



Research Article

Open Access

## Adoption and Implementation of Human Resource Information System in a Private Higher Education Institution of City of Santiago

Ramonsito B. Adducul<sup>1</sup>, Winston G. Domingo<sup>2</sup>, Viridi C. Gonzales<sup>3</sup>

(College of Information Technology, University of La Salette, Inc., Philippines)<sup>1</sup>  
(CITE, Cagayan Valley Computer and Information Technology College, Philippines)<sup>2</sup>  
(CITE, Cagayan Valley Computer and Information Technology College, Philippines)<sup>3</sup>

e-mail address: chief\_editor\_tjct@isu.edu.ph

### ABSTRACT

*The Human Resources Information System (HRIS) is a computer-based system that enables human resources managers to compile, arrange, store, update, and retrieve the data needed to handle employee records. A technique for HR managers to maximize the performance of HR department management as well as the productivity of the entire company's employees. The Cagayan Valley Computer and Information Technology College (CVCITC), a higher education institution in the City of Santiago, needs a computer-based information system to address the increasing volume of data on its human resources in order to manage the demand for reports to be produced. It aimed at examining the current structure and processes of CVCITC's human resource information; the creation of computer-based HRIS and evaluate its user's acceptability. A software development tool has been used for the design of HRIS and an agile model was used to directing system creation. The descriptive method was also employed for explaining the framework and evaluating its outcomes. The ISO 9126 software quality features survey questionnaire was used to evaluate the quality of the system in terms of its accessibility, reliability, usability, efficiency, sustainability, portability, and legal enforcement. The results of the evaluation show that as perceived by users, the application system was very widely accepted. This implies that the adoption of this application would enhance the current management of HR and would serve as an additional technology in trying to improve most processes of the institution.*

**Keywords** - Agile Methodology, Application Development, Human Resource Information System, Information Management, Private Higher Education Institution

### Introduction

Information is considered to be an advantage for any organization. It must be coordinated and handled effectively to achieve consistency. The advancement of technology allows companies to implement a computer-based information system to preserve their information assets and turn most of their processes into digital processes. Process digitization converts data into a digital form so that data is well structured and processed efficiently [1]. Data transmission would then be carried out remotely and access to data would be simpler and quicker. This would result in better performance of the transactional processes of the organization, quicker communication,

and increased productivity performance of employees using the system.

Since no other business functions or procedures can be carried out without the initial input of the HR Office, the role of the office is considered to be a supporting role. The HR role may be referred to as an organizational function or unit that deals with employees in the areas of jobs, training, promotion, termination, record keeping, and compliance with other legal requirements [2]. The HR Office contributes to the organization's strategic planning and growth. By efficiently acquiring, improving, and maintaining its resources, which are crucial to the smooth operation of the company as a whole the HR

Office shall become professional. In addition to the standard recruiting process, one of the key tasks of HR is to acquire and preserve complex data volumes that can be further classified, cross-checked, and retained for potential use, which is a complex task in itself [3].

The role of the Human Resources Information System (HRIS) in an educational institution that facilitates the implementation of functional business processes by HR professionals. In an organization that promotes decision-making and control information systems can be defined as the collection of interrelated elements that collect, process, store, and distribute information. [4].

Strategic HRIS offers valuable information on the needs and skills of human resources; this insight allows the management team to set the corporate mission and set the significances and objectives. In view of this context, the use of HRIS in the enhancement of HR activities focuses on the need for HRIS functions at the lowest possible cost and at a rapid pace in the performance of managing human resource functions, which pose increased challenges for HR professionals [5]. Companies are investing in information systems to monitor their internal growth functions and to meet the requirements of key players in their environment. In order to achieve operational excellence, develop innovative products and services, enhance decision-making, achieve competitive advantages, and ensure survival, businesses are investing in information systems [6].

Computerized information systems assist managers in decision-making and monitor the current state of the organization. Such systems can collect and process information from various organizational sources to help decision-makers at the management level [7]. HRIS is therefore an instrument for gathering, preserving, evaluating, and publishing information on people and jobs [8]. In order to provide correct information and enhance employee communication within the organizational environment, the system needs to be processed quickly [9]. In addition, HRIS is the method of generating, arranging, and preserving information to support managers at various levels of the organization.

Today, the most effective companies use HRIS in their management process to promote the day-to-day operations of HR [7]. Organizations need to align their available capital to achieve the desired profitability and survival to compete in the global market. HR management is believed to be the most important position for any organization that wants to have a competitive advantage over its rivals because processes are built and managed by humans [10].

Most of the related work examined addressed the usefulness and advantages of having HRIS in an organization, while not taking into account the system design process. This study, therefore, considered the conceptualization of project specifications for HRIS and its implementation using hardware and software resources, the use of different methodologies, and the evaluation of its end-user acceptability.

The Cagayan Valley Computer and Information Technology College (CVCITC), a private higher education institution (PHEI) in the City of Santiago, needs a computer-based information system to address the increasing volume of data to be collected on individual employee files and the increasing demand for reports to be generated for dissemination to offices or government agencies. The goal of this study was to identify the current structure and processes of CVCITC human resource information; to suggest the creation of technology mixing processes; to prepare, create and evaluate the performance of the computer-based human resource information system.

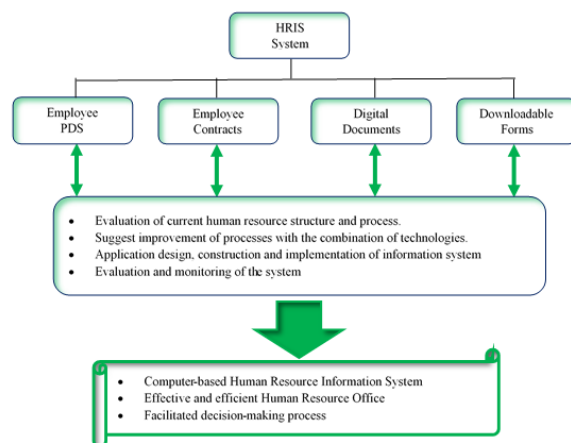


Figure 1. Framework of the HRIS Project

Fig. 1 demonstrates the framework for the HRIS project pursued by the proponents. The figure consists of the employee's personal data sheet, contracts, digital documents, and downloadable forms, which are called inputs to this report. The layout of the framework includes an assessment of the existing human resource structure and its processes. Following a thorough review of the existing method, the proponents of this study recommended changes to processes with a mixture of technologies. Appropriate software development tools have been used to design the HRIS and to build its programming codes. The gradual adoption of HRIS was implemented to test and track the usability and its operability.

The existence of a computer-based HRIS would enhance the timely decision-making process for

CVCITC administrators, making their Human Resources Office more productive and efficient in their transactional processes. Specifically, this study sought to answer the following questions:

1. What processes are involved in the information system for human resources?
2. What technologies have been used to enhance existing processes?
3. How would HRIS have been designed and built using a software development tool?
4. What is the extent of participants' acceptability in implementing a computer-based human resource information system?

## Methods

### Research Design

This study followed an agile approach to direct proponents in the development of the computer-based HRIS [11]. It has been commonly used by most system designers to define approaches to software development that emphasizes gradual delivery, team coordination, on-going preparation, and learning [12]. The descriptive research design was also used to identify measurable circumstances and to analyze the data collected from the participants in this study. Some of the concepts used by papers [13], [14], [15] were considered in the organization of this study.

### Participants

Forty-three (43) personnel were involved as participants or respondents in this study. It consists of eight (8) administrators, thirty-three (33) teaching and non-teaching personnel, and two (2) end-users of the application system at the CVCITC Human Resource Office. Moreover, the end-users have been trained to safeguard and manage the security of records stored in a computer-based system.

### Instrumentation.

The proponents made use of interviews with the participants, review of documents, and print materials in gathering information and to guide the proponents in designing and developing the system. The ISO 9126 Software Quality Characteristics [16] was also used as a survey questionnaire to evaluate the extent of acceptability of the developed application system on its functionality, reliability, usability, efficiency, maintainability, portability, and its legal compliance.

### Data Gathering Procedures

This research used three phases of data collection. Initially, existing HR records and related materials were reviewed by the proponents. In the course of developing the application system, a series

of interviews were conducted to obtain criteria and benchmarks with some organizations that are implementing the same application system. Based on the feedback received, the proponents created a prototype of the system to be evaluated and suggestions were gathered from users to further improve the system until it is completely implemented. When the system was completed and deployed, a survey questionnaire was sent to users to determine the acceptability of the HRIS application provided.

## Data Analysis

In the analysis of data gathered, diagrams were used to present the schema of these data. Diagrams are also used to display the conversion of data to information in the developed application system. Obtained data from the survey questionnaire were tabulated and analyzed employing the 5-point Likert scale of 1 to 5 with a qualitative description as 1 - unacceptable, 2 - slightly acceptable, 3 - moderately acceptable, 4 - highly acceptable, and 5 - very highly acceptable, respectively. A weighted mean formula was used to analyze the data gathered from the survey. This formula is represented as  $WM = \sum wx / \sum w$ , where WM is the weighted mean,  $\sum$  is the sum of, w is the weights, and x is the value.

## Results

### 1. Processes of human resource information system

The presence of the Human Resources Management Office handles the personnel needs of the CVCITC, develops the expertise of staff, and maximizes productivity by maximizing the efficiency of its employees.

HRMO also incorporates workforce relations techniques to meet organizational needs, precisely as follows:

- Employee Requisition. Requisition of a new employee arises in the event that the employee ceases to be working in any situation, or in the case of an additional employee, and must therefore be replaced immediately.
- Recruitment Process. If an accepted application to fill a vacancy has been submitted, the HRM office must assemble a group of eligible applicants where satisfactory applicants can be chosen.
- Propose and approve the procedure. Final consideration shall be given to the selection of suitable candidates to be recruited by the Recommending Officers and Authorizing Officers.
- Notice of Employment. The newly employed personnel shall be informed of employment and shall sign a contract upon fulfillment of the applicable documentary specifications.

- In-Service Training. Newly hired teaching staff are expected to engage in the faculty learning program before the start of the first semester of the new school year while newly hired non-teaching staff will be required to attend one-week training to adjust to the nature of their jobs.
- Employment Contract/Appointment. Employment is a contract between the institution and a staff member. The contract/appointment of a newly employed employee shall be subject to special labor and compensation laws and the like.
- Notice of Regularization or Permanence. Once the probationary employee has served the probation period, the institution shall issue a notice of regularization or permanence. A new contract, specifying additional terms and conditions and benefits as a result of regularization or permanence, shall be given.
- Shift in the Employment Status of Academic Teaching Staff. Academic teaching staff may apply to change their employment status from full-time to part-time, but they will be expected to resign without prejudice to their re-applying for part-time teaching.
- Employee promotion. Teaching and non-teaching, preferences for the promotion of higher academic or higher administrative positions shall be given to them in order to give them the opportunity to develop professionally during their time of continuous employment with the institution.
- Transfer of Employees. It is a management privilege to place workers in roles where they are better qualified to accomplish the duties of positions more efficiently and more effectively.

- Employee resignation. A written notice of resignation should be filed at least 30 days before the effective date of the resignation. Employees who wish to resign are required to submit clearance from all records, assets, and monetary accounts, and liabilities.
- Employee Retirement. Upon reaching the retirement age set out in the collective bargaining agreement or the approved retirement package, any employee can retire.

## 2. Technologies used to improve the current processes

The development and implementation of computer-based HRIS for the improvement of the existing system in managing records and documents of employees of CVCITC require the need to have better hardware and software technologies. Modern computer hardware with recommended specifications such as higher processor and storage capacities, with advanced peripherals and connected on the institutional network with the internet. Recommended software requirements would be the latest MS Windows release, web server, database management system, and web browser. HRIS is operational on a client-server architecture that enables centralized management of information and resources. It is also implemented to a multi-platform system to achieve better accessibility. The implementation of these technologies as compared to the actual processes of HRMO improves its services and the entire institution's system.

## 3. HRIS Design and Development.

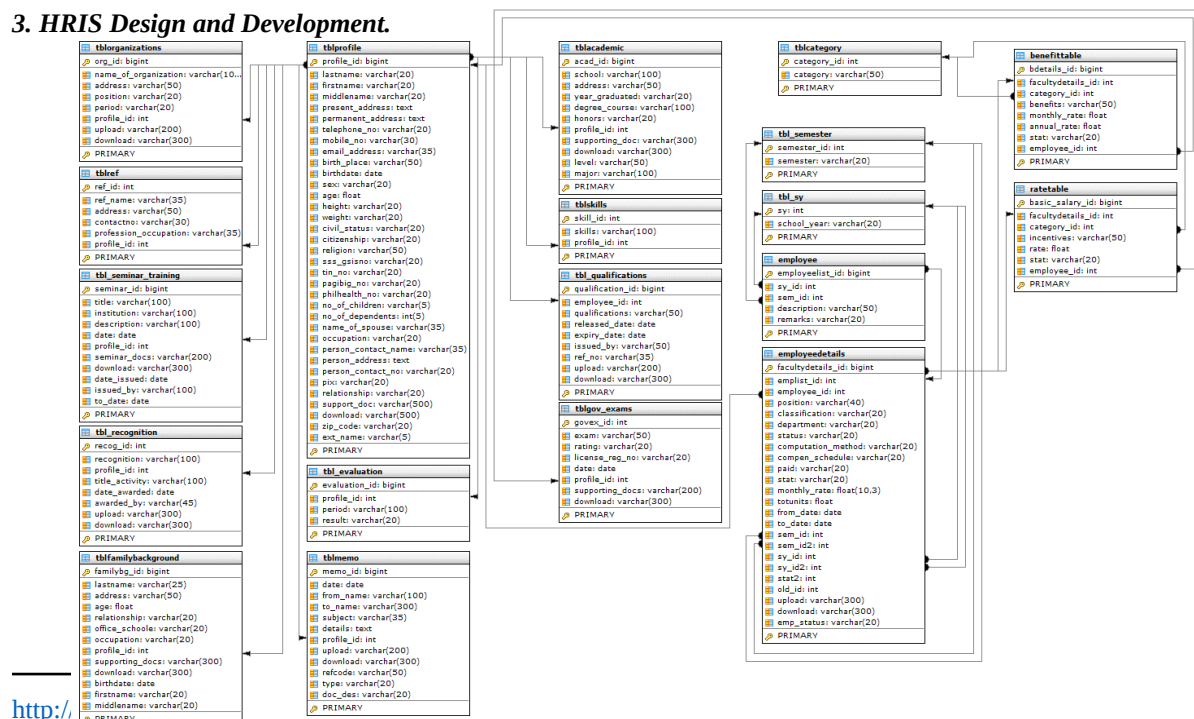


Figure 2. HRIS Entity-Relationship Diagram

Fig 2 illustrates the relationship between the different entities needed in the system. Employee's information has to be maintained which are digitally stored in the following database tables: (1) Personal Information, (2) Academic Background, (3) Employment Background, (4) Relatives Employed, (5) Qualifications, (6) Seminars and Training, (7) Organization Affiliation, (8) Skills, (9) Government Exams Taken. It is also needed for the generation of the personal data of the individual employee. The system also produces an employee list of the current school year and semester. Employee details like classifications, positions, and the department are also maintained and used in determining rate and benefits to determine employee remunerations.

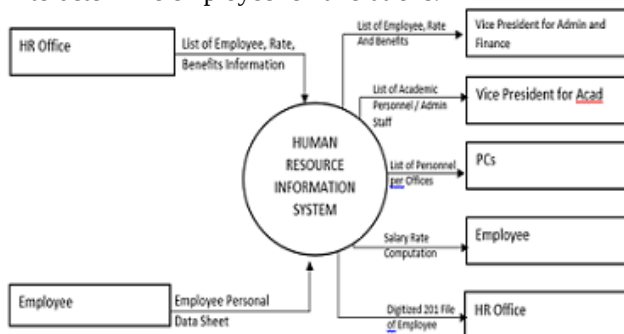


Figure 3. HRIS Contextual Framework

Fig 3 displays the contextual framework HRIS presenting how the external entities interact with the system. Different offices in CVCITC has an entree to the system, primarily, the HR Office manages the entire human resources records. The Vice President for Administration and Finance Office has access to the list of employees, rates, and benefits as references. The Vice President for Academics and Program Chairs Office has also an access to the List of Personnel and employee details under their respective supervision. Employees may also access their own records for viewing purposes and download their needed forms.

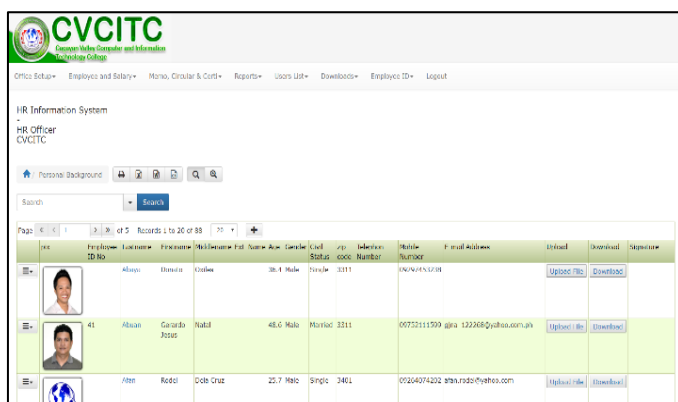


Figure 4. HRIS Employee List Module Screenshot

Fig 4 shows the sample screenshot of the HRIS of the Employee List module. The system was developed using a web-based programming tool particularly PHP5.5 and MySQL5 as its database management system. These tools enable the system accessible in a client-server architecture and on a web-based implementation. It was also developed with the Bootstrap v4 framework for a mobile-responsive design interface. Moreover, user credentials are encrypted with the MD5 algorithm and authenticated to eliminate unauthorized access to various stored data.

#### 4. Participants' extent of acceptability of the computer-based HRIS

**Table 1. Mean Assessment of Participants' Extent of Acceptability of the Developed System to ISO 9126 Software Quality Standards**

| SYSTEM QUALITY CHARACTERISTICS | ADMIN | STAFF | USERS | MEAN | INTER PRETATION |
|--------------------------------|-------|-------|-------|------|-----------------|
| Functionality                  | 4.07  | 4.23  | 4.38  | 4.22 | Acceptable      |
| Reliability                    | 3.79  | 4.21  | 4.00  | 4.00 | Acceptable      |
| Usability                      | 4.10  | 4.17  | 4.88  | 4.38 | Acceptable      |
| Efficiency                     | 4.19  | 4.29  | 4.50  | 4.33 | Acceptable      |
| Maintainability                | 4.35  | 4.40  | 5.00  | 4.58 | Very Acceptable |
| Portability                    | 4.16  | 4.18  | 4.50  | 4.28 | Acceptable      |
| Legal Compliance               | 4.75  | 4.58  | 5.00  | 4.78 | Very Acceptable |
| TOTAL                          | 4.20  | 4.29  | 4.61  | 4.37 | Acceptable      |

The table shows the mean assessment of participants' extent of acceptability of the developed system to ISO 9126. The functionality means of 4.22 with an interpretation of "very highly acceptable" indicates that the system has the capability to accomplish the tasks being required which can generate anticipated data. It also supports data manipulation by computerized software customized to a particular role and operations that can communicate well with other systems. Moreover, it offers a security feature that may not allow any unauthorized access and malicious intrusions. The reliability mean of 4.00 or "highly acceptable" interpretation implies that the application can handle, obtain, and process data to perform complex and sophisticated tasks. The system has the capability to recover lost data after system breakdown and reliable when it comes to its maturity, fault tolerance and recoverability, better data storage and retrieval, models, algorithms, graphical capabilities, and better system interaction.

The mean score of 4.38 or interpreted as “very highly acceptable” on usability characteristics

denote that users can comprehend and easily learn the operations of the application system. Along efficiency characteristics, a mean score of 4.33 or “very highly acceptable” indicates that the system responds quickly and able to utilize its resources according to users' needs. The maintainability with a mean score of 4.58 or “very highly acceptable” denotes that the system can work overtime while updates or new features are made. It can easily detect problems as it has the capacity to diagnose its own errors. Therefore, the system could easily be maintained in the operation under respective areas on end-users. Results reveal that portability with a mean score of 4.28 or “very highly acceptable” indicates that the application is capable to adapt wherever it is being installed and it could be attributed to the design which conforms to the portability standards.

Compliance of the application has a mean score of 4.78 or “very highly acceptable” which implies that it complies with the set of rules, regulations, and standards. It allows to be operated in its full capability while the system would be continuously reviewed its security, procedures to test the vulnerability and to fulfill with the prescribed law. With an overall mean of 4.37 and a qualitative value of “very highly acceptable”, indicates that the system is found to show a crucial role. The capability of developing a high-quality application is regarded as an appropriate and cost-efficient process which is expected to influence the deployment of technology. It helps to improve collaboration supported with work using different automation that includes computer-aided design. Therefore, the system would be helpful and acceptable to the administrators, staff, and users of the institution.

## Conclusion and Future Works

The HRIS of CVCITC provides information and management of processes for the operation of HR functions. The presence of an application system makes information readily available and useful for making decisions by the administrators. It would help the HR Office in enhancing the value of service, saving time, cost, and maintenance of data. The presence of open-source software tools with the support of different technologies and methodologies has guided the project proponents to come up with a functional and tested HRIS. The evaluation results indicate that the overall software quality based on specified characteristics as perceived by administrators, staff, and end-users is very highly accepted. This could be attributed to the different functions and outputs provided by the system and

which are most needed by the personnel of the institution. In addition, the stored data were only retrieved when it is necessary for certain legal purposes to protect the owners from their privacy.

The uprising of emerging technologies would greatly influence the development of a more sophisticated human resource application in the future. To consider, the current system may be enhanced to include augmented reality or similar features that can be accessed in various types of platform technologies.

Furthermore, future researchers may work on a similar study to take into account emerging applications for information management and designing HR systems for both online and offline applications.

## Ethical Considerations

This research was granted permission from the head of the institution where this project was conducted. Likewise, participants' consent was also considered before gathering data. Their personal information was kept confidential while collected data were merely used for this research purpose only.

## Acknowledgment

The research proponents would like to acknowledge the administrators of the CVCITC for allowing this research to be conducted; the participants who provided data; and the blind reviewers for their comments, suggestions, and acceptance of this paper for publication.

## References

- [1] Ritter, T., & Pedersen, C. L. (2020). Digitization capability and the digitalization of business models in business-to-business firms: Past, present, and future. *Industrial Marketing Management*, 86, 180-190.  
<https://www.sciencedirect.com/science/article/pii/S0019850119300999>
- [2] Chugh, R., 2014. Role of Human Resource Information Systems in an educational organization. *Journal of Advanced Management Science* Vol, 2(2).
- [3] Tambe, P., Cappelli, P., & Yakubovich, V. (2019). Artificial intelligence in human resources management: Challenges and a path forward. *California Management Review*, 61(4), 15-42.

- [4] Chyhryn, O. Y., Karintseva, O. I., Kozlova, D. D., & Kovaleva, A. V. (2019). HR Management in the Digital Age: the Main Trends Assessment and Stakeholders.
- [5] Chauhan, A., Sharma, S.K., and Tyagi, T., 2011. Role of HRIS in improving modern HR operations. *Review of Management*, 1(2), p.58.
- [6] Periysamy, M. N., Amsa, A., Gomathiyalini, A., Devi, K. R., Rathika, S., Geetha, S., & Christopher, N. (2014). Human Resource Information Systems (HRIS) in modern business. *International Journal of Scientific Research and Management (IJSRM)*, 2(9), 1305-1307.
- [7] Hasan, Al-Mamary Yaser, Alina, Shamsuddin, & Nor, Aziati. (2014). The Role of Different Types of Information Systems in Business Organizations: A Review. *International Journal of Research*, 1(7), 333-339.
- [8] Shaikh, MD Sadique. (2012). Human resource information system (HRIS) designing needs for business applications. *JSET*, 4(1), 19-24.
- [9] Kashive, Neerja. (2011). Managing today's workforce: Human Resource Information System (HRIS), its challenge, and opportunities. *International Journal of Research in Finance & Marketing*, 1(6), 38-66.
- [10] Kumar, R. (2012) Human Resource Information System: An Innovative Strategy for Human Resource Management. *Gian Jyoti E-Journal*, 1, 1-12.
- [11] Shrestha, Buddhi Kumar, Agile Methodology, <http://sthbuddhi.com.np/agile-methodology/>
- [12] Ilyés, E. (2019)). Create your own agile methodology for your research and development team. In 2019 Federated Conference on Computer Science and Information Systems (FedCSIS) (pp. 823-829). IEEE.
- [13] Beerbaum, D. (2019). Applying Agile Methodology to regulatory compliance projects in the financial industry: A case study research. *Journal of Applied Research in the Digital Economy (JADE)*, Special Issue, 2.
- [14] Kim, H. W. (2020). A Study on the Application of Agile Methodology to Improve Software Development Quality. *International journal of advanced smart convergence*, 9(3), 59-70.
- [15] Bhatia, L., & Jain, B. (2019). Broke-Implement Agile Method of Mobile App Development. *International Journal of Software Engineering & Applications (IJSEA)*, 10(3).
- [16] ISO 9126 Software Quality Characteristics, <http://www.sqa.net/iso9126.html>.