

Technological Organizational Environmental Determinants of Human Resource Analytics Adoption

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Abstract

Managing human resources by using big data is a contemporary trend in the field of human resource management. This article aims to contribute to the available literature on human resource analytics. The main research problem of this study is “What are the key determinants of human resource analytics adoption?” This study is mainly descriptive study based on Technological- Organizational- Environmental framework. Therefore, it can be identified three research questions as; (1) What are the technological determinants of human resource analytics adoption?”, (2) “What are the organizational determinants of human resource analytics adoption?” and (3) “What are the environmental determinants of human resource analytics adoption?”. Comprehensive literature on scholarly papers published in recent five years was reviewed to address the research questions. These papers were searched in three databases which are Emerald Insight, ScienceDirect and ResearchGate. Then 14 scholarly papers were filtered with abstract review and used for the content analysis. It can be observed that, organizational determinants are the most frequent determinants while environmental determinants are the least frequent determinant in the available literature. To become effective in human resource analytics adoption, it is required to pay more and enough attention to the technological determinants like; 1) Compatibilities among systems, 2) Data authenticity, 3) Fairness of algorithms, 4) IT infrastructure & capability and 5) Complexity in human resource analytics projects. Also, it is required to pay more and enough attention to the organizational determinants like; 1) Analytical Competencies, 2) Strategic business view, 3) Focus on business issues, 4) Employee engagement and 5) Leadership support. To become effective in HRA adoption, it is required to pay enough attention to the environmental determinants like;.1) Environment of mistrust, 2) Technostress in the society, 3) Multi infrastructure nature, 4) Competitive pressure and 5) Data governance factors. Making the HRA adoption successful is very important because only a successful HRA adoption leads to become a strategic partner in the present competitive corporate environment.

Keywords: *Human Resource Analytics, Human Resource Analytics Adoption, Determinants, of Human Resource Analytics Adoption*

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Introduction

Human Resource Analytics (HRA) is an emerging trend which is transpired due to the expansion of Information Technology (IT) and it is currently being accepted by many organizations (Reena, Ansari K and Jayakrishnan, 2019). HRA mainly assists to data-driven decision making and this big data can be handled only with the proper IT systems (Christidis, & Devetsikiotis, 2016). So, HRA is also a concept which is innovated with the advancement of IT. HRA has become a renowned concept due to the importance and advantages towards the future of the business (Belizon & Kieran, 2021). Businesses are functioning in a volatility, uncertainty, complexity, and ambiguity (VUCA) environment (Nowacka and Rzemieniak, 2021) with massive competition. Therefore, the techniques for stability in a severely competitive business environment are discovered and demanded by many business organizations and HRA can be introduced as such a technique to compete with the competition (Belizon & Kieran, 2021). Also, data-driven decision making, and strategic-oriented decision making are empowered by HRA. Finalizing decisions with a statistical base is also another importance of HRA as the decisions can be taken and those taken decisions can be evaluated based on measures and statistics which are generated from HRA outputs (Belizon & Kieran, 2021). So, business organizations can easily gain competitive advantages over their rivals with the more strategic decisions which are determined through the usage of HRA (Alamelu et al., 2017).

HRA adoption is a kind of an action which is taken up to follow or practice HRA in a business organization (Heuvel & Bondarouk, 2017). HRA adoption is not a simple action (Belizon & Kieran, 2021). It is a complex process. Simply, HRA adoption can be defined as the implementation of HRA into a business entity (Alamelu et al., 2017). HRA adoption has change the traditional HRM and transform the field of HRM from traditional HRM to strategic HRM (SHRM) (Coolen & Ijsselstein, 2015). Traditional HRM mainly focuses on the HR functions such as job design, job analysis, human resource planning, recruitment, training, and development etc. with a reactive approach. But HRM with HRA adoption modifies the HRM into a data-driven approach (Greasley & Thomas, 2020). These data can either internal or external. Also, HRA adoption makes organizations towards the achievement of long-term objectives and provides organizations with competitive advantages over rivals. It cannot be noted a unique, well-defined method for the HRA adoption and the adoption of HRA may be changed and moderated with various factors (Heuvel & Bondarouk, 2017).

The next important concept which is engaged with the HRA adoption is HRA adopters. These are the determinants or factors which affect HRA adoption. These HRA adopters can affect positively or negatively for the HRA adoption process. If the HRA adopters affect positively, the HRA adoption is become success otherwise the negative influence of HRA adopters can fail the HRA adoption (Heuvel & Bondarouk, 2017).

Problem of the Study

There are many studies that have been conducted relating to HRA by using different methodologies and in different contexts, but little about the Key determinants of HRA. However, there isn't any study to investigate the key determinants of HRA by using TOE framework. Therefore, it can be identified as a gap in the available empirical knowledge. The problem statement of the study is that "what are the technological, organizational, and environmental key determinants of HRA adoption?"

Having considered the above research problem, the following research questions can be derived and enlisted to give direction to the study:

- 1) What are the technological determinants of Human Resource Analytics adoption?
- 2) What are the organizational determinants of Human Resource Analytics adoption?
- 3) What are the environmental determinants of Human Resource Analytics adoption?

Objectives of the Study

- To identify and describe the technological determinants of human resource analytics adoption.
- To identify and describe the organizational determinants of human resource analytics adoption.
- To identify and describe the environmental determinants of human resource analytics adoption.

Literature Review

Human Resource Analytics (HRA)

According to Belizón and Kieran (2021), HRA had been defined as the data-driven HR decisions making practice. Further it was mentioned that tackling operational or strategic HR concerns with the usage of data such as HR data, commercial data or else external data is done in HR analytics. It had been identified that the Key Performance Indicators (KPIs) of HR Analytics are multiplex to determine when comparing to further business domains such as marketing, operations, finance and this was mentioned with the basis of a finding of Ellmer and Reichel (2021) and Greasley and Thomas (2020).

According to Alamelu et al., (2017), HR analytics as a part of analytics which emphasizes human processes related metrics and measures in an analytic way. Also, it had been mentioned that the decision process involved from recruitment to employees' integration is authenticated by HR analytics. HR analytics helps organizations by retaining the top talent in order to gain competitive advantage while failed HR analytics makes adverse effect on competitive advantage of organization.

According to Boundreau and Ramstad (2007), HRA permits methodical analysis of complex data which assistance to settle organizational dares and hence HRA is reflected as forthcoming value driver in HRM.

Human Resource Analytics Adoption

The research paper with the title of “Transforming human resources management in the age of Industry 4.0: a matter of survival for HR professionals” by Placide Poba-Nzaou, Malatsi Galani and Anicet Tchibozo was published in Emerald Insight database in the year of 2020. Contributing to the available literature regarding the necessity for conversion of human resource professional and human resource facilities and proposing the initiation of People Analytics as a transformation in human resource function towards a more strategic positioning are the purposes of this paper and this is conceptual paper. Reviewing over the usage or readiness to practice analytics by HR professions had been done as the methodology for this paper. According to Sierra-Cedar (2019), barely 17% organizations practice analytics for the HR forecasts and 22% organizations are still in the procedure of assessing analytics tools. In addition to that, it was mentioned that barely 26% organizations practice analytics for HRM according to a study done by Deloitte (2019) and it was founded by a survey that is conducted by KPMG (2019) that only 20% organizations believe analytics as a key Human Resource initiative over the following one to two years. These findings of other researchers also confirmed in this paper as HR divisions are the minimum energetic in data valuation and quantitative data analysis although HR divisions are wealthier in data creation and data possession than other divisions.

Determinants of HRA adoption

The research paper which is with the title of “Smart Contracts and Internet of Things: A Qualitative Content Analysis using the Technology-Organization-Environment Framework to Identify Key Determinants” is authored by Gregor Schmitt, Andreas Mladenow, Christine Strauss and Michaela Schaffhauser-Linzatti in the year of 2019. This paper was published in ScienceDirect database with the purpose to identify main factors of smart contracts in Internet of Things (IoT) and to examine the chances and challenges related with smart contracts in the context of IoT from a management viewpoint. According to Atzori, Iera and Morabito (2010), IoT had been defined as a conceptual outline that habits collected data from devices as a joint information base to figure applications. IoT is principally related with gathering data, combining data and investigating data. But IoT less concerns about the automation of interactions between things. This matter is addressed with smart contacts because smart contracts enable the automation between multi-stepped activities according to Christidis and Devetsikiotis (2016) So, basis for innovative solutions is formed by smart contracts based on the automated transactions. So, HRA can be identified as an IoT within a smart contract. A qualitative content analysis had been used as the research methodology and the framework as (T)technology-(O) organization-(E)environment (which had been initially proposed by Tornatzky and

Fleischer) is used for the data categorization. This TOE framework identifies three main contexts as technology, organization and environment which influence for the adoption and execution of a technological invention within an organization. Four expert interviews with IoT applied practitioners and IoT researchers had been conducted for the data collection and open-ended questions had been used in the interview. 13 key determinants for IoT and smart contracts had been identified as findings of the research and those determinants can be presented as follows.

Table 1:TOE Framework

	Number of the determinant	Identified determinant	Definition of the determinant
Technology (T)	1	Performance expectancy	The degree to which a technology revolution is considered superior to the technology presently in use.
	2	Technology maturity	The degree to which a technological architecture is ready to be arranged within an organization.
	3	Perceived compatibility	A construct explaining the level to which an innovative technology encounters technical standards and necessities of existing IT infrastructure.
Organization (O)	4	Firm size	Number of employees.
	5	Attitude towards change	An indicator of a firm's readiness and capability to implement technological deviations or transform its organization.
	6	Organizational slack	The availability of uncommitted resources to an organization and is among the most commonly debated factors within organizational background.
	7	Perceived technical capability	The capability to handle technical resources to create a competitive advantage in the market.
	8	Security concerns	Firms' uncertainty if their assets which are exposed to threats in the digital world.

Environment (E)	9	Regulatory policy	General data protection regulations.
	10	Competitive pressure	An industry incentivizes for a firm to implement innovative technologies.
	11	Legal uncertainty	Non-existence or very vaguely existence of regulation.
	12	Consumer perception	The attitude of end users for innovative technologies.
	13	External data	Oracles that cause an event or the execution of a smart contract, outside an organization.

(Source: Schmitt, Mladenow, Strauss and Schaffhauser-Linzatti (2019))

It can be identified above-mentioned 13 determinants as the determinants for HRA adoption.

Conceptualization

Table 2: Conceptualization of Basic Concepts

Concept	Definition	Author
Human Resource Analytics (HRA)	Human Resource Analytics is a strategic process which is based on Information Technology, data and statistical models with the ultimate goal for a real-time, data-driven decision making.	Author constructed based on: Fernandez and Gallardo (2020), Marler and Boudreau (2017) and Zhu (2013).
Human Resource Analytics Adoption (HRA Adoption)	The process through which an organization invests in, operationalizes, and assimilates HRA into the work force's decision-making process.	Shet, Poddar, Samuel and Dwivedi (2021).
Determinants of Human Resource Analytics Adoption (Determinants of HRA adoption)	Something that controls or affects what happens in the process through which an organization invests in, operationalizes and assimilates HRA into the work force's decision-making process.	Author constructed based on: Cambridge Dictionary and Shet, Poddar, Samuel and Dwivedi (2021).

Technological Determinants	The available technologies important to the firm, both internal and external, that might be useful in improving organizational productivity.	Lippert and Govindarajulu (2006).
Organizational Determinants	Resources available to support the acceptance of the innovation.	Lippert and Govindarajulu (2006).
Environmental Determinants	The setting in which the firm conducts business, and influenced by the industry itself, its competitors, the firm's ability to access resources supplied by others, and interactions with the government.	Lippert and Govindarajulu (2006).

Themes Construcst

It can be identified three themes as;

Table 3:Theme Construct

Theme number	Theme name	Definition
Theme 1	Technological determinants of HRA adoption.	Both internal and external available technologies which are important to a firm in the process of which an organization invests, operationalizes and assimilates HRA into the work force's decision-making process.
Theme 2	Organizational determinants of HRA adoption.	Resources available for a firm to support the process of which an organization invests, operationalizes and assimilates HRA into the work force's decision-making process.
Theme 3	Environmental determinants of HRA adoption.	The setting in which the firm conducts business and influenced by the industry itself, its competitors, the firm's ability to access resources supplied by others and interactions with the government in the process of which an organization invests, operationalizes and assimilates HRA into the work force's decision-making process.

Methodology

As a comprehensive literature review (which is based on the research articles) was performed in order to collect data, the data collection method which is used for this research as secondary data collection. The population for this research can be mentioned as nearly 8,147 results from Emerald Insight, nearly 108,205 results from ResearchGate and nearly 130,213 results from ScienceDirect for the initial search with the keyword of “human resource analytics”. Then the advanced search was done with the keyword of “human resource analytics adoption” within the data range of year 2015 to year 2021 and the available population for this advanced search was nearly 750 results in Emerald Insight database, nearly 5,627 results in ResearchGate database and nearly 10,604 results in ScienceDirect database. According to Sekaran (2003) sampling refers to the process of selecting a portion of the population to represent the entire population. Purposive sampling technique was employed, and sample consists of 13 research papers from Emerald Insight, 02 research papers from ResearchGate and finally 02 papers from ScienceDirect.

Result and Discussion

Initially, the available literature was searched in three main databases which are Emerald Insight, ResearchGate and ScienceDirect with the keyword of “human resource analytics”. Then the advanced search was done with the keyword of “human resource analytics adoption” within the date range of year 2015 to year 2021. Abstract cleaning review was performed after the advanced search and a cluster of 14 available literature was for the literature review in order to identify the technological, organizational and environmental determinants of HRA adoption which had been already identified by the other authors. Then a data coding template was created to summarize the identified technological, organizational and environmental determinants of HRA adoption. After the data coding template, a thematic analysis was performed for each of the HRA adoption determinants for the purpose of removing duplicating determinants and to note down a list of determinants of technological, organizational and environmental for the HRA adoption and after these steps, most significant technological determinants are pointed out as; 1) Compatibilities among systems, 2) Data authenticity, 3) Fairness of algorithms, 4) IT infrastructure & capability and 5) Complexity in HR analytics projects. Then significant five organizational determinants are picked as; 1) Analytical Competencies, 2) Strategic business view, 3) Focus on business issues, 4) Employee engagement and 5) Leadership support and finally most important environmental determinants are placed as; 1) Environment of mistrust, 2) Technostress in the society, 3) Multi infrastructure nature, 4) Competitive pressure and 5) Data governance factors.

Above-mentioned 15 HRA adoption determinants can be further described as;

1. Compatibilities among systems

This means the proper rapport between the each of sub systems within the HRA main technical system. If compatibilities among the systems is high, the probability for a successful HRA adoption is high while compatibilities among the systems is low, the probability for a successful HRA adoption is low.

2. Data authenticity

This represents about the accuracy and the credibility of the data which are used in the HRA. If data authenticity is high, the probability for a successful HRA adoption is high. Otherwise the probability for a successful HRA adoption is low.

3. Fairness of algorithms

Fairness can be emphasized that the ability of algorithms to make impartial or unbiased decisions. Successful HRA adoption can be achieved through fairness of algorithms and HRA adoption will not be successful with the unfair algorithms.

4. IT infrastructure & capability

These are the Information Technological related facilities and structures which are essential in the HRA adoption and maintenance. Sufficient IT infrastructure & capability makes the HRA adoption effective while insufficient IT infrastructure & capability makes the HRA ineffective.

5. Complexity in HR analytics projects

This is the difficulty of understanding and adopting HRA projects to the organization. So, more complex HRA project makes the HRA adoption failure while less complex HRA project makes the HRA adoption a reality.

6. Analytical Competencies

This is the logical reasoning ability of the employees within an organization. If the employees are more analytical, then it leads for an effective HRA adoption and if employees are not much capable with analytical competencies, HRA adoption will not be successful.

7. Strategic business view

This represents a strategic business view is enriched with an innovative and competitive gain. Therefore, successful HRA adoption is lead with such a strategic business view while other business views do not lead for a HRA adoption.

8. Focus on business issues

This is related with the management concern over the daily business problems rather than providing solutions for tactical issues. HRA adoption is become unsuccessful if an organization pays more attention on business issues and HRA adoption is become successful if an organization pays more attention on tactical issues which is based on data driven decision making.

9. Employee engagement

This is the commitment of employees of an organization towards the HRA adoption. If there is a high employee engagement, the HRA adoption will be successful while HRA adoption will be unsuccessful due to the low employee engagement.

10. Leadership support

This is the preference, guidance and dedication of top managers of an organization to accept HRA adoption. If top management does not willing to accept HRA, HRA adoption will be dream. But if they keen to practice HRA in their decision making, the HRA adoption will be fruitful.

11. Environment of mistrust

This is the disbelief about HRA and its usefulness which exists in the external environment. If there is a high mistrust of the environment, organizations are not keen to adopt HRA. On the other hand, if there is less mistrust of environment, organizations are very keen to adopt HRA.

12. Technostress in the society

This is the negative psychological relationship between the people in society and HRA adoption. High technostress constructs a failure in HRA adoption and low technostress constructs an achievement in HRA adoption.

13. Multi infrastructure nature

This is the more infrastructural requirements of a HRA adoption project. Advanced multi-infrastructure nature makes the HRA adoption unsuccessful and less-advanced multi infrastructure nature makes the HRA adoption successful.

14. Competitive pressure

Competitive pressure comes from the rivals of the organization. If rivals adopt HRA, respective organization also tries to adopt to HRA. On the contrary, organization do not hurry to adopt HRA, if rivals also do not hurry for HRA adoption.

15. Data governance factors

These are the rules and regulations which are associated with the control of data in HRA. If there are high data governance rules and regulation, less HRA adoption can be observed while less data governance rules and regulation establish more HRA adoption.

Conclusion and Recommendations

HRA is an emerging trend which is very useful for the data-driven decision making in the field of Management. Though this concept is very useful and fruitful, the adoption to the HRA is challengeable due to various reasons. Therefore, it is essential to know and fit with the HRA adoption determinants for the achievement of successful HRA adoption. Therefore, suggestions for the HRA adoption determinants is important. It can be observed that, organizational determinants are the most frequent determinant while environmental determinants are the least frequent determinant in the available literature. Therefore, to become effective in HRA adoption, it is required to pay more and enough attention to the organizational determinants.

Further, recommendations for the future research can also be mentioned as follows:

This research title is narrowed down only to the pre-adoption stage of HRA adoption though the HRA adoption consist with several stages such as pre-adoption stage and post-adoption stage. Therefore, future research can be performed for post-adoption. The literature review was the only method of data collection, and this literature review was limited to the 17 research articles which were found only in 03 databases due to the available time limitation. Those databases are Emerald Insight, ResearchGate and ScienceDirect. Therefore, more research papers from various databases can be used in future research and more data collection methods can be used in future research. Content analysis was performed as the research methodology in this research. Continuous research methods can be used in future research. Also, data can be collected from interviews instead of literature review data for future research. Nominal Group Technique (NGT) also can be used as a method of data analysis. This research is entirely on qualitative research approach. Accordingly, quantitative approach such as survey techniques can be used in future research as quantitative techniques assistance to measure the impact of each field of HRA adoption determinants which are technological, organizational and environmental. The literature review for this research was performed based on the available literature from the time range from year 2015 to year 2021. Thus, continuous periodic studies can be applied for future research.

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