the key elements determining the long-term potential of HRA" - HRVP</p>	<p>Building an analytics culture</p>	
<p>"The HRA processes made us realize that to continue correctly with analytical processes, but also HR processes, we needed to rethink and optimize the classic HR processes [...], since work methods have changed, we needed to adapt and integrate various elements" – TADH</p> <p>"We rethought various internal processes, such as data collection and organization, based on data collected from employees [...]" – HRAN</p> <p>"I work on optimizing HR processes, which is essential for developing HRA" – HRIS</p> <p>"To make HRA work, there is a whole process of optimizing existing processes" – HRIS</p> <p>"For example, we're currently working on optimizing activities and workflows for processes like recruiting and performance management" – TADH</p> <p>"The optimization of our processes has a dual objective: improving HR process efficiency and having better, cleaner, and more valuable data and records" - TADH</p>	<p>Optimising HR processes</p>	
<p>"I load HR processes into HR information systems, to which I have applied a sort of reengineering process, [...] so integration is necessary because I have to think simultaneously about the processes and the data I collect and bring to the process" – HRIS</p> <p>"I am also primarily responsible for optimizing and managing HR systems" – HRIS</p> <p>"We considered how data was stored in HR systems, and some logics have been redefined" – HRIS</p> <p>"For example, a Data Loader was created to mass-load paper documents [...], the system now automatically notifies the person of the document upload, provides data and information [...], it's a good example of reengineering systems and processes" – HRIS</p> <p>"We optimized the recruiting system [...], data is now collected automatically" – TADH</p> <p>"For the first few months, we mainly worked on systems, integrating them with processes, but also understanding where they could be optimized and improved to have useful data for analytics initiatives" - HRAN</p>	<p>Optimising HR systems</p>	<p>Processual integration</p>
<p>"Existing HR processes feed data into HRA processes, and that's why an integrated reasoning is important" – HRIS</p> <p>"When I work on HR processes optimisation, I do it with thinking about HRA, because HR processes are inputs to HRA processes, and thus, the two must be integrated" – HRIS</p> <p>"HR processes serve as input flows for HRA processes, and therefore, they need to be integrated" – HRIS</p> <p>"When we rethink HR processes, we do it with integration in mind, considering systems [...], this integration provides material for HRA initiatives" – TADH</p> <p>"We started working on various processes because working on recruitment, compensation, or performance management processes is crucial as they provide information for our analyses" – TADH</p> <p>"I insisted on this point because, in my opinion, we haven't always worked on it in the right way [...], we need to integrate employee communication processes with data collection processes (e.g., surveys), or else people don't understand why we're asking certain questions, lose trust, and refuse to let us analyse their data" – HRAN</p> <p>"The proliferation of analytics has increased the focus on HR processes because it was understood that HRA couldn't function without effective HR processes" - HRAN</p>	<p>Upstream integration (i.e. input)</p>	

<p><i>"Analytics results are used to make decisions that influence the definition of HR processes [...], even though they are two separate tracks, they work within a unified system, and that's why it's important to consider both HRA inputs (i.e. data) and outputs (i.e. results)" – HRAN</i></p> <p><i>"Automation mechanisms have been created to improve our decisional processes [...], for example, compensation decisions have been integrated with predictive analytics on recruitment" – TADH</i></p> <p><i>"The automatic screening of curriculum has allowed us to conduct a sort of predictive assessment of candidates using data from the performance management system [...], this is an example of process integration [...], and it's quite complex in practice" – HRIS</i></p> <p><i>"Activities related to recruitment, reporting, and the creation of interactive dashboards produce a wealth of information to be integrated into other processes" – HRAN</i></p> <p><i>"HR processes and HRA processes are closely linked; the results of our analyses have been and will be used to improve HR processes [...], it's like a cycle" – HRAN</i></p>	<p>Downstream integration (i.e. output)</p>
<p><i>"TADH and I are working to integrate various information systems with personnel information, such as the recruitment system, in order to have a unified and integrated database. This is undoubtedly the first step" – HRSI</i></p> <p><i>"The integration of information systems and available technologies has been crucial to have quality data for analysis" - HRVP</i></p> <p><i>"I have been involved in the integration of information systems and their diverse modules" – HRIS</i></p> <p><i>"We have enhanced integration among information systems [...], the recruitment module has been integrated into the primary management system to automate the screening phase" – TADS</i></p> <p><i>"We have been advancing this technological integration for a few months now, primarily thanks to HRSI [...]. His contribution has been essential because otherwise, no one in the HR department could have managed this while simultaneously considering HR and HRA processes" – TADH</i></p> <p><i>"The integration efforts have been carried out both within HR systems, integrating various modules, and at an organizational level, integrating all information systems that could be linked to HR and HRA processes" – HRIS</i></p> <p><i>"Integration is not yet complete; there are still some systems (e.g., employee communication platform) that need to be integrated into HRIS" - HRSI</i></p>	<p>Integrating information systems</p>
<p><i>"We began by focusing solely on the HR department, examining our systems, and attempting to gather all the data and information available" – TADS</i></p> <p><i>"The complexity and multitude of systems have underscored the fundamental role of data [...]. We are now working not only on system integration and data accumulation but also on their integration, distribution, and value enhancement" – HRIS</i></p> <p><i>"Before 2022, our HRIS was not yet consolidated [...]. We then commenced structuring a unified database to ensure data consistency" – HRIS</i></p> <p><i>"An essential dimension, on which we are not yet mature, is the complete integration and cleansing of data" – TADH</i></p> <p><i>"The foundation for effective HRA lies in having a unified database with clean, valuable, consistent, and analytically explorable data across various granularities [...]. We are still working on this" – TADH</i></p> <p><i>"Compared to 2021, data is now much more coherent and integrated [...]. The groundwork has been laid for improving analytical processes" – HRAN</i></p> <p><i>"Initially, integrating data was extremely challenging because systems were not optimized and integrated [...]. However, we have since made significant strides forward" – HRAN</i></p> <p><i>"We are now integrating the different information systems that hold data that can be used for HRA practices [...], this technological integration is crucial because the speed of data processing and the quality of analytics results depends on having integrated and clean data" – HRVP</i></p>	<p>Technological integration</p>
<p><i>"The results of our dashboards are now viewed by HR business partners, line-managers, and other figures, who have started asking us for information and metrics" – HRSI</i></p> <p><i>"The HRIS provide us dashboard and other information [...], they are quite useful to make decisions" – HRP2</i></p> <p><i>"In recent months, and I think a lot in the future as well, we will have to understand how to better use data and analytics for HR decisions" – HRP4</i></p> <p><i>"Compared to 2021 and 2022, data is now being more extensively used within the HR department [...]. HR business partners are beginning to seek information and analyses" – HRAN</i></p> <p><i>"HRA is significant for the HR department as it aids in building a solid strategy, enhancing organizational and employee satisfaction, and supporting decision-making processes on various fronts" – TADH</i></p> <p><i>"The HRA results have initiated a series of other HR activities, such as leadership training, defining the employee value proposition, introducing specific work methodologies, and more" – TADH</i></p> <p><i>"HRA provides support for improving people-related decisions but also poses questions and reveals certain issues" – TADH</i></p> <p><i>"Analytics results support our decisions" - HRD</i></p> <p><i>"The formulation of the People Strategy 2022 and subsequent decisions have been heavily influenced by the results of HRA" - HRVP</i></p>	<p>Integrating HRA results in HR decisional processes</p>
<p><i>"The CEO and other executive often asks us for metrics to take people-related decisions [...], they have a fairly modern view ... they don't just ask for data but also want to understand how to use those data and information in their decisional processes" – HRSI</i></p> <p><i>"Line managers and some organizational units are beginning to request reports and data to understand how to manage their employees [...]. This is intriguing" – HRIS</i></p> <p><i>"In 2023, the integration of analytical results with decision-making processes has significantly increased [...]. Interactive dashboards, for example, are now provided to different top- and line-managers" – HRAN</i></p> <p><i>"It has been fascinating to observe how some decisions are now predominantly based on the use of analytics [...], for instance, decisions related to defining and redesigning the People Strategy" - HRAN</i></p> <p><i>"The results of our analyses are beginning to serve as tangible outputs for senior management" – TADH</i></p> <p><i>"Reporting processes, as well as the results of HRA, have increased HRA diffusion at various hierarchical levels" – HRD</i></p> <p><i>"HRA provides information to the business for optimizing organizational talent in the best possible way" - HRVP</i></p>	<p>Decisional integration</p>
<p><i>"Line managers and some organizational units are beginning to request reports and data to understand how to manage their employees [...]. This is intriguing" – HRIS</i></p> <p><i>"In 2023, the integration of analytical results with decision-making processes has significantly increased [...]. Interactive dashboards, for example, are now provided to different top- and line-managers" – HRAN</i></p> <p><i>"It has been fascinating to observe how some decisions are now predominantly based on the use of analytics [...], for instance, decisions related to defining and redesigning the People Strategy" - HRAN</i></p> <p><i>"The results of our analyses are beginning to serve as tangible outputs for senior management" – TADH</i></p> <p><i>"Reporting processes, as well as the results of HRA, have increased HRA diffusion at various hierarchical levels" – HRD</i></p> <p><i>"HRA provides information to the business for optimizing organizational talent in the best possible way" - HRVP</i></p>	<p>Integrating HRA results in business decisional processes</p>

In the final stage, we organized in September 2023 two follow-up meetings with the TADH, HRIS, and HRAN to discuss and validate our results. Additionally, a draft of the research has been sent to HRVP and HRD for further validation of the results and approval to publish its content.

#### 4. Results

This research identifies 6 phases for HRA capability development, each one characterised by different microfoundational actions, interactions, and dynamics. Findings are presented considering the three traditional stages (i.e. founding, development, maturity) for capability development proposed by Helfat and Peteraf (2003). More specifically, each stage and phase will be described in the following paragraph explaining in detail their microfoundational dynamics and the elements that enabled the transition from micro- to macro-level HRA capabilities.

##### 4.1. HR Analytics development and its microfoundations

Our findings revealed that the actions and interactions constituting each HRA development phase have a defined distribution in time, often occurring in specific time periods. For instance, 90% of the actions and/or interactions related to the *Legitimation* phase took place between February 2022 and June 2022; the other 10% between July 2022 and January 2023. Figure 1 describes this longitudinal distribution for each HRA development phase. The bars indicate the percentage distribution in time of the microfoundational actions and/or interactions constituting each phase. The analysis enabled the definition of a chronological order of development phases, further explaining the evolutionary path of HRA capabilities.

Table 4 resumes each development phase describing its properties, conditions to rise, microfoundations, and consequences.

##### 4.1.1. HR Analytics founding stage

The HRA project began in 2021 at the direction of the HR Vice President (HRVP) and the HR Director (HRD), in response to the HRIS update and the availability of a larger quantity of data. Additionally, HR managers were interested in improving people-related decisions and increasing HR abilities to communicate with line managers and executives. This research presents the HRA development path from February 2021 to June 2023.

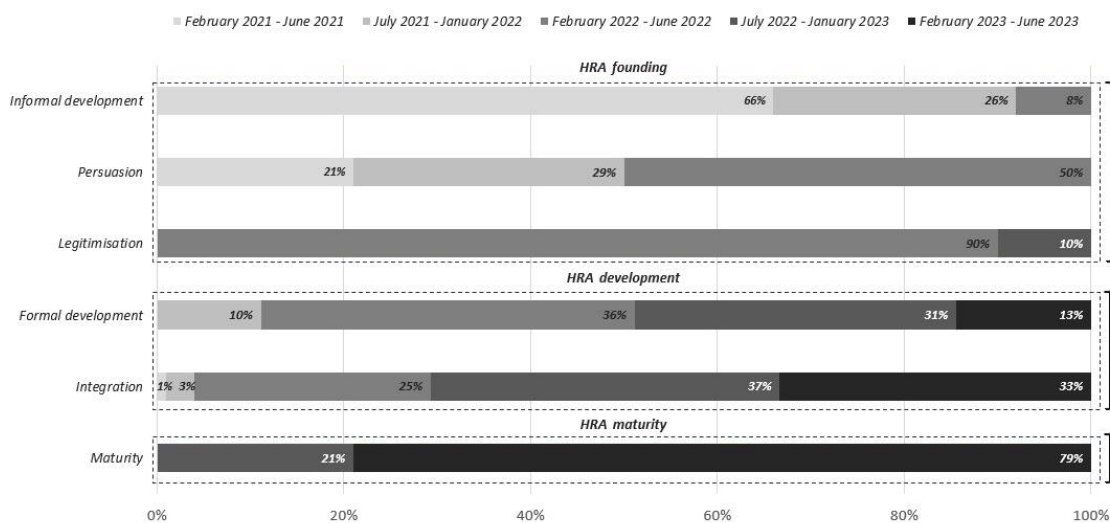


Figure 1. Longitudinal distribution of microfoundational actions and interactions for each HR Analytics development phase.

Table 4. HR Analytics development phases.

Stages	Development phases	Conditions to rise	Description	Microfoundations	Consequences
			<i>Properties</i>		
<i>HRA founding</i>	<i>A. Informal development</i>	<ul style="list-style-type: none"> <li>• Opportunities for experimentation, learning by doing, interactions and knowledge exchange</li> <li>• Individual motivation and personal interest in analytics</li> <li>• Individual coordination abilities</li> <li>• Managerial willingness to expose themselves and create a working environment where it is possible to experiment, learn by doing, and fail</li> </ul>	<p>Absence of a well-defined strategic plan, dedicated roles, defined responsibilities, and structured processes</p> <p>Individuals are most relevant actors, and:</p> <ul style="list-style-type: none"> <li>• develop individual capabilities and experience;</li> <li>• define, organise, and manage stakeholders' objectives and requirements</li> <li>• search and define the first HRA business case for analytics application</li> </ul>	<ul style="list-style-type: none"> <li>• Individuals (i.e. HR professionals, HR managers, line-managers)</li> </ul>	<ul style="list-style-type: none"> <li>• Emergence, development, and consolidation of individual capabilities</li> <li>• Definition and development of the first HRA business case</li> </ul>
	<i>B. Persuasion</i>	<ul style="list-style-type: none"> <li>• Managers' (HR) social capital, organisational network, and willingness to expose themselves</li> <li>• Individual storytelling and issue-selling abilities</li> <li>• Intelligent choice of the first business case</li> <li>• Managerial social capital and networks; Opportunities for interactions hierarchical levels</li> </ul>	<ul style="list-style-type: none"> <li>• Individuals at the operational levels perform a process of operational persuasion, proposing possible HRA development paths to the managerial figures leading the HRA project</li> <li>• The HR managers perform a strategic persuasion process, seeking support from other departments for the development of HRA initiatives (i.e. horizontal) and presenting HRA initiatives and results to hierarchical structures (i.e. vertical)</li> </ul>	<ul style="list-style-type: none"> <li>• Individuals (i.e. HR professionals, HR managers, line managers)</li> <li>• Hierarchical structures (i.e. board)</li> </ul>	<ul style="list-style-type: none"> <li>• Validation of HRA operational activities and continuation of the development path</li> <li>• Opportunities for HRA implementation and development</li> <li>• Start of transition from individual to organisational capabilities</li> </ul>
<i>HRA development</i>	<i>C. Legitimation</i>	<ul style="list-style-type: none"> <li>• Top-management analytics culture, interest in people-related practices, and habit of listening</li> <li>• Communication and issue-selling abilities</li> <li>• Successful HRA business case</li> <li>• Capabilities to convert investments in benefits for the firm</li> </ul>	<p>Higher hierarchical structures (i.e. the CEO, the board):</p> <ul style="list-style-type: none"> <li>• evaluate HRA initiatives</li> <li>• legitimise organisational structures responsible for HRA development</li> <li>• legitimise HRA processes</li> <li>• allocate organisational resources</li> </ul>	<ul style="list-style-type: none"> <li>• Collective of individuals (i.e. HRA team)</li> <li>• Hierarchical structures (i.e. board)</li> </ul>	<ul style="list-style-type: none"> <li>• Legitimation, formalisation, and institutionalisation of HRA organisational structures</li> <li>• Legitimation, formalisation, and institutionalisation of HRA processes</li> <li>• Formal allocation of resources for HRA development</li> </ul>
	<i>D. Formal development</i>	<ul style="list-style-type: none"> <li>• Top-management support and legitimisation for HRA development</li> <li>• Organisational resources (i.e. budget, time, individuals, technologies)</li> </ul>	<ul style="list-style-type: none"> <li>• Definition of HRA governance (i.e. roles, responsibilities)</li> <li>• Investments in HRA development (i.e. individual competencies; technological infrastructures)</li> <li>• Definition and formalisation of HRA processes (i.e. rules, best practices)</li> </ul>	<ul style="list-style-type: none"> <li>• Individuals and collective of individuals (i.e. HRA team)</li> <li>• HRA processes</li> <li>• HR processes</li> </ul>	<ul style="list-style-type: none"> <li>• HRA team creation and organisation (i.e. definition of individuals roles and responsibilities)</li> <li>• HRA processes definition, structuring, and management (i.e. definition of rules and best practices)</li> </ul>
	<i>E. Integration</i>	<ul style="list-style-type: none"> <li>• Defined HRA team</li> <li>• Defined and structured HRA processes</li> <li>• Optimised HR processes and systems</li> <li>• Top-management inclusion in HRA process formation</li> </ul>	<ul style="list-style-type: none"> <li>• Integrating individual into HRA processes</li> <li>• Integrating HR processes and systems in HRA processes</li> <li>• Integrating databases and technologies infrastructures</li> <li>• Integrating HRA outputs in the decisional processes of different decision-makers</li> </ul>	<ul style="list-style-type: none"> <li>• Individuals and collective of individuals</li> <li>• HR and HRA processes</li> <li>• Hierarchical and technological structures</li> </ul>	<ul style="list-style-type: none"> <li>• Increased HRA adoption and diffusion</li> <li>• Transition from individual to organisational capabilities</li> </ul>
<i>HRA maturity</i>	<i>F. Maturity</i>	Not enough empirical evidence	<ul style="list-style-type: none"> <li>• Greater inclusion of managers and business units in HRA development</li> <li>• Full integration of individuals, organizational processes, technological structures, and hierarchical structures</li> <li>• High diffusion of analytics culture</li> </ul>	<ul style="list-style-type: none"> <li>• Individuals and collective of individuals</li> <li>• HR and HRA processes</li> <li>• Other organisational processes</li> <li>• Technological structures</li> <li>• Hierarchical structures</li> </ul>	<ul style="list-style-type: none"> <li>• Regular exercise of HRA capability</li> </ul>

## A. Informal development

The first phase refers to the development of individual capabilities, the definition and management of stakeholders' objectives and requirements, and the research and definition of the first HRA business case. The main difficulties of this phase have been related to the absence of a well-defined strategic plan, dedicated roles, defined responsibilities, and structured processes. Most activities and interactions have been informal, conducted outside organisational roles and processes, and left to individuals. The individuals responsible at the operational level, thus, become the most relevant actors:

*"In the early stages, the HRA project relied almost exclusively on individuals and their capabilities, without having a clear plan or objectives [...], it was only in the later stages that Tyche started to have real analytics processes characterised by well-defined roles and rules" (HRD).*

Previous research argued that individual knowledge (Felin and Hesterly, 2007), competencies (Sousa-Zomer et al., 2020) and capabilities (Bağış et al., 2022) are relevant factor for the development of organisational routines and capabilities (Felin et al., 2012). In *Tyche*, individual capabilities have been developed through learning by doing, experimentation, and continuous knowledge exchange during operational activities, similar to what academic research suggested (e.g. Dixon et al., 2014). More specifically, *Tyche* provided specific training to just one individual (i.e. the HRAN), through an industrial doctoral program contemporaneous to the HRA project. The other individuals (i.e. TADS, TADH, etc.) developed their capabilities informing themselves (e.g. through academic articles, free online courses, etc.), exchanging information and knowledge, and by performing analytics activities:

*"I became interested in analytics, and thus, I started reading different materials on HRA and analytics in HR management, trying to understand how you can use analytics techniques to support HR practices [...], I can say it was a sort of personal interest in analytics [...], then we built our capabilities along the way, even making mistakes and blowing holes in the water" (TADS).*

Individuals have been required to be personally interested in analytics, motivated, and with good coordination abilities. Personal interests and curiosity (Bağış et al., 2022), motivations (Lindenberg et al., 2011; Foss and Pedersen, 2019), and emotions (Huy, 2012; Unluoglu and Kevill, 2021), are indeed essential factors for the evolution of organisational capabilities.

In this stage, several individual interactions and coordination activities have been recorded across organisational levels and boundaries. Individuals responsible for HRA development needed to manage, organise, and integrate operational and stakeholders requirements (i.e. HR managers, line-managers):

*"The first step was a series of interview with first-line managers to identify most interested stakeholders [...], possible business challenges [...], and departments with more available data" (HRAN).*

The main objective was defining the first business case for analytics application. These interactions and coordination activities were time-consuming and often unsuccessful due to lack of time and interest of other managers, practical constraints (e.g. lack of data), and/or incompatibility of stakeholders objectives. In *Tyche*, the first two business cases defined in the Commercial Operation and Customer Hub business units both failed for a combination of these reasons. In the end, the first analytics case has been developed in the HR department, using econometrics techniques to support the definition of the people strategy for the upcoming year. In this phase, managers leading the project needed to expose themselves by providing development cases and ensuring a working environment where it is possible to fail, experiment, and learning by doing:

*"The HRVP accepted the first analytics failures and committed himself [...], after the two failed attempts he decided indeed to apply analytics to the definition of Tyche People Strategy [...]. He took a risk, because a failure of the project would have affected his personal career" (HRD).*

## B. Persuasion

Persuasion is a fundamental mechanism of action, coordination, and repetition of activities for the development of organisational capabilities (Bağış et al., 2022). Additionally, it reduces resistance to change, conflicts, and disagreement arising during individual interactions (Bingham et al., 2019; Bapuji et al., 2012; Naveed et al., 2022). The second phase is characterised by two persuasion mechanisms.

The first mechanism – i.e. *operational persuasion* – refers to vertical persuasion activities performed by individuals at the operational level toward the managerial figures leading the project. More specifically, individuals propose possible HRA development paths, with the objective of validating activities and continuing analytics development. In the case of *Tyche*, several meetings have been organised throughout 2021 and 2022:

*“In September 2021, we tried to define a roadmap, we made a presentation, and then we presented it to them (i.e. HRVP, HRD), proposing our ideas for HRA development, including the global survey. Once we got their validation we moved forward step by step [...], it was a persuasion process that lasted months [...].” (TADS).*

The second mechanism – i.e. *strategic persuasion* - refers to the activities performed by the HR managers towards other managerial figures. These persuasion activities are both horizontal and vertical. Horizontal persuasion aims at seeking support from other departments for the development of HRA initiatives. Vertical persuasion refers to the presentation of HRA initiatives and results to C-level structures:

*“Operational activities were mainly carried out by TADS, TADH, and HRAN [...], but we (i.e. HRD, HRVP) held the strings of the project, connecting operational and business level [...], then we organised various meetings with the CEO, the departmental presidents, and most the of the line-managers, also exposing ourselves personally, in order to present HRA results [...].” (HRD)*

The objective is the legitimisation of analytics initiatives and the subsequent formalisation of organisational structures responsible for HRA processes. These persuasion mechanisms are fundamental in the transition from individual to organisational capabilities (Bapuji et al., 2012; Bağış et al., 2022).

According to the empirical evidence that has been gathered, in this stage there are different relevant factors that affect HRA development. First, in line with prior research (e.g. Mäkelä et al., 2012; Schwarz et al., 2018), managers (HR) social capital, organisational network, and willingness to expose themselves provides opportunities for individuals to implement persuasion strategies. Second, individual storytelling and issue-selling abilities (Belizón and Kieran, 2021) influence operational and strategic persuasion mechanisms. Third, the choice of the business case is fundamental because its results are the main lever to convince hierarchical structures of the possible benefits related to the development of HRA capabilities:

*“The HRVP and the HRD have been able to present the global survey and HRA initiatives to the board and the other departments through a great deal of political and diplomatic work [...], we needed a quick win to show the benefits of HRA to the board [...]. The success of the People Strategy then was the key to convince the board about analytics benefits, in case of failure I think we would have had a lot of problems [...].” (HRAN).*

It is also important to remember that the individual actions and interactions recorded in the *Informal development* stage and the *Persuasion* stage do not occur sequentially but rather in an iterative process based on continuous recirculation.

## C. Legitimation

The third phase refers to the evaluation of HRA initiatives, the legitimisation of the organisational structures responsible for HRA development, the legitimisation of analytics processes, and the allocation of new organisational resources. The term legitimacy indicates the degree of social and collective acceptance of a certain phenomenon within an institutional context (Aldrich and Fiol, 1994; Schuman, 1995).



The legitimisation phase begins from the evaluation of the results of the HRA initiatives by the hierarchical structures (i.e. CEO, board). In the case of *Tyche*, the HRVP and the HRD presented to the top-management the econometric results used to support the definition of the firm people strategy:

*“In January 2022, we presented the HRA results to the CEO and the board, and it was a sort of surprise for them, because they did not know about the use of analytics in the HR department [...], in the end, they appreciated HRA results and the new people strategy, and then, let’s say, they legitimised the existence of the project and HRA activities, supporting us in its future development” (HRD).*

The outcome (i.e. positive or negative) of the hierarchical evaluation have determined the legitimisation, institutionalisation, and formalisation of HRA processes in the organisation. A positive evaluation depends on top-management analytics culture, interest in people-related practices, and habit of listening to lower hierarchical levels (Minbaeva, 2018), as well as the selection of the business case and the communication and selling abilities described above:

*“We were very good in presenting analytics results, showing them in a simple, understandable, but effective way [...], but the positive evaluation also depended on the CEO, which already had an analytics mindset, and which really listened to us [...], this is not always the case in big organizations” (HRAN).*

Then, hierarchical structures legitimise the existence and formation of a first organisational structure (i.e. a small team) that is formally in charge of HRA processes. The legitimisation and formalisation of this embryonic structure enable the definition of analytics roles, responsibilities, and resource allocation for HRA development. Additionally, the legitimisation and formalisation of HRA processes enable the definition of rules, best practices, and systematic repetition of analytics activities:

*“It was only after the presentation to the board that we started to have a more structured approach to HRA [...], with more defined roles, responsibilities [...], and processes that worked on their own, regardless of the people working on them [...]” (TADS).*

In the legitimisation phase, the interested hierarchical structures started to be included in HRA development, becoming active elements in the definition of analytics processes

*“The various hierarchical figures were involved in analytics and HR activities; there was collaboration because they saw the value of HRA for the organization” (HRD).*

The comprehension of HRA processes and development path is associated with an increase in the resources allocated for the development of analytics capabilities (i.e. financial resources, technologies, people):

*“Also, thanks to the HRA results presented to the top-management, the board released some resources for the HR department and the development of HRA capabilities” (TADH).*

This business inclusion and allocation of organisational resources is the first step towards the transition from individual (i.e. micro) to organisational (i.e. macro) capabilities. In this phase it is important to notice that the legitimisation phase does not end with an increase in resources for analytics initiatives but continues during the entire HRA development path. As reported by previous research (Angrave, 2016; Minbaeva, 2018; Belizón and Kieran, 2021), the legitimisation of HRA practices is a loop process formed by the allocation of organisational resources, the investment and utilisation of these resources, the organisation and development of HRA practices, and the presentation of analytics results. From a financial perspective, the business expects that investments in analytics to bring benefits to the firm. The organisational capabilities to convert resources into organisational benefits, thus, becomes crucial for a successful HRA development.

Before going on, it is important to notice that till the *Legitimation* phase the HRA development has been led by a limited set of individuals, with a very limited participation of the HR department, the line-managers, the top-management, or other hierarchical structures.

#### 4.1.2. HR Analytics development phase

##### D. Formal development

The formal development phase refers to the definition of HRA governance, the investment in HRA development, and the definition and formalisation of HRA processes.

In the design of the formal organisational structure, individual roles and responsibilities are formally defined. In the case of *Tyche*, the structure responsible for HRA development was a team composed exclusively of HR professionals. In these early stages, individuals were often not exclusively dedicated to HRA development but instead devoted part of their time to HRA activities and processes:

*"I am dedicated to different activities ... for instance the recruitment and talent development processes, as well as the HRA ... the HRSI, on the other hand, is much more dedicated, dealing with HR systems and analytics processes [...], with the HRAN, they identify the HRA function, in a certain way [...], then we have the managerial figures (i.e. HRD, HRVP), that connect the team with the business and the managerial lines [...], but it is still an agile structure" (TADH)*

During the definition of the HRA team, the HR department needed also to decide how utilising the resources provided by the organisation in the *Legitimation* phase. Analysing *Tyche's* internal discussions, we have noticed that organisational resources tend to be used to acquire or improve analytics competencies, or to invest in the technological infrastructures supporting HR and HRA processes. In the case of *Tyche*, resources have been used to hire a management engineer with competencies in HRIS and information distribution within the organisation (i.e. HRSI):

*"[...] some resources were used to hire the HRSI, who had statistical, engineering, and IS competencies [...], these competencies were very useful for managing data input to analytics practices" (TADH).*

In this stage, it has been interesting to notice that the hiring of the HRSI enabled the full utilisation and exploitation of the technological structures in the organisation, which had hitherto been ignored due to lack of individual competencies and expertise. This suggests that individual capabilities are often a pre-condition for profitable investment in analytics technologies.

Eventually, HRA processes have been defined, structured, and formalised through the definition of rules and best practices for the repetition of analytics activities. In process formation, it is important to involve the final "users" of HRA outputs, including top-management, line-managers, and HR business partners:

*"The rules and activities behind the reporting processes have been defined including top- and line-managers, who are the end users [...], we provide them with dashboards that show them, for example, if there is a high rate of absenteeism, or turnover, or where there may be people-related problem [...], the metrics and data have been defined together, and also because of that we succeeded in involving them" (HRIS)*

In *Tyche*, in addition to the traditional processes required to perform analytic initiatives (i.e. business objectives definition, research agenda definition, data collection, and data management), three further processes have been defined. First, the team organised the activities required to use econometric techniques to support the definition of the people strategy (i.e. administration of an annual survey to the entire population; data integration; descriptive analytics for geographical area and department; econometric analysis; brainstorming meeting; people strategy definition; results distribution). Second, the reporting process has been created, formalised, and structured. This process provides top-management with descriptive results each month through interactive dashboards (i.e. PowerBI). Third, by integrating data available from the recruitment system, the PMS, and survey data, the first predictive models for selection processes had been defined.

In this stage, the definition of roles, responsibilities, and formal processes determines the transition from individual to organisational capabilities:

*“After the first year and a half – i.e. September 2022 – we started to have the first real analytics processes, and a first idea of analytics team, [...], this allowed us to take a step beyond individuals, which remain fundamental, and have a first idea of HRA at departmental and organisational level” (HRD).*

### *E. Integration*

The formal development of analytics capabilities requires the integration of HRA at different levels, including individuals, processes, and structures (Minbaeva, 2018). The integration phase, thus, refers to the individual, processual, technological, and decisional integration.

First, individual integration refers to the integration of individuals (i.e. HR professionals) into HRA processes. Integrating individuals into analytics processes means changing their traditional way of working to facilitate the collection of data inputs required for the development of HRA initiatives, developing an analytic culture:

*“The diffusion of analytics processes in the HR department has started to change the traditional way of working of our colleagues [...], now everyone is thinking a bit more about recording what happens during HR processes, in order to collect data and information, and they also think about what data and information they need to improve their decisions [...], in short, an analytics culture is spreading” (TADH).*

Second, processual integration refers to the integration of HR processes and systems with HRA processes. HR processes need to be integrated upstream (i.e. providing input data; discovering problematic areas) and downstream (i.e. providing information for improvement; driving HR agenda) of analytics processes. This interaction forced the HR department and its professionals to optimise HR processes and systems. For instance, Tyche is redesigning its PMS to have metrics more consistent with actual employee performance:

*“The firm needs to optimise some fundamental processes, because otherwise we would have analytics techniques that use in input data from ineffective and inefficient processes, which not reflect the reality [...]. For instance, if we take our PMS, we can also have several metrics, but if the performance management process is done as an “exercise in style”, we will have ratings without variability, which do not really reflect employees’ performance, development, or potential, and therefore we risk making wrong decisions, or even worse, not making any decisions because everything seems to be going well, despite the use of analytics [...], analytics and organisational processes need to be integrated” (TADH).*

This indicates that analytics processes lead to a rethinking of organisational processes on different levels, including redesigning their flow of activities, organizing data collection points and frequencies, or redefining performance and metrics.

Third, technological integration refers to the integration of available data and information systems:

*“We are now integrating the different information systems that hold data that can be used for HRA practices [...], this technological integration is crucial because the speed of data processing and the quality of analytics results depends on having integrated and clean data” (HRVP).*

The results observed in Tyche support the contributions provided in previous research, emphasising the importance of having an integrated data warehouse and technological infrastructure (van den Heuvel and Boundarouk, 2017; Boudreau and Cascio, 2017; Belizón and Kieran, 2021).

Eventually, decisional integration refers to the integration of HRA outputs in the decision-making processes of different decision-makers (e.g. HR business partners; CEO; line-managers):

*“In 2023, the integration of analytical results with decision-making processes has significantly increased [...]. Interactive dashboards, for example, are now provided to different top- and line-managers” (HRIS).*

In this stage, it is important to involve decision-makers in the definition and structuring of analytics processes. In Tyche, the reporting process has been defined and structured in collaboration with the CEO, the executive board, and the HR business partners, who indicated which people-related data and metrics to include in their

monthly reports. The inclusion of relevant decision-makers in the development of HRA processes, as explained above, enabled greater integration of analytics results into decisional processes, increasing HRA adoption at the organisational level.

#### **4.1.3. HR Analytics maturity phase**

The maturity stage of organisational capabilities refers to the regular exercise of the capability, which becomes refreshed and more deeply embedded in the memory structure of the organization (Helfat and Peteraf, 2003). In this regard, *Tyche* has not yet reached the maturity stage:

*“If we compare Tyche to most firms, or even to our initial state 3 years ago, we can define ourselves as a state-of-the-art firm [...], but considering our internal evolution, and the actual state of information systems, organizational processes, and analytics initiatives, we are still in an embryonic stage of HRA development”* (TADH).

This depends on three main reasons, indicated by respondents as the main dimensions on which to act in the future. First, most business units and managerial lines have not been involved in the development of HRA initiatives. Including business and end-users in analytics development has been emphasised as a sufficient condition for defining analytics objectives and the HRA agenda (Levenson, 2018; Tursunbayeva et al., 2021; , Shet et al., 2021) , fostering its organisational diffusion:

*“We will reach true diffusion and maturity when all managerial lines will be involved in HRA processes, when they will have direct access to data, and they will ask us for more complicated analysis [...], but first we need to make HRA processes functional within the HR department, we need to understand how they work, and then expand”* (TADH).

Second, the full integration of individuals, organisational processes, technological structures, and hierarchical structures is still to be achieved. Research suggested that HRA development requires consistent integration across all dimensions (Shet et al., 2021; Wirges and Neyer 2022). Full integration among individuals, processes, technological structures, and hierarchical structures, indeed, is a crucial element for developing HRA as an organisational capability (Minbaeva, 2018):

*“In the long period, to reach a real maturity, you need to work on several aspects, including the technological infrastructure, people, the HR processes, the business expectations, final users [...], you need to think about all these things, and integrate all these dimensions [...], for now we are taking one step at a time, and this is working”* (HRIS).

Third, the analytics culture and mindset should spread more in the HR department and among analytics users:

*“What we would like to do is to create a series of automations, creating a culture of data and HR Analytics in the organization [...], it is a multi-level objective, because you have to consider the HR department, the managers who will use the data, the business that has to provide use people-related problems or challenges, our HR business partners [...], it is a very long process, in our opinion, but we are on the right track”* (TADH).

Previous research reported that the development of HRA capabilities requires the development of an individual analytics mindset, social structures, and an organisational culture favourable to analytics (Minbaeva, 2018; Elmer and Reichel, 2021; Shet et al., 2021). Individual and organisational culture are critical for developing an evidence-based approach to people-management (Peeters et al., 2020), increasing HRA adoption and use (Vargas et al., 2018), and making analytics outputs more actionable (Shet et al., 2021).

## **5. Discussion**

In recent years, academics and practitioners become increasingly interested in understanding how to develop HRA capabilities (Thakral et al., 2023; Verma et al., 2023; McCartney and Fu, 2023). Previous research, however, provided limited contributions on how organisations need to build and develop HRA capabilities over time (Angrave et al., 2016; Greasley and Thomas, 2020; Falletta and Combs, 2021; Larsson and Edwards, 2021; Qamar and Samad, 2021; Ramachandran et al., 2023). More specifically, there is a pressing need to

study how micro-level actions and interactions with other individuals, processes, and structures determine and shape the evolution of HRA (Minbaeva, 2018; Greasley and Thomas, 2020; Gal et al., 2020; Fernandez and Gallardo-Gallardo, 2020; Wirges and Neyer, 2022). In this regard, we respond to the call for further empirical (Minbaeva, 2018; Greasley and Thomas, 2020; Gal et al., 2020; Fernandez and Gallardo-Gallardo, 2020; Wirges and Neyer, 2022; Ramachandran et al., 2023) and longitudinal research (Angrave et al., 2016; Larsson and Edwards, 2021; McCarney and Fu, 2023) on HRA, proposing a longitudinal case study on the evolutionary path of *Tyche*, an Italian organisation that conducted a 3-year project for HRA development. The direct involvement of the authors enhances data richness and the generation of relevant theoretical and practical contributions (Van de Ven, 2007; Goffin et al., 2019), discussed on five main headings.

First, our findings demonstrates that HRA capability development goes through 6 phases, each characterised by specific microfoundational actions and interactions: (i) Informal development: developing individual capabilities; defining and managing stakeholder's objectives and requirements; searching and defining the first HRA business case; (ii) Persuasion: operational persuasion; strategic persuasion; (iii) Legitimation: evaluation of HRA initiatives; legitimisation of HRA team; legitimisation of HRA processes; allocation of organisational resources; (iv) Formal development: definition of HRA governance; HRA investments; definition and formalisation of HRA processes; (v) Integration: individual, processual, technological, and decisional integration; (vi) Maturity. These findings are in line with previous research suggesting that micro-level actions and interactions are fundamental element for the emergence, development, and function of organisations (Felin et al., 2012; Minbaeva, 2018), shaping their processes, routines, and capabilities (Barney and Felin, 2013).

Second, this research reveals how microfoundational actions and interactions change over time, according to the shifting importance of each microfoundational pillar. In the first phases (i.e. *Informal development; Persuasion*), the organisation has not yet defined a well-defined plan for HRA development, analytics processes are not in place, and individual roles and responsibilities have not formally defined. The individuals responsible for the HRA operational development, thus, become the most important factor for successful HRA development. The coding processes showed that most initial interactions occur among individuals and collective of individuals, as there are no formal processes or organisational structures involved in HRA development. These findings confirm that individual actions (Bağış et al., 2022), competencies (Sousa-Zomer et al., 2020), and motivation (Lindeberg and Foss, 2011) are fundamental factors for the development of organisational capabilities. In the specific case of HRA, previous research argued that data management (Andersen, 2017), analytical (McCartney and Fu, 2023), technical (Andersen, 2017; Minbaeva, 2018), consulting (McCartney et al., 2020), story-telling (Andersen, 2017; 180), and business (Andersen, 2017; McCartney et al., 2020) abilities are necessities for the execution of analytics practices. Our research enriches these contributions showing that further individual competencies and interests are required for the emergence and development of HRA capabilities over time. More specifically, this research demonstrated that individuals also need coordination, issue-selling, and management capabilities, coupled with strong motivation and personal interest in analytics (Vargas et al., 2018). In this regard, HR managers need to provide individuals opportunities for experimentation and learning by doing, accepting possible errors. Additionally, they are required to have good social competencies and networking abilities, generating opportunities for interactions across organisational boundaries and hierarchical levels. Reaching and persuading relevant managerial figures, organising the objectives of different stakeholders, and managing the trade-off between short- and long-term organisational goals, indeed, have been indicated as some of the main barriers for HRA evolution (Angrave et al., 2016; Hamilton and Sodeman, 2019; Shet et al., 2021; Samson and Bhanugopan, 2022). In first development stages, thus, individuals are fundamental not only in performing analytics activities but also in leading HRA emergence and development, overcoming organisational barriers and resistances.

In the subsequent phases (i.e. *Persuasion, Legitimation*), most interactions occur among individuals or collective of individuals and hierarchical structures through processes of persuasion and legitimisation. This research complements previous discussion on persuasion (Greasley and Thomas, 2020; Ramachandran et al., 2023) and legitimisation (Belizon and Kieran, 2022) by focusing on microfoundational actions and interactions and their effect over HRA development. Our findings align with previous studies emphasizing the importance of managerial support (Shet et al., 2021; Samson and Bhanugopan, 2022) and business buy-in (Andersen, 2017; Ratnam and Devi, 2023) for HRA development. Furthermore, we argue that the support from hierarchical structures needs to be gained through a process of continuous persuasion and legitimisation. Our results demonstrate that the persuasion process occurs at two stages: at the operational level within the HR department and at the strategic level across hierarchical structures and levels. In most organisations, top-management is indeed not interested in investing organisational resource for HRA development until its possible benefits are clear and visible (Minbaeva, 2018). HR managers and professionals, thus, are fundamental in persuading other hierarchical figures of the possible benefits of analytics initiatives (Greasley and Thomas, 2022), educating and motivating them to actively participate in the formation and development of HRA processes (Samson and Bhanugopan, 2022). Our findings also contribute to recent research on legitimisation processes (Belizon and Kieran, 2022), revealing which variables affect analytics legitimisation over time. On the one side, individuals should invest effort and resources in the selection of an intelligent first HRA business case, leveraging on their issue-selling and communication abilities. On the other side, the successful interaction between individuals and hierarchical structures depends on top-management analytics culture, interest in people-related practices, and habit of listening to lower hierarchical levels. Future research could investigate the effect of these variables on HRA development and outcomes.

In the final phases (i.e. *Formal development, Integration, Maturity*), organisational structures and processes are most relevant microfoundational pillars. Individual knowledge and experience is decoupled from individuals and organised into formalised and structured processes, through the definition of roles, responsibilities, rules, and best practices. Our findings reveal that HRA processes emerge from the capitalisation of individual competencies, the continuous repetition of analytics activities, and the development of sequential rules, aligning with previous research on routines and organisational processes (Bapuji et al., 2012; Lin and Li, 2018). Rules and best practices are then refined and organised in processes through experimental learning and individual knowledge accumulation (Felin et al., 2012). Furthermore, in defining and structuring HRA processes, it is important to involve relevant decision-makers, shaping analytics outputs according to their needs and enhancing their active support for HRA development. These results, thus, confirm that the definition of structured rules, procedures, routines, and processes are critical for organisational capabilities formation and development (Laamanen and Wallin, 2009; Felin et al., 2012). Once analytics processes and structures are defined, the main challenge for HRA development becomes achieving an effective integration of all microfoundational pillars, considering individuals, processes, and structures.

Third, this paper contributes to microfoundations and HRA research providing results on how the transition from individual-level capabilities to firm-level capabilities occurs. Previous research on organisational capabilities and microfoundations has focused on different variables and mechanisms, ranging from individual cognitive factors (Gavetti, 2005) to transactive memory systems (Argote and Ren, 2012). In the academic literature on HRA, apart from that of Minbaeva (2018), there are no further studies on microfoundations and micro-macro transition. In this regard, our research reveals that the transition for HRA capabilities occurs through a shift in interactions dynamics, from individual level interactions to interactions across organisational levels and boundaries, similar to other organisational capabilities (Bingham et al., 2019; Bağış et al., 2022; Dedehayir et al., 2022). More specifically, the transition from individual-level to firm-level HRA capabilities occurs based on a gradual existence and three main stages. At the first stage, individuals responsible for HRA evolution form and develop their competencies, knowledge, and expertise. This is done through experimentation, learning by doing, and knowledge exchange, confirming the results of previous research on organisational capabilities (Helfat and Peteraf, 2003; Bapuji et al., 2012). At the second stage,

individual capabilities are grouped, organised, coordinated, and integrated through the definition of roles, responsibilities, rules, best practices, and in the end, processes. These findings confirm that organisational capabilities emerge from a process of formalising repeated activities and routines (Bağış et al., 2022), moving from individual schemata to organisational shared schemata (Mäkelä et al., 2012). At the third stage, HRA processes and structure (i.e. HRA team) are integrated into existing organisational processes and hierarchical structures. Organisational integration embraces all organisational areas and hierarchical levels (Rasmussen and Ulrich, 2015; Ramachandran et al., 2023) and is a critical factor for the future development of HRA capabilities (Van den Heuvel and Boundarouk, 2017; Minbaeva, 2018).

Fourth, this study enriches previous research focused on the emergence and definition of HRA governance. Previous research did not indicate a single and dominant option for organising HRA team or function (Dahlbom et al., 2019; Shet et al., 2021), proposing both a centralised analytics function (Marler and Boudreau, 2017; McIver et al., 2018) and an analytics team emerging in the HR department (Falletta and Combs, 2021; Ellmer and Reichel, 2021). Scholars argued that HRA future is a centralised analytics organisational department enabling the identification of larger business challenges, the cooperation with different departments, and the collection of data from other organisational units (Dahlbom et al., 2019; Shet et al., 2021). Our findings show that HRA founding and development has been guided by a HRA team, similar to previous case studies on HRA (Ellmer and Reichel, 2021). The team consists of a limited number of individuals whose competencies ensure the operational execution of analytics activities (e.g. HRSI, HRAN) and the continuation of HRA development at the strategic level (e.g. HRVP, HRD). Most team members are responsible for managing specific HR processes or systems, formally dedicating only part of their time to the development and implementation of HRA initiatives. At the operational level, individuals all had engineering competencies or analytics expertise and developed individual HRA capabilities over time through experimentation, learning by doing, and knowledge exchange. At the strategic level, HR managers social capital, organisational network, and willingness to expose themselves have been fundamental in connecting the team with line-managers, top-management, and relevant decision-makers. These operational and strategic capabilities made it possible to overcome the difficulties related to the development of HRA within the HR discussed in previous research (Van den Heuvel and Boundarouk, 2017). The formation of a HRA team, thus, seems the most suitable governance option for the emergence and development of HRA. It is important to notice that these findings are valid for organisations starting their HRA development path from the bottom, within the HR department, and with a low HRA maturity. Under these conditions, organisational resources are not immediately available for the HR department and, thus, it is difficult to set up an HRA team within a centralised analytics function from scratch. In more mature states, it is possible that a centralised analytics function is the most suitable solution for HRA functioning and diffusion. Further empirical research is needed on the emergence, management, and development of HRA structures and governance, as studies on the topic are still insufficient.

Eventually, we provide interesting contributions on the effect that HRA have on the HR department and its professionals. Previous research discussing HR transformation focused on HRA promised outcomes (Andersen, 2017). Scholars stated that analytics improve HR decisions (Dahlbom et al., 2019), transform HR department into a strategic business partner (Lawler et al., 2004; Sharma and Sharma, 2017), and bring people-related issues to the “business table” (Andersen, 2017), increasing HR legitimacy in the organisation. Despite HRA has the potential to transform the way organisations develop, manage, and control their workforce (Huselid, 2018; Giermindl et al., 2021), contributions on the internal HR transformation process are limited. Our findings demonstrate that the diffusion of HRA leads to a transformation affecting individuals, processes, systems, and organisational structures. First, HR professionals and HR business partners interfacing with analytics processes need to change their way of working, reasoning about how to collect and use data for improving their decisional processes. For instance, individuals responsible for the selection process have redefined and automated the processes of assessment and curriculum vitae evaluation, optimising data collection and enabling the definition of the first predictive model. Second, the

integration of analytics processes forces the HR department to redesign and optimise its traditional processes and systems, enabling better data collection, analysis, and reporting activities (Dahlbom et al., 2020; Verma et al., 2023). The redesign of processes and technological systems also aims to have measurements, and thus, data, that represents the actual measured phenomena. In this regard, Tyche is working on its PMS in order to have a technological and processual infrastructure that enables the collection of data (i.e. performance ratings) representing the actual performance of employees. Eventually, HRA outputs need to be integrated in the decisional processes of relevant stakeholders. The integration of analytics outputs into the decisional structures of relevant decision-makers is crucial to reach the later stages of HRA maturity. HRA value is indeed evaluated through the impact that analytics can generate on organisational decisions and change policies (Levenson, 2018).

### **5.1. Limitations and future research**

Despite the methodological rigour, we recognise that our research has some limitations that could be addressed in future research.

First, the research is based on a single case study. Previous research explained that single case studies enable the generation of solid and generalizable contributions on microfoundations and capability development (Bağış et al., 2022; Kryeziu et al., 2022). However, organisational capabilities are often context and path dependent, and thus, a single case reduces the validity and generalisability of our results in other organisational settings, industries, or countries (Helfat and Peteraf, 2003; Laamanen and Wallin, 2009). In this regard, it is important to recognise the boundary conditions identified in *Tyche* case, within which other cases might present similar micro- and macro-level dynamics. Our findings, thus, could predict the HRA evolutionary path of organisations presenting similar initial conditions (i.e. project initiated by the HR department or innovative individuals; low HRA maturity; different non-integrated information systems; limited analytics and engineering competencies) and characteristics to *Tyche* (i.e. European HR department; over 1000 employees; operating on a global level; not in digitised industries). Firms falling outside these boundary conditions, however, might demonstrate different microfoundational dynamics and development paths. Future research thus, should implement a multiple case studies approach to analyse how microfoundational actions and interactions shape HRA emergence and development in different domains.

Second, our primary data sources (i.e. transcribed interviews) are often retrospective in nature, making it complex to understand whether retrospective accounts were generated after or during the investigated phenomena (Laamanen and Wallin, 2009). Additionally, due to the first two authors' involvement in the HRA project and the use of historical data, our results could be influenced by subjective and interpretation bias (Bojesson, 2020; Bağış et al., 2022; Dedehayir et al., 2022). In this regard, we applied 3 main strategies defined and used by previous research to reduce these concerns (Laamanen and Wallin, 2009; Davis et al., 2016; Tallot et al., 2016). First, we conducted the interviews at the beginning, during, and the end of the analytics project in order to observe the entire development path of HRA capability during its real evolution. Although not all interviews were recorded and transcribed, our notes have been an excellent source of information to go back in time, reconstructing individual historical perceptions. Second, data collected from different sources (i.e. transcribed interviews, participant notes, secondary data) have been triangulated throughout the case analysis, ensuring on the definition of robust and reliable considerations. Third, the results of each stage of the analysis process have been compared and discussed among the authors and firm representatives, emphasising possible divergences in personal considerations. However, we may have not considered all relevant micro-level factors or overlooked some of them. Future research, thus, should overcome these limitations adopting a prospective or empirical approach to the study of HRA development.

Fourth, this research focuses on the emergence and development of HRA capabilities resulting from microfoundational actions and interactions. Organisational variables have been discussed in our paper but may deserve further attention in future studies. Additionally, wider macro-level variables related to the



geographical area, political context, industry, and the relationships with clients, suppliers, the core group, and other subsidiaries have not been included in our work. Although these issues have never surfaced in available data, thus, future research could enrich previous research on HRA from a firm-level perspective (Shet et al., 2021; Bechter et al., 2022; Conte and Siano, 2023) investigating the effect of these variables on HRA emergence, development, and diffusion in organisations. Multi-level approaches (Foss, 2009; Aguinis and Molina-Azorin, 2015) and techniques (Rabe-Hesketh and Skronidal, 2008) could be useful methods for integrating micro-, meso-, and macro-level variables, analysing their impact and relative importance for HRA capability development.

Eventually, future studies could deepen three themes emerged in our research. First, future research could study HRA development in organisations characterised by higher levels of analytics maturity. In this organisational settings, it could be interesting to delve into the determinants of HRA evolution, the emergence, management, and development of HRA structures and governance, and the perceived benefits at different organisational levels (i.e. employees; HR professionals; HR managers; line-managers; top-management). Second, our findings revealed that the success of persuasion and legitimisation processes also depends on top-management analytics culture, interest in people-related practices, and habit of listening to lower hierarchical levels. Future research, thus, could empirically investigate the effect of top-management characteristics and corporate organisational culture on the development, dissemination, and adoption of HRA practices. Eventually, organisational capabilities depend on, develop, and interact with other organisational capabilities, shaping their evolution and development path (Helfat and Peteraf, 2003; Winter, 2012). In future studies, thus, researchers could investigate the relationship between HRA capabilities and other organisational capabilities (e.g. operational and strategic HR capabilities), focusing on the organisational capabilities system (Laamanen and Wallin, 2009).

## **5.2. Practical contributions**

This research provides three main managerial contributions.

First, our findings identify six main phases for HRA development, each one characterised by different micro-level actions, interactions, and dynamics. In this regard, this paper contributes to prior research on HRA development (e.g. Falletta and Combs, 2021; Shet et al., 2021; Wirges and Neyer, 2022; Verma et al., 2023) providing a description of a successful practical case. Thus, our findings support organisations and their HR managers in planning their HRA capability development, explaining them what phases they might go through and what their development path might be.

Second, we provide a description of HRA evolution through its microfoundations, revealing how individual actions and interactions with other individuals, processes, and organisational structures determine the emergence and development of HRA capability. This research, thus, supports practitioners explaining how micro-level actions, interactions, and dynamics occur over time. Additionally, our findings provide insights into the fundamental factors for completing the transition from individual to organisational HRA capabilities (Bingham et al., 2019; Bağış et al., 2022). More specifically, we indicated experimentation, learning by doing, and continuous knowledge exchange as fundamental methods for the development of individual HRA capabilities. Then, we demonstrate that analytics processes and structures are built and formalised through the definition of roles, responsibilities, rules, and best practices. Eventually, we emphasise the need to integrate HRA with existing organisational processes and structures.

Third, this research discusses the critical factors and the main difficulties of each development phase. In addition, we reveal to organisations which are the main variables to be leveraged to address these challenges and succeed in HRA development. For instance, our findings indicate which individual competencies and organisational conditions are needed to organise different stakeholders' objectives, reach different hierarchical structures, and persuade relevant managerial figures of the benefits of HRA. Likewise, our research reveals the dimensions (i.e. individual, processual, technological, decisional) and variables (e.g.

analytics culture, optimisation and redesign of HR processes and systems, etc.) to be considered in the challenge of integrating HRA into existing organisational processes and structures. Our findings, thus, provide practical guidance for managing the relationships and interactions among individuals, processes, and structures, supporting practitioners in managing possible conflicts, barriers, and resistances.

Further managerial contributions on individual capabilities development, persuasion and legitimisation processes, analytics processes development, HRA governance, and HR transformation have been discussed in previous sections.

## 6. Conclusion

Despite the increasing interest in HRA, academic research on HRA development and microfoundations is still rare (McIver et al., 2018; Greasley and Thomas, 2020; Falletta and Combs, 2021; Larsson and Edwards, 2021; Qamar and Samad, 2021; Ramachandran et al., 2023). In this regard, this paper enriches previous research on HRA emergence and development (e.g. Minbaeva, 2018) proposing a longitudinal single case study (Corbin and Strauss, 1990; Eisenhardt and Graebner, 2007; Eisenhardt et al., 2016) of a practical case. The study is based on multiple data sources and respond to call for more empirical and longitudinal research on HRA development (Larsson and Edwards, 2021; McCartney and Fu, 2023). More specifically, this research provides findings on how HRA capabilities are created and developed over time through microfoundational actions and interactions. Our findings identified six phases for HRA capability development, each one characterised by different microfoundational dynamics: (i) Informal development; (ii) Persuasion; (ii) Legitimation; (iv) Formal development; (v) Integration; and (vi) Maturity. For each phase, we presented fundamental microfoundational actions and interactions, revealing a shifting importance of each pillar (i.e. individuals, processes, structures). Additionally, we discuss the transition from individual-level to firm-level capabilities, describing its gradual transition through three main stages. Eventually, our research provides contributions on HRA governance and the analytics effect on the HR department and its professionals. Future research directions have been also proposed to fill the limitations of this paper and deepen the implications of specific variables and mechanisms identified in this study.

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## 8. Annex

### Annex 1. HR Analytics Maturity Model application

Maturity Models (MMs) offer a simple but effective method to assess the maturity of organisational capabilities and systems (Lismont et al., 2017; Doctor et al., 2023). More specifically, the HRA Maturity Model (HRAMM) is a comprehensive model to measure and evaluate HRA capability maturity, described through 4 areas, 14 dimensions, and 37 further components (Rigamonti et al., 2022).

In this research, the model has been retrospectively applied to quantitatively evaluate the HRA capability maturity at three points in time (i.e. February 2021; February 2022; and February 2023). The questionnaire has been filled in with the support of the HR Talent Acquisition and Development Specialist (TADS), the Head of HR Talent Acquisition and Development (TADH), the HR Information System Analyst (HRSI) and the HR Analyst (HRAN). More specifically, three virtual meetings have been organised, in February 2021, 2022, and 2023. Despite retrospective research has the limitation of reconstructing causal events, several studies shown that the participants in organizational processes do not forget key events (Huber, 1985; Leonard-Barton, 1990).

The model has been applied for three main reasons. First, it enables an effective and objective evaluation of HRA development at the macro-level. Second, it ensures that HRA capabilities have been developed over the 3-year period studied in this research. Third, through the assessment of the various areas (e.g. technological, organizational, functional, diffusion) and dimensions (e.g. technological architecture, HRA governance, etc.) of HRA maturity, allow us to observe and better understand the impact of micro-level actions and interactions on capabilities development at the macro-level.

### Annex 2. HR Analytics Maturity Model results

Table 5 describes Tyche's positioning in each area of the HRAMM in the three time periods (i.e. February 2021; February 2022; February 2023) and difference in maturity over time (i.e.  $\Delta M$ ). Dimensions have been selected as granularity level to provide a simple and clear visualisation of the firm's level of maturity.

Table 5. HRA MM results.

Area	Maturity					Dimensions	Maturity			
	Time	T1	$\Delta M1$	T3	$\Delta M2$		T5	Time	T1	T3
Technological	1.34	+0.79	2.13	+0.81	2.94	HRA architecture	1.00	2.00	3.00	
						Data management	1.34	2.03	2.78	
						HRA application	2.00	2.50	3.00	
						Interface	1.00	2.00	3.00	
Organizational	1.33	+1.23	2.56	+0.58	3.14	HRA competencies	1.75	2.67	3.17	
						Operating model	1.00	2.25	3.00	
						HRA strategy	1.25	2.75	3.25	
						Data governance	1.70	2.20	2.97	
Functional	1.41	+0.80	2.21	+0.52	2.73	Measurement	1.50	2.33	2.50	
						Reporting	1.46	1.96	2.80	
						Analytics	1.00	2.33	2.67	
						Accessibility	1.60	2.20	2.80	
Diffusion	1.31	+0.76	2.07	+0.86	2.93	Culture	1.00	2.00	3.00	
						Adoption	1.33	2.00	3.00	
<b>Total</b>	1.35	+0.89	2.24	+0.70	2.94					

### ***Annex 3. Interview protocol***

- Q0. Dear [Insert name], can you tell me about *Tyche's* HR Analytics project?
- Q1. What did you do for HR Analytics development?
- Q2. Which individuals participated in the project? And with whom did you interact the most?
- Q3. What are the main processes of the project? In which ones did you participate?
- Q4. What are the main hierarchical and technological structures that were involved in the project? What was their role in the project?
- Q5. In your opinion, are there any particular aspects of the project that you would like to tell us about?

### Annex 3. Coding process.

Example of quotes	First-level concepts	Second-order concepts	Categories
<p>"We should also thank HRD and HRVP for giving us permission to experiment, they granted us autonomy [...], we made some mistakes along the way, but then we corrected our course [...]" – HRAN</p> <p>"The interactions between me, the HRAN, and the other figures were crucial because each of us brought our own vision, expertise, and competencies [...], I learned a lot in the early months" – TADS</p> <p>"We learned a lot by doing, and failing at the beginning, often because we didn't have data [...], but this is part of the journey" - TADS</p> <p>"I become interested in analytics, and thus, I started reading stuff on HRA and analytics in HR management, trying to understand how you can use analytics techniques to support HR practices [...], I can say it was a sort of personal interest in analytics [...]" – TADS</p> <p>"The topic of predictive recruitment doesn't fall under my role or responsibilities, but it's something I'm personally interested in, so I tried to learn something and also work on" - TADH</p>	<p>Learning by doing and experimentation</p> <p>Knowledge exchange</p> <p>Self-learning</p>	<p>Development of individual capabilities</p>	
<p>"In the early months, we organized several meetings with different line-managers to identify potential business challenges that could be addressed through HRA practices" – HRAN</p> <p>"In March 2021, we spoke with different managers to understand their vision of the organization and their people-related issues [...], this provided a good starting point for HRA initiatives" – TADS</p> <p>"[...] It wasn't easy to lay the foundation for the development of organizational HRA capabilities, which inherently have a multi-year duration, given the short-term orientation of our managers" - TADS</p> <p>"HRVP's objectives were more short-term oriented because there was the need to figure out how to structure the firm People Strategy (i.e. 2022-2023) and be convincing with the business" - TADS</p> <p>"I was unclear what the HRA was for ... After a few meetings we tried to understand what it could help us with in HR" – HRP2</p> <p>"In the early months, we had many meetings with our colleagues (i.e. HR professionals) to determine the direction to take [...], to be honest, at the beginning we didn't have a well-defined plan" – HRD</p>	<p>Organising meetings and brainstorming sessions</p> <p>Interacting with line-managers</p> <p>Interacting with HR managers</p> <p>Defining long and short-term objectives</p> <p>Defining business objectives</p>	<p>Definition and management of stakeholders' objectives and requirements</p>	<p><b>Informal development</b></p>
<p>"One of the main challenges for our colleagues was to integrate the interests of HR, business, and the various operational constraints" – HRD</p> <p>"To understand where we could work, available data was integrated [...], we realized that the data was not coherent and consistent, and that data collection needed improvement" – ITHR</p> <p>"[...] econometric analyses were conducted to study relationships between variables and the data provided by the Commercial Operation Unit" - TADS</p> <p>"We started a first business case with the Contact Center Hub in Barcellona, interested in understanding the performance drivers of their employees [...], unfortunately, it didn't succeed due to time constraints" – HRAN</p> <p>"[...] In the end, our business case was the use of descriptive and econometric analysis to support the definition of our People Strategy" – HRD</p> <p>"In November 2021, we administered this long questionnaire covering various aspects (e.g., performance, HR practices, wellbeing), though which we collected several variables for our analyses" - TADS</p>	<p>Integrating business and operational requirements</p> <p>Collecting and integrating available data</p> <p>Defining possible business case</p> <p>Performing first analytics activities</p>	<p>Research and definition of the first HRA business case</p>	
<p>"In June 2021, we began defining the goals for HRA development [...], one of the main objectives was the need to obtain quality data because the available information was insufficient" - TADS</p> <p>"In September 2021, we tried to define a roadmap, made a presentation, and presented it to them (i.e., HRVP, HRD), proposing our ideas for HRA development, including the global survey [...], once we got their validation, we moved forward step by step [...], it was a persuasion process that lasted months [...]" - TADS</p> <p>"During the summer, several meetings were organized with HRD, HRVP, and some HR Business Partners [...], the goal was to persuade them of the need for a global survey and to use that data as a basis for HRA initiatives" - TADS</p>	<p>Defining HR Analytics research agenda</p> <p>Proposing possible HR Analytics development paths</p> <p>Persuading HR managers (i.e. internal persuasion)</p>	<p>Operational persuasion</p>	<p><b>Persuasion</b></p>

<p>“Operational activities were mainly carried out by TADS, TADH, and HRAN [...], but we (i.e. HRD, HRVP) held the strings of the project, connecting operational and business level [...], then we organised various meetings with the CEO, the departmental presidents, and most the of the line-managers, also exposing ourselves personally [...]” - HRD</p> <p>“The HRVP and the HRD have been able to present the global survey and HRA initiatives to the board and the other departments through a great deal of political and diplomatic work [...], they exposed themselves [...], allowing us to get to the CEO and the other departmental presidents to present them our analytics results” - HRAN</p> <p>“HRVP and I facilitated the connection with top management because we were interested in analytics and the idea of transforming the HR in a more data-driven department” – HRD</p> <p>“The final step consisted in presenting all the initiatives to the CEO and top-management through a 3-hour meeting, where we explained the initiatives, methodology, results, and future goals of HRA” – TADS</p>	<p>Connecting operational (e.g. HR) and business (e.g. CEO) levels Searching for managerial support Presenting HR Analytics results</p>	<p>Strategic persuasion</p>	
<p>“The important thing was to prepare these presentations that allowed us to onboard various hierarchical figures, from the CEO to the line-managers [...], their evaluation of HRA was crucial to continue with the project” – TADS</p> <p>“The positive evaluation also depended on the CEO, which already had an analytics mindset, and which really listened to us [...], this is not always the case in big organizations” - HRAN</p> <p>“The various hierarchical figures were involved in analytics and HR activities; there was collaboration because they saw the value of HRA for the organization” - HRD</p>	<p>Evaluation of HR Analytics activities</p>	<p>Evaluation of HRA initiatives</p>	
<p>“The CEO was very satisfied with what we had done [...], he gave us the green light [...], and supported the idea of forming a group to handle analytics activities” – HRAN</p> <p>“Top-management subsequently legitimized the existence of HRA within the HR department and the possibility for some of us to dedicate a portion of our time to develop this topic” - HRD</p>	<p>Roles legitimisation Responsibilities legitimisation</p>	<p>Legitimation of HRA team</p>	<p><b>Legitimation</b></p>
<p>“The CEO legitimized the existence of these analytical activities and, indeed, included people management practices among the 5 most important levers to reach business objectives” – HRD</p> <p>“The positive results of the People Strategy and HRA initiatives allowed us to obtain approval to repeat these activities, starting from an annual global survey and progressing to the use of analytics for recruitment or to support people-related decisions” - TADS</p>	<p>Analytics activities legitimisation Permission to repeat analytics activities</p>	<p>Legitimation of HRA processes</p>	
<p>“Also, thanks to the HRA results presented to the top-management, the board released some resources for the HR department and the development of HRA capabilities” - TADH</p>	<p>Providing new organisational resources for HRA activities</p>	<p>Allocation of organisational resources</p>	
<p>“The HRSI is focused on data and information systems management, activities that are the pillars of HRA processes” – TADH</p> <p>“I am formally responsible for all information systems related to HR and HRA processes” - HRSI</p> <p>“The only figures entirely dedicated to HRA are the HRAN and the HRSI, although HRSI also handles other processes [...], I dedicate only a portion of my time, [...], then the HRD and the HRVP handle the strategic dimensions, [...] the other figures are currently influenced in a cross-functional manner” - TADH</p>	<p>Definition of roles and responsibilities Definition of the time spent for analytics activities</p>	<p>Definition of HRA governance</p>	
<p>“[...] In the summer of 2022, we completed the hiring of the HRSI [...], the goal was to bring competencies related to HRIS, data management, and process engineering into the HR department” - TADH</p> <p>“Resources were also invested in a platform (i.e., an employee experience platform) for data collection, administering quick surveys, continuous feedback, and other features that could aid personnel management” - TADS</p>	<p>Investment in individual competencies Investment in technologies</p>	<p>HRA investments</p>	<p><b>Formal development</b></p>
<p>“In recent months, we've started to have some processes with well-defined rules that operate autonomously, in a certain way, and don't solely depend on individuals, as was the case at the beginning” – TADH</p> <p>“Around the summer of 2022, we started interacting more frequently with the HRSI to figure out what data to collect, what metrics to display in reports, etc. ... it was very helpful” – HRP3</p> <p>“It was only after months that I got in touch with the HRA again ... they asked me to intervene in the definition of some processes [...]” – HRP4</p> <p>“Now, there are actual processes, such as the reporting process related to creating and sharing dashboards with the CEO, some line-managers, and HR business partners” – HRSI</p> <p>“Reporting processes have been developed collaborating with analytics users, including the HRVP, HRD, CEO, and other line-managers [...], they explained us what they wanted to see in the dashboards” - HRSI</p>	<p>Definition of rules Definition of best practices Inclusion of analytics users Building processes</p>	<p>Definition and formalisation of HRA processes</p>	

<p><i>"The diffusion of analytics processes in the HR department has started to change the traditional way of working of our colleagues [...], now everyone is thinking a bit more about recording what happens during HR processes, in order to collect data and information" – TADH</i></p> <p><i>"Our colleagues started to think about what data and information they need to improve their decisions [...], in short, an analytics culture is spreading" – TADH</i></p> <p><i>"Now I know that there are data that I can use for my activities" – HRP2</i></p> <p><i>"My role as an HR professional has changed, and I see the same happening for my colleagues in their day-to-day work" – HRP3</i></p> <p><i>"People are developing this mindset [...], I'm beginning to understand what it means to work with data and have more data" – HRBP4</i></p>	<p>Transforming traditional way of working of HR professionals</p> <p>Building an analytics culture</p>	<p><i>Individuals integration</i></p>	<p><b>Integration</b></p>
<p><i>"The HRA processes made us realize that to continue correctly with analytical processes, but also HR processes, we needed to rethink and optimize the classic HR processes [...], since work methods have changed, we needed to adapt and integrate various elements" – TADH</i></p> <p><i>"I load HR processes into HR information systems, to which I have applied a sort of reengineering process, [...] so integration is necessary because I have to think simultaneously about the processes and the data I collect and bring to the process" – HRIS</i></p> <p><i>"Existing HR processes feed data into HRA processes, and that's why an integrated reasoning is important" – HRIS</i></p> <p><i>"Analytics results are used to make decisions that influence the definition of HR processes [...], even though they are two separate tracks, they work within a unified system, and that's why it's important to consider both HRA inputs (i.e. data) and outputs (i.e. results)" - HRAN</i></p>	<p>Optimising HR processes</p> <p>Optimising HR systems</p> <p>Upstream integration (i.e. input)</p> <p>Downstream integration (i.e. output)</p>	<p><i>Processual integration</i></p>	
<p><i>"We are now integrating the different information systems that hold data that can be used for HRA practices [...], this technological integration is crucial because the speed of data processing and the quality of analytics results depends on having integrated and clean data" - HRVP</i></p> <p><i>"TADH and I are working to integrate various information systems with personnel information, such as the recruitment system, in order to have a unified and integrated database. This is undoubtedly the first step" - HRSI</i></p>	<p>Integrating information systems</p> <p>Integrating available data</p>	<p><i>Technological integration</i></p>	
<p><i>"In recent months, and I think a lot in the future as well, we will have to understand how to better use data and analytics for HR decisions" – HRP4</i></p> <p><i>"The results of our dashboards are now viewed by HR business partners, line-managers, and other figures, who have started asking us for information and metrics" – HRSI</i></p> <p><i>"Reporting processes, as well as the results of HRA, have increased HRA diffusion at various hierarchical levels" - HRD</i></p> <p><i>"The CEO and other executive often asks us for metrics to take people-related decisions [...], they have a fairly modern view ... they don't just ask for data but also want to understand how to use those data and information in their decisional processes" - HRSI</i></p>	<p>Integrating HRA results in HR decisional processes</p> <p>Integrating HRA results in business decisional processes</p>	<p><i>Decisional integration</i></p>	

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"We are well aware that this is just the beginning... in the future, we will need to address and integrate numerous dimensions to truly progress with HRA ... it will take years." – TADS

"In the long term, you must address and integrate different things: technological systems, personnel, HR, business engagement... it is truly challenging to consider everything simultaneously. It's better to take it one step at a time, and for now, we are succeeding." - TADS

"If we compare Tyche to most firms, or even to our initial state 3 years ago, we can define ourselves as a state-of-the-art firm [...], but considering our internal evolution, and the actual state of information systems, organizational processes, and analytics initiatives, we are still in an embryonic stage of HRA development" – TADH

"We will reach true diffusion and maturity when all managerial lines will be involved in HRA processes, when they will have direct access to data, and they will ask us for more complicated analysis [...], but first we need to make HRA processes functional within the HR department, we need to understand how they work, and then expand" – TADH

"What we would like to do is to create a series of automations, creating a culture of data and HR Analytics in the organization [...], it is a multi-level objective, because you have to consider the HR department, the managers who will use the data, the business that has to provide use people-related problems or challenges, our HR business partners [...], it is a very long process, in our opinion, but we are on the right track" – TADH

"In the long period, to reach a real maturity, you need to work on several aspects, including the technological infrastructure, people, the HR processes, the business expectations, final users [...], you need to think about all these things, and integrate all these dimensions [...], for now we are taking one step at a time, and this is working" – HRIS

"In the future, to complete the transition to true analytics, we need to enhance the integration between systems and the people working with them. A small example of this achievement is in recruiting, where the individuals involved, processes, and SHL system are perfectly integrated" – HRIS

"The (i.e. HRA) adoption in other units depends on many factors, with resource availability being a primary concern. Additionally, we have not yet integrated all HR processes, technological systems, and data from other organizational units" – HRIS

"Sooner or later, we will include also other line managers in HRA development ... in order to make decisions based on their specific requirements, which may vary across professional families. However, this involves a different role and a different sensitivity... I believe we will achieve this when we have promoted a greater analytical mindset and consolidated processes within HR" - HRD

"The HR department is leading this change, which in its upcoming phases will see increased collaboration with other departments and managerial figures" - HRVP

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Managerial lines inclusion  
in HRA development  
Full integration among  
individuals, processes, and  
structures  
Diffusion of analytics  
culture

*Future Maturity*

**Maturity**