Ethical Framework for Iot in People Analytics: Risks and Opportunities

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Abstract

Purpose: This research studies the ethical perspective concerning internet of things (IoT) placement in People Analytics. To provide researchers and professionals with ethical framework for IoT (internet of things) in people analytics. .Also to identify associated risk and opportunities.

Design/methodology/approach: Initially, the applicability of Chuck Huff's original Personality, Integration of morality, Moral Ecology and skills Model (PRIMES) is studied from context of IoT in people analytics. Secondly consideration of ethical issues in addition to PRIMES model are proposed based on limited scope of PRIMES in IoT and people analytics.

Findings: The original PRIMES Model can be utilized in initial stages as ethical guiding framework for individuals employed in personnel department but it lacks coverage of ethical issues from perspective of IoT in people analytics. To address the ethical dimensions from IoT in people analytics viewpoint, additional ethical issues are addressed.

Research limitations: The novel ethical framework for IoT in people analytics required further authentication and validation along with empirical testing in continuously emerging IoT and people analytics ecosystem.

Implications: Considering the paucity of ethical frameworks in emerging area of IoT in people analytics, this study provides the ethical model in the area of IoT in people analytics for the researchers and practitioners. This framework can further be tested and used practically and can also be considered for theoretical development.

Originality/Value: There is apparent deficiency of ethical norms in area of IoT in people analytics, this study contributes to the area by providing extended PRIMES Model as a preliminary ethical framework for IoT in people analytics.

Keywords: Ethics, Internet of Things, People Analytics, PRIMES, Human Resource Management.

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1. Introduction

The Internet of Things (IoT) is novel and rapidly evolving platform in era of knowledge economy which enables its user to observe, create, store, interpret, moderate and use data acquired through physical objects embodied with sensors, software and other technologies that interact and exchanges data with other entities over internet and other communication networks (Vermanen, Rantanen and Ville,2021). At the same time innovation in human resource management (HRM) through people analytics is an emerging area which is making human resource (HR) system as data driven through studying people, process and techniques at work so as to elevate the human resource system for sustainable development. People analytics is gaining importance with advancement in digital and data science methods to explore, investigate and visualize information (Tursunbayeva, Pagliari and Lauro and Antonelli, 2021). People analytics strategically optimizes the employees, teams, departments and workforce through the application of IoT in human resource management (Fitz-Enz and Mattox, 2014). IoT may be applied in people analytics at individual level, departmental level and enterprise level (Edwards and Edwards, 2016). IoT captures employee's performance, skills, and abilities throughout life cycle of employee from acquisition to separation for effective outcomes in people analytics. This data can be used to identify employee's potential, assess performance data, designing personalized training programmes, forecast future performances and infer employee satisfaction, tracking employee wellness (Nunn, 2018). Personal analytics also extends beyond work life by keeping an eye on employees personal emails, usage and interaction with digital devices and apps, tracking employee's activities on social media platforms. People analytics using

IoT acquires employees personal data related to their purchases, location, health, activities and social life (Ajunwa, I., Crawford, K. and Schultz, J., 2017). Employee data captured through IoT devices are used to design algorithms for people analytics to shape their behavior on the basis of recorded pattern of their existing behavior through rewards, appreciation, incentives and other techniques (Cardador, M.T., Northcraft, G.B. and Whicker, J., 2017). The use of IoT in people analytics is encouraging from organizational perspective but present the risks for employee's privacy, autonomy and confidentiality. The IoT in people analytics may unmask the hidden unethical practices which may include fraudulent expense claims, gender bias and intellectual property theft (Holeman, I., Cookson, T.P. and Pagliari, C., 2016).

The number of successful implementation and execution of IoT devices is increasing and business of IoT devices is expanding with the cost of IoT devices declining (Vermanen and Harakke,2019). With decreasing costs of IoT devices, the ethical concern in the area is increasing. As IoT devices offers several solutions, at the same time they come with many associated risks also (Hoyer, V., Janner, T., Mayer, P., Raus, M. and Schroth, C., 2006). There is a strong need to explore and identify the practices that can facilitate the ethical consideration while execution and implementation of IoT devices specifically in people analytics. Thus in this paper, we have developed an ethical framework for IoT devices in people analytics.

## 2. Background: Internet Of Things For People Analytics

Organizations are progressing through development, advancement and expansion in technological infrastructure by implementing artificial intelligence, robotics, machine learning,

data sciences, IoT and people analytics (Gaur Bhawna, Shukla Kumar Vinod and Verma Amit, 2019). IoT is a nexus of physical objects that are implanted with sensors, software, and other technologies which are connected to internet for communicating and exchanging information with a goal to create smart organizations and smart homes (Wortmann, F. and Fleuchter, K., 2015). IoT binds end users with several physical objects embedded with sensors, software, tracking devices for collecting the data of interest (Gubbi, J., Buyya, R., Marusic, S. and Palaniswami, M., 2013). The data is gathered through these objects and delivered to end users (Jin, J., Gubbi, J., Marusic, S. and Palaniswami, M. ,2014). Through IoT applications companies perform on high accuracy and with utmost efficiency. IoT is most leveraged by people analytics for enhanced business decisions in context to procurement, development, performance monitoring, compensation, optimum utilization, behavior shaping and retention of talent in organization. IoT has radically transformed the traditional HR practices into people analytics through better use and further application of people data. IoT device collect the real time data from employees through sensors and transmit the data to the system through communication network enabled with internet. IoT have majorly reformed Human resource management through people analytics. IoT is facilitating and making HR activities convenient through better recruitment, performance monitoring, tracking employee wellness, attitude measurement, behavior tracking which is leading to accurate insight of work done. People analytics helps HR professionals for optimum utilization of big data for decision making .People Analytics utilize and harvest historical data so as to reap its benefit in future decision making and strategy building through designing suitable algorithms. People analytics have transformed traditional HRM practices and resulted in better workplace

learning, motivating employees, identifying potential for future tasks, assessing candidates through regular performance tracking and reducing biasness.

IoT is used by HR managers to develop people analytics for operational excellence in various traditional HR practices. Figure 1 depicts contribution of IoT towards talent acquisition and on boarding, performance monitoring & management, designing personalize training programme, succession planning, compensation management, improved employee productivity, monitoring employee health. IoT tools are used for acquisition of personnel and to minimize the perceptual biasness in decision making related to recruitment and selection. IoT has automated and optimized the process of recruitment resulting in improved quality of hiring and reduced personal biasness. IoT devices monitor the performance of employees on real time basis and data accumulated through these IoT devices is used to develop performance management system through analytics. On the basis of performance monitoring, management and evaluation through IoT devices, personalized training programmes are developed. Data captured by IoT devices enables the HR manager to decide the candidates who can occupy senior positions in organizational hierarchy for better succession planning. IoT devices help the HR department in managing payroll and other expenses like transportation bills and other expenses. IoT devices are attached to employees as well as their systems or equipments so as to measure the employees experience at work and to develop strategies to improve their productivity. The companies monitor employ wellness through providing them fitness trackers which tracks their physical movement, calorie count, stress level which are related to health issues like heart disease, obesity and diabetes.

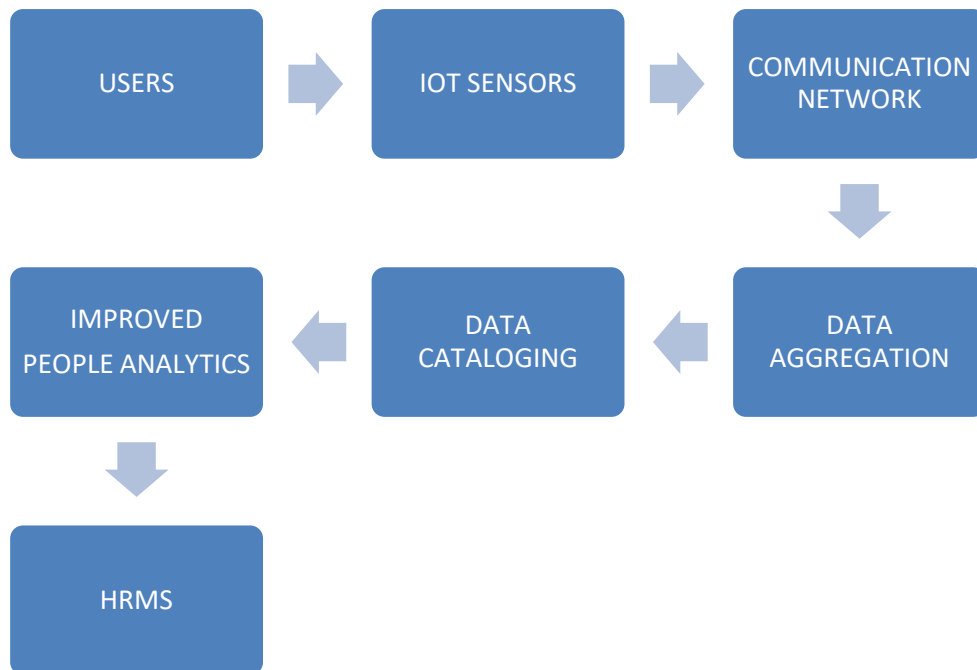**Figure** 1. Connectivity of Basic HRM Functions with IoT Devices
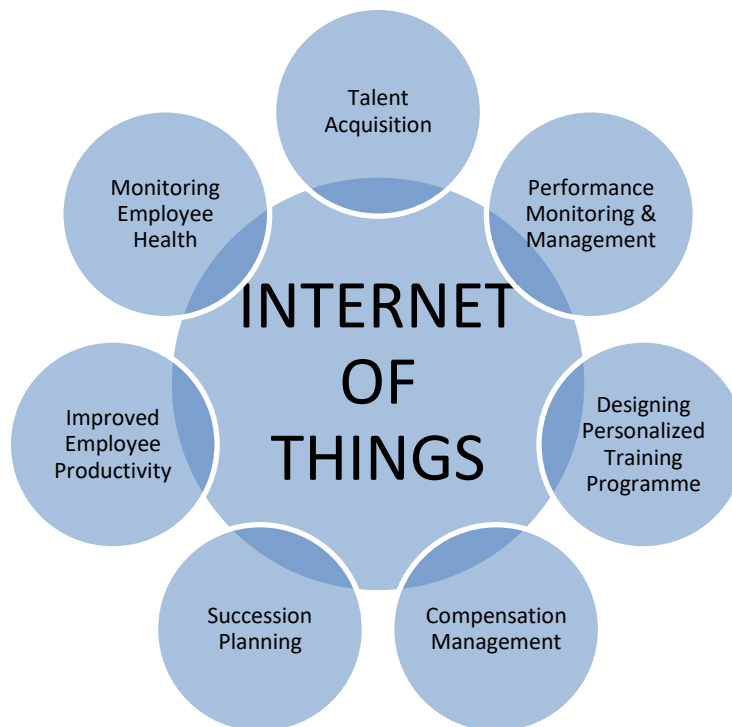
Source: Compiled by authors

Figure 2 demonstrates the process of data collection through IoT devices in people analytics. The various IoT devices used by the HR department are equipped with various sensors like location tracking, pulse rate monitoring, and thermo sensor to measure body temperature. This data can facilitate real time decision. Data is collected on continuous basis with the help of sensors which is further disseminated through organization network. Further to this stage, data is summarized in an organized and systematic manner for statistical analysis and investigation. This stage is referred to as data aggregation. After data aggregation, the data is fragmented and stored in local databases and cloud for maximum utilization. This process leads to betterpeople analytics and HRMS

Figure 2. Process of data collection with IoT devices

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┌─────────────┐      ┌─────────────┐      ┌──────────────────┐
│    USERS    │ ───▶ │ IOT SENSORS │ ───▶ │   COMMUNICATION   │
│             │      │             │      │     NETWORK       │
└─────────────┘      └─────────────┘      └──────────────────┘
                                                    │
                                                    ▼
┌─────────────────┐  ┌─────────────┐      ┌──────────────────┐
│    IMPROVED     │◀─│    DATA     │◀─────│      DATA         │
│ PEOPLE ANALYTICS│  │  CATALOGING │      │   AGGREGATION     │
└─────────────────┘  └─────────────┘      └──────────────────┘
        │
        ▼
┌─────────────┐
│    HRMS     │
│             │
└─────────────┘
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Source: Bhawna Gaur, Vinod Kumar Shukla and Amit Verma (2019)

3. Ethical Challenges Of Internet Of Things In People Analytics

IoT devices and solutions bring many benefits and simultaneously bring various risks associated with privacy and safety of employees (Conti, M., Dehghantanha, A., Franke, K. and Watson, S., 2018). The safety and security of every IoT device which includes sensor, software and information unit are compromised with excessive use, declining prices and vulnerabilities leading from excessive growth of IoT market where security measures fail to cope up with all associated risks (Giaretta, A., Balasubramaniam, S. and Conti, M., 2016). These concerns can have symbolic consecutions from individual perspective as IoT devices can also collect employee's private and personal data (Lee and Lee, 2015). IoT devices can collect personal chat conversation, location, movement, shopping behavior, purchasing preferences, health conditions. As the IoT device keeps on monitoring the location, IoT device can also monitor the places visited by the person, whom the person is meeting, where person is travelling along with the current and live location of that

person being tracked. The IoT devices in people analytics not only monitor employee's performance, assess training needs, monitors wellness but also invades into employees privacy. People analytics is a special case in handling of both technology and human resource data. The most relevant attribute of people analytics is people-centered style of knowledge management. This attribute of people analytics influence the ability of people from HRM department to tackle ethical queries in their HR data, IoT devices and information systems. However it is very much debated that the consecutions of increased privacy protection may not be totally positive, as this could delimit the uses and benefits that could be attained from IoT devices and data collected through it. IoT infrastructure possesses heterogeneous setup with hardware, software, sensor, network which creates much complexity in managing privacy and security issues. There is a need to identify, explore and establish practices and policies that guides ethical implementation of IoT in people analytics. To intensively address and comprehend the need of ethics in IoT driven

people analytics, a comprehensive ethical framework is needed.

4. Research Approach

This section constitutes the exploration and identification of research literature focused towards ethical framework for IoT in people analytics. While the main area of inclination was literature in ethics and IoT from HRM perspective. The literature was explored to allow for disciplinary breadth. The searches were carried out in two multidisciplinary databases – Web of Science Core Collection (WoS) and Scopus in March 2022. Google scholar was utilized to ensure all-inclusiveness of results returned from the databases.

The search combined the terms ethics with IoT and people analytics as well as human resource management. . An example Boolean search would be ("ethics" or "ethical framework" or "model of ethics") and (Internet of Things) and (people analytics or human resource management). The result of searches in WoS and Scopus were 23 and 31 with total of 54 results. Total 41 results were attained after elimination of duplicates. Four more results were eliminated as they were in language other than English. Two more results were removed as they were revealing the similar study as other articles in list. Finally only studies with empirical work and/ or studies with conceptual framework studying ethics in IoT driven people analytics or HRM was included. While satisfying this criteria nine more papers were excluded. At last after the thorough examination, 21 papers were finalized and were further analyzed and summarized.

After conducting this process, HRM functions facilitated through IoT devices, data collection through IoT devices, model of ethics (PRIMES) and ethical issues were identified. Theoretical and empirical findings from previous literature have been reviewed to support the relevance of ethical framework for IoT in people analytics.

5. Ethical Model (Primes) From Hrm Pperspective

Ethicality in information age is of vast importance as information systems have high degree of invasion in individual's privacy and ethics in technology related matter is dependent on nature, use and potential of technology. Since IoT in people analytics is majorly driven by personnel's of HR department, so the model of ethics under considering here is PRIMES which focuses on ethics from personality, skill and morality of surrounding people viewpoint. This model is being utilized from perspective of its application to the employees of HR department. As employees or teams from HR department are the one who are totally involved in people analytics and deployment of IoT for achievement of best and effective results from people analytics. In people analytics driven through IoT, employees from HR department are the main drivers for ethicality or un-ethicality in the organization. Thus the understanding of ethics by a individual or a team, skills to handle ethical dilemmas, commitment towards pursuing ethical deeds, orientation of entire team towards morality lays down the foundation of ethical framework in IoT driven people analytics. PRIMES Model constitutes personality, Integration of morality, moral ecology and skills (Chuck Huff, 2010). Personality in PRIMES model indicates how individual carry out work with ethical orientation and is totally independent from external factors like possession of ethical behavior by team, department, organization. Personality trait of ethics is clearly visible in the action of people at work while carrying out their routine duties and responsibilities. Personality component of PRIMES model is formed from various factors like family background and past experiences. The second component of PRIMES model is Integration of morality. Integration of morality refers to individual's commitment towards ethics
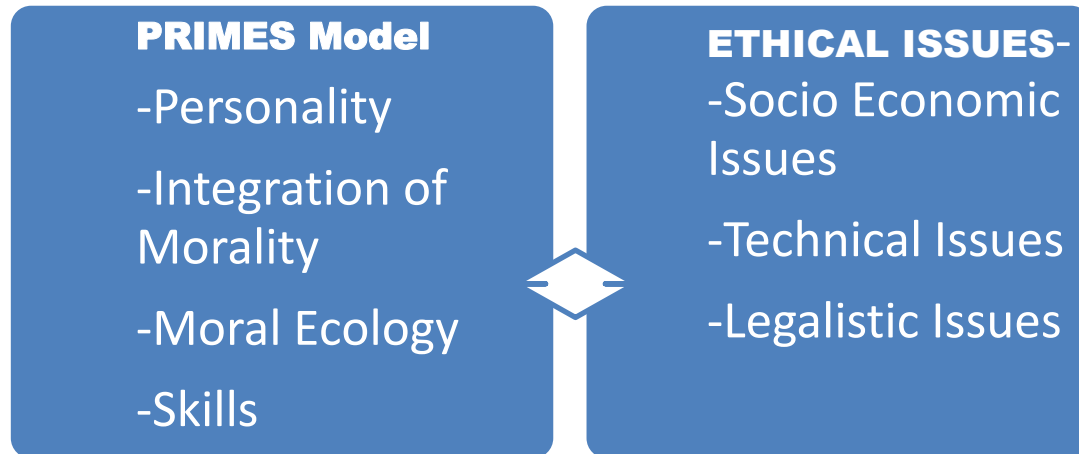
and moral action. Integration of morality constitutes intensity with which individual act morally and his persistence towards moral behavior. The third component of PRIMES Model is moral ecology. Moral ecology refers to morality and moral action of people in surrounding who are part of same team, group and department. Surrounding constitutes of both moral and immoral action which can both support and hamper moral action of individual (Huff, C.W., & Barnard, L.,2008)**.** The last component of PRIMES model is skill. Skill is the ability of individual to carry out moral actions at personal level as well as in team. Skill set support an individual in ethical dilemma encounters. The use of IoT in people analytics present risks for employee's privacy, autonomy and confidentiality. And the application of the ethical principles is totally dependent on the ethical orientation of individual, team and department which can be reflected through their personality, moral commitment, moral ecology and skill set. So PRIMES Model is best at ground level to establish ethical foundation for IoT driven people analytics.

6. Expanded Primes Model

PRIMES model provide with basic understanding of ethics for individual, team and department but fails to deliver comprehensive framework for IoT driven people analytics. As the IoT in people analytics unmask the hidden unethical practices which may include retrenchment or downsizing issues as expertise of employees is already captured through IOT devices, technical issues where devices are capturing the personal and private information of employees, intellectual property theft where individuals personal knowledge is claimed as organizations knowledge. (Land, F., & Urooj, A.,2003) explored three pivot dimensions to ethical issues which include socio economic issue, technical issue and legalistic issue. The organization always has a hidden objective behind implementing IoT in people analytics. The underlying motivation is to capture the expertise of employee through IoT devices in knowledge repositories and expert system (Bryant, 2006). Based on this agenda organization goes for downsizing as employees become less valuable. There are technical teams or outsourcing organizations that provide support in IoT implementation and execution. These third party companies or outsourcing firms are also involved in data theft or capturing of personal data of employees while designing installing and implementation the system. Many times the HR team can act as a whistle blower by being vigilant during design process, implementation and execution of IoT in people analytics. Also the data captured by IoT devices is claimed as organizations asset. This is prone to legalistic issues because of ownership conflict between the employee and the company. These ethical issues should also be embedded with the PRIMES model to provide a comprehensive ethical framework for IoT driven people analytics.

Figure 3. Ethical framework integrating PRIMES Model and Ethical Issues

PRIMES Model	ETHICAL ISSUES-
-Personality	-Socio Economic Issues
-Integration of Morality	-Technical Issues
-Moral Ecology	-Legalistic Issues
-Skills	

Source: Compiled by authors

7. Risk And Opportunities

This section presents the associated risks and opportunities for employees and organizations in ethics for IoT driven people analytics. There are various risks for employees from IoT and people analytics which includes biasness and discrimination from collected data, psychological profiling, threat to privacy through tracking & surveillance and behavior shaping. Personal analytics based on IoT devices are designed with motive of enabling HR related decisions based on data instead of biased human perceptions and flawed human reasoning. But the IoT based people analytics is also designed under the supervision of same HR team so the biased behavior and potential for prejudice still remains same and is encrypted in algorithms (Dastin, 2018). As the recruitment portal may be designed discriminating female applicants leading to biasness towards female gender. It can also be incorporated for race, age, disability, sexual orientation leading to biasness and discrimination. In people analytics while conducting employee selection, personality tests are conducted through specially designed algorithms. These kinds of tests overlook moral character, cultural differences and perform psychological profiling (Kirke, 2019). IoT driven people analytics track and monitors employee in workplace as well as in personal

lives through mobile phones or IoT devices like smart watch, systems given to employees from companies (Guenole, N., Feinzig, S. and Green, D., 2018),. The data captured through IoT devices on performance patterns of employees along with emails and other responses are utilized to design algorithms. These algorithms further works to transmit personalized messages to shape employee behavior to achieve individual's work related objectives as well as team and organizational objectives (High, 2019). But at the same time it lacks transparency as whether employees know their emails and other responses are being observed and tracked along with performance related data to frame the messages and repeated reminders which they receive resulting in their behavior shaping.

Ethics possess a point of risk to organizations for IoT driven people analytics (Peterson 2018). IoT and people analytics are relatively new so organizations lack appropriate ethical and legal knowledge to tackle prevailing situations. IoT driven people analytics projects fails as they compromise with privacy and security issues. Also existing risk management strategies are unsuccessful because they are unable to recognize indicators of failure in this new domain of IoT driven people analytics (Clavard and Jeske, 2018). Employees also lack the trust in IoT driven people analytics as they

believe employers are storing their expertise along with their personal and sensitive data (Pease 2018). Thus employees play smart and also game the system when they are already aware that they are under observation (Jacobs, 2017). The organizations also keep delaying their IoT driven people analytics projects due to uncertainty over there regulatory compliances. One of the ignored aspects in IoT driven people analytics is that design and implementation of IoT and people analytics is left over to technology outsourcing partners whereas it should be carried out under the strict observation of HRM team. Employees are criticizing and revolting against perceived misuses of data collected and stored through IoT and people analytics leading to failure of these projects (Helmore, 2019).

The IoT in people analytics deliver many benefits to the employee and organization. These benefits can be fully harnessed and further opportunities can be tapped by developing ethical framework for IoT driven people analytics. IoT and people analytics perform the major operative functions of HRM which includes employee acquisition and retention, assessing candidates through regular performance monitoring, performance management, designing personalize training programme, compensation management, tracking employee wellness and monitoring employee health, attitude measurement, behavior tracking for optimum job performance, identifying potential for future tasks leading to succession planning.

The risks associated with IoT and people analytics can be transformed into opportunities by devising an ethical mechanism to tackle all prevailing risks. The organizations should disseminate the purpose and benefits of implementing IoT and people analytics throughout the organizations which may lead to transparency and fairness amongst the employees in organizations. Transparency and fairness may deliver optimum results from IoT and people analytics (Manyika, 2019). The IoT and people analytics should completely adhere to legislation in order to avoid any allegation from employees and to avoid any kind of protest for the same (Kim, 2017). This may result in industrial peace and smooth execution of IoT and people analytics. The ethical guidelines and charter in regard to IoT and people analytics may prevent any conflict amongst employee and organization (Peterson, 2018). The employees should be made aware and sensitized about data tracking, data storage, data ownership permitted in their jurisdiction (Jones, 2018). Also, the people analytics team should take complete control over IoT implementation in people analytics rather than allowing technology outsourcing firms to independently design, execute and implement IoT in people analytics (Agarwal, D., Bersin, J., Lahiri, G., Schwartz, J. and Volini, E.,2018). The legal compliance officers should be consulted for regulation and polices in relation to IoT as people analytics team cannot know everything about data security and privacy and legal requirements (Green, 2018).

8. Conclusions And Implications

The curiosity of organizations in implementing information technology based infrastructure at organization level and specific department level has risen at an exponential rate. This era is to be marked as knowledge era, with steady rise in information technology infrastructure provided by IoT for HR analytics, marketing analytics and other related fields of management. This has pursued government, corporate and researchers to establish and manifest ethical principles, guidelines and frameworks. This study primarily develops a comprehensive framework of ethics for IoT driven people analytics. The framework is expanded from the PRIMES model which provides ethical ground for the related employees but lacks ethical coverage from IoT

and people analytics perspective. The proposed framework integrates PRIMES model with three ethical concerns in relation to IoT and people analytics. The ethical deliberation for IoT and people analytics has received less attention being a new domain area. While exploring academic literature very limited information was available for ethics in IoT and people analytics. Although blog posts, discussion papers and subjective case reports were available on ethics in IoT and people analytics. But there was scarcity of conceptual models and empirical studies on ethics in IoT and people analytics. After analyzing all the ethical concerns raised by IoT and people analytics, organization may face serious repercussions and losses regarding employee trust and company image. IoT devices rarely limit unethical malpractices as data can be collected and stored anywhere and anytime despite of time and location. The existing law provides limited protection against security and privacy risks imposed by IoT and people analytics. The ethical responsibility primarily lies on individual's and group's moral standards. With the same belief this paper has utilized PRIMES model as basic approach towards studying and implementing ethics in IoT and people analytics as PRIMES cover individuals orientation towards ethics, commitment towards ethics, and ethics of people in surrounding environment and skills to navigate through ethical dilemmas. The socio-economic issues, technical issues and legal issues are also incorporated along with PRIMES to provide a comprehensive ethical framework to deal with ethical concerns in IoT and people analytics. The IoT use in people analytics is growing rapidly, so the need and relevance of ethical framework in the field is much required.

The study has contribution towards literature and also has practical contributions as it can be utilized by companies and people analytics team to yield better results from IoT and people analytics. The study has a relevant theoretical contribution as it conceptualizes ethical framework for IoT and people analytics. The expanded PRIMES model provides a platform for studying ethical issues further. This framework from practical viewpoint provides practicing managers to apply it in their people analytics project which are IoT diven. We suggest further this framework can be tested empirically and more dimensions can be added to the framework paving the way for future research.

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